USING INFORMATION SYSTEMS TO MANAGE WATER-RELATED DISASTERS IN VIETNAM

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Hanoi, Vietnam

Your Excellencies, Mr. Duoji Cairang, Minister of Civil Affairs, Respected Guests, Colleagues, Ladies and Gentlemen,

In her introductory speech this morning, the Resident Representative of the UNDP, Ms. Leitner, asked us to pay special attention to measures that can be undertaken to improve and to better organize the gathering and transmission of disaster predictions, disaster assessments and other disaster management information to the responsible authorities and to the general public. Hence I would like to discuss how the Standing Office of the Vietnam Central Committee for Flood and Storm Control (SOCCFSC) uses information systems to manage water disasters in Vietnam. And in doing so, I hope to describe how the SOCCFSC, the primary disaster coordination body in Vietnam, strives to integrate state-of-the-art technologies with Vietnam's ancient disaster management culture. Before I talk about the information systems employed in Vietnam, therefore, I would like to begin with a brief outline of water-related disaster management in Vietnam.

Water is the lifeblood of the people of Vietnam. Much of what constitutes Vietnamese society emerged from centuries of struggle to capture the annual rains to irrigate paddy rice. At the same time, water is the most destructive force in Vietnam. Coming all within the space of a few short months, the monsoon rains saturate the earth, flood the rivers, and top the banks to flow onto the broad plains of the river deltas. Coupled with seasonal typhoons that batter the coasts before moving inland, flooding is an annual occurrence.

As a result, Vietnam is generally numbered among the world's most disaster-prone countries. With a long coastline backed by high mountains on the one hand and broad, flat flood plains on the other, over 70 percent of Vietnam's population is at risk from typhoons, floods, storm surges, flash floods, landslides, and mud flows.

Over the past 25 years in Vietnam, more than 13,000 people have been killed by disasters. A tropical depression off the coast of Thanh Hoa in 1996 caught thousands of fishermen at sea; over 600 lost their lives. In the same year, in the mountain province of Lai Chau, the hamlet of Lo Le was literally washed off the map by a flash flood; 89 people were killed. In 1997, Typhoon Linda became the worst natural disaster in Vietnamese memory when it struck the southern tip of Vietnam, killing well over 3,000 people, and causing more than US$ 400 million in damage. In 1998, Vietnam's Central Provinces underwent eight months of drought, which destroyed both annual rice crops, and then record flooding, resulting in nearly 400 deaths.

Yet if the threat of disasters is ancient in Vietnam, so is the Vietnamese tradition of preparing for and mitigating the effects of storms and floods. For instance, dykes have been constructed and maintained for over two thousand years in Vietnam. The annual effort of maintaining dykes is even woven into our legends. Over these two millennia, methods of maintenance have been developed and refined, and much of what is done today was begun centuries ago. Indeed, Vietnam has had a Department of Dyke Management for at least five centuries, of which the current Department of Dyke Management and Flood and Storm Control is just the latest embodiment.

Because of this long history of disasters and our age-old experience in water management, the logical place to locate Vietnam's main disaster co-ordination body was within the Dyke Department. As a result, the SOCCFSC -- as the agency with the main responsibility for monitoring the effects of storms and floods, for

gathering official damage data in the aftermath of a disaster, for providing official warnings of disasters, and for co-ordinating and implementing disaster response and mitigation measures -- relies on the traditional administrative structure and procedures of the Dyke Department to carry out its disaster assessment, disaster reporting, and emergency co-ordination duties. Under the Department of Dyke Management, there is a Provincial Dyke Department in every province, as well as two dyke monitors, officials of the Dyke Department, in every district in Vietnam, as indicated in Figure 1 below.

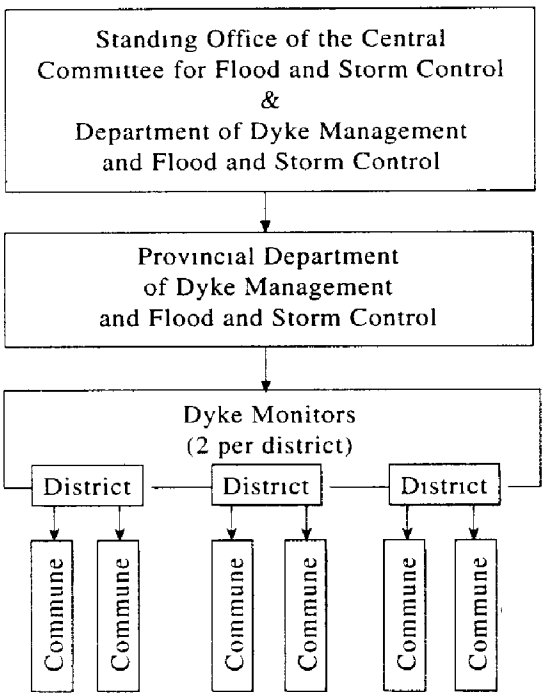

Figure 1: Administrative Structure of the DDMFSC

When a flood or storm occurs, the district level officials are responsible for measuring district damage and for sending a district disaster assessment report to the provincial level. Provincial officials then collate the various district reports they receive, and verify them, before forwarding them to SOCCFSC, which in turn collates the provincial reports to produce a national damage assessment report. Figure 2 below represents the flow of disaster assessment information

