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Managing Emergency in Hong Kong, China

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Abstract

People living and working in cities today eagerly want to lead active lives in complete safety and security. This compels individual government to be more responsive and accountable in making his/her city a safer place to live. Otherwise, any upsurge of disaster may turn into significant political repercussions.

The purposes of this applied research project which was a descriptive one were (a) to investigate the effectiveness of the emergency management system of Hong Kong, China, (b) to identify the common areas of major concerns throughout the course of managing emergencies and (c) to draw up a framework and general guidelines to facilitate the preparation/formulation of emergency plan by individual department of the Hong Kong Special Administrative Region Government (HKSARG) where appropriate contingency plans may not be in hand.

The research method covered multiple cases study with multiple sources of information gathered from interview(s) to key persons/case officers; access to related government publications/press clippings/archival records as well as researcher's direct observation. Besides, similar experience from New South Wales, Australia that had comparable geographic and demographic situations to Hong Kong was also taken into account. Four notable cases, which related to biological and natural disasters and put great challenges to their governments, were selected to enable better understanding of the emergency management system being examined. The selected cases were Avian Flu and Typhoon York in Hong Kong, China, and Newcastle Disease and Sydney Hailstorm in New South Wales, Australia. In meeting the purposes of this applied research project, the following questions will guide the research:

(1) What are key themes, issues and approaches in the relevant literatures about managing emergencies, including the organization of emergency service and/or best practice in responding to particular crisis?

(2) How effective and efficient did the HKSARG respond to the Avian Flu and Typhoon York?

(3) How effective and efficient did the New South Wales State Government respond to the New Castle Disease and the Sydney Hailstorm?

(4) What lessons, if any, might arise for the HKSARG as a result of comparing other experience/best practice when responding to similar emergencies in the future?

Results of this study indicated that both governments commonly adopted a comprehensive approach and an all-agency approach in managing emergencies. The emergency management systems practiced in Hong Kong and New South Wales had their own merits in that they were both specially designed and geared to different disastrous scenarios. In general, both countries could manage most of the disasters effectively and efficiently. However, the cases of Avian Flu and Sydney Hailstorm did leave rooms for improvement.

As regards recommended measures for managing emergencies more effectively and efficiently, in particular under the possible impact of second wave, the comprehensive approach and all-agency approach underpinned by Incident Command System, computerized technology, crisis communication skills and industry/public engagements should be generally and wisely applied.

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Introduction

People living and working in cities today eagerly want to lead active lives in complete safety and security. Hong Kong has in the past encountered difficult issues such as Avian Flu and typhoons. The New South Wales State Government had to manage similar issue with a local outbreak of Newcastle Disease and the Sydney Hailstorm. All these incidents had devastating effects to the general public and required massive mobilization of emergency services. In each case, the overall effectiveness and efficiency were subject to public criticism, and resulted in a number of lawsuits and political crises.

The purposes of this Applied Research Project are (a) to investigate the effectiveness of the emergency management system of Hong Kong, China, (b) to identify the common areas of major concerns throughout the course of managing emergencies and (c) to draw up a framework and general guidelines to facilitate the preparation/formulation of emergency plan by individual department of the Hong Kong Special Administrative Region Government (HKSARG) where appropriate contingency plans may not be in hand.

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The research approach was a descriptive one. The research method adopted multiple cases study approach with multiple sources of information gathered from interviews to key persons/case officers; access to related government publications/ press clippings/ archival records as well as researcher’s direct observation.

Background and Significance

In Hong Kong, its climate, physical geography and geology make it prone to a range of emergencies resulting from natural hazards. Moreover, its industrial and logistic hub developments and activities entail a variety of emergencies resulting from other hazards such as transport mishaps and industrial accidents involving hazardous materials. These emergencies may imperil life and property, and cause substantial economic losses and business disruptions. The problem could further be compounded by the ever-increasing concern over environmental protection and government transparency. The consequences of any disasters would be significant. The importance of having an effective emergency plan and providing efficient response to emergencies is therefore obvious and assertive. This

compels the government to be more responsive and accountable for making the city a safer place to live and work. Otherwise, any upsurge of disaster may turn into significant political repercussions. Yet information is often unclear and media activity can interfere with rescue operations. In the face of particular crisis episodes, the task of managing emergencies has gained in priority in a number of authorities having jurisdiction.

In Hong Kong, a dedicated Emergency Response System under government administrative commitment has been adopted to handle extreme emergencies. The system is managed and operated within a hierarchy. Accordingly, sets of contingency plans have been promulgated. For instance, the Contingency Plan for Natural Disasters details the alerting system and organizational framework for responding to disasters resulting from inclement weather such as heavy rainfalls, storm surges, thunderstorms and tropical cyclones. Other specific contingency plans such as contingency plans for Daya Bay Nuclear Powered Plant, Salvage of Crashed Aircraft and Response to Terrorism etc. are also in place for handling different identifiable emergency situations. According to the contingency arrangements, voluntary services such as the Auxiliary Medical Services and the Civil Aid Service may be called in to provide supporting services. Outlines of the emergency management system in Hong Kong and a flow chart of the Emergency Response System are at Appendix A and Appendix B respectively.

