

Beirut, October 16, 2006

### **Environmental Impact of the 2006 Lebanon War**

Israel's offensive in Lebanon between July 12 and August 14 caused almost 1,200 fatalities, more than 4,000 injuries and close to one million displaced (<http://www.lebanonundersiege.gov.lb/english/F/Main/index.asp>). Estimates have put the damage caused to property and infrastructure at US \$ 3.6 billion (<http://www.msnbc.msn.com/id/14862977/site/newsweek/page/2/>). But in addition to the loss of life and damage, the war caused several environmental problems that will have long-term consequences. This report will examine the following issues:

- \* The 15,000 ton oil spill caused by the Israeli air strikes on the fuel tanks of Jiyeh power station.
- \* The dust and smoke pollution caused by the bombardment.
- \* Unexploded ordinance, primarily the estimated one million cluster bombs in south Lebanon.
- \* Impact on farming communities.
- \* Long-term implications for the environment and environmental policy.

### **Oil Spill**

On July 13 and 15 Israeli jets targeted the fuel tanks at the Jiyeh power station some thirty kilometers south of Beirut, resulting in the leak of between 10,000 to 15,000 tons of fuel oil into the Mediterranean, the worst in the sea's history <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2006/08/28/MNGHDKQHK31.DTL>. Due to the conflict situation in Lebanon the reaction to the spill was delayed and a clean-up campaign was not started until the ceasefire was declared, five weeks later.

By this time the oil had contaminated at least twenty-two areas over a stretch of 150 kilometers out of Lebanon's 225 kilometer coastline. The spill also reached areas on the Syrian coastline and Turkish and Cypriot waters. No sites south of the power station were contaminated as the sea current at that time was flowing north.

Because the clean-up and mitigation campaign was delayed much of the damage is now irreversible. More than two months later attempts by the Lebanese government and NGOs to clean up the oil have had little impact and so far only between one and three percent of the spill has been removed ([http://www.iucn.org/en/news/archive/2006/08/pr\\_lebanon\\_oil\\_spill.htm](http://www.iucn.org/en/news/archive/2006/08/pr_lebanon_oil_spill.htm)), while most of the oil has sunk to the sea floor.



*Oil Spill in Ramlet Al-Baida at the southern edge of Beirut. The oil spill contaminated 22 areas on Lebanon's coastline and will have a long-term impact on the tourism and fishing sectors.*

“The scenery down there is terrifying”, says Mohammad Al-Sarji, the chairman of the association of professional divers, who explored the seabed around the Jiyeh power station in late August, “everything is covered by this black slick, and it will threaten maritime life over years to come.” (A picture gallery of the oil spill is available on the [BBC website](#))

While the sea along the coast appears deceptively blue there are fears that the winter storms will wash the sedimented oil ashore, and cause new pollution. But even if it stays on the sea bed, the fuel oil will slowly degrade releasing toxic substances such as poly-nuclear aromatic hydrocarbons (PAH) into the water. PAH causes cancer and accumulates in the organs of fish and can result in the collapse of fish populations years after the spill.

"All these impurities and chemicals will go into the marine life, into the food chain and they will continue to build up for years and years. It's going to affect seafood restaurants, fishermen, fisheries and tourism. It's going to be a hard and tough few years in terms of marine environment," said Wael Hmaidan, a coordinator with the Lebanese environmental NGO Greenline.

Endangered species that live in the seas around Lebanon, such as the Blue Fin Tuna, Loggerhead Turtle and Monk Seals have been threatened by the spill. The Palm Islands Nature Reserve off the coast of Tripoli was contaminated by oil ([http://www.iucn.org/en/news/archive/2006/08/pr\\_lebanon\\_oil\\_spill.htm](http://www.iucn.org/en/news/archive/2006/08/pr_lebanon_oil_spill.htm)).

