Tropical Cyclone Nargis Myanmar

RAPID ENVIRONMENTAL ASSESSMENT
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Purpose

This brief report provides the findings of a rapid environmental assessment conducted following Cyclone Nargis.

Background

Cyclone Nargis struck Myanmar on 2 and 3 May 2008 with winds up to 200 kph, sweeping through the Ayeyarwady (Irrawaddy) delta region and the country's main city and former capital, Yangon (Rangoon). Authorities initially declared five states and divisions (Yangon, Ayeyarwady, Bago, Mon and Kayin) to be disaster areas, but on 6 May revised this to the Ayeyarwady and Yangon Divisions only. Damage was most severe in the delta region, where the effects of extreme winds were compounded by a sizable storm surge that destroyed an estimated 95% of housing[1]. The official figures for dead and missing were reported as over 77,000 people killed and almost 56,000 people missing. The estimated number of affected people at the time of this assessment was 2.4 million.

The Joint UNEP/OCHA Environment Unit (Joint Environment Unit) is the United Nations mechanism to mobilize and coordinate the international response to environmental emergencies. In situations such as Cyclone Nargis, the Joint Environment Unit's role is to assist in the identification and address any acute environmental issues that may have resulted from the disaster – with an emphasis on those that have greatest implications for human life and health.

However, in the case of Cyclone Nargis, the Joint Environment Unit requested that an environmental expert from the Swedish Rescue Services Agency (SRSA) be deployed on a bilateral basis, which SRSA agreed to do.

Mission overview

The SRSA expert travelled to Bangkok to await permission to enter Myanmar and have access to the affected area. A visa was granted for 7 days in the capital Yangon. Government policy was that no international staff would be allowed in the cyclone-affected areas outside of Yangon at that point in time.

Therefore, the SRSA expert's assessment was, by necessity, limited in scope. Details are below.

The Joint Environment Unit's involvement in the Nargis disaster was, following the SRSA experts mission, to providing support to the UNEP Post-Conflict and Disaster Management Branch to facilitate their work in the early recovery phase.

Activities undertaken

At the onset of the emergency, the Joint Environment Unit used the Hazard Identification Tool (HIT) to identify sites in the affected area that could pose acute secondary risks (see Annex 1). The HIT is a desk-based research tool, the results of which are provided to experts travelling to emergency situations and to UN Country Teams. Information provided by the courtesy of the Swedish Defence Research Institute, was used to identify possible critical environmental impacts from industrial activities.

[1] http://ochaonline.un.org/cap2005/webpage.asp?Page=1665

Upon arrival in Yangon, the SRSA expert contacted UNEP's Regional Office for Asia Pacific (UNEP ROAP)'s National Focal points in Myanmar to obtain information on land use and farming activities, critical industries, large infrastructure, waste management. The expert met with UNDP representatives and attended WASH Cluster meetings for the same purpose.

Information Sheets such as 'Do's and Don'ts on Emergency Solid Waste' were distributed to UNICEF and Myanmar Information Management Unit.

Information from assessments - carried out within the framework of the IASC- coordinated cluster approach - was reviewed with the purpose of identifying critical environmental concerns.

Findings

The following information is based on information gathered during meetings with Mr. Khin, NGO Myanmar EGRESS and Dr. San Win, Director General of National Commission on Environmental Affairs and UNDP.

