



Water stress in Yatta, Palestine

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YATTA IS A Palestinian town of 50,000 inhabitants, eight kilometres south of Hebron in the West Bank. It is located at the edge of the desert, with an average annual rainfall of about 450mm.

The Oslo Interim Accords of 1995 placed the town centre in *Area B*, that is, under joint Israeli/Palestinian jurisdiction, while most of the springs and the surrounding agricultural land were placed in *Area C*, that is, under complete Israeli control. Access to spring water and facility in tending crops was consequently almost impossible (Scarpa, et al., 1998). As a result of the Camp David Agreement, 2000, the built-up area and the surrounds contained within the wedge of the Israeli bypass roads, but not within 300 m of the roads, is now in *Area A*, that is, under the Palestinian Authority. The bypass roads, the settlements and all the remaining area come under the complete control of the Israeli authorities (Figure 1). Thus, Yatta still does not have access to its springs and agricultural land.

The population growth rate is 4.8%. The per-capita water supply is 14m³/year. The World Health Organisation suggests that 100m³/person/year is a domestic minimum, with an additional 25m³ for agricultural purposes (WHO, 1995).

The Zif 1 well (Riheyeh) is located 2 km to the north-west of Yatta town centre and was drilled between 1984 and 1988 into an upper unconfined aquifer in Cenomanian dolomites extracting water from a depth of about 150m, and a lower confined aquifer in Albian limestones and dolomites extracting water from a depth of about 330m. The base of the aquifer is at 483m. This well supplies the city of Hebron, the town of Yatta and other surrounding towns and villages. In 1997 the pumping rate was 35-40 m³/hr. This well is now the responsibility of the Palestinian Water Authority (PWA). The pump, set deep down in the well, was damaged in September 2000, just before the violence erupted between Palestinians and Israelis. The Israeli company, Mekorot, responsible for drilling the well and maintaining it until the PWA took over that responsibility just before the breakdown, was unable to complete repairs because of the violence. The PWA was unable to hire a Palestinian company with the necessary equipment to complete the repairs. Thus the Yatta citizens were deprived of a major source of potable water. Mekorot, later came to an understanding with the PWA and piped water to Yatta from the Herodion field, 25 km to the north-east, at a rate of 40-50m³/hr. However, in summer, this rate is halved to 20-25m³/hr and the supply is irregular. A further problem is loss of network water by leakages in the system. Intermit-

tent supply causes negative puncture in the pipes, resulting in contamination of the water supply.

A reservoir was built in 1999 near Birein, Bani Naim, to contain water from one of the new PWA wells near the village of Tequ'a, 25km to the north-east of Yatta. The PWA upgraded the Tuwani Spring and its adjoining cisterns in 1999. However this spring and its accompanying cistern are located in Area C and access is almost impossible for the people of Yatta. The central area of the town, under Palestinian control, has a good network delivery system. However, the lack of water necessitates sub-zoning by the PWA into 14 areas, each of which receives a supply of water once every 60 days. Repairs to the communal cistern in the town and sanitary improvements were made with money and expertise from the United Kingdom's Department for International Development (DFID) during 1999-2000.

Privately owned water tankers augment Yatta's meagre supply. These are unregulated and charge prices four or five times that of the network water.

Yatta does not have a sewage system and wastewater disposal is by means of cesspits, always a hazard in karstic aquifers. A further source of pollution is the Wadi Nar, an open sewer, flowing south from Hebron. A wastewater treatment plant, located to the south of Hebron, is an important part of Phase 3 of the West Bank Integrated Water Resource Programme (USAID/ PWA, 2000).

Following discussions with the West Bank Water Department (WBWD) during 1997, additional wells in the Riheyeh area were drilled but failed and were abandoned. A monitoring well was drilled near to Bani Naim, 10km southeast of Hebron, an area believed to have great aquifer potential. The Water Resource Programme then identified several production sites with a capability of providing an additional 17 x 10⁶m³/yr for the Ramallah, Bethlehem and Hebron districts. This amount still falls short of the Oslo Accords projected 28 x 10⁶m³/yr, for the Bethlehem and Hebron districts alone, by the year 2000 (Interim Accords, 1995).

A monitoring well has been drilled near to Bani Naim, 10km southeast of Hebron, an area believed to have great aquifer potential, but the new production wells are not yet on tap.