Additionally, the spill had a substantial impact on the fishing and tourism sectors. Contamination of beach resorts and coastal towns led to a reduction in visitors. The Lebanese ministry of tourism estimates the tourism sector lost around US \$ 3 billion because of the war. While it is difficult to differentiate between losses attributable to the security situation – foreign tourists canceling their trips to Lebanon, Lebanese staying at home – and losses incurred by the pollution, the fact that around 60 percent of the tourism industry in Lebanon depends on sea-related activities means that even after the end of the hostilities (August 14) and the lifting of the Israeli blockade (September 7) the tourism sector continued to incur significant losses. “Beach owners practically lost around 90 percent of this years income, in some cases up to half a million dollars”, said Hmaidan of Greenline.

During the war, Lebanon’s 8,500 fishermen were prevented from venturing out to sea due to the Israeli naval blockade, at a time that represents the peak of the fishing season and typically generates more than one third of their annual income. Additionally, some fishing ports such as the Dhalia harbor in the Raouche area of Beirut were hit directly by the spill, as a thick layer of oil gathered on the sea surface coating the boats and equipment of the 100 fisherman who use the port, making it very difficult for them to fish once the blockade was lifted. To make things worse, the consumer market for fish in Lebanon has virtually collapsed in the aftermath of the war, as demand for fish has fallen due to health fears.

“Fishermen are among the poorest people in Lebanon. Their monthly income is an average of 300,000 Lebanese Lira (US \$ 200) and in the winter season there is no work for almost two month. So for them, this is a tragedy. They can do nothing, they are sitting at home and borrowing money from relatives,” said Mohammad Knio, the chairman of the fishermen’s association in Ras Beirut.

The government has compensated fishermen US \$ 200 each, although many complain that this is inadequate considering that during the summer they can earn as much as US \$ 600 a month. The Lebanese NGO Bahr al-Loubnan has attempted to aid some fishermen by employing them in the clean-up operation.

In addition to the contamination of the sea the spill also caused air pollution. Around twenty percent of the oil evaporated creating a toxic spray that will affect the long-term health of as many as three million people who live on Lebanon’s coast.

### **Dust and Smoke Pollution**

According to the Lebanese government 30,000 homes, 92 bridges and 900 private sector buildings were destroyed in Israeli bombing raids (<http://www.lebanonundersiege.gov.lb/english/F/Main/index.asp>) and this has resulted in the release of toxic dust and smoke pollution into the environment.

The attack on the fuel tanks at Jiyeh power station caused a fire that burnt for three weeks leaving a plume of smoke that could be seen from 60 kilometers away. The bombing of the fuel tanks at Beirut airport also resulted in a large fire that burnt for several days.



*Air raids resulted in the release of toxic smoke and fumes into the atmosphere.*

"Chemical traces and dust from buildings that were destroyed have heavily contaminated the air and land, in addition, bombed out factories has caused chemical releases that could potentially affect two million inhabitants in the country," said the environmental pressure group Greenpeace.

Smoke from burning factories released a cocktail of toxic chemicals, such as poly-nuclear aromatic hydrocarbons (PAH). Attacks on electricity substations resulted in the burning of parts that contained the internationally banned carcinogenic polychlorinated biphenyls (PCBs), which when burned are liable to produce the highly toxic substance dioxin.

"These are chemicals that are bio-accumulative and persistent so when you inhale them they stay in your body and they do cause cancer. These chemicals are being banned internationally, and if they are burned that way the results are disastrous", says Zeina al-Hajj of Greenpeace.

## **Unexploded Ordinance**

Unexploded ordinance has been a long-standing problem in Lebanon and in the south alone there are around 400,000 mines that date back to the Israeli occupation of the area ([http://www.dailystar.com.lb/article.asp?edition\\_ID=1&article\\_ID=1953&categ\\_id=1](http://www.dailystar.com.lb/article.asp?edition_ID=1&article_ID=1953&categ_id=1)). However the recent conflict has increased the level of unexploded ordinance. The most serious aspect of this issue is the use of cluster munitions that were fired by Israel.

The UN estimates that around 1 million unexploded cluster bombs failed to explode and now litter 590 sites in south Lebanon posing a serious hazard to civilians who returned to the area after the war and are now trying to rebuild their lives (<http://www.mineaction.org/overview.asp?o=540>).