- The main sectors in the delta region are agriculture (rice) sea salt production, aquaculture and fishery. No major industries are found in the affected areas.
- Warehouses with larger stock of agrichemicals (pesticides and fertilizers) can be found in Labotta and Bogale. There has not been any major impact on these warehouses and stocks are believed to be safe.
- Houses outside of the urbanized areas are normally built with a light frame of timber or bamboo and walls and roofs are made out of leaves. Asbestos cement roofing is not very common, estimated at less than 10 %
- There is no waste collection, not even in the two Hubs Labotta and Bogale. Solid waste is managed on an individual scale with disposal in hand-dug holes or on open ground.
- There is no information on types and quantities of hazardous waste but typically waste oil, used solvents, paint, infectious health care waste, used batteries, pharmaceuticals and agri-chemicals could be anticipated in the affected area.
- There are no sewerage systems in the delta region.
- Waste and sanitation from IDP camps could eventually pose an environmental problem.
- Damages in Yangon City consists mainly of lost roofs, wind-felled trees and damage to power distribution nets and telecommunications. Some areas were still waiting for repair of the grids, even two weeks after the disaster The majority of the roofing in the city proper seems to be GI sheets or roof tiles but some buildings have roofing made out of asbestos cement that lost some parts that now lie broken on the ground.
- No reported damage to industry or heavy infrastructure.
- A ship sunk in the Yangon harbour and blocked the access to the wharf. No information was available on whether the ship was loaded and with what content. The harbour is now open but the fate of the sunken ship is unknown.
- Solid waste collection is only practiced for the central parts of Yangon city. Waste is transported to a landfill in the vicinities of Yangon. There was at the time of the assessment no knowledge of location, status or damage by the cyclone.
- The central part of Yangon has a water distribution network and a sewage network but no wastewater treatment plant.

Conclusion

The above information is incomplete and based on non-validated secondary sources. There was no firm foundation for any comprehensive assessment of acute secondary environmental risks or impacts.

However, to a reasonable level of certainty, based on the HIT and Swedish Defense Research Agency reports and the information obtained above, it is possible to conclude that there were no major impacts or risks, from hazardous industrial activities or critical infrastructure, in the most affected areas in the Irrawaddy Delta.

It was not possible to draw any conclusion about Nargis'impacts on oil fields or the industrial zone in Yangon.

Hazard Identification Tool

Tropical Cyclone Nargis – Myanmar – 02 May 2008

TC-2008-000057-MMR

Disclaimer

This profile is not a conclusive list. Other hazards may not be readily identifiable. The information sources used are public websites. All efforts are made to screen the websites for accuracy.

Objective

The objective of the Hazard Identification Tool (HIT) is to alert the UN Country Team and emergency responders to potential secondary risks after a natural disaster posed by large infrastructure and industrial facilities containing hazardous materials located in the affected area. This information can be shared with competent local and national authorities as appropriate. Any actual secondary risk should be addressed at the earliest possible stage.

Methodology

The HIT provides the user with the (expected) location of hazards in the affected area. In addition, the substances that are expected to be present in these facilities are listed, as also the hazard type for the whole of the substances. The last column gives the estimated impact type of the hazard.

Event

Category 3 Cyclone Nargis struck Myanmar on 2 May. The cyclone made landfall in the Ayeyarwady (Irrawaddy) delta region, approximately 250 km southwest of Yangon, at around 16:00. The storm then tracked inland in an ENE direction, directly hitting the capital Yangon itself late the same night. Latest reports indicate that five areas have been affected: Ayeyarwady (Irrawaddy) Division, Yangon Division, Bago Division, Kayin (Karen) State, Kayah State and Mon State.

The Joint UNEP/OCHA Environment Unit

The Joint UNEP/OCHA Environment Unit is the United Nations mechanism to mobilize and coordinate the international response to environmental emergencies caused by natural disaster, technological accidents and complex emergencies.

