ENVIRONMENTAL MANAGEMENT AND DISASTER PREPAREDNESS

Three Years after the Tokage Typhoon of 2004

Contents

Abstract

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Considering the unusual severity of the Tokage typhoon that hit Toyooka in 2004, and of the typhoon season of 2004 as a whole, a number of initiatives were undertaken by the city as a result – both to overcome the impacts of the disaster, and to further prevent/mitigate the negative impacts of climatic events such as typhoons.

This publication, a follow-up to the first version done within months of the disaster, assesses and documents the longer-term measures put in place by Toyooka city as a result of the lessons learnt in the aftermath of the Tokage Typhoon.

After three years, the documentation looks at the following issues:

- The process of Toyo-oka city's recovery from the typhoon disaster
- Problems faced during the last three years since the Tokage typhoon disaster
- Long-term disaster prevention measures put in place: Landslides, waste/debris management, riverbank management etc.
- Long-term disaster preparedness measures put in place: community awareness, evacuation procedures, disaster leadership etc.
- Transferable lessons for other cities that face similar disaster events

1. **Background**

Through its resolution A/RES/58/214, the United Nations General Assembly convened the World Conference on Disaster Reduction (WCDR), that was held in Kobe, Japan, from 18 to 22 January 2005. The Conference took stock of progress in disaster risk reduction accomplished since the Yokohama Conference of 1994 and to make plans for the next ten years. A key roadmap document emerging out of WCDR was the Hyogo Framework of Action (HFA)[1].

As a contribution to the WCDR, the United Nations Environment Programe's International Environmental Technology Center (UNEP-IETC) conducted an assessment of the environmental consequences of the Tokage Typhoon (Typhoon no. 23 of 2004) that struck Toyo-oka city, Hyogo Prefecture – one of the worst affected cities – on 20 October 2004

An aerial photo of the Tokage Typhoon over the Japan mainland on 20 October 2004.

A report was produced using information collected from a field mission, and was launched by the former Minister of Environment of Japan, Ms. Yuriko Koike and UNEP's former Executive Director, Dr. Klaus Toepfer, during the WCDR, in the presence of Toyo-oka's Mayor, Mr. Muneharu Nakagai.

A number of key lessons learnt from the study included:

- 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

[1] Full text of the HFA can be downloaded at the following website: http://www.unisdr.org/wcdr/intergover/official-doc/L-docs/Hyogo-framework-for-action-english.pdf. Details of WCDR and its outcomes can be viewed at http://www.unisdr.org/wcdr

Annex 1 provides an executive summary of the report. The full report can be accessed online as a PDF file at the following URL:

http://www.unep.or.jp/ietc/wcdr/unep-tokage-report.pdf

2. The Tokage Typhoon Revisited

On Wednesday 20 October 2004, Typhoon Tokage (called the "Typhoon no. 23 of 2004" in Japan), one of the deadliest storm in years, swept through most of the southern half of Japan. People were overcome by the massive waves and flash floods triggered by the typhoon's heavy rains and strong winds, which left at least 69 people dead, 20 missing and some 342 injured, out of which 66 were serious injuries.

A local government official points to the level of flood waters (red line) as a result of the typhoon. Such markers have been placed throughout the city to remind residents of the dangers of disasters.

The number of typhoon related casualties was the highest in over a quarter of a century, and it further destroyed fifty homes, damaged 1,350 residences and flooded 26,800 others. Typhoon Tokage was the tenth typhoon to make landfall in Japan in 2004. Storms and floods killed over 100 people in Japan that year, resulting in hundreds of millions of yen in damage, highlighting once again the importance of disaster management in both Japan and in East Asia.

Coming just months before the World Conference on Disaster Reduction (WCDR) that was to take place in January 2005 in Kobe, Japan – the typhoon, along with the Indian Ocean Earthquake and Tsunami disaster, was also a rude reminder of the vulnerability that people faced to climatic events and ensuing disasters.

3. Three Years on: How do things stand?

Considering the unusual severity of the Tokage typhoon, and of the typhoon season of 2004 as a whole, a number of initiatives were undertaken at the national, prefectural and local levels, as a result – both to overcome the impacts of the disaster, and to further prevent/mitigate the negative impacts of climatic events such as typhoons.

An assessment mission was planed to Toyo-oka city to document the longer-term measures undertaken by the city administration as a follow-up to the typhoon, and implementing the lessons learnt in the aftermath of the Tokage Typhoon.

