

Resting and Restoring Gaza Strip's Underground Water Supplies Emerges as Top Priority Says UNEP Post Conflict Report Highlights Damage from Recent Hostilities and its Contribution to Already Declining Environmental Health

Nairobi/Ramallah/Jerusalem, 14 September 2009 – The underground water supplies, upon which 1.5 million Palestinians depend for agricultural and drinking water, are in danger of collapse as a result of years of over-use and contamination that have been exacerbated by the recent conflict.

A report released today by the UN Environment Programme (UNEP) on the environmental condition of the Gaza Strip following the hostilities, calls for the aquifer to be "rested" and alternative water sources found.

"Unless the trend is reversed now, damage could take centuries to reverse. Since the aquifer is a continuum with Egypt and Israel, any such action must be coordinated with these countries," it says.

The report points to increased salinity from salt water intrusion caused by over-abstraction of the ground water as a key concern, alongside pollution from sewage and agricultural run off.

Pollution levels are such that infants in the Gaza Strip are at risk from nitrate poisoning.

UNEP estimates that well over US\$1.5 billion may be needed over 20 years to restore the aquifer back to health, including the establishment of desalination plants to take pressure off the underground water supplies.

These are among more than twenty recommendations made in the [*Environmental Assessment of the Gaza Strip: following the escalation of hostilities in December 2008-January 2009*](#).

The report, requested in February 2009 by UNEP's Governing Council – the annual gathering of environment ministers – examines the direct impact of the recent conflict and its contribution to existing and persistent environmental problems.

The report also assesses the likely economic costs of the hostilities and recommends levels of investment needed to secure rehabilitation, recovery and the longer term sustainability of the Gaza Strip.

Some of the Direct Impacts

Strikes on buildings and other infrastructure have generated 600,000 tonnes of demolition debris.

- The removal and safe disposal of rubble, some of which is also contaminated with asbestos, is calculated at over US\$7 million.

An estimated 17 per cent of cultivated land including orchards and greenhouses was severely affected.

- The report estimates the costs in terms of damage to farmers' livelihoods alongside clean-up measures at around US\$11 million.

Other impacts include sewage spills as a result of power cuts to treatment facilities– some of which is likely to have percolated through the Gaza Strip's porous soils into the ground water.

There has also been an increase in the build-up of hazardous hospital wastes at landfill sites generated in part as a result of the numbers injured.

The report also underlines factors such as the collapse of refuse collection services as a result of the hostilities, and the way this has exacerbated pressure on existing landfill sites.

- The estimated cost of decommissioning existing landfills and establishing new solid waste management facilities is put at over US\$40 million.

Achim Steiner, UN Under-Secretary General and UNEP Executive Director, who initiated the assessment during a tour of the Gaza Strip in April this year, said: "The assessments conducted and the findings presented here identify and document a serious challenge to the environmental sustainability of the Gaza Strip."

"The hard facts and figures, alongside the indicative investment estimates presented in this report, should assist all concerned parties to understand the gravity of the situation in order to provide transformative solutions. The international community has indicated its willingness to assist with providing technical, financial and diplomatic assistance in order to turn environmental restoration into an opportunity for cooperation and restoration," he added.

"Many of the impacts of the recent hostilities have exacerbated environmental degradation that has been years in the making–environmental degradation that does not end at the borders of the Gaza Strip but also affect the health and welfare of those living beyond," he added.

The Key Findings and Recommendations in More Detail

Water

The area receives 300 mm of rain annually, of which 46 per cent of some 45 million cubic metres, recharges the underground aquifer.

For many years now abstraction levels of some 160 million cubic metres annually have out-stripped the natural replenishment levels.

The situation is causing salt water from the sea to intrude into these freshwater supplies, and the report says salinity levels for most parts of the Gaza Strip are now above World Health Organisation guideline limits of 250 milligrams per litre.

In addition, the nature of the soils in the Gaza Strip means that sewage, irrigation water and 'leachate' from overwhelmed and unsealed landfills can easily percolate down into the aquifer.

Tests at nine private wells found many with nitrate concentrations exceeding WHO guidelines of 50 milligrams per litre—one tested as high as 331 milligrams per litre.

High levels of nitrates can cause a form of anaemia in infants known as 'blue baby syndrome'.

One study of close to 340 babies, published in 2007, found that the proportion with worrying levels of the blue baby indicator protein–methemoglobin–was close to half of those studied.

There is concern that levels of nitrates in water may have perhaps become worse as a result of the recent hostilities.

Several recommendations are outlined to deal with the long-standing challenges and ones either exacerbated or caused by the recent escalation of hostilities:

- The provision of safe water for infants and the carrying out by the UN of a comprehensive study on 'blue baby syndrome'.
- The development of alternative water supplies using desalination of sea water
- An entire restoration of the current water supply network to reduce losses from leakages equal to over 40 per cent of the water being pumped.

- Improved measures to control sources of contamination to the underground aquifer from sewage, agricultural run-off and storm water run-off.
- The establishment of one or two new and modern sewage treatment plants able to handle nitrates so that effluent can be used for agriculture alongside treating and composting facilities for sewage sludge.
- Until new treatment works are in place, all sewage should be disposed of at sea in suitably deep and far offshore locations.

Landfills and Waste

The recent conflict has generated some 600,000 tonnes of construction and demolition waste, of which over 200,000 tonnes is in Gaza city and 100,000 tonnes is in Rafah.