Both Hong Kong and New South Wales, Australia have a sub-tropical climate and are prone to natural disasters including severe storms, floods and cyclones. These two areas are also densely populated. Hong Kong is crowded with 6.7 million people in a tiny place whereas in New South Wales about 6 million people live in the coastal strip from Newcastle to Wollongong. Urbanization in New South Wales has also exacerbated the risk potentials as more and more people are now moving into the more hazardous areas such as the flood plains and storm-prone coastal fringes. In New South Wales, the government also acknowledges the inevitable nature of emergencies and the social, economic and environmental consequences, and fully recognizes the need for a coordinated response by agencies concerned. The enactment of the New South Wales State Emergency and Rescue Management Act 1989 provides a legislative basis for the overall co-ordination of emergency operations. Under a partnership approach, voluntary services such as the Rural Fire Services and the State Emergency Services could be assigned as the designated combating agency. Outlines of the emergency management system of New South Wales are at Appendix C.

To facilitate better understanding, comparison and contrast findings of the emergency management systems in the two places are attached at Appendix D with salient points summarized in Table 1 below.

Table 1 – Comparison and Contrast Findings of the Emergency Management Systems in Hong Kong and New South Wales

New South Wales	Hong Kong
Operated under legislative directive	Under Government administrative commitment
Partnership approach	Hierarchical approach
Adopt an all agency approach	Adopt an all agency approach
Adopt a comprehensive approach	Adopt a comprehensive approach

New South Wales	Hong Kong
Voluntary services could be assigned as a designated agency such as the NSW Rural Fire Services and the State Emergency Services	Voluntary services such as the Auxiliary Medical Service and Civil Aid Service only play an supporting role
No specific media strategy	A well-structured media strategy is in hand to handle/oversee crisis communication matters such as the organization of the Emergency Monitoring and Support Centre and Inter-departmental Helpdesk, and the proactive involvement of Information Services Department
State Emergency Management Committee is assigned to have full responsibility for the prevention of all kinds of hazards and review appropriate emergency management measures	Contingency planning rests on the initiative and responsibility of individual Policy Secretary. However, there is no coordination mechanism for emergency management across policy areas
In case there is no designated combat agency to respond, the State Emergency Operations Controller would automatically take the lead	In case emergency situation involved more than one policy area, it takes time to identify and establish the most suitable/ultimate responsible agency

From the episodes mentioned above, there are at least two aspects of emergency services that warrant attention. First is the structure of the organization to manage emergencies in particular jurisdictions. And second are the processes by which particular emergencies are actually handled. Only by reviewing past experience of what worked, what failed and why, can maximum preparedness be developed for subsequently/invariably unforeseeable issues. Hitherto and oftentimes, domestic experience has been the primary reference point in developing new approaches or reviewing existing practice. While this continues to be critical, comparing the experience of other countries when considering new policy approaches or when evaluating existing frameworks can help identify pitfalls that may not be immediately obvious. Such comparisons can also help identify the varying ways that are available to meet specific objectives.

This ARP directly relates and supports the United States Fire Administration's operational objectives of (a) improving the fire and emergency services' capability for response to and recovery from all hazards and (b) improving the fire and emergency services' professional status.

Literature Review

The purpose of the literature review was to explore the key themes, common concerns and approaches associated with emergency management, including the organization of emergency services and the best practice in responding to a particular crisis. In addition to theoretical works, references were also made to empirical studies contained in some professional journals and international conference papers. Lessons learnt from past notable disastrous incidents that were relevant and useful to meet the research objectives were also taken into account.

As summarized by Fritz (1961), a US pioneer of disaster research and quoted by Fischer (1984), emergencies are defined as follow:

> "actual or threatened accidental or uncontrollable events that are concentrated in time and space, in which a society, or a relatively self-sufficient subdivision of a society undergoes severe, and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfillment of all or some of the essential functions of the society, or its subdivision, is prevented".

In essence, an emergency is a significant and rapid degradation in a population 's status quo that exceeds its ability to cope (Kelly, 1996). It implies elements of magnitude, the need for taking action and the necessity of a timely response (McMullan, 1997). In general, an emergency may relate to any one type or any combinations of the following hazards:

(1) natural hazards such as hailstorm and cyclone;

(2) biological hazards such as Newcastle Disease and Avian Flu;

(3) technological hazards such as Y2K problem; and

(4) civil/political hazards such as terrorism.

Managing emergencies is described in a variety of ways. Amongst other names, emergency management, crisis management, disaster management and disaster planning are widely used. Nevertheless, they are more or less referring to the same subject. Managing emergencies is "… the range of activities designated to maintain control of disaster… and to provide a framework for helping at–risk persons to avoid or recover from the impact of the disaster" (Cuny, 1992).