After three years, the documentation looked at the following issues:

- The process of Toyo-oka city's recovery from the typhoon disaster
- Problems faced during the last three years since the Tokage typhoon disaster
- Long-term disaster prevention measures put in place: Landslides, waste/debris management, riverbank management etc.
- Long-term disaster preparedness measures put in place: community awareness, evacuation procedures, disaster leadership etc.
- Transferable lessons for other cities that face similar disaster events

4. Conceptual Background for Toyo-oka's Disaster Management Planning

Over the years since the Tokage Typhoon of 2004, Toyooka underwent a number of administrative changes – key among them being the merger of five neighbouring cities/towns into one larger urban area, under the banner of 'Toyooka city'. The towns that were absorbed into and consolidated as Toyooka city were: Izushi, Kinosaki, Hidaka, Banto and Takeno. This significant change created additional impetus to develop a comprehensive disaster management plan for the 'new' and expanded Toyooka.

The responsibility of administering the new Toyooka city was reflected in the views of the Mayor of Toyooka, Mr. Muneharu Nakagai. The Mayor outlined his basic 4-point strategy to develop and sustain the growth of Toyooka. It is interesting to see this strategy as a guiding philosophy that influences and steers local policies, including that of disaster management.

The 4-point strategy covers:

(1) Emphasis on **local endemism** (as city's survival strategy) – many local cities look same in Japan. There is a need to focus on locally specific history and characteristics as a 'survival' strategy. For example, Toyooka uses oriental storks, which roost in the city, as a symbol of the city.

(2) **Living in peace** strategy – development that is based on long-term prospects, while maintaining the importance of tradition. This is probably opposite to the anonymity of large megacities such as Tokyo (which is also called as 'amnesia city' due to the fact that things change or move quickly in Tokyo)

(3) **Innovation from tradition** – Real new innovation draws its inspiration from, and is derived from local tradition. Linked to the first point on local endemism, preserving the local tradition becomes an issue for the city's revitalization.

(4) **Sustainability –** Traditional knowledge and ways of doing things have already the test of time and of sustainability over generations. This is the reason why traditions continue to survive even today. The emphasis and interlinks between sustainability and traditional ways of doing things is an integral and interesting part of the strategy.

Photos showing floating debris from nearby mountains and forests that blocked rivers and damaged bridges on the left, and well maintained rivers and embankments on the right.

For Toyo-oka, disaster management is therefore looked at from such strategic urban planning scenarios – where both positive and negative aspects of development and nature are taken into account. (For example, the Maruyama river, which runs through the city, has a very small gradient, which enables

people to enjoy boating and other water sports, but at the same time increases the potential risk of flooding).

The three pillars on which Toyooka city's urban planning and development is based on, are:

(1) *Shizen ni idakare te ikiru* ("Living life that is embraced by nature")
(2) Cherish the moment and enjoy everyday life
(3) Take responsibility for future

Such conceptual visions have been a critical part of Toyooka's planning processes for the future, whether for the next 10 years, or for medium/short term development plans (three to five years). While the emphasis on traditional values as a counter force to 'anonymous modernization' has been a key to Toyooka's image of itself, the problems of the larger environment, such as climate change, cannot by ignored by the city. As the Mayor said in his interview, "I would say it is important to fit it into the local nature. The answers are always in the past. For example, acid free agriculture is our tradition but its technology is completely new."

An old photo of Toyo-oka, dating from the 60s, showing the symbiotic relationship between farmers, farm animals and wild oriental storks.

The need to create a unique image and vision for Toyooka was also driven by the merger of the neighbouring towns into Toyooka. The Mayor strongly felt that focusing and nurturing local tradition was the right strategy for the city. He citied the case of a junior high school student who told him that '… the merger is a good thing because the circle of helping hands would increase, while at the same time locally specific culture would not disappear. Like in the European Union … '

Such thinking has also influenced the disaster management strategies of the city, according to the Mayor. With the new city, when disasters such as typhoons approach, local officers are asked to return to their respective home regions to take emergency decisions such as evacuations etc. Due to the larger administrative area after the merger, swift monitoring/evaluation has become necessary, and decisions need to be taken as close to the disaster area as possible.

The need for disaster education in schools has also taken on added importance – for example, every year, one day is designated as a "Back to Nature" Education Day in nursery, elementary and junior high schools. Textbooks for teachers and students are also being prepared, aiming to nurture ecological ethics in the children.