The report calls for the establishment of a new facility to handle the debris and maximize the re-use and recycling of the materials and the separation of those that may be contaminated.

Some buildings, such as the El Swaity juice and food produce factory in the northern Gaza Strip caught on fire after being struck by munitions and there is concern that the burning may have generated hazardous pollutants such as furans and dioxins.

The report notes that demolition here and at other similar sites will require workers to wear personal protective equipment which is not readily available in the Gaza Strip.

It also underlines other forms of contamination in need of action such as those linked with fuels spilling into soils as a result of strikes which in turn has the potential to percolate into the groundwater.

Analysis at the Az Zaitoun poultry farm, a gasoline station and at a cement factory at Rafah showed soil contamination from petroleum-based substances often exceeding internationally recognized limits. These will need to be collected and stored in secured facilities, currently not available in the Gaza Strip.

The report also flags up concern over the disposal of hazardous healthcare wastes in the Gaza Strip in part as a result of an increased level of casualties.

The UNEP team visited several landfills and found items such as needles and bandages that were openly accessible and a risk to children and adults scavenging off the tips at nearly every site.

The report recommends that a dedicated, hazardous waste management facility be established to deal with these waste streams.

The capacity and management of the Gaza Strip's existing landfill sites and their impact on the environment is a key challenge.

The report highlights the old Tal El Sultan landfill close to Rafah city which during and after the conflict was re-opened as a temporary storage and transfer station for solid waste.

The site, covering an area of around six hectares and where the nearest house is less than 50 metres away, has no control systems to stop contaminated water leaching into the ground or base lining.

"The site constitutes a health hazard to people working on or near it, as well as to the neighbouring community. The slaughterhouse waste is a particular problem as it attracts rats which may transmit diseases such as leptospirosis and meningitis," says the report.

It recommends that the El Sultan site, along with all the other landfills in the Gaza Strip with the exception of a UN Development Programme storage facility, be closed and decommissioned and the land returned to alternative uses.

It estimates the costs of decommissioning existing landfills and establishing new solid waste management facilities at over US\$40 million.

Agriculture

Before 27 December 2008, the cultivated area in the Gaza Strip was recorded as 170,000,000 square metres.

During the conflict an estimated 17 per cent of cultivated area was completely destroyed, including orchards and open fields.

The concern now is how easy it will be to restore the lost agricultural production in a region surrounded by sand dunes and whose soils are fragile.

Destruction of vegetation cover and compacting of soil by strikes and tank movements has degraded the land and made it vulnerable to desertification, and it might for a variety of reasons be difficult to revegetate.

The report estimates that Resting and Restoring Gaza Strip's Underground Water Supplies Emerges as Top Priority Says UNEP

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The report estimates that the costs in terms of damage to farmers' livelihoods as a result of damage and contamination of agricultural land, including ensuring the land is safe to re-plant, is around US\$11 million.

Environmental Governance

The report points out that critical to the future sustainability of the Gaza Strip will be re-building the institutions charged with managing the environment. During the recent conflict the Palestinian Environmental Quality Authority building was damaged, resulting in the loss of equipment and data.

Due to the internal political situation many of the staff are not attending the office. Consequently, systematic environmental monitoring systems are not currently in place.

Similar is the case with the Palestinian Water Authority where the licensing regime for new water wells is not functional and private wells are being drilled, further exacerbating the groundwater crisis, without any control. Water being used for drinking around the Gaza Strip is also not systematically monitored, which may be placing the community at risk.

The report calculates that establishing groundwater and marine monitoring systems, retraining staff and restoring buildings and equipment might cost close to US\$20 million.

Notes to Editors:

Immediately following the ceasefire in January 2009, UNEP deployed an expert to the Gaza Strip to make an initial assessment of the environmental impacts of the hostilities, as part of the UN Early Recovery Assessment mission. The findings of the initial assessment were included in the Palestinian National Early Recovery Plan for Gaza that was presented at the Donor Conference in Sharm El-Sheikh, Egypt, in March 2009.

In February 2009, the Governing Council of UNEP, in its Decision 25/12, mandated the organization to initiate a post-conflict environmental assessment to examine the natural and environmental impacts on the Gaza Strip caused by the hostilities. UNEP was also requested to conduct an economic evaluation of the cost of environmental rehabilitation and restoration.

The fieldwork phase of the assessment was carried out by a multi-disciplinary team of eight UNEP experts, who spent ten days in Gaza from 10 to 19

May. The main sectors under investigation were waste and wastewater, the coastal and marine environment, and solid and hazardous waste management, including asbestos.

Travelling extensively across the Gaza Strip, the UNEP team undertook walkover inspections of some 32 sites to assess environmental impacts and collect samples for laboratory analysis. The team also collected data for an economic evaluation of the cost of rehabilitation and restoration of the environmental damage in Gaza.

Sites visited included residential areas, schools, industrial areas, sewage facilities, landfills and the coastline, where detailed sampling of water and sediments, bio-indicators, asbestos and waste water was conducted. Samples collected on the ground were analysed by an independent international laboratory.

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Or Silja Halle, UNEP Communications Advisor , on Tel: +41 (0)22 917 8441, e-mail: silja.halle@unep.ch the costs in terms of damage to farmers' livelihoods as a result of damage and contamination of agricultural land, including ensuring the land is safe to re-plant, is around US\$11 million.

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