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The Gaza Strip: politics and environment

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Abstract

In a region where politics is part of the vocabulary of daily life, this study reveals the environment as a victim of politics in the Gaza Strip. The environmental crisis in Gaza continues to worsen as the groundwater becomes increasingly polluted and the political situation delays hope of "resting" the Gaza aquifer and finding solutions for proper disposal of sewage and solid waste. Wastewater treatment plants (WWTPs) have been destroyed more than once as a result of the turbulent political situation. The Beit Lahia wastewater treatment plant flooded and killed several people in addition to causing casualties and displacing thousands of people, besides destroying homes and killing animals. The closure of the Gaza Strip led to a total paralysis of the economic sector. People's diets were seriously affected. The effects on the industrial sector were not limited only to economic dimensions but affected the environment as well. In mid-2007 alone, more than 70% of the industrial sector was closed and the environmental indicators showed around a 70% decrease in the industrial waste production compared to the previous six years. However, the pollution load was increasing due to the absence of technologies and wastewater treatment facilities. Despite all the complicated circumstances in the Gaza Strip, the population growth rate is the highest in the world which means more needs, further depletion of natural resources, and more waste and pollution.

Keywords: Environment; Gaza; Politics; Pollution

Introduction

Geography, politics, and war combine to make the Gaza Strip a worst-case scenario for water-resource planners (Bohannon, 2006). The Palestinian National Authority Ministry of Environmental Affairs (MEnA) has issued two reports regarding the ongoing environmental destruction. The Palestinians say the Israelis are destroying the environment of the West Bank and Gaza Strip to intimidate them. Examples given are the burning of orchards and olive groves, enforced unhealthy storage of medical waste due to closures and difficulties in maintaining water supplies, and the destruction of the Gaza central wastewater treatment plant (MEnA, 2002).

The disengagement of Israeli settlements in the Gaza Strip during the second part of 2005 was a historical event. It was therefore no surprise when, as part of the Palestinian efforts to manage the

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anticipated impacts of the disengagement, the Palestinian Environment Quality Authority (EQA) requested the United Nations Environmental Program (UNEP) to undertake an environmental assessment of the areas disengaged (UNEP, 2006).

Kahan (1987) described the water situation in Gaza between 1967 and 1987 and the elevated salinity in most areas of the Gaza Strip, as well as the relationship between agriculture and water quality and quantity.

The problem is that the 1.5 million people crammed into the Gaza Strip (most of them the children of refugees who fled their homes in the 1948 and 1967 Arab–Israeli wars) depend on a shallow aquifer for water. But year by year, that source is becoming more contaminated by salt and pollution. Most wells already produce water that is nonpotable under the standards set by the World Health Organization (Shomar, 2006).

Water scarcity is a perennial problem in the region, but nowhere is it worse than in Gaza. Several Gaza water projects have been planned by donor countries in recent years, including state-of-the-art wastewater treatment and desalination plants, but all have failed to be implemented due to security concerns and sanctions on the new Hamas-led Palestinian government (Bohannon, 2006).

Israel's withdrawal of settlers and troops from Gaza in 2005 is a bittersweet victory for the Palestinians. Although they are fully in control of Gaza's water for the first time, they must now scramble to save it before it becomes irreversibly contaminated.

At first glance, the Gazans' water woes seem insurmountable. The only natural fresh source available is the coastal aquifer, a soggy sponge of sediment layers a few dozen meters beneath their feet that slopes down to the sea (Baalousha, 2005).

Gaza's three WWTPs are far from adequate. The largest, south of Gaza City, was designed to treat 42,000 m^3 per day (the amount produced by 300,000 people) but now facing a daily inflow of more than 60,000 m^3. This has overwhelmed the biological step of the treatment process. As an emergency measure to prevent sewage from overflowing, barely treated wastewater is now piped to the coast, where the dark grey liquid can be seen, and smelled, flowing along the beach. Meanwhile, the 40% of Gazans without access to a centralized sewage disposal system contribute to the burgeoning cesspits. A 40-hectare lake of sewage that has formed in Beit Lahia, in northern Gaza, is a menace to people at the surface and to the aquifer beneath.

