

# ENVIRONMENTAL MANAGEMENT AND DISASTER PREPAREDNESS

*Lessons Learnt from the Tokage Typhoon (Typhoon 23 of 2004) in Japan*



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UNITED NATIONS ENVIRONMENT PROGRAMME

## FOREWORD



In order to assess global environmental conditions and to identify potential environmental problems and new ways to address the complex effects of environmental change on sustainable development, we must pay particular attention to the broad causes and effects of disasters.

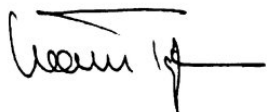
The increasing frequency and severity of man-made and natural disasters may well be changing the global environment. All of these threats to the environment have been apparent in recent disasters. Disasters affect the environment when they have direct or indirect effects on ecology and human settlements that last far beyond the scope of immediate humanitarian response. Changing ecological conditions can provoke emergencies by placing concurrent stresses on the environment. Mitigating the effects of disasters are primary components in global efforts to ensure environmental security.

It is clear that further coordination and cooperation on environmental matters depends on UNEP's ability to set an environmental agenda for disaster management. In particular, UNEP's strategy on disasters can help the United Nations to pay attention to the environmental conditions that lead to disasters, and to natural resource management for disaster prevention and reduction.

There is a clear need to reinforce the importance of environmental concerns in the entire disaster management cycle of prevention, preparedness, assessment, mitigation and response and to integrate environmental concerns into planning for relief, rehabilitation, reconstruction and development. This will also require the enhancement of capacities to undertake short and medium-term activities in disaster management based on long-term environmental considerations.

Japan has been in the forefront of sound practices in minimizing the destructive impacts of disasters, with a comprehensive system of preparedness and response in place at the national, prefectural and local levels, and with responsibilities mapped to respond to disaster situations.

This UNEP study on the recent Tokage Typhoon (No. 23 of 2004) is the first in a series of publications that will help demonstrate the preparedness measures in place in Japan, and provide valuable lessons for mitigation and management in other countries facing similar disasters.



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*United Nations Environment Programme extends its deepest condolences and sympathy for the great suffering that recent natural disasters in 2004, have caused in Japan. UNEP joins the international community in calling for disaster preparedness strategies to be integrated in regional and national development in all countries that are affected by disasters and learn from the lessons of Japan in preparing and coping with disasters.*

## EXECUTIVE SUMMARY

The impacts of disasters, whether natural or man-made, not only have human dimensions, but environmental ones as well. Environmental conditions may exacerbate the impact of a disaster, and vice versa, disasters tend to have an impact on the environment. Deforestation, forest management practices, or agriculture systems can exacerbate the negative environmental impacts of a storm or typhoon, leading to landslides, flooding, silting and ground/surface water contamination – as illustrated by the 2004 hurricane and storm tragedies in Haiti, and in the Philippines.

We have only now come to understand these cyclical causes and impacts and realize that taking care of our natural resources and managing them wisely not only assures that future generations will be able to live in sustainable ways, but also reduces the risks that natural and man-made hazards pose to people living today. Emphasizing and reinforcing the centrality of environmental concerns in disaster management has become a critical priority, as advocated by UNEP, requiring the sound management of natural resources as a tool to prevent disasters and lessen their impacts on people, their homes and livelihoods. Thus, understanding of current practices of disaster preparedness has to intrinsically incorporate environmental management issues.

Meteorological and hydrological events, such as typhoons, are hazards that cause heavy rain, high wind and sea surges. But the real damage also happens due to the vulnerability of the people who lie in its path. Post-disaster assessment of hurricanes and typhoons have clearly illustrated that, along with disaster preparedness, proper management of the environment – its air, land, water, forests, and wastes, go a long way in reducing the risks and vulnerabilities associated with typhoons.

The recent spate of typhoons to hit Japan in 2004 – a record of ten typhoons, out of a total of 29 made landfall – has put the country in the spotlight for disaster preparedness. The Tokage typhoon (Typhoon No. 23 of 2004) hit the Japanese islands from 19 to 21 October 2004, leaving a trail of damage and destruction. It was the worst typhoon for 2004. While the impacts was heavy – 93 dead with more than 490 injured as of 29 November 2004 – extensive damage was avoided due to the various levels of preparedness and mitigation measures that were in place at the national, prefectural and local levels.

Compared to typhoons that usually strike Japan, Tokage had a number of characteristics that increased its impact, including strong wind speed and gradually increasing energy, deflection from usual typhoon paths, and the fact that the hardest hit areas were affected during the night. The combination of these factors worsened the impact of the typhoon on people, infrastructure, leaving small cities particularly vulnerable.

As a part of the preparation of this report, UNEP carried out a field survey in Toyo-oka city in Hyogo Prefecture, one of the worst affected cities. There were a number of factors that resulted in extensive damage in Toyo-oka city, including, extreme rainfall and rapid rise of river water within short period; failure of the pump system; collapse of the dyke system; critical

timing of peak rainfall; low evacuation rate; management of relief materials etc.

With respect to the local environment and ecology, Toyo-oka city also faced a number of challenges, particularly related to landslides and its effect on the topography, extremely high volume of waste debris, high percentage of electrical waste, silting of river and water systems, high volume of waste plant debris and logs, effects on the local ecology and effects to the local economy.

A number of lessons were learnt from the Tokage typhoon in Toyo-oka with respect to infrastructure management (related to management of dykes, forests, river basins etc.) policy, strategy, and planning (related to policy integration, development of plans and programmes, knowledge dissemination, and training), and community activities (related to community awareness and action, and local preparedness).

The degree of preparedness that Japan has put in place for disasters in general provide some important lessons for policy development and action in other countries facing similar disasters. These include:

- Need to raise awareness for integration of environment and disaster issues
- Need to document and disseminate examples
- Need to bridge gaps between knowledge and practice
- Need to implement practical examples
- Need to develop guidelines and tools on environment and disaster management
- Need for continuous monitoring

This UNEP report is a collaborative effort of the UNEP Disaster Management Branch in Nairobi, Kenya and the UNEP International Environmental Technology Center in Osaka, Japan. It was developed in cooperation with the UNEP-OCHA Joint Unit in Geneva, Switzerland.

It forms part of a series that will be developed on the interlinkages between environmental management and disaster preparedness. Lessons learnt and the environmental know-how that reduce the vulnerability and risks will be covered in future reports, including measures relevant both at the national and local levels.

The overall lesson emerging from this study is clear – a number of good environmental management measures are in place in Japan, as in many countries, but these have to be studied in greater detail, in light of the needs of disaster management. It is imperative that environmental knowledge is integrated into the prediction, prevention, risk reduction, assessment and response policies.

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