5. Toyooka's Disaster Management plan

The City of Toyooka established its Disaster Prevention Plan in 2006, and a document was prepared and issued by the Toyooka City Disaster Prevention Council.

After the Typhoon number 23 of 2004, the idea of " Protect our lives by our joint efforts" was formed and the three basic precepts –

1. Realize that disaster inevitably happens,
2. Act for damage mitigation,
3. Treasure local community power

Hearings organized with city officials to discuss their plans for disaster management in Toyo-oka city.

were used to create disaster-resistant Toyooka City. These ideas are reflected throughout the Toyooka Disaster Prevention Plan, and detailed and concrete information and guidelines are provided in the area of flood, storm, earthquake, tsunami, snow damage and large-scale accidents.

It is expected that the Plan work as guidelines to prevent future disasters and mitigate damages when they occurred, and inspire citizens and communities to actively and spontaneously involve in disaster management.

Toyooka Disaster Prevention Plan: ***"Protect our lives by our joint effort"***
The manual consists of six chapters as below. Chapter 1: General Rules

Chapter 2: Disaster Prevention Plan
Chapter 3: First-aid measures against flood and storm
Chapter 4: First-aid measures against earthquake and tsunami
Chapter 5: First-aid measures against snow damage and large-scale accidents
Chapter 6: Disaster Recovery Plan

Chapter 1:

Chapter 1 defines the purpose of the Toyooka Disaster Prevention Plan ("…to protect citizen's life, health, and assets by establishing and promoting comprehensive disaster prevention and mitigation measures"), and provides overall ideas for disaster prevention and mitigation in Toyooka City. The main idea "Protect our lives by our joint effort" is explained, and the three basic precepts (1. Realize that disaster inevitably happens, 2. Act for damage mitigation, 3. Treasure local community power) are discussed.

The Chapter also discusses damage estimates of hypothetical earthquakes, tsunamis, floods, and tidal waves to reinforce and improve disaster preparedness.

It predicts vulnerable areas and degree of damages both personal and physical. Detailed information on each community's vulnerability to floods and landslides, as well as information on community shelters and their stock of food, water etc. are available as an annex of this chapter.

Chapter 2:

Following the General Rules discussed in Chapter 1, Chapter 2 discusses the Disaster Prevention Plan in six sections.
These sections are:
1) Damage mitigation management
2) Solid disaster preparedness
3) Improving local disaster prevention and mitigation measures
4) Adjusting infrastructure for damage mitigation
5) Passing the experience to the future
6) Other disaster preparedness measures

In each section, it shows the "division/organization-in-charge" and outlines the actions to be carried out. For example, in section 2, Department of General

Affairs and Fire Department of the City and FM Tajima, a radio station, is responsible for collecting and spreading the news of disasters. The Department of General Affairs appears in almost all sections as the headquarters of disaster management. Other groups, such as Department of Construction, local business, hospitals, doctor's association, fire stations, and local disaster management organizations are also listed as responsible bodies according to each disaster theme.

Chapter 3,4 & 5:

These Chapters provide countermeasure guidelines in the case of flood and storm (Chapter 3), earthquake and tsunami (Chapter 4), snow damage and large-scale accidents such as nuclear power plant accident (Chapter 5).

Same as Chapter 2, each section of each chapter shows the division/organization-in-charge, and outlines the actions to be carried out. Each chapter describes information flow within the headquarters/City, cooperation with relevant organizations such as Hyogo prefectural government, Japan Self-Defense Forces and police, as well as rescue and evacuation measures, treatment for food, housing, utilities, medical care and the wastes generated. It also discusses restoration of school education and psychological treatment for children and adults after the disasters.

Chapter 6:

Chapter 6 talks about City's responsibilities in helping citizens recover from the disasters. It mainly discusses post-disaster financial assistance, such as condolence money from the City, extension of tax payment deadlines, reducing or exempting payment of tax, fees and utility bills to lighten financial burdens of disaster victims. Low-cost financing for disaster victims for their housing and businesses are also discussed.

Toyooka's Disaster Management Plan is operationalized by a process in which detailed and 'micro' plans are devised by a number of local entities, governmental, non-governmental, and community-based.