All-agency Approach

Since there are wide differences in the organization of government structures and geographic availability of emergency resources, there appears to be no definitive managing emergency model. In most places, although not everywhere in the world, much emergency management is agent-specific in that there is a tendency to organize separate and distinctive planning around specific disaster agents (Quarantelli, 1992). The agent-specific approach assumes that each type of disaster agent possessed certain distinctive characteristics that have consequences for what occurs. Thus, there often exist separate plans for disaster resulting from hazardous chemicals, hurricane, nuclear failure, flooding and so on. Since there is a need for organized search and rescue or large-scale delivery of other emergency services, the more important organizational aspects that have to be dealt with do not depend on the

specific agent in the situation (Quarantelli, 1983). In an all-agency approach, multiple agencies are oftentimes involved in emergency management, particularly in large scale or territory-wide disastrous incidents. The all-agency approach recognizes that many agencies and organizations have statutory and/or moral responsibilities to the community, and are expected to play a role in one or more stages of emergency management. From empirical observation, the all-agency approach is commonly recognized and widely practiced in many countries. These include the US Federal Emergency Management Agency (FEMA), the UK County Emergency Planning Offices, Emergency Preparedness Canada, Australian State Emergency Management Committee and the Government of Hong Kong Special Administrative Region Government (HKSARG).

Comprehensive Approach

An emergency management cycle essentially comprises four stages. They are stages of prevention, preparation, response and recovery (Perry, 1985). In relation to an emergency:

(1) Prevention includes the identification of hazards, the assessment of threats to life and property, and the taking of measures to reduce potential loss to life or property.

(2) Preparation includes arrangements or plans which are developed to provide for the mobilization of the emergency management structure and resources at those levels to deal with an emergency or the effects of an emergency.

(3) Response includes the process of combating an emergency and of providing immediate relief for persons affected by an emergency. The aim of responses is to save life, protect property, and render an affected area safe.

(4) Recovery includes the process of returning an affected community to its proper level of functioning after an emergency.

These four stages being identified as a cycle in the philosophy of modern emergency management are processed in a comprehensive manner, and precisely known as a comprehensive approach.

Incident Command System

A supplementary tool for promoting emergency management is the Incident Command System (ICS) developed in USA. The ICS could be regarded as a consequence of a wild land fire that consumed large portions of Southern California in 1970 (Moore, 1989). The paramount object of the ICS is to enable different agencies and jurisdictions to work together towards a common goal in an effective and efficient manner. The structure of the ICS can be established and expanded depending on the size, type or changing circumstances of the incident. The ICS is designed to begin developing from the time an incident occurs until the need for management and operations no longer exists. It is intended to be staffed and operated by qualified personnel from any emergency services agency and could involve personnel from a variety of agencies in a large-scale disaster.

Indeed, the ICS is based on business management practices and comprises four functional areas (Federal Emergency Management Agency, 1999):

(1) Command – This area includes an Incident Commander who has the

overall management responsibility for the incident. A Command Staff element is provided for handling such matters as Public Information, Safety and Liaison so as to develop a common and consistent plan to make best use of all available resources.

(2) Operations – This area is headed by an Operation Section Chief who is responsible for gathering and analyzing all data regarding operations and assigned resources, developing alternatives for tactical operations and preparing action plans.

(3) Logistics – This area is headed by a Logistics Section Chief and is responsible for providing all support needs to the incident. This section would order all resources and provide facilities, transportation, supplies, equipment maintenance, fueling, feeding and medical services.

(4) Finance – This area is established on incidents when the agencies involved have a specific need for finance services, such as tracking costs in order to apply for disaster reimbursement funds from the Government.

An adaptable ICS organizational structure comprises eight major components to ensure a quick and effective resource commitment and minor disruption to the existing system. These components include:

(1) Common terminology to prevent confusion with incident names;

(2) Modular organization to provide the foundation for developing the line organization structure;

(3) Integrated communications to use a common communications plan, standard operating procedures, clear text and common terminology;

(4) Unified command structure to share the overall management responsibility for an incident;

(5) Consolidated action plans to identify the strategic goals, tactical objectives and support activities;

(6) Manageable span-of-control to ensure that each supervisor can manage effectively;

(7) Designated incident facilities either to be available from the Command Post, the base or the staging areas; and

(8) Comprehensive resource management to maximize resources use, consolidate control of single resources and reducing the communication loads.

The framework and practice of the ICS have been fine-tuned after a number of catastrophic incidents, including Hurricane Hugo in Caribbean and South Carolina in 1989, Hurricane Andrew in South Florida in 1992, Great Flood in Central America in 1993, Laguna Beach Bush Fire in Los Angela in 1993, Angles Earthquake in 1994, severe weather which swept across Texas in 1997 and a bush fire across 11 states of USA in 2000.

Crisis Communication

When a crisis strikes an organization, normal management decision-making can be overtaken by fast moving events and short-circuited by a cacophony of voices and confusion. Facts about how the events occurred may be incomplete or unclear, and priorities are difficult

to sort out. People outside the organization may overreact, or those within may under-react, or worse, do nothing at a time when an effective response is vitally needed to deal with the emergency and help to restore the public's confidence. Undoubtedly, determining what constitutes a correct response is never easy. Very often, short-term gains must be weighed against the potentials of lawsuits and even long-term survival. Public safety must be measured against the potential for undue alarm. The need for crisis communications becomes obvious and essential for enabling an organization concerned to control the situation instead of letting the situation to control itself.