The main objective of this study is to show the implications of the political situation on the wastewater sector in the Gaza Strip.

Study area, materials and methods

Details of the study area (Figure 1) and the sampling campaigns are described in Shomar *et al.*, (2004, 2005) and in Shomar (2007). Beside the laboratory work, comprehensive field surveys were conducted on the industrial areas, the ex-Israeli settlements (Figure 1), the coastal areas and the Israeli–Palestinian borders.

Results

Table 1 shows the differences in the concentration of wastewater characteristics for the average of the five years (2001–2005) and for the year 2007. There was a stable margin of fluctuation between influent

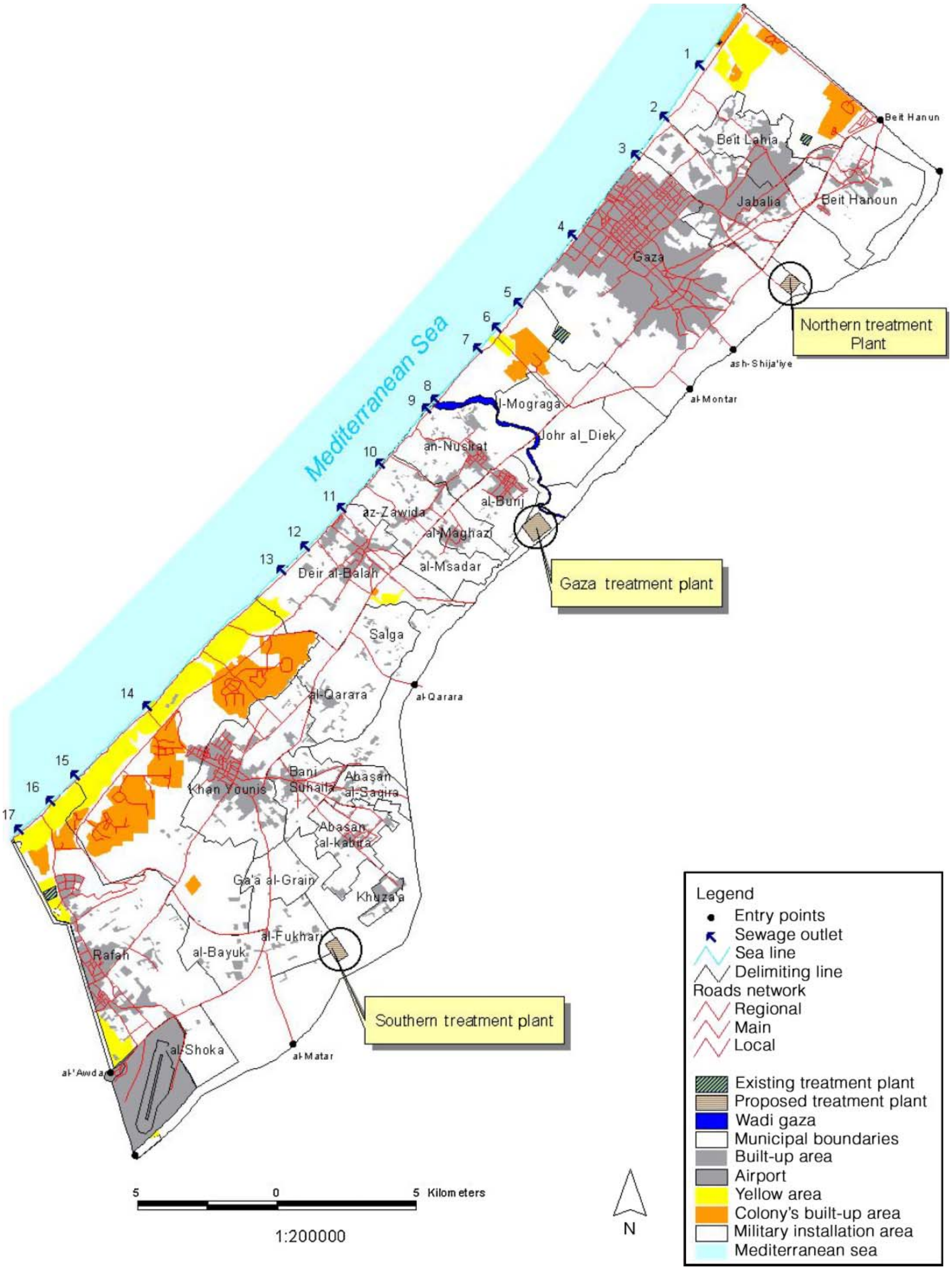

Fig. 1. Existing and proposed wastewater treatment plants and sewage outlets to the sea in the Gaza Strip.

Table 1. Performance of the Gaza Wastewater Treatment Plant, 2001–2005 and in 2007.

Parameter	Influent average (5 years)	Effluent average (5 years)	Influent June 07	Effluent June 07
pH	7.5 ± 0.5	7.7 ± 0.5	7.6 ± 0.5	7.7 ± 0.5
Temperature (°C)	25.5 ± 1	26 ± 0.8	26 ± 1	27 ± 1
Settleable Solids (SS) (ml/L)	9 ± 0.3	0.1 ± 0	10.5 ± 0.9	7 ± 1
Total Dissolved Solids (TDS) mg/L	1470 ± 81	1536 ± 110	1159 ± 152	1091 ± 128