Cluster bombs are designed to explode immediately but as many as 40% fail to detonate and are scattered indiscriminately in a wide area. The bombs are about half the size of a soft-drinks can and they pose a risk to farmers and workers who are trying to clear the rubble from residential areas that were damaged during the war as well as children who are playing in the affected areas.



*The UN estimates that around one million unexploded cluster bombs now litter South Lebanon*

At least 21 people have been killed by cluster bombs since the ceasefire and more than 100 have been injured. "The artificial limb technicians are going to have their work cut out for them in the weeks and months to come," Dr Ali Hajj Ali, the director of a hospital in the southern town of Nabatiyeh, was quoted as saying by the website Middle East Online.

International observers especially criticized the intense use of cluster bombs during the final days of the conflict, when a cease-fire was clearly imminent. "What's shocking and completely immoral is: 90% of the cluster bomb strikes occurred in the last 72 hours of the conflict, when we knew there would be a resolution," said UN Under-Secretary-General for Humanitarian Affairs [Jan Egeland](#) in late August.

Some farmers in the area have become desperate and are venturing into the fields in order to harvest their crops regardless of the threat that cluster bombs pose. The mine removal teams that have been deployed by the Lebanese army, UN and private companies are unable to cope with the number of bombs and in some cases locals are attempting to remove the bombs themselves. "They take the risk. Either they enter the fields and try not to step on a cluster or they remove them themselves," said Dalya Farran, spokesperson for the UN Mine Action Coordination Center (<http://www.mineaction.org/overview.asp?o=540>).

It is estimated that clearing the cluster bombs will take at least a year although the task will become much harder as winter rains and the growth of grass and foliage in spring will conceal the bombs. Although many fields will still be contaminated during the springtime planting period, many farmers will most likely work their land despite the risks.

Apart from cluster bombs, there are also problems with other unexploded ordinance such as tank, artillery and mortar shells. On a daily basis during the conflict Hezbollah fired on

average around 100 rockets into Israel and Israel fired around 2,600 missiles, rockets and bombs into south Lebanon. In south Lebanon more than 10 percent of this ordinance did not detonate and although the risk is not as severe as that of the cluster bombs the presence of these unexploded weapons poses a threat for civilians. ([http://www.usaid.gov/our\\_work/humanitarian\\_assistance/disaster\\_assistance/countries/lebanon/fy2006/lebanon\\_ce\\_sr19\\_08-14-2006.pdf](http://www.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/countries/lebanon/fy2006/lebanon_ce_sr19_08-14-2006.pdf))

### **Impact on Farming Communities**

Farmers were hit hard during the conflict and the Lebanese government estimates that 85 percent of the country's 195,000 farmers will lose all or some of their harvest at a cost of between \$135 and \$185 million ([http://www.oxfam.org/en/news/pressreleases2006/pr\\_060931\\_lebanon](http://www.oxfam.org/en/news/pressreleases2006/pr_060931_lebanon)).

In the south and the Bekaa valley, Lebanon's two biggest agriculture regions, the bombing made it too dangerous to either harvest the crops or to transport them to market, and potatoes, tobacco, melons and citrus fruit were left to rot in the fields. The killing of 33 laborers who were harvesting peaches in an Israeli air strike in Al-Qaa in the northern Bekaa valley was an example of the risks that farmers faced ([http://news.independent.co.uk/world/middle\\_east/article1214552.ece](http://news.independent.co.uk/world/middle_east/article1214552.ece)). Farmers were also unable to access their livestock or buy animal feed and the Lebanese government estimates that one million poultry, 25,000 goats and sheep and 4,000 cattle died ([http://www.oxfam.org/en/news/pressreleases2006/pr\\_060931\\_Lebanon](http://www.oxfam.org/en/news/pressreleases2006/pr_060931_Lebanon)). The effect was clearly felt during and in the aftermath of the war as supermarket shelves emptied and prices for vegetables and perishables soared.