Annex 1

Hazard Identification Tool (HIT) conducted for Myanmar

List of Hazards				
Location	**Actual Hazard**			**Estimated Impact Type**
	Facility	**Substances**	**Hazard Type**	
Ayeyarwady (Irrawaddy) Division and possible other locations.	**Production wood**	solvents	Liquid Toxic to the Environment, Liquid Toxic after contact with water, Carcinogenic, Mutagenic	Long-term impact
	Wood treating industry	pentachlorophenol, creosote, chromium (III), arsenic, copper salts	Liquid Toxic to humans, Solid Toxic after contact with water//Liquid Toxic to the Environment, Carcinogenic, Mutagenic /Toxic/persistent,	Direct impact on Human Health, Direct impact on life-support functions and nature
GYOBYU Dam near Rangoon; MOBYE Dam near Loikaw/Kayah Division; SEDAWGYI Dam near Loikaw/Kayah Division	**Hydrodams (Large)**	-	-	Dam stability might be affected, dammed water, high voltage electricity
Mon Division and possibly other locations.	**Production rubber tyres**	chloroprene	Carcinogenic, Mutugenic, Liquid Toxic to the Environment	Long term impact
POSCO steel plant in Yangon	**Iron and steel foundries**	cleaning agents, solvents	Liquid Toxic to the Environment, Flammable liquid, Toxic/persistent, Liquid Toxic after contact with water, Carcinogenic, Mutagenic	Direct impact on Human Health, Direct impact on life-support functions and nature, Long term impact
	Production iron and steel base materials	oxigas	Flammable Gas, Gas Toxic to the Environment	Direct impact on Human Health, Direct impact on life-support functions and nature
Yadana gasfield in Moattama, Gulf of Martaban; Yetagun gasfiled in Tanintharyi, Gulf of Martaban: Mann Oilfield, south of Yangon; Refinery at Thanlyin (near Yangon); Refinery at Thanbayakan, central Myanmar	**Oil and gas mining (onshore, offshore)**	oil and solvents, natural gas	Liquid Toxic to the Environment, Toxic/persistent, Flammable Gas, Gas Toxic to the Environment	Direct impact on Human Health
Yangon and possible other locations.	**Loading and storage ships (oil and solvents,**	oil and solvents, fire	Liquid Toxic to the Environment, Toxic/persistent,	Direct impact on Human Health

	hazardous, etc)		Combustible	
Yangon; Ye	**Airports (air-side)**	kerosine	Liquid Toxic to the Environment, Toxic/persistent	Long term impact, Direct impact on life-support functions and nature
Yangon; Ye and other locations	**Railwaystations (no marshalling)**	cleaning agents, solvents	Liquid Toxic to the Environment, Flammable liquid, Toxic/persistent, Liquid Toxic after contact with water, Carcinogenic, Mutagenic	Direct impact on Human Health, Long term impact, Direct impact on life-support functions and nature
These facilities are expected to be present in the affected area, but an exact location could not be identified.	**Agricultural services (incl small storage)**	mixed chemicals (fire)	Gas Toxic to Humans (toxic smoke)	Direct impact on Human Health
	Agriculture (animals, crop, forestry, fruit, etc)	Organotin pesticide, Organochlorine pesticide, Phenoxyacetic acid derivative pesticide, Carbamate pesticide, Substituted nitrophenol pesticide, Organophosphorus pesticide, Pyrethroid pesticide, Triazine pesticide, Mercury based pesticide, Dithiocarbamate pesticide, mixed chemicals (fire)	Toxic/persistent, Carcinogenic, Mutagenic, Liquid Toxic to the Environment, Liquid Toxic to humans, Flammable liquid, Gas Toxic to Humans, (toxic smoke)	Long-term impact, Direct impact on life-support functions and nature (Direct impact on Human Health)
	Breeding and keeping animals	mixed chemicals (fire)	Gas Toxic to Humans (toxic smoke)	Direct impact on Human Health
	Bus-, tram- and metro, taxi, touringcar stations	solvents, cleaning agents	Liquid Toxic to the Environment, Liquid Toxic after contact with water, Carcinogenic, Mutagenic, Flammable liquid, Toxic/persistent	Direct impact on Human Health, Long Term impact
	Energy production and distribution (steam, propane/butane, oil and solvents, etc)	natural gas, propane, butane, ammonia	Flammable Gas, Gas Toxic to the Environment, Gas Toxic to Humans	Direct impact on Human Health
	Fishfarming	mixed chemicals (fire)	Gas Toxic to Humans (toxic smoke)	Direct impact on Human Health
	Forestry and - services (incl small storage)	mixed chemicals (fire)	Gas Toxic to Humans (toxic smoke)	Direct impact on Human Health
	Gas servicestations (with LPG)	LPG	Flammable Gas, Gas Toxic to the Environment	Direct impact on Human Health
	Production fertilizer	ammoniumnitrate, ammonia	Liquid Toxic to the Environment, Liquid Toxic to humans, Gas Toxic to Humans, Gas Toxic to the Environment	Direct impact on Human Health
	Production of agricultural	chlorine, carbon disulfide	Gas Toxic to Humans, Gas Toxic	Direct impact on Human Health