Total Suspended Solids (TSS) mg/L	440 ± 33	20 ± 4	625 ± 97	105 ± 18
Chloride (mg/L)	555 ± 78	480 ± 68	550 ± 70	500 ± 65
Fluoride (mg/L)	1.2 ± 0.1	1.4 ± 0.1	1.6 ± 0.2	1.3 ± 0.1
Sulfate (mg/L)	314 ± 14	320 ± 22	370 ± 27	350 ± 34
Total P (mg/L)	23 ± 4	9 ± 2	20 ± 3	11 ± 2
Total N (mg/L)	19 ± 4	7 ± 1	15 ± 2	8 ± 1
NO_3 (mg/L)	71 ± 13	20 ± 4	66 ± 7	18 ± 3
NH_4-N (mg/L)	62 ± 9	60 ± 8	55 ± 5	51 ± 7
COD (mgO_2/L)	940 ± 28	89 ± 24	570 ± 100	80 ± 19
BOD_5 (mgO_2/L)	520 ± 115	25 ± 8	170 ± 77	42 ± 7
Ag (μg/L)	0.8 ± 0.1	0.7 ± 0.1	0.2 ± 0	0.2 ± 0
Al (μg/L)	90 ± 11	70 ± 8	32 ± 5	30 ± 4
As (μg/L)	6.5 ± 1	5.4 ± 1	2.4 ± 0.4	2.2 ± 0.2
Cd (μg/L)	< 0.5 ± 0.1	< 0.5 ± 0.1	< 0.5 ± 0.1	< 0.5 ± 0.1
Co (μg/L)	1.0 ± 0.1	0.8 ± 0.2	< 0.5 ± 0.1	< 0.5 ± 0.1
Cr (μg/L)	10.2 ± 3	5.3 ± 2	4.2 ± 2	3.1 ± 1
Cu (μg/L)	5.8 ± 2	5.5 ± 2	3.3 ± 1	3.4 ± 1
Fe (μg/L)	155 ± 17	135 ± 15	80 ± 12	118 ± 19
Mn (μg/L)	82 ± 20	58 ± 14	46 ± 9	40 ± 7
Ni (μg/L)	5.5 ± 1	6.2 ± 1	2.6 ± 0.7	2.5 ± 0.6
Pb (μg/L)	2.8 ± 0.7	2.5 ± 0.4	1.7 ± 0.2	1.5 ± 0.1
Zn (μg/L)	80 ± 8	48 ± 7	54 ± 6	44 ± 6

and effluent wastewater concentrations for the period 2001–2005, whilst 2007 shows a decline of 30–45% in the values recorded for the two major parameters COD and BOD_5. Some trace elements (Cr, Cu, Fe, Pb and Zn) decreased dramatically in 2007.