Public relations are another paramount element in almost all-successful crisis management (Marra, 1998). Today, appropriate handling of public relations is imperative. What happens in the absence of adequate and accurate information was illustrated by the Piper Alpha disaster as illustrated below:

> "The initial problem, which has been reflected in other disasters, was the sheer chaos, confusion and lack of information. The last of these led, almost inevitably, to a welter of rumors moving into the vacuum" (Riley & Meadow, 1997, p16)

Years ago, Johnson & Johnson acted in one way to a real tampering of extra-strength Tylenol in which seven people died. Pepsi-Cola Co. took a different approach during what turned out to be a hoax when reports started surfacing that syringes had been found in cans of Diet Pepsi on 13 June 1993. The Pepsi-Cola Company set up a 12-person crisis management team next day with Mr. Craig Weatherup (President of Pepsi-Cola North America) as the team leader. The team operated on the premise that the incidents were unrelated hoaxes. The premise was based on the extreme difficulty of tampering with the product during the production process, the obviousness to the consumer of any tampering, and the fact that the incidents must have been unrelated since they concerned cans produced six months apart in different sites. The team began telling its story to the media, with particular attention to the electronic media. After the release of a surveillance tape on 18 June 1993 showing a woman putting a syringe in a can at a supermarket, the situation started to calm down (Steve, 1993). If the company failed to keep the public well informed on the situation, the people start making up their own minds and the crisis becomes media-fed. In the event of crisis, candor is better than getting caught in an untruth (William, 1993). It is important to work from a written statement to try to anticipate questions and rehearse answers in advance. If someone asks a "loaded" question, it is important to defer the response by asking for time to research the answer. In essence, an initial statement to the media should cover at least three major points:

(1) Acknowledge the facts of the crisis, including what happened, where and when;

(2) Define the immediate impact of the crisis; and

(3) Describe the immediate response.

Key elements for effective crisis communications (Cos, 1994) should include the following:

(1) A contact list including back-up members should be maintained and regularly updated;

(2) A spokesperson who has an in-depth knowledge of the company and operation and reacts calmly under pressure should be designated to handle

the media;

(3) Training for potential spokespersons for better communication skills when under fire should be available;

(4) Someone should be in charge at the incident to maintain communication with the local media if necessary;

(5) Set up of a command centre with the provisions of additional phone lines and other resources may be needed;

(6) Company positions on volatile issues should be delineated in a 'white paper' and circulated to potential spokespersons;

(7) Effects of media attention need to be measured;

(8) Conducting a series of focus group meetings may be useful in maintaining continual communication with key audiences;

(9) Employees in particular should be made aware of the company's position at the outset as their reactions (positive or negative) greatly influence company morale, and can affect public opinion; and

(10) Post-crisis communication should be continued to reassure the public and notify them when the normal situation is resumed.

Setting Up of a Help Line

The establishment of a help line could be an advantage in strengthening the media strategy in the course of managing an emergency. What Coca-Cola should have done when 200 people fell ill, including 100 children in Belgium after possibly drinking Coke was to set up a help-line (Rachel, 1999). In the case of a health scare, the need to offer immediate advice and reassurance is even greater. Days had elapsed before Coca-Cola acknowledged the contamination of some bottles of Coke in Belgium. Further days passed before the company's response by recalling 2.5 million bottles and issued a statement. Eventually, Philip Lenfant, Director-General of Bottling at Coca-Cola Enterprise in Belgium, admitted that he had perhaps lost control of the situation to a certain extent. Setting up a dedicated help-line enables a company to provide consistent information and an external call centre can handle large volumes of calls while the company fixes the problem.

Information Technology

As a corollary, technology breakthroughs have a direct bearing on crisis communication. New communications techniques however have transformed the arena in which the public relations professional has to operate. Links with the world are becoming obviously vital in a crisis. When thousands died at Bhopal, India in the worst industrial accident in history, there was no CNN to break the news worldwide in minutes, and there was no facsimile line between Union Carbide's headquarters in Danbury, Connecticut and Bhopal. Nowadays, the story can spread within hours to all other markets, and consumers will not differentiate between a poisoned chocolate bar in New York and one bought in Manila (John, 1994).

Media Strategy

When a problem hits, the crisis team is trying to concentrate on dealing with the problem and the media. This can easily lead to a situation where reality is lost, and the team's responses are determined solely by what the media are saying. Crisis managers must anticipate more because of the pressures of instant worldwide communications, and they must take a much broader view of potential sources of trouble. A continuing routine corporate public relations program plays a key role in ensuring that the organization is in a strong position before it finds itself in a crisis. Strategic employment of media strategy can also allow the crisis management team to know what their key stakeholders are really thinking and saying. Besides, criticism from politicians and special interest groups who make use of a crisis to gain political or other advantage should in no way be underestimated. In this age of the "copycat", major crises such as the Pepsi and the World Trade Centre bombing are likely to be followed by more than the usual share of hoax calls and threats, each becoming a mini-crisis of its own. By anticipating and intervening proactively, the crisis team can have more influence (John, 1994).

It is therefore critical that preparation should start by assigning the responsibility for media relations to one person, preferably someone with public relations skills and training. Only one person should speak for the organization during an emergency. Besides, a well-defined communication policy that outlines the roles and responsibilities of employees related to media communication should be established. Forming a relationship with the local media representatives is also critical and essential so that the organization becomes a known personality in the community (William, 1993). It is an added reason why issuing an early statement, and establishing the organization as an authoritative information source is so important.

