Strengthening Disaster Reduction Capacity through Reliable Information System of Hazard Mapping and Vulnerability Assessment

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Today, at first I would like to introduce the recent volcanic eruptions in Japan and successful early warning at that moment, then to think what is the most important factors to strengthen disaster reduction capacity.
And at the last of my presentation, I would like to make an announcement about the UN second world conference on natural disaster reduction which will be held in Kobe, in 2005.
. Then In a limited time for my presentation, I will quickly outline the natural conditions of our country just for background information on the topic, and then I will introduce our current experience of volcanic eruptions and early warning.

Seismic and volcanic activities

Firstly, I will brief on the natural conditions of our country. The Japanese archipelago is part of the highly volcanic Circum-Pan-Pacific mobile zone. Although the continental shelf where Japan and its surrounding area is located makes up only roughly 0.1**%** of the entire world, the seismic energy it generates accounts for approximately 10**%** of that of the entire planet.

The reason of the vulnerability is that Japan is located where four big plates, namely the Pacific, Philippine Sea, Eurasian and North American tectonic plates collide. Crustal activity in the region is so active that a large number of earthquakes besides volcanic eruptions occurred along the plate boundaries.

In addition, the region has 86 active volcanoes, or roughly 10**%** of active volcanoes in the world, and has seen a large number of disasters triggered by volcanoes.

Furthermore, as the statistics shows we have several volcanic eruptions almost every year. Two cases I will tell you today are the major eruptions in our country, however no casualty is recorded thanks to the successful emergency response.

Case study

The first case is Mt. Usu located in northern Japan
erupted for the first time in 23 years in March 2000.

This area is well known for the hot-springs. More than 1million tourists per year visit there to enjoy the beauty of nature. However, Mt.Usu has erupted 7 times in its history and devastated villages around the mountain.

After its last eruption in 1977, Japan Meteorological Agency , universities and other research institutes have continuously observed this volcano. They have been conducting researches on volcanoes and monitoring on a real-time basis by using seismographs and cameras.

Also the government has prepared the hazard-map and distributed to all residents so that people can be evacuated smoothly.

On 28th March, the Meteorological Agency identified the increasing number of volcanic earthquakes was unusual. They commented on the high possibility of imminent eruption.

Immediately, the National Government dispatched officials to the site and set up a local headquarters. Local governments issued an "Evacuation Advisory" to residents and tourists. The Evacuation Advisory" was raised to an "Evacuation Order" which is the highest-level of warning.

Approximately 16,000 residents and all tourists have completely evacuated within 1 day.

Then eruption occurred, which was only a half-day after evacuation was completed.

5 craters were formed by the eruption and the height of volcanic ash rose 3,200m from the crater. It was a large-scale volcanic eruption that brought huge economic loss to the hot-spring resort, however, no one was killed or injured.

These are destroyed buildings by cinders.

This is destroyed public library near crater.

This is a damaged apartment. The second floor was almost buried by mudflow.

This is depressed road by volcanic ground deformation.

Next, we move to the second case of Mt.Oyama in Miyake Island.

Miyake Island is located 100 kilometers south of the capital Tokyo.

In late June of 2000, a large number of earthquakes began on the island, alerting the possible eruption of Mt.Oyama on the island. In early July, an eruption took place at the top of Mt. Oyama. The pyroclastic flow had reached to the coastal area which is 5km from the crater.

The mountain erupted repeatedly and volcanic toxic gas like sulfur dioxide has emitted. Since September, all residents evacuated the island by ship. No deaths or injuries recorded, although related earthquakes killed one person on other island.

However, houses and roads, electricity, water supply and other infrastructure were totally damaged, seriously affecting the inhabitant's livelihoods. Volcanic mudflow had carried down the great amount of logs as well as volcanic ash.

These are houses buried by volcanic mudflow.