Tables 2 and 3 present the concentrations of trace elements in the effluent wastewater from Gaza's major industries in 2001–2005 and in 2007. The results for 2007 show a big decline in the concentrations of most parameters.

Sludge produced by the same treatment plant carries the same data for the whole period and for all parameters with minor deviation in 2007 for Ni and Ti concentrations (Table 4).

General readings

One cannot in any way separate the environment from those things influencing it. The Gaza Strip represents a very clear example of the interaction between environment and politics, history, economy and population activity. The influence of each component and the interaction among the components varies with events of the day, as well as the relationship of new environmental insults to longer term environmental degradation.

Table 2. Average concentration (μg/L) of trace elements in industrial wastewater effluent (2001–2005).

Industry	Detergents (1)	Detergents (2)	Galvanization	Jeans washing (1)	Pharma-ceuticals	Cosmetics Perfumes	Jeans washing (2)	Paint Industry	Soft drinks	Plastics	Electroplating
Ag	3 ± 0.5	35 ± 7	22 ± 6	9 ± 3	1 ± 0.2	0.5 ± 0.1	1.755 ± 0.1	< 0.5 ± 0.1	2.05 ± 0.3	< 0.5 ± 0.1	0.94 ± 0.2
Al	925 ± 110	1010 ± 214	104 ± 23	59 ± 18	313 ± 97	33 ± 9	38 ± 9	1440 ± 210	466 ± 35	920 ± 41	143 ± 23
As	31 ± 6	29 ± 5	8 ± 2	5 ± 1	14 ± 3	8 ± 2	10 ± 3	15 ± 4	14 ± 3	5 ± 2	< 5 ± 2
Cd	1 ± 0.1	2 ± 0.2	< 0.5 ± 0.1	0.6 ± 0.1	0.8 ± 0.2	< 0.5 ± 0.1	< 0.5 ± 0.1	0.5 ± 0.1	0.8 ± 0.1	< 0.5 ± 0.1	0.7 ± 0.2
Co	2 ± 1	2 ± 1	3.4 ± 2	0.8 ± 0.2	3.5 ± 1	0.5 ± 0.2	0.5 ± 0.1	2.2 ± 1	1.0 ± 0.2	0.3 ± 0.1	3.6 ± 0.6
Cr	104 ± 20	281 ± 33	72 ± 17	8 ± 3	103 ± 18	11 ± 3	34 ± 10	9 ± 2	27 ± 6	7 ± 2	48050 ± 2351
Cu	174 ± 24	48 ± 10	385 ± 46	39 ± 11	54 ± 9	11 ± 3	25 ± 4	51 ± 7	32 ± 9	10 ± 3	1585 ± 245
Fe	645 ± 178	375 ± 88	565 ± 127	380 ± 44	3200 ± 689	379 ± 58	281 ± 72	585 ± 87	1330 ± 214	395 ± 61	1270 ± 201
Mn	12 ± 3	16 ± 3	3 ± 1	111 ± 21	221 ± 24	42 ± 11	32 ± 10	45 ± 7	21 ± 4	22 ± 7	80 ± 23
Ni	27 ± 9	5 ± 2	5 ± 2	5 ± 2	22 ± 6	5 ± 2	13 ± 4	6 ± 2	14 ± 2	2 ± 0.7	74 ± 24
Pb	11 ± 2	8 ± 1	< 2.5 ± 0.2	< 2.5 ± 0.5	53 ± 11	< 2.5 ± 1	< 2.5 ± 1	453 ± 89	85 ± 21	17 ± 3	7 ± 2
Zn	269 ± 66	174 ± 24	10200 ± 587	940 ± 241	605 ± 44	426 ± 88	102 ± 23	173 ± 31	63 ± 20	53 ± 11	1085 ± 198

Table 3. Concentration (μg/L) of trace elements in industrial wastewater effluent in June 2007.