Methods

During the rainy seasons of 1997-98 and 2000-2001 the Water and Soil Environmental Research Unit of Bethlehem University (WSERU) sampled the deep well water, the

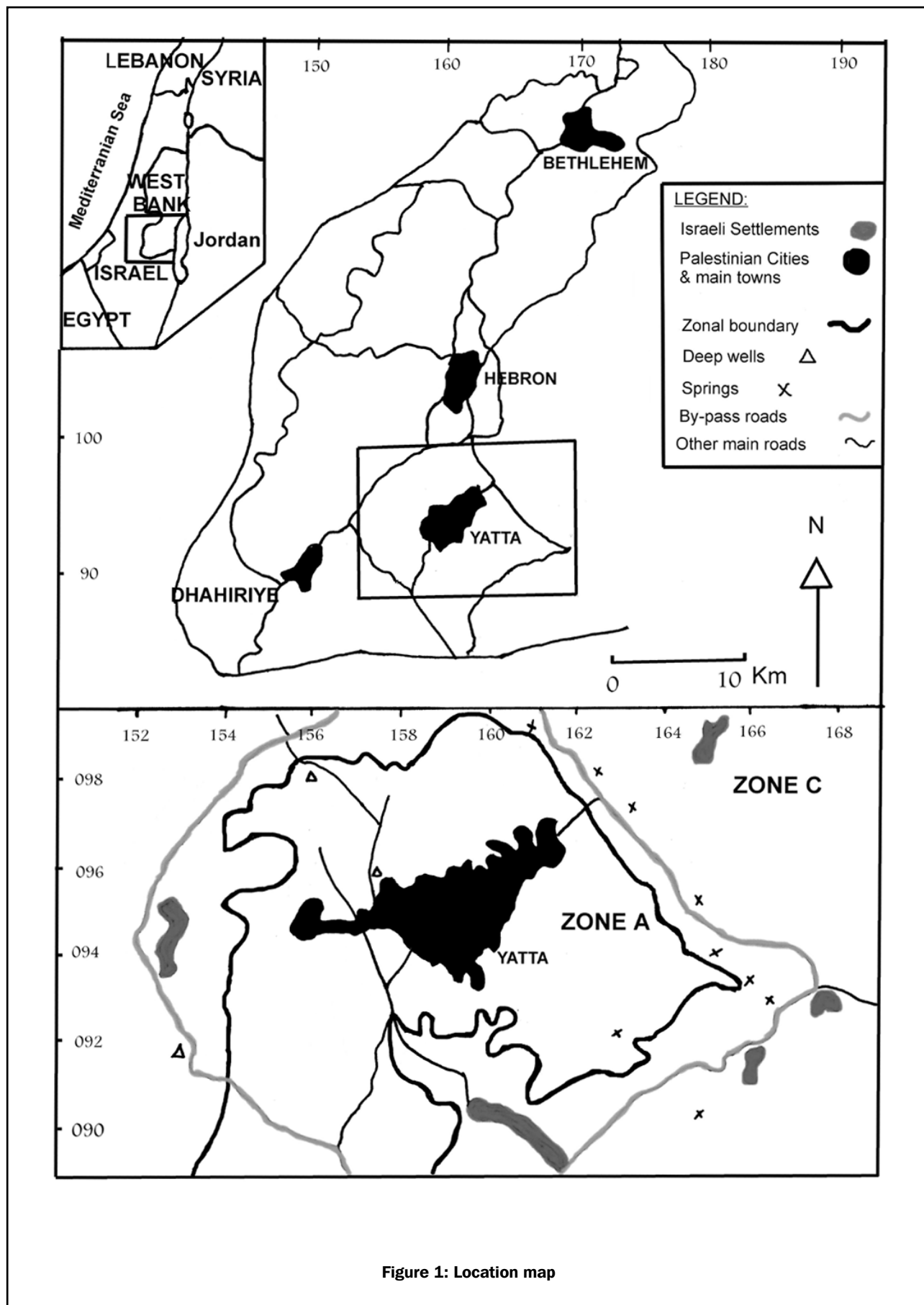


Figure 1: Location map

network supply system, springs and rain-fed cisterns that provide the people of Yatta with their water. The samples were field tested for temperature, pH, EC, DO and analysed in the WSERU laboratory for faecal and total coliform for the major ions and cations, for hardness and for heavy metals.

Results

When the Zif 1 well was sampled by the WSERU team on March 7th 1997, the temperature of the water at wellhead was 22.7°C, the pH 6.99, the EC 660 μ S/cm, the TDS 334 mg/l and the DO 7.8mg/L. Zif 1 has a 38m draw-down and a specific capacity of 21.5 m²/day (Abed Rabbo, et al.,1998:32). It was impossible to sample this well during the 2000-2001 rainy season because the damaged pump had not been repaired.