Computerized Technology

Associated with the advance of technology, the employment of modeling techniques (such as optimization, simulations and risk analysis) and the appropriate use of computerized decision-support model could well assist emergency managers to mitigate the potential impact of an event (Tufekei & Wallace, 1998). By using databases with details of key groups, messages can be quickly dispatched to vast audiences. Although some consumers may find the Internet so impersonal, it is anyhow a powerful tool for people to access information (Rachel, 1999). On the other hand, Geographical Information System (GIS) is also a powerful tool of managing emergency (Clarsen, 1993) for the purposes of:

(1) Providing support for general spatial query and analysis operations in the course of formulating emergency plans;

(2) Providing support for the dispatch and control of emergency response units during crisis; and

(3) Facilitating simulation during an emergency response operation.

Civic Awareness

Regarding human behavior, it seems that people tend not to be interested in preparedness, and are unwilling to take preventive measures themselves (Larsson & Enander, 1997). Weinstein (1984) suggested several reasons. One reason behind the lack of willingness to prepare may be that people judge it to be highly unlikely that they will find themselves in an accident or disaster situation. People tend to believe that they are less vulnerable than others, a belief which is sometimes termed "unrealistic optimism". Other

reasons for the lack of action may be that people do not know what they should do, or believe that preparations are of little or no use if an accident or disaster should occur. However, once the threats for public safety have been identified, and planned for, the next logical step is to publicize the situation and develop community education programs so that the public is aware of the existence of a plan and react rationally. This not only helps them to minimize life loss/injury and property damages, but would also avoid preventable chaos (Murray, undated).

Community and Industry Involvement

Parallel to the importance of civic awareness, self-discipline and commitment of the public is equally critical. Rather than wait for help after a catastrophe, people and businesses can take specific steps to save lives and cut potential losses before a disaster strikes. The Federal Emergency Management Agency (FEMA) years ago unveiled a series of disaster prevention initiatives and corporate partnership in support of its program, namely Project Impact: Building a Disaster-Resistant Community (Nakicenovic, Grubler & McDonald, 1999). An important part of FEMA's disaster prevention initiative is to encourage property owners to take responsibility for their choices. The strategy encourages house owners not to build their houses within a floodplain, to have buildings with storms/earthquake resistant ability and/or to have retrofitting of up-to-date building fire protection installations. In Hong Kong, a similar community participation program known as the Fire Safety Ambassador Scheme was launched in 1997 after a spate of tragic fires. Among the notable ones are the Garley Building Fire on 20.11.1996 and the Top One Karaoke Fire on 25.1.1997, claiming 47 deaths in total. The purpose of this scheme is to promote community involvement in fire protection through the enhancement of fire safety awareness and civic responsibility of abating fire hazards.

Stress Counseling to Emergency Workers After Critical Incident

Another paramount consideration rests on the emergency workers themselves. It is often assumed that emergency workers are tougher than most and good at suppressing their feelings (Moran & Colless, 1995). Stress counseling to emergency workers after attending critical incidents is of paramount importance and should under no circumstances be neglected.

Summary

The ideas outlined in the literature provide a theoretical framework as well as key themes, issues and approaches for managing emergencies. In the past, domestic experience has been the primary reference point in developing new approaches or reviewing existing practice. This continues to be critical. But three factors – convergence in agendas between Hong Kong, China and New South Wales, Australia, the impact of new technologies, and parallel political and public pressures – mean that comparative experience is now more relevant and practical. Although there is no definitive model on managing emergencies, experience is the best teacher. Comparing the hard-earned experience of other countries when evaluating existing frameworks can help identify pitfalls that may not be immediately obvious.

In line with the definition of emergency management requiring massive mobilization of resources and coordinated efforts, the comprehensive approach and the all-agency approach are the core elements in managing emergencies. To gain better control and coordination

over emergencies, many developed/developing countries have integrated the Incident Command System into their respective emergency management systems. On the other hand, various management skills (such as crisis communications, stress counseling, and community education) and computerized technology are other prerequisites in addition to those incident nature-related counter measures.

Procedures

Multiple Cases Study

Hong Kong and New South Wales each has its unique emergency management system in place to handle disastrous situations. In the course of design and implementation, these systems were under critical evaluations through brainstorming, simulations, tabletop exercises, practical drills etc. Nonetheless, the ultimate situations in a real incident could be unexpected or overtaken by events, rendering possible difficulties in the application of the predetermined management measures, particularly in the outset of the incident. Their overall effectiveness and efficiency could thus be adversely interrupted or undermined. The most practical way to attest the efficacy of the emergency management systems is by real-life incidents. The researcher therefore decided to apply case study as they allow an investigation to retain the holistic and meaningful characteristics of real-life event.