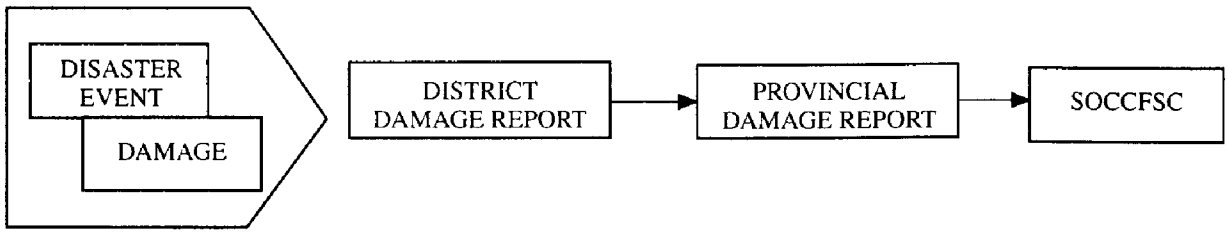

Figure 2: Disaster Assessment Reporting

The SOCCFSC then takes measures to counter the disaster, based on the provincial assessments of the severity and nature of the event. The challenge for the SOCCFSC has therefore been to put in place mechanisms that will expedite the transmission of this disaster information. The most important tool for this has been the SOCCFSC's disaster communications system, an emergency electronic mail network that links provincial dyke department offices with the SOCCFSC.

This disaster communications system was first rolled out in 1995, and by late 1998 was extended to every province in Vietnam. The Government of Vietnam considered the system sufficiently important to put a large portion of its own funding into the project. Additional funding was received from UNDP, the Government of Luxembourg, and the BP and Statoil Alliance The system now operates 24 hours per day, 365 days per year, and has become the official, obligatory mechanism for transmitting disaster damage and needs data to the SOCCFSC The SOCCFSC also uses the system to issue disaster prevention or mitigation directives to its staff in the field: the provincial dyke department officials and district dyke monitors. The system was used effectively during the 1996 to 1998 flood seasons as a tool for gathering damage data and particularly, in the aftermath of Typhoon Linda in 1997, for co-ordinating disaster relief activities between the SOCCFSC and disaster affected provinces.

Still, truly effective disaster communications require more than an emergency e-mail system, the capabilities of which are rapidly being surpassed by advances in Vietnam's IT technology and infrastructure. Rather the challenge is two-fold.

1. To provide information systems to provide a standard set of disaster knowledge, which in turn serves to harmonize and integrate official disaster management procedures throughout the country; and,
2. To provide easy-to-use disaster information products to decision-makers and to the general public.

In fact, we are talking about providing two interrelated and overlapping sets of information products: standard, corporate information used at the operational level by disaster managers, and the output of the application of this knowledge, the processed data or finished information, public warnings, or policy options that are provided to users; whether they be the Minister of Agriculture and Rural Development or members of the public.

The first set of information *products* in large part already exists, of course - in the minds of disaster officials, in the traditions of the SOCCFSC and the Vietnamese people, and in the extensive body of laws and regulations that govern disaster management in Vietnam. The question, then, is how to make this assembled information available to all sections of the SOCCFSC.

The SOCCFSC has opted to create a Department-wide Intranet, accessible both to central disaster management authorities and to officials in the localities. This Intranet will serve as a virtual database for disaster management officials throughout Vietnam. With the assistance of the UNDP Disaster Management Unit in Hanoi (Project VIE/97/002), the SOCCFSC is developing this Intranet out of the existing disaster communications system. The Intranet is being designed to serve as a repository for:

- Assembled laws, decrees, directives, and procedures on disasters and disaster management in Vietnam;
- Summaries of disaster conditions in Vietnam and announcements of storm forecasts and warnings;
- Official Damage Assessment Reports released by the Standing Office of the Central Committee for Flood and Storm Control;
- Archived disaster damage data and media reports on disasters in Vietnam;
- Hydro-meteorological data for river basins and regions throughout the country; and,
- Additional archived Disaster Management Reference Materials.

The Intranet will be regularly updated with essential corporate information and serve as a general reference tool for disaster managers in their day-to-day work. Senior decision-makers for their part, will be able to rely on the Intranet for much of the key information that they need to make urgent decisions Essentially, the

Intranet will act as a tool for preserving the SOCCFSC's institutional memory, thereby contributing to the preservation of Vietnam's disaster management traditions as the country modernizes.