On Miyake Island, the mountain has released sulfuric dioxide and other toxic volcanic gases constantly. Even today, it continues to release 4,000 to 10,000 tons of gases a day, an output level unprecedented anywhere in the world and has not been expected to end. For this reason, the island's population of nearly 3,000 is unable to return to the island to this day for more then 2years.

The reconstruction projects are ongoing by the Government so that residents can return to the island smoothly when toxic gas ceases.

Importance of early warning

The absence of human casualties in both cases can be attributed to the coordinated efforts taken by the people in various sectors.
Firstly, it can be largely attributed to the accurate prediction made by a continuous observation with latest technology. The accurate prediction made it possible to establish first response system quickly by national government and related organizations.

Secondly, the strong network among all relevant ministries and organizations enabled to decide the most efficient mode of transportation for evacuation and to set up shelters immediately. Moreover, partnership with other organizations such as the media contributed a lot to disseminating information such as "Evacuation Order" to all residents.

In Mt.Usu, now the volcanic activity is over and the local governments and universities are planning to establish an eco-museum so that people can learn science and technology relating to the active volcano and disaster management. Their aim is not only to avoid damage by emergency response but also to enjoy the beauty of nature as resources for tourism.

Since Japan has high-density population and there are many volcanoes on the island as I told you before, we need to live with volcanoes and enjoy their blessing while avoiding disasters which could be caused by their activities. It depends on the ability of humankind to cope and to live with risk. This policy is understood as "Living with Volcanoes" in our country.

Important factors for living with risk

Risk equal Hazard is multiplied by Vulnerability. As you know Hazards are Earthquake, typhoon, flooding, Volcanic eruption, so we cannot stop or mitigate those natural phenomena. But as I showed you the two cases, we can reduce Vulnerability or enhance disaster reduction capacity through the reliable information system.

Now I would like to show you the survey which indicate what kind of information people want to know for preparing natural disaster risk.

The survey undertaken in three cities, which experienced recent torrential rains, Hiroshima, kure, and Kochi, See Figures 1 and 2. Those indicate that the citizens want to know concrete information related to disasters such as where disasters may occur and where to seek refuge.

To spread the idea `self-protection`, it is of utmost important for the government to share relevant information regarding natural disaster risk of the community with the inhabitants. Recently in Japan, local governments started to make efforts, however, not all of them contribute to raising awareness or enhancing the implementation of disaster management measures. In order to increase disaster reduction capacity, the national and local government, communities and inhabitants must share information and they need to cooperate in the implementation process.

Cooperation in international disaster management

Lastly I will introduce briefly about our international cooperation and the second UN Conference on natural disaster reduction.

Could you look at Page 2 of figure 3, **"Promotion of International Strategy for Disaster Reduction**

Towards the 2nd World Conference on Natural Disaster Reduction"
Looking at the international community, systems for international emergency assistance were greatly improved in the 90s and capacities for disaster reduction were enhanced by the efforts made by the United Nations and many countries worldwide. However, even in recent years, we have witnessed human losses as well as physical losses caused by natural disasters in many parts of the world. Therefore, there is an urgent need to undertake more effective early waning systems in order to reduce the negative impacts of disasters.

The United Nations ISDR - International Strategy for Disaster Reduction is currently in the review process of the Yokohama Strategy and Plan of Action, which is the policy of international cooperation of the natural disaster reduction.

The Government of Japan intends to actively contribute to the review of the Yokohama Strategy and Plan of Action promoted by the UN/ISDR with a view to developing new guidelines of effective disaster reduction activities for the future. In this connection, the Government of Japan is considering to host the United Nations World Conference on Natural Disaster Reduction in January 2005. We would like to discuss the results of the review and propose a new international strategy for disaster reduction recommending means of implementation of effective disaster reduction measures for the coming decade in close coordination and cooperation with the United Nations, governments and relevant organizations.

For more information, please refer to the distributed paper titled "second UN conference on **Natural Disaster Reduction".**