Yin (1989) remarked that case study had long been stereotyped as a weak sibling among social science methods. Researchers who did case studies were regarded as having deviated from their academic discipline. In spite of this stereotype, case study continued to be used extensively in social science research, including the traditional disciplines as well as practice-oriented fields such as public policy. In general, case study was the preferred strategy when the researchers had little control over events and when the focus was on a contemporary phenomenon within some real-life context. Moreover, case study enabled the researchers to deal with a full variety of evidence such as documents, artifacts and observations that were not usually included in the historian's repertoire. In fact, some areas of research, particularly in government evaluative situations and community-based program, often use case study techniques extensively. Having said that, there was a frequent criticism of case study methodology in that its dependence on a single case rendered it incapable of providing a generalizing conclusion. In the light of this, this research utilized multiple cases study by giving special attention to the completeness in observation, reconstruction and analysis of cases being selected. The cases covered the incidents of Avian Flu and Typhoon York in Hong Kong as well as Newcastle Disease and Sydney Hailstorm in New South Wales. In the course of managing these emergencies, interventions at various stages of the incidents were effected. With the benefit of multiple cases study, the researcher attempted to explain the causal links in real-life interventions that were too complex for the survey or experimental strategies, and to describe the real-life context in which interventions had occurred.

Multiple Sources of Evidence

To avoid potential subjectivity and to ensure validity on the collected data and information (Stake, 1995), the researcher had endeavored to use multiple sources of evidence including documents, archival records, interviews, direct observation, participant-observation and physical artifacts as suggested by Stake (1995). Accordingly, the sources of evidence contained in this study mainly comprised:

(1) Government Publications – References were made to some of the contingency plans, emergency manuals and relevant pamphlets/brochures promulgated by the HKSARG and the State Government of New South Wales. Throughout the course of investigation into this information, better knowledge on the set-up and operation of the emergency management system in individual area was acquired.
(2) Press Clippings - With the benefit of the Reuters Business Review available on Internet, the researcher was able to reconstruct most facts and figures relating to the selected incidents.
(3) Archival Records – Official weather records on Typhoon York and Sydney Hailstorm were obtained for tracking the incidents' development. On the other hand, references were also made to the official press release for the Avian Flu and Newcastle Disease.
(4) Interviews – During the period between October 1999 and December 1999, the researcher attended an official overseas training in the Australian Graduate School of Management (AGSM), Australia. In the course of associated management and counterpart visits, the researcher interviewed some senior government officials who had performed key roles and functions during the incidents of Sydney Hailstorm and Newcastle Disease. They were Mr. Ross Brown (Secretary for the New South Wales State Emergency Services Management Committee), Mr. John Purdie-Smith (CEO of the Southern Sydney Recovery Task Force), Dr. R.E. Jane and Mr. Robin Scott (Chief Veterinary Officer and Operations Director of the New South Wales State Agriculture Department respectively) and Mr. George Irwin (Hazard Reduction Officer of the New South Wales Fire Brigade). The interviews were conducted on 26 October 1999, 3 November 1999, 10 November 1999 and 22 November 1999 respectively. On the other hand, the researcher also interviewed Peter Yen (Agriculture Officer of the Agriculture, Fisheries and Conservation Department who was the then subject officer of the Avian Flu) on 4 March 2010 and Mr. Kent Yau (Assistant Secretary of the Security Bureau) on 5 March 2010 on the subject of the HKSAR Government Emergency Response System.
(5) Direct Observation - As a public fire officer, the researcher witnessed the whole process of Typhoon York and Avian Flu in Hong Kong. Owing to operational requirements, the researcher was called for duty during these two incidents. In the course, the researcher was kept well informed on the incident development and had been involved in logistics and support arrangements. Regarding the Sydney Hailstorm, the researcher also had opportunities to see the post-incident situations and arrangements in the Randwick area where traces of damages by hailstones were observed. Apart from these, observations and views from the college students of the New South Wales University, which was within the damaging zone of this hailstorm, were sought during casual conversations.

Evidences Analysis

"Analyzing case study evidence is especially difficult because the strategies and techniques have not been well defined in the past." (Yin, 1989, p.105) At the very beginning, the gathered information and data were primarily used to reconstruct the events. Due references were made to the structure of individual emergency management systems as well as technological and resource variables as they might have a crucial impact on what had happened. Each event was subsequently put in chronological order and categorized into four critical stages (prevention, preparation, response and recovery) for facilitating better understanding. Unavoidably, there were several interventions during the incidents, either under predetermined arrangements or subject to group pressures, or changing environment and so on. Particular attention was thus made to these effects as they might have impact on

the outcome of the situation. Having established the facts under multiple sources of evidence, cases under the same nature of hazard were grouped and presented together. The purpose was to help analyze and evaluate the overall effectiveness and efficiency. Up to this juncture, the researcher did not jump to any conclusions but attempted to identify the shortfalls and the best practice.

The final question was what could have been done to enhance the performance standards in the future. As mentioned in previous chapter, there was no definitive model on managing emergencies. In the absence of theoretical propositions, the goal was to analyze the collated data by building an explanation for the cases. The outcome however was not to conclude this study but to develop ideas for further study.

Summary

With a view to strengthening the validity and relevancy of this study, the researcher decided to use multiple cases study under multiple sources of evidence to form the basis of this study. In the ensuing chapters, detailed examination and critical analyses of the four selected cases under the category of biological hazard and natural hazard were made. In order to maintain impartiality, both government and public views through the means of official publications and press clippings were encompassed in subsequent deliberations. Observations from the literature review were applied to assist in evaluating the overall effectiveness and efficiency of the emergency management systems in Hong Kong and New South Wales. Based on the findings, framework and general guidelines to facilitate the preparation/formulation of contingency plans by individual government department in HKSARG, where appropriate contingency plan might not be in hand, were drawn up.