Industry	Detergents (1)	Detergents (2)	Galvanization	Jeans washing (1)	Pharma-ceuticals	Cosmetics Perfumes	Jeans washing (2)	Paint Industry	Soft drinks	Plastics	Electroplating
Ag	2.5 ± 0.3	30 ± 5	21 ± 6	10 ± 3	1 ± 0.2	0.5 ± 0.1	1.8 ± 0.1	< 0.5 ± 0.1	2.5 ± 0.4	< 0.5 ± 0.1	0.9 ± 0.2
Al	820 ± 120	995 ± 88	110 ± 25	55 ± 16	305 ± 70	30 ± 7	36 ± 6	1650 ± 250	460 ± 31	880 ± 40	139 ± 20
As	28 ± 5	26 ± 5	8 ± 2	5 ± 1	12 ± 4	8 ± 2	11 ± 3	16 ± 4	14 ± 3	5 ± 2	< 5 ± 2
Cd	1 ± 0.1	2 ± 0.2	< 0.5 ± 0.1	0.6 ± 0.1	0.8 ± 0.2	< 0.5 ± 0.1	< 0.5 ± 0.1	0.5 ± 0.1	0.8 ± 0.1	< 0.5 ± 0.1	0.7 ± 0.2
Co	2 ± 1	2 ± 1	3 ± 2	0.9 ± 0.2	3.5 ± 1	0.5 ± 0.2	0.5 ± 0.1	2.5 ± 1	1.1 ± 0.2	0.3 ± 0.1	3.7 ± 0.6
Cr	98 ± 21	254 ± 31	69 ± 17	7 ± 2	115 ± 17	12 ± 3	40 ± 7	8 ± 2	25 ± 5	7 ± 2	48120 ± 2320
Cu	155 ± 22	44 ± 9	358 ± 45	35 ± 10	50 ± 7	13 ± 3	22 ± 4	48 ± 7	30 ± 6	11 ± 3	1475 ± 301
Fe	533 ± 78	338 ± 81	528 ± 111	383 ± 40	3005 ± 354	349 ± 48	266 ± 70	570 ± 79	1280 ± 201	380 ± 60	1150 ± 190
Mn	10 ± 3	17 ± 3	3 ± 1	102 ± 20	220 ± 25	40 ± 8	30 ± 5	40 ± 7	22 ± 5	21 ± 4	83 ± 20
Ni	22 ± 4	5 ± 2	5 ± 2	5 ± 2	20 ± 4	5 ± 2	11 ± 3	7 ± 2	15 ± 3	2 ± 0.7	70 ± 22
Pb	9 ± 2	8 ± 1	< 2.5 ± 0.2	< 2.5 ± 0.5	51 ± 9	< 2.5 ± 1	< 2.5 ± 1	440 ± 81	77 ± 20	18 ± 3	7 ± 2
Zn	240 ± 60	154 ± 23	10300 ± 611	1000 ± 220	625 ± 50	455 ± 80	99 ± 18	167 ± 40	60 ± 14	50 ± 10	1105 ± 187

Table 4. Chemical characteristics of sludge samples from Gaza.