To understand this process, the following persons/entities were interviewed and a hearing organized to document their responses:

- **Bosai Anzen Ka**（Disaster Management Department/Unit）
- **Seikatsu Kankyo Ka**（Environmental Department/Unit）
- **Toshi Seibi-Ka, Kensetu-Ka**（Urban Planning and Construction Department/Unit）
- **Norin Suisan Ka**（Agriculture and Forest Management Department/Unit）
- **Kanko-Ka**（Tourism Department/Unit）

Besides the above local government entities, the following organizations were also interviewed:

- **Shobodan** (Fire fighting community group）
- **Jishubosai soshiki** (Community-based disaster management group）
- **Kodomo Kyoiku Ka**（Education Department）
- **Nitta Shogakko**（Nitta Primary School's Project E）

Assessment and Lessons learnt

The format for developing a disaster management plan at the local level is provided by the central government. Each city/town/village in Japan has to therefore develop a comprehensive plan to prevent, mitigate and prepare for various disasters that they potentially face.

As shown in the box above, the Plan document is quite comprehensive, covering a range of issues related to risks and hazards that Toyo-oka faces and countermeasures that are needed to be put in place.

Besides the contents and format of the plan itself, two key features of Toyo-oka's plan provide interesting lessons – (a) the process of developing the plan in itself provided a number of opportunities for the city administration to review raise awareness of its residents and integrate it into various other development activities, and (b) a number of organizations and entities, both governmental and non-governmental, adopted the plan to develop further and more micro plans for the respective communities they served or lived in.

The following five sections provide an insight into various local entities and organizations that have adopted and operationalized the disaster management plan. It also provides valuable lessons for cities in the region that are planning to adopt similar measures.

1. *Bosai Anzen Ka* (Disaster Management Department/Unit)

Much was learnt from the Tokage Typhoon of 2004. The main problems encountered by the city, according to the officials of the department, was (1) the low rate of evacuation by residents despite warnings issued by the city, (2) lack of systematic and concerted information sharing and response, and (3) inter-organization coordination within the city.

As a result of the above problems, the department has improved its evacuation drills and information sharing process. This includes more intensive interaction with the local communities to organize drills, and provision of emergency radios to every household in the city.

Low-lying areas near the Maruyama river that are now being closely monitored for potential flooding during heavy rains and typhoons.

A detailed disaster management plan (reviewed above in Box 1) was prepared by the department, which was then intrapolated into ten localized hazard maps and plans. The three core components of the plan rests on the city office being responsible for disaster preparedness, the city's urban service agencies being responsible for developing/implementing the response mechanism, and the community at large being responsible for disaster awareness and education.

The Maruyama river today, with its strengthened embankments that is also a place of attraction for local residents to relax.

The importance attached to disaster management was also reflected in the upgrading of the head of the department to be under the Mayor's office, effectively making the head equivalent to a Vice Mayor.

But challenges still exist – the key being that the plan focuses more on preparedness issues in the shorter term, and not on prevention/mitigation issues

of the longer term, particularly of anticipating future disasters or climate change issues. Disaster management is still implemented in isolation, and is not integrated into the 10-year development plans of the city as a whole.

Assessment and Lessons learnt

A key aspect of the follow-up measures after the Tokage Typhoon, was the enhancement of the role that the Disaster Management Department played, and its proximity to senior management officials of the city, including the Mayor's office itself (the head of the department in fact reports directly to the Mayor – a change from previous practice, where the department was part of the construction department.

The key feature of the plan is outlining of the specific and enhanced roles that city service agencies have to play in the case of a disaster. This division of labour is critical and provides interesting lessons for other cities in the region – It also includes citizens and community organizations.

In the Plan, the city office is itself responsible for disaster preparedness as a whole, while the city's different urban service and infrastructure agencies are responsible for developing and implementing the disaster response mechanism. The community at large also has a role to play in being responsible for disaster awareness and education.

2. *Seikatsu Kankyo Ka* (Environmental Department/Unit)

With the huge volume of wastes generated during the Tokage Typhoon, one of the key areas focused on by the department is that of waste generated during future disasters. Specifically, the effectively separation of wastes, its temporary storage and proper disposal and recycling.

The department quickly learnt that clearing off the waste debris is a critical priority for rebuilding programme to commence. The awareness of local residents on waste separation and proper disposal is a critical starting point for speedy recovery after a disaster.

The department strongly felt that there was a need to put in place a Disaster Waste Treatment Plan, which it developed and implemented in May 2006. Some of the key features included:

- Separate different types of wastes at three levels, (1) in front of the house itself by the resident or by volunteers, (2) in the designated temporary waste-dumping site by the waste department, and (3) in the final incinerator by the waste management company.
- The prior designation of vacant areas a temporary holding of waste debris for further processing to be recycled or processed/incenerated.
- Agreement between neighbouring cities and cities in the region to help each other to dispose waste in the aftermath of a disaster.
- Determine and designate the categories of waste that residents/volunteers will have to separate into, for recycling/processing.