Limitation of the Study

First, in drawing parallels between Hong Kong and New South Wales, the different setting in government structures necessitates careful consideration. The HKSARG is under one central administration whereas New South Wales encompasses layers of government structures at Federal, State and local levels. Therefore any lessons learned in one jurisdiction in terms of coordination, control and implementation of policies may not be fully applicable in the other jurisdiction.

A second consideration is document confidentiality. Albeit the researcher under his incumbent duties could have ample opportunities to gain access to those government contingency plans classified as confidential/restricted documents, the researcher is legally bound by the Official Secret Act, inter alia not to reproduce/divulge the information therein inappropriately. Nevertheless, the researcher would uphold a conscientious and honest attitude towards the interpretation of this privileged information.

Last but not the least, both the Sydney Hailstorm and the Newcastle Disease caused many medium interests at the time and public outcries over government performance. These unpleasant incidents remain sensitive subjects with political overtones at the time when the researcher probing into the cases years ago. Understandably, certain privileged information was withheld and could not be accessed.

Delimitation of the Study

As mentioned in the preceding paragraph, the definition of emergency is very wide-ranging. It is therefore necessary to narrow down the scope of study to natural hazard and biological hazard to enable succinct analyses and precise presentation.

A second consideration is the possible cultural difference in the two places. People in the community at large are indeed the major stakeholders. The level of civic awareness, general attitude and response towards emergency situations could have direct bearings on the emergency management system itself. Having said that, it is extremely difficult, if not totally impossible, to substantiate the direct relevancy of different culture within a particular setting of emergency management system. In the light of this, the researcher did not probe into cultural factors in this study.

Results

In the first part of this chapter, detailed examination and critical analyses of the two selected cases under the category of biological hazard were made. They were the H5N1 Avian Flu in Hong Kong and Newcastle Disease in New South Wales. Brief incident outlines, generic-handling procedures under normal situations and specific emergency interventions were covered.

Case 1- H5N1 Avian Flu in Hong Kong

With references to the interview with Agriculture Officer Peter Yen of the Agriculture, Fisheries and Conservation Department (AFCD) and the relevant department annual report 1997/98, background information and courses of action taken for the subject event were recapitulated below.

Incident Outline

In 1997, a highly pathogenic H5N1 influenza virus attacked both chickens and humans in Hong Kong. This was the first reported case in the world that such a virus caused human fatality. The event attracted international media attention as speculation grew that it could represent the beginning of a new influenza pandemic. The outbreak reached a climax in late December 1997 after 18 people had developed clinical disease associated with this virus, including five fatal cases. At this point, a decision was made to:

(1) Depopulate all poultry markets and chicken farms;
(2) Clean up these premises thoroughly; and
(3) Suspend trade in live poultry temporarily.

These measures were successful in that no further cases have been detected in either poultry or humans since then.

Emergency Response System

During the outbreak, there was no specific emergency plan in place to coordinate responses for a virus disease affecting both animals and human beings. Individual

departments responded only within respective jurisdictions. The situation swiftly developed on a magnitude that could not be effectively dealt with by the departments alone at the level of Tier One Response. Consequently, the level of government response was progressively upgraded according to the Emergency Response System. First was the operation of the Emergency Support Unit (Tier Two Response) for the government secretariat to monitor closely the unfolding of the incident. Afterwards, the Emergency Monitoring and Support Centre (Tier Three Response) was operated under the personal supervision of the Chief Secretary for Administration.

Prevention Stage

Surveillance and Risk Assessment

The Department of Health (DH) and the then Agriculture and Fisheries Department (A&FD) had put in place surveillance systems to monitor and assess the risk of human and animal diseases respectively. The DH commanded an intelligence network within Hong Kong. Private practitioners were obliged to inform the DH of a wide range of suspected diseases including human infection of avian influenza. The A&FD routinely inspected local poultry farms to evaluate poultry health status and assess the risk of poultry diseases. Poultry farmers also reported cases of suspected diseases and unusual mortality to the A&FD for expert assistance.

Since some 75% of the live poultry consumed in Hong Kong were imported from Mainland China, there was also a close dialogue between the Mainland animal health authorities and the A&FD. Through such communication channels, A&FD was kept informed of major outbreaks of poultry diseases in the Mainland.

Quarantine and Import Control

Live poultry could only be imported via the designated import control point at Man Kam To. The A&FD quarantine staff conducted visual inspection on each consignment of live poultry and checked if a health certificate issued by the Mainland animal health authorities accompanied it.

On the other hand, A&FD collected samples from poultry farms in Hong Kong routinely for veterinary testing. Veterinary advice on safe and environmentally acceptable disposal of poultry carcasses was provided, and assistance for curing of diseases and disinfections was rendered.

Public Education

The DH regularly launched public health education programs to encourage public awareness of the risk of diseases and importance of personal hygiene in the face of possible threat of diseases.