Parameter	Unit	2001 ($n = 20$)	2002 ($n = 15$)	2003 ($n = 10$)	2004 ($n = 20$)	2005 ($n = 20$)	2006 ($n = 20$)	2007 ($n = 20$)
AOX	mg/Kg	470 ± 22	450 ± 56	480 ± 80	495 ± 38	480 ± 101	210 ± 22	N.D.
Ag	mg/Kg	16 ± 3	13 ± 2	11 ± 2	10 ± 2	10 ± 3	8 ± 2	17 ± 3
Al	g/Kg	8.6 ± 0.9	9.2 ± 2	9.8 ± 2	10.3 ± 2	10.7 ± 3	7.1 ± 2	N.D.
As	mg/Kg	35 ± 7	21.2 ± 3	6.4 ± 1	4.1 ± 1	5.3 ± 1	4.5 ± 1	6.4 ± 2
B	mg/Kg	42 ± 7	45 ± 8	52 ± 7	51 ± 7	57 ± 7	38 ± 9	N.D.
Ba	mg/Kg	240 ± 86	230 ± 76	260 ± 19	270 ± 18	270 ± 42	250 ± 18	N.D.
Br	mg/Kg	19 ± 4	17 ± 3	18 ± 2	24 ± 6	21 ± 6	17 ± 3	29.6 ± 6
C (total)	wt. %	31 ± 5	31 ± 4	34 ± 3	24 ± 4	29 ± 4	27 ± 6	N.D.
$CaCO_3$	wt. %	17 ± 3	23 ± 3	17 ± 2	22 ± 3	20 ± 5	17 ± 4	N.D.
C (inorganic)	wt. %	2.04 ± 0.4	2.76 ± 0.5	2.04 ± 0.5	2.64 ± 0.8	2.4 ± 0.3	1.9 ± 0.2	N.D.
Ca	wt. %	4 ± 1	4 ± 1	8 ± 1	11 ± 2	9.5 ± 2	8.5 ± 2	10.4 ± 3
Cd	mg/Kg	2.4 ± 0.3	1.3 ± 0.4	2.0 ± 0.3	1.8 ± 0.3	1.9 ± 0.4	1.0 ± 0.1	1.6 ± 0.3
Co	mg/Kg	6.5 ± 1.4	5.3 ± 0.2	2.8 ± 0.4	2.5 ± 0.2	2.7 ± 0.3	3.7 ± 0.2	5.2 ± 0.7
Cr	mg/Kg	120 ± 24	82 ± 6	98 ± 10	93 ± 8	96 ± 9	76 ± 10	117 ± 20
Cu	mg/Kg	200 ± 46	250 ± 66	260 ± 14	280 ± 21	270 ± 67	190 ± 14	237 ± 26
Fe	wt. %	1.7 ± 0.2	1.2 ± 0.4	1.4 ± 0.6	1.4 ± 0.3	1.41 ± 0.2	1.2 ± 0.1	2.1 ± 0.3
Hg	mg/Kg	1.9 ± 0.2	2.6 ± 0.2	2.4 ± 0.4	3.3 ± 0.2	2.9 ± 0.1	1.7 ± 0.1	N.D.
K	g/Kg	1.16 ± 0.2	1.45 ± 0.3	1.89 ± 0.2	1.75 ± 0.1	1.82 ± 0.2	1.88 ± 0.2	1.38 ± 0.1
Li	mg/Kg	3.4 ± 1	3.2 ± 0.4	3.1 ± 0.1	2.9 ± 0.1	3.0 ± 0.1	8.1 ± 2	N.D.
Mg	g/Kg	1.2 ± 0.4	1.3 ± 0.2	1.04 ± 0.1	0.98 ± 0.1	1.01 ± 0.1	1.35 ± 0.1	9.02 ± 2
Mn	mg/Kg	148 ± 32	235 ± 35	158 ± 17	244 ± 31	201 ± 20	254 ± 30	185 ± 12
Na	g/Kg	1.26 ± 0.2	3.08 ± 0.6	4.15 ± 0.6	7.10 ± 1	5.62 ± 1	2.27 ± 0.2	1.45 ± 0.2
Ni	mg/Kg	60 ± 14	25 ± 4	46 ± 9	25 ± 4	36 ± 4	106 ± 15	29 ± 5
P	g/Kg	10.2 ± 2	9.5 ± 2	9.3 ± 2	9.7 ± 3	9.4 ± 2	9.1 ± 3	N.D.
PO_4	g/Kg	10 ± 2	21 ± 4	13 ± 0.9	25 ± 6	19 ± 3	10 ± 3	N.D.
Pb	mg/Kg	77 ± 16	121 ± 22	92 ± 10	140 ± 21	116 ± 18	29 ± 5	125 ± 13
Rb	mg/Kg	8.5 ± 2	8.1 ± 2	9.7 ± 2	10.2 ± 2	10.14 ± 2	0.4 ± 0.1	10.5 ± 3
S	wt. %	2.0 ± 0.3	2.0 ± 0.4	3.8 ± 0.4	2.6 ± 0.6	3.2 ± 1	1.7 ± 0.1	N.D.
Se	mg/Kg	1.2 ± 0.1	1.5 ± 0.1	2.8 ± 0.3	4.0 ± 0.3	2.23 ± 0.7	4.5 ± 0.8	1.7 ± 0.2
Sr	mg/Kg	350 ± 41	480 ± 74	310 ± 16	490 ± 42	530 ± 87	940 ± 116	503 ± 92
Zn	g/Kg	1.65 ± 0.7	1.91 ± 0.3	2.00 ± 0.1	2.28 ± 0.4	2.14 ± 0.3	1.65 ± 0.1	1.87 ± 0.2
Zr	mg/Kg	96 ± 26	92 ± 11	108 ± 13	98 ± 10	100 ± 11	194 ± 40	109 ± 11
Th	mg/Kg	7.1 ± 2	7.0 ± 2	5.2 ± 0.8	7.3 ± 0.9	4.3 ± 1	6.9 ± 2	4.4 ± 0.8
Ti	wt. %	N.D.	N.D.	N.D.	N.D.	0.4 ± 0.2	N.D.	N.D.
Y	mg/Kg	N.D.	N.D.	N.D.	N.D.	7.6 ± 2	N.D.	8.3 ± 2