Laboratory analysis of the samples taken from the Zif 1 well revealed that good drinking water quality was extracted. We did not detect any loss of water quality in the water supplied to the network from this well and, in the winter of 2000-2001, from the Herodion well field (Figure 2).

Field-testing revealed that many of the springs had EC readings in excess of 1000 μ S/cm. Laboratory analysis indicated that the Yatta springs are all contaminated with coliform bacteria (Figure 3) and therefore unsuitable for drinking unless properly disinfected. Some springs have high chloride readings and nitrate levels that exceed WHO guidelines (WHO, 1995).

Water in the rain-fed cisterns often suffers storage contamination. Bacteria are always high and tend to increase during the course of the long dry summers (Figure 3).

Another important source of drinking water is from the privately operated tankers that extract water from either deep wells or privately owned springs. There is no hygienic control over these tankers in which contamination often occurs. Further contamination may also takes place once the water enters domestic storage cisterns.

This season (2000-2001), the third consecutive year when rainfall has been considerably below the annual average, spring discharge has been very poor. The highest recorded discharge rates were in the order of 20 L/hr. Pollution is such that the water is non-potable.

Recommendations

It is important for the survival of Yatta that it has complete access to its springs and that these be upgraded to provide the necessary water for crops and livestock. The PWA must be able to maintain and repair the Zif well and to extend the network to cover a greater proportion of the population. The network must be upgraded to lessen leakage and negative puncture. At present, this supply is insufficient for the town's needs and must be augmented by at least one of the new wells currently being developed (USAID/PWA, 2000).

What may be learnt from the Yatta experience that might be useful to people in other countries? If a rural community is deprived of its irrigation water and farmland on which it depends for its food and livelihood, there should be alternative options available. It is the responsibility of decision makers, not only to provide good inter-urban highways that serve the needs of commuter settlements, but also to provide food security and livelihoods for the rural community deprived of these essentials as a result of the highway construction. This may involve economic decisions that make better returns for water by importing foodstuffs and developing appropriate industries rather than maintaining a rural farming economy. The water provision will be allocated as a first priority for drinking water and domestic uses. This kind of decision-making requires thoughtful, long-term planning.

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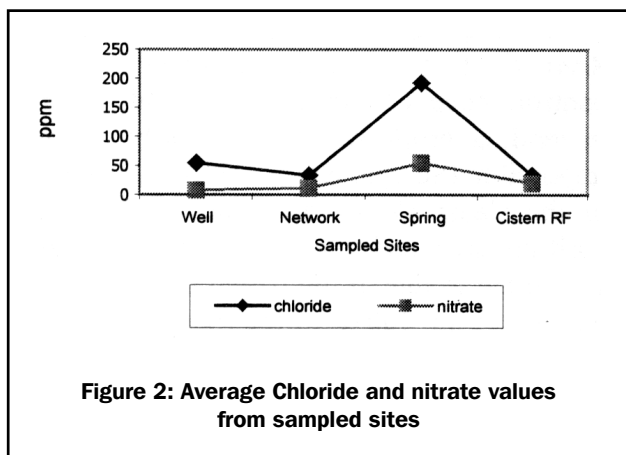


Figure 2: Average Chloride and nitrate values from sampled sites

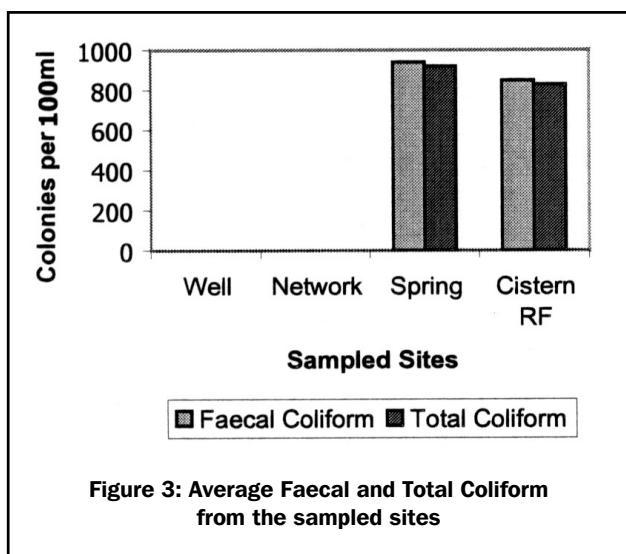


Figure 3: Average Faecal and Total Coliform from the sampled sites

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