Daily waste separation of wastes that is also done with disaster debris, enabling easy clearing and processing of wastes.

There were many additional steps that the department was planning to take in the future, or was not doing currently. These included:

- Simulation exercises to determine the kinds and volumes of waste generated after different kinds of disasters
- Development of waste management plans on future disaster scenarios, and not based on past experiences alone.
- Strengthen the intrinsic link between waste plans and disaster management plans
- Increase awareness among residents on issues related to disaster debris and the role that they have to play in effective and speedy waste clearance for recovery

Before-and-after photos of a temporary debris storage area. The area is now a designated for temporary waste storage after disasters.

Assessment and Lessons learnt

Many of the lessons learnt from the clean-up in the aftermath of the Tokage Typhoon has been adopted and incorporated into the disaster management plan.

Effective and timely clearance of waste and debris was a key focus of the department as a critical pre-condition for the residents to recover from a disaster. An important measure taken by the department is the development and implementation of a disaster debris clearance plan.

As outlined in the text above, besides the preparation of a basic disaster waste management plan, some of the features that can be adopted by other cities in the region include (a) a system of separation of wastes into its component streams, (b) designation of temporary waste handling sites, (c) agreement between neighbouring cities' waste management departments to help each other in the case of a disaster

The future plans outlined by the department also provide insight into measures that can be taken by a city's waste management agency to also handle disaster debris.

3. *Toshi Seibi-Ka, Kensetu-Ka* (Urban Planning and Construction Department/Unit)

The Urban Planning and Construction Department of Toyo-oka city is primarily responsible for the overall physical development and growth of the city. The department felt that its key role in disaster management programmes lay in reconstruction plans after a disaster, and in future development plans that influence the ability of a community to mitigate and prevent disasters.

Balancing different land-uses such as agricultural lands, housing, infrastructure (for example, the pump house above), and residential housing (in the background) is a critical objective to sustain the economic growth of Toyo-oka.

The key operating mechanism of the department is the 10-year Mater Plan for the city, outlining the land use and zoning patterns, transportation routes etc. Within the process of developing the plan, several potential vulnerability issues can and has been incorporated in the designs and plans, including safe neighbourhoods, disaster facilities, localized plans for prevention, hill development etc.

Downtown area of Toyo-oka city

The department still faced a number of challenges, including the fact that only 60 percent of the current area of Toyooka was actually planned, and the other 40 percent remained 'unplanned'. It was also of the opinion that links to local economy and to construction investment that inherently took disaster issues into account, needed to be strengthened.

Assessment and Lessons learnt

Vulnerability of communities to risks and disaster events are primarily caused as a result of the *proximity* of human settlements to such hazards and risks. Infrastructure and urban development processes can either increase this risk, or help mitigate it.

An in-depth internal assessment carried out by the department has resulted in a better understanding of the intrinsic linkages between infrastructure and urban development, and disaster hazards/risks for their programmes and projects. An important outcome of this assessment is the resultant stronger integration of disaster risk mitigation measures into the department's medium and long term planning processes.

The opinions and views expressed by the department also highlight the importance of involving the private sector in ensuring that disaster risk reduction is made an integral part of the construction and development process of a city.

The 'unplanned' areas of a city – particularly those used by lower income households, continue to pose a challenge to most local governments, and illustrate the importance of involvement of local community groups and NGOs assisting them in disaster planning and preparedness exercises.

4. ***Norin Suisan Ka*** (Agriculture and Forest Management Department/Unit)

The Agriculture and Forest Management Department is responsible for the planning and management of forests and agriculture lands in and around the Toyo-oka city. Linked to the national Ministry of Agriculture, Forests and Fisheries, the department is Ultimately, an assessment of the damages caused by the 2004 Tokage Typhoon showed that a key cause was the improper pruning and maintenance of the forests that surrounded Toyooka, eventually leading to their flooding the rivers and breaching the dykes.

Balancing agricultural land-use and forests/mountains is critical for long-term recovery. Photo shows agricultural fields recovered after extensive silting.

A better understanding of such interlinkages has led the department to focus its attention also on disaster management issues, without loosing the focus on its 'regular' issues such as improving the natural environment, fostering environmentally friendly agriculture etc.

The Department, for example, has designed a special eco-label, based on the city;s symbol – the oriental stork - as a logo. Agriculture produce that is 'friendly' to the storks and do not damage the environment is designated as a "Stork Firendly" item – an eco-product.