Throughout Lebanon, up to thirty-five percent of the population is directly or indirectly dependent on farming, mostly on a small and barely sustainable scale: 75 percent are working one hectare or less, with little or no capital reserves to absorb the losses. Many of these small farmers are now in a financial quandary, facing debt or even bankruptcy.

"In our agriculture, you have one harvest a year and that's it. So what happens is that the farmers borrow money to pay for the cost of production, and they wait for the harvest to pay back the debt. But now, they will not only have a loss of revenue, but many of them will also go deeply into debt," said Kanj Hamade, an agriculture student from Hermel, a mainly agricultural town in the northern Bekaa valley that was hit repeatedly by Israeli attacks.

Many orchards and olive trees were destroyed due to fires started by the Israeli bombardment. The exact number remains to be established, and the United Nations Environment Program (UNEP) is currently conducting a study of damaged trees and farmland, however it appears certain that thousands of trees were destroyed. In one farm near Nabatiyeh alone, more than 1,000 trees were destroyed over a surface of 46 hectares, and so far 1,092 cluster bombs have been removed from the farm. The landowner said farmers and workers were not entering the fields due to the risks of unexploded ordinance. "In my area I took the biggest toll, but there are definitely farmers elsewhere who are in even a much worse situation," said the landowner, Adnan Khayat.

Although the Lebanese government has begun to take details of losses in order to compensate farmers, there is little optimism among farmers that they will be given the full value of what they lost. Additionally, the impact of the shelling was not always immediately apparent, and trees that appeared unscathed at the end of the war continued to die in the following weeks. “When the damage was assessed at my farm, they registered some 350 destroyed trees, but in the weeks since another 700 turned yellow and died”, said Mr. Khayyat.

### **Long-term Implications for the Environment and Environmental Policy**

Lebanon has a poor record when it comes to environmental issues and the divided nature of Lebanese politics means that the environment is not a policy priority. Problems such as uncontrolled quarrying, poor waste disposal techniques and the dumping of raw sewage into the sea have not been properly addressed.

Now, in the post-war period these issues are only likely to slip further down the agenda and the reconstruction of infrastructure and property destroyed during the war will likely eat into any funds that could be used for environmental projects.

Many rural communities in south Lebanon have been traumatized and in some villages, such as Bint Jbeil and Khiyam, the majority of houses have been destroyed or severely damaged. As a result of the destruction of around 30,000 homes, the Lebanese government estimates that as many as 200,000 people are now homeless (<http://www.lebanonundersiege.gov.lb/english/F/Main/index.asp>) and have sought alternative accommodation with relatives or are living in tents or the wreckage of their home.



*The trauma suffered by communities in the south, such as this one in Khiyam in the Western Bekaa Valley, is likely to have a knock-on effect on the environment.*

Although this is an adequate solution for the time being, life for the homeless will become tough in winter. It is likely that their need for shelter will push them to cut trees for both fuel and shelter. In the long-term the reconstruction process will also increase demand for stone meaning that the problem of uncontrolled quarrying will likely be exacerbated.

“When people need to rebuild they are looking for survival. They don’t think long term they want to know how they are going to survive this winter”, said Assad Serhal, the head of the Society for the Protection of Nature in Lebanon.

“There is no water, electricity is off, and their houses are destroyed. So people are going to be looking for basics whatever they can get their hands on, whether it’s fire for cooking or fuel for the winter or sand from the beaches to build a house or a rock quarry. All of this is going to come out of nature and I don’t think the government or anybody is prepared to deal with the issue. The tragedy is so overwhelming on people that nobody would dare tell them that they can’t cut this tree or take this sand,” Serhal said.

## **Sources**

Interview with Wael Hmaidan, a coordinator with the Lebanese environmental NGO Green Line.

Interview with Zeina al-Hajj, Greenpeace coordinator.

Interview with Assad Serhal, head of the Society for the Protection of Nature in Lebanon.

Interview with Kanj Hamade, agriculture student.

Oxfam, UN, The World Conversation Union