(n = number of samples collected and analyzed, N.D. = not determined; wt. % = Percentage in dry weight).

Groundwater is the only natural source of drinking water in the Gaza Strip. The aquifers have deteriorated to the point that contaminants in the water exceed health standards and thus, the water should be considered non-potable (Shomar, 2006). Nonetheless, for lack of other water sources, many Gazans drink this water. However, even poor quality water is not always available. An electricity power supply is needed to pump water to consumers but it is only available for several hours a day. Additionally, the limited distribution of electricity can be erratic due to the political climate. The scarcity of water resources affects many details of Palestinian life, including health and living conditions, economic opportunities, and social aspects. The United Nations Relief and Works Agency for Palestine

Refugees (UNRWA) has documented the emergence of several diseases linked to water scarcity and poor hygiene (UNRWA, 2007).

The deteriorating internal security situation amongst the Palestinians themselves exacerbates environmental problems. When people cannot leave their homes, garbage cannot be collected and solid waste accumulates indoors. Even when it is relatively safe for people to leave their homes in some areas of Gaza, the municipal solid waste workers cannot work in all areas due to the risk of being caught in violence and, potentially, killed. Additionally, the WWTPs cannot operate at full capacity due to the destruction of wastewater networks. The conflict has added a new layer of complexity. The relevant authorities realizing the consequences of these escalations on human and environmental health, and on the spread of epidemics, in addition to the significant financial loads which are above the municipal and governmental capabilities both technically and financially.

In addition to scarcity of water and exposure to hazards from accumulating solid wastes and curtailed treatment of wastewater, Gazans face hardship from the economic sanctions on the Gaza Strip. The gates to Israel are the most important crossing points for goods and personnel, and they are closed almost all the time. Consequently, there is a scarcity of essential imports such as food and raw materials. While lack of food and raw materials has serious consequences for health and quality of life in Gaza, ironically the lack of raw materials has also led to a reduction in pollutants from industrial and agricultural activity.