The disaster communication system, though very important, is far from the only information system used by the SOCCFSC. As the main co-ordinating body for disasters in Vietnam, responsible co-ordinating disaster response measures, for collecting official damage data, for issuing disaster warnings, and for keeping Vietnamese leadership informed of the latest official information on disasters, the SOCCFSC is the nexus for several types of essential disaster information, and uses various information systems both to obtain key data and to disseminate the collected and treated information to the appropriate recipients.

Perhaps the most important of these systems is the SOCCFSC's automatic link to the Hydro-Meteorological Service's vital flood and typhoon forecasts. The forecasts are received up to four times per day and form, along with the SOCCFSC's computerized mathematical models of discharges on major reservoirs, the basis of the SOCCFSC's disaster warning work. Other systems, adopted and being developed with the assistance of the UNDP Disaster Management Unit, include a Geographic Information System (GIS) and a bilingual public-information Website.

The GIS is being developed, as a simple way to organise and present highly complex disaster management and relief needs data on Vietnam. The GIS will be a vital decision support tool for Vietnamese disaster management officials, because by presenting disaster-related information graphically, it simplifies analysis of disaster situations. As a result, disaster management officials are better able to identify where and what resources to commit to fight disasters in Vietnam.

GIS is particularly efficient at producing thematic hazard and vulnerability maps. By identifying selected variables (economic value, population, flood risk, and age of infrastructure for example), the GIS can identify risk areas and clarify how best to respond to or to mitigate the risk of disaster. Similarly, the GIS can display disaster damage data, which makes it easier for international organisations and Vietnamese decision-makers to target disaster relief aid

Thus far I have mainly discussed how the SOCCFSC is using information systems to streamline its operations and to disseminate disaster information within the organization. Yet it is important as well to make disaster information available to the public. The SOCCFSC's mechanism for this has been Internet Web technology With the help of the Disaster Management Unit, the SOCCFSC maintains a bilingual, Web-based, public information system for:

- Encouraging information sharing on disasters amongst disaster-management projects in Vietnam, regardless of sector; and,
- Disseminating key information on disaster management in Vietnam to the national and international aid community.

This Disaster Management Website was also the prototype for the SOCCFSC Intranet mentioned above. As a result, the content of the public information system is similar to that which being created for the Intranet, though of course the Intranet will contain much additional, strictly internal information and documents used by the SOCCFSC and Dyke Department in their daily operations.

Some of the key information provided in Vietnamese and English on the Website includes.

- Summaries of disaster conditions in Vietnam and announcements of storm forecasts and warnings.
- Official Damage Assessment Reports released by the Standing Office of the Central Committee for Flood and Storm Control;
- Archived disaster damage data and media reports on disasters in Vietnam;
- Disaster Management Reference Materials; and
- A database of DMU sponsored and other disaster management programmes in Vietnam (training projects, humanitarian aid, etc.).

The Website is constantly expanding New features to be added to it, as to the Intranet, include links to other

organisations involved in Disaster Management, thematic maps imported from the GIS, engineering and technical guidelines, and official notices from the Government of Vietnam.

Now, the SOCCFSC has developed the various information systems I have mentioned incrementally. Each of these systems was adopted to fulfill a particular information service need within the SOCCFSC. Yet the main information management achievement so far of the SOCCFSC has been the success with which the various technologies are being combined to form an integrated "package" of disaster management strategies and technology truly adapted to organizational structures and procedures in Vietnam.

The disaster communication system furnishes rapid disaster assessment data, which disaster managers use to target response and relief to those areas and people in greatest need. Yet these data can now also be input into the GIS system Based on the new data, the GIS system produces hazard or vulnerability maps that can be posted on the Intranet or public disaster communications Website, respectively for the use of decision-makers and for the use of the public and the international donor community. Similarly, the official hydro-meteorological reports, based on which the SOCCFSC sends official directives via the disaster communication system to its staff in the field, are posted on the Website. For that matter, the SOCCFSC supplements the official hydro-meteorological bulletins with forecasts, satellite images, and graphics downloaded from the Internet: notably from the websites of the American joint Typhoon Warning Centre and from the Regional Office of the World Meteorological Organization in Japan.

As this package of services of information services is further integrated and developed, it prepares the ground for the integration into SOCCFSC operations of other new information systems. For instance, the SOCCFSC is currently preparing to pilot Radar satellite imagery for operational flood monitoring as it was so successfully employed in China in 1998. Yet it is the forecast data obtained from the Vietnam Hydro-meteorological Service and from international meteorological sites on the World Wide Web that will permit the SOCCFSC to target and time radar satellite imagery shots to coincide with peak flood periods and typhoons, and thereby strengthen the disaster management capacity of the SOCCFSC as well.

The key to Vietnam's success, thus far, in introducing such information systems is that the development of the country's disaster management needs has paralleled the development of technologies. Is there, then, a general lesson to this other than the importance of an incremental, step-by-step approach to the introduction of information systems for disaster management? I'm not sure, but it might be this: that one should not underestimate the capacity of developing nations to adapt and make efficient use of information systems for disaster management, provided that what is introduced closely matches existing indigenous disaster management procedures and culture.