	chemicals		to the Environment, Liquid Toxic to the Environment	
	Production of farmaceutical base materials	methanol/ammonia/ isopropanol/pentane/medicine	Liquid Toxic to the Environment, Carcinogenic, Mutagenic /Gas Toxic to Humans, Gas Toxic to the Environment/ Flammable liquid/ST	Direct impact on Human Health
	Production of rubber	chloroprene	Carcinogenic, Mutagenic, Liquid Toxic to the Environment	Long term impact
	Textile industry (dyes)	naphtalene, benzene, bromine, chlorine, alkali, sodium nitrate, sodium sulfide	Toxic/persistent, Solid toxic after contact with water, Carcinogenic, Mutagenic, Liquid Toxic to the Environment, Liquid Toxic to humans, Gas Toxic to the Environment, Gas Toxic to Humans	Direct impact on Human Health
	Trading and repair cars, motorcycles, service stations	cleaning agents, solvents	Liquid Toxic to the Environment, Flammable liquid, Toxic/persistent, Liquid Toxic after contact with water, Carcinogenic, Mutagenic	Long term impact, Direct impact on life-support functions and nature
These facilities may be present in the affected area (Standard facilities in HIT)	**Electricity distribution**	ammonia	Gas Toxic to Humans, Gas Toxic to the Environment	Direct impact on Human Health, Direct impact on life-support functions and nature
	Hospital /sterilizing industry	ethylene oxide	Gas Toxic to Humans, Carcinogenic, Mutagenic	Direct impact on Human Health
	Production of food and drink, incl. slaughterhouse	ammonia	Gas Toxic to Humans, Gas Toxic to the Environment	Direct impact on Human Health, Direct impact on life-support functions and nature
	Winning, preparing and distribution drinking water (with chemicals)	chlorine	Gas Toxic to Humans, Gas Toxic to the Environment	Direct impact on Human Health

Explanation of the impact types

- Direct impact on Human Health
  - Immediate death and immediate adverse health effects (explosion, immediate toxic effects)
- Direct impact on life-support functions and nature
  - Humans are impacted through effects on their life-support functions e.g. direct impacts on crops, fish resources, agricultural land, water supply
  - The same direct impacts that affect life support functions can also threaten biodiversity and specific species or ecosystems
- Long-term impact on life-support functions, nature and humans (toxic persistent substances entering the food chain and natural ecosystems and effects of carcinogenic substances

Information sources

- http://www.iaea.org/programmes/a2/index.html
- http://www-pub.iaea.org/MTCD/publications/PDF/cnpp2003/CNPP_Webpage/pages/countryprofiles.htm
- http://www.iaea.org/worldatom/rrdb/
- http://www.grid.unep.ch/data/download/gnv181.gif
- http://www.worldenergy.org/wec-geis/publications/reports/ser/nuclear/nuclear.asp
- http://www.worldenergy.org/wec-geis/publications/reports/ser/hydro/hydro.asp
- ICOLD World Register of Large Dams
- http://www.pops.int/documents/implementation/nips/submissions/default.htm
- http://www.chem.unep.ch/pops/pcdd_activities/inventories/default.htm
- http://www.eia.doe.gov/emeu/cabs/index.html
- http://www.worldenergy.org/wec-geis/publications/reports/ser/gas/gas.asp
- http://www.lib.utexas.edu/maps/map_sites/oil_and_gas_sites.html
- http://www.worldenergy.org/wec-geis/publications/reports/ser/coal/coal.asp
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- http://minerals.usgs.gov/minerals/pubs/country/2005/mzmyb05.pdf
- http://www.basel.int/natreporting/compilations.html