Industrial activity has decreased by 70% in 2007 compared to the previous 5 years (2001–2005). Consequently, there has been more than a five-fold decrease in the total pollution loads in industrial effluent over the same time period. The decrease in industrial and agricultural activity, the inability of workers to go to Israel to work, and the lack of pay for government workers has resulted in a drastic decrease in purchasing power for Gazans. This decrease has resulted in changes in diet that can be seen when comparing the biological oxygen demand (BOD) of the Gaza central wastewater treatment plant for 2001–2005 (Shomar *et al.*, 2005) with the BOD in December 2006 (Shomar, 2007). Biological oxygen demand indicates the load of the organic matter entering the plant, and it dropped more than 3-fold from 520 mg O_2/L in 2001–2005 to 170 mg O_2/L in 2007. This drop reflects a change in the diet of Gazans. People who used to eat meat at least once a week can now eat meat once per month at best. Slaughter houses work only when people can afford to purchase meat. These slaughter houses and other food industries represent a major source of organic matter entering the wastewater treatment plants. Today, most of the food industries are not working and thus not producing organic matter in their effluents.

Visits to the industrial areas showed that the industries present are light, use old technologies, and have no wastewater treatment facilities (Shomar, 2007). Their effluents are discharged directly to municipal sewage systems from which they flow to the Gaza WWTP. The political and socio-economic situation in Gaza has affected industrial activity, which decreased 70% in 2007 compared to the previous period (2001–2005). Several visits on several days were conducted to collect effluent samples from eleven industries. Raw materials were almost absent and, when present, they are old. Although trace element concentrations in the industrial effluents show no major change in 2007 (Tables 2 and 3), one should take into consideration that the total pollution loads entering the central WWTPs decreased by between more than 2- and 3-fold compared to the previous period (2001–2005).

The people of Gaza remember a major humanitarian disaster caused by the rush of sewage which flooded the Bedouin village at the northern area of the Gaza Strip (Figure 2): in March 2007, an earth embankment around a cesspool suddenly collapsed, releasing a river of sewage and mud that injured 15 people and killed at least five people with scores of others missing. The people of the northern area of Gaza described the scene as like a Tsunami, and the village was declared a disaster area. The level of

Fig. 2. The flooded Beit Lahia Wastewater Treatment Plant (March 2007).

sewage in the pool had increased for several days, creeping up the earth embankments around the pool until one embankment collapsed, causing the sewage to pour toward the village.

Several major sewage treatment projects funded by foreign donors (CAMP, 2001, 2002) including one in the northern area (SIDA, 1999), were frozen after Hamas won elections in 2006. Their project aimed to treat sewage in north Gaza and it was worked on for two years and a pressure pipe line and a pumping station were constructed. These projects were stopped after the election of Hamas. Desalination plants planned by donor countries have also but all have fizzled due to security concerns and sanctions against the new Hamas-led Palestinian government (Bohannon, 2006).

Evacuation of the Israeli settlements in August 2005 from an area that occupies more than 40% of the region might open opportunities for better groundwater management. It may help in solving the problems which demand the studying of environmental elements in the unoccupied area at large, and monitoring the groundwater there as well as studying the benefits of providing inhabitants with water compatible with drinking water standards (with regard to salinity and nitrate concentration which are the major pollutants in Gaza).

The environmental situation in the Gaza Strip is intertwined with the political situation and it is no less complex. Likewise, the need to rectify the environmental situation as quickly as possible is no less important for health and the quality of life in Gaza than finding a resolution to the ongoing political conflict. Moreover, understanding the environmental situation requires an understanding of the political situation, living conditions, public behaviour and local/regional history. Delineating the interplay between these elements is the basis of a clear diagnosis that is needed to develop and adopt environmental solutions. These solutions should rank health, welfare and sustainable development as top priorities.

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