It has also taken action to petition the national Ministry of Agriculture, Forestry and Fisheries (MAFF) to designate Toyooka as a 'BioMass Town'[2]. The city's biomass town strategy calls for the revitalization of forestry and improving access to forests.

The department has promoted Shimin Kumiai or forestry cooperatives among the residents in order to network and improve access of the community to forest's resources and to create jobs during the off-season.

The ownership registration of properties in forests and nearby areas was also considered important by the department in order to facilitate community involvement in maintaining forests in the longer term. A corporate 'green tax' was also implemented to revitalize the mountains and forests on a continual basis

Forests surrounding Toyo-oka city that is targeted for better maintenance to reduce debris being washed into the river along with the run-off.

Challenges that the Department faced were essentially related to a lack of awareness and appreciation of the links between proper maintenance of the local

[2] More information on Japan's Biomass town initiative can be found on the MAFF website at: http://www.maff.go.jp/

environment, and the potential externalities in disaster prevention and mitigation. It was obvious that much more needed to be done to increase the knowledge and awareness both within the department as well as with various stakeholders in the public, private and community sectors of the city.

Assessment and Lessons learnt

The key cause of flooding during the Tokage Typhoon was the run-off from nearby by forested mountains surrounding Toyo-oka city, which blocked rivers and inlets to streams, and consequently resulting in a breach of the river embankments.

This understanding and post-disaster assessments has provided the department with valuable lessons, as outlined above, for it to better mitigate and be prepared for disasters in the future.

Improving access to nearby forests, and streamlining ownership of pockets of forested lands are cornerstones of the policies that other cities can learn from. For Toyo-oka, such an approach has brought the local community closer to the forests, and hence to closer monitoring of potential degradation and maintenance problems.

It also includes a more systematic integration of the city's image and vision into features derived from the forests, mountains and agricultural areas that surround the city.

A key challenge that the department continues to face, and so will other cities adopting such an approach, will be the lack of awareness of the local communities and hence their active participation and involvement in the department's activities to reduce/mitigate the disaster risks and hazards that Toyo-oka faces.

5. *Kanko-Ka* (Tourism Department/Unit)

As a city that extensively depended on domestic tourists for its economic growth, tourism plays a very important role not only in the economic sense, but also in preserving traditional assets and ways of living.

For example, Izushi is well known in the region for *soba* (buckwheat) noodles and pottery; Kinosaki is famous for hot springs and crab dishes; Toyooka itself is well known as a roosting place for the almost extinct oriental storks.

But disaster events such as the Tokage Typhoon severely affected the city. During the typhoon, there was a 30 percent drop in tourist arrivals in Toyooka, and the city has not yet recovered, even now, to the pre-typhoon levels. Mass media unfortunately played a critical role in creating an image that discouraged travelers from coming to Toyooka.

Photos of festivals and events organized in Toyo-oka

This is why the department has increasingly focused on local events, traditions, products and features as attractions for visitors, but simultaneously also promoting an image of 'safety' and 'ecologically friendly and secure city' by offering farmers' day events, homestays, eco-tourism etc. For example, a small town such as Toyooka will soon play host to a group of 400 students from China.

The successes of all these initiatives depend heavily on proper disaster management and safety of not only the local residents, but also of tourists – during and in between disasters. The need to balance the environmental impacts of tourism on a fragile local environment was also a concern of the department.

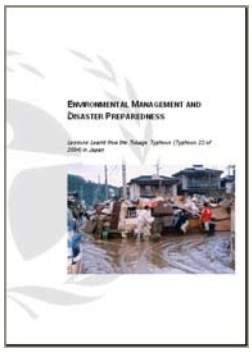
Assessment and Lessons learnt

A key lesson learnt from Toyo-oka's Tourism Department is the role that tourism inflows play in enhancing the city's image and the pride that local residents have in the city. This will consequently increase the pressure to take measures that will ensure safety of the city's assets and residents/visitors during a disaster.

The plans of the department in integrating environment, safety and local culture, and in projecting this impression to the outside world is an important lesson that can be transferred.

The fact that tourism programmes/plans in themselves have a role to play in disaster management – in bringing about greater participation of the local community in enhancing the city's image, and in ensuring safety and security, is an important lesson to be understood.

Annex 1



ENVIRONMENTAL MANAGEMENT AND DISASTER PREPAREDNESS

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

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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 the 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.