The A&FD occasionally launched public health education programs on the safety of fresh food. It also provided extension services, technical assistance and seminars to promote awareness so that the risk of contamination and infection could be minimized.

Preparation Stage

There was no specific emergency plan for biological disasters as there was a lack of prior knowledge of the detrimental health risk to humans before the outbreak of this Avian Flu. Therefore the preparedness of the A&FD was geared to the arrangement, logistic support and resources deployment required to deal with more commonly found diseases. In fact, in all previous cases, common diseases like the Newcastle Disease, which had occurred in Hong Kong in the past, were effectively and swiftly dealt with within the means of the A&FD. However, the Avian Flu had developed on such a scale and with such complexity that it:

(1) Entailed a human health hazard;
(2) Required a large scale depopulation operation (1.5 million birds in 24 hours); and
(3) Necessitated multi-agency contributions.

Consequently, the A&FD was unable to manage all the tasks required within the desired time frame. Incident development and response actions taken in chronological order are detailed in Appendix E (interview with Agriculture Officer Peter YEN of the Agriculture, Fisheries and Conservation Department on 5 April 2000).

Response Stage

Response to the outbreak of the disease was basically in line with the 'Three Tier' Emergency Response System. The DH and then A&FD attempted to handle the case in the first instance. The disaster developed with so much complexity and on such a scale that could not be handled by the two departments alone. The matter was eventually escalated through the 'Three Tier System' and received the personal attention of the Chief Executive and the Chief Secretary for Administration. Meetings amongst Policy Secretaries and departments concerned were held to formulate directives and to coordinate logistic support. The most drastic action taken was the order issued on 28 December 1997 to destroy all poultry in markets and all chickens on local farms.

Recovery Stage

A task force personally headed by the Chief Secretary for Administration was set up immediately after the slaughtering operation to formulate a comprehensive action plan for recovery. The most significant decisions were to effect compensation and ex-gratia grants amounting to HK$100 million to compensate farms and traders' losses (including transport operators) and assist them to re-establish their business. At the same time, legislative amendments were passed to tighten up the imports of birds and poultry and the segregation of water fowls (mainly ducks and geese) from all other poultry at all stages of the production and marketing chain. Details of recovery actions are recorded in Appendix E.

Case 2 - Newcastle Disease in New South Wales

With references to the interview with the Chief Veterinary Officer Dr. R.E. Jane and Operations Director Robin Scott of the New South Wales State Agriculture Department and the Australian Veterinary Emergency Plan (AUSVETPLAN), background information and courses of action taken for the subject event were recapitulated below.

Incident Outline

The Newcastle disease occurred a number of times in the past few years. For example, the disease occurred at Tamworth in 1997, Western Sydney in 1998 and Mangrove Mountain in 1999. In this case study, concentration was made on the one that was more complicated and could fully reflect the operations undertaken by the New South Wales State Government.

For the Newcastle disease outbreak in Mangrove Mountain 1999, the virus was virulent. Response to the outbreak was in accordance with the national strategy as described in the AUSVETPLAN, in which the New South Wales State Agriculture Department coordinated the overall operations. All commercial and backyard flocks in the Mangrove Mountain were slaughtered and disposed of by burial or incineration.

Emergency Management

The emergency management strategy is mainly based on the State Disaster Plan (DISPLAN) under which the combat agency for emergencies relating to agriculture and animal services is the New South Wales State Agriculture Department. The Executive Director (Regulatory) is the coordinator in the DISPLAN. Under this plan, the New South Wales State Agriculture Department is responsible for the implementation of procedures in conjunction with the State and National authorities for the eradication or control of exotic animal diseases, including:

(1) Detection, diagnosis, risk assessment and surveillance of the disease;
(2) Destruction and disposal of infected animals, plants and products as required;
(3) Disinfecting of contaminated areas, buildings and vehicles;
(4) Programs for vector control;
(5) Quarantine controls for the movement of persons, animals and plants; and
(6) Provision of adequate trained staff to ensure quarantine requirements are observed.

AUSVETPLAN is a national technical response plan for the control and eradication of animal diseases including the Newcastle Disease. Therefore, emergency response is mainly based on this plan. In fact, AUSVETPLAN is based on the agreement among Commonwealth, State and Territory governments and primary producer representatives. It sets out, in a series of detailed manuals, how government veterinary and emergency agencies as well as rural industries will coordinate their efforts to respond to a suspected incursion by an exotic animal disease.

Prevention Stage

Public Education

Leaflets relating to the Newcastle Disease were published by the New South Wales State Agriculture Department to educate the public (in particular, the industry people - poultry farmers and processors) about the preventative measures, symptoms and the necessary actions when a disease was suspected. Periodic newsletters were also published to keep the industry people updated on the latest developments.

Hotline

The New South Wales State Agriculture Department had established a toll-free 24-hour hotline called “Disease Watch Hotline”. The hotline was automatically connected to a senior veterinary officer in the relevant State or Territory for answering queries from the public relating to animal diseases. It could help prevent occurrence of the disease and help its early detection.

Surveillance and Risk Assessment

The surveillance system was mainly based on Rural Lands Protection Boards and their district veterinarians and the senior field veterinary officers of the New South Wales State Agriculture Department.

Quarantine and Import Control

Australia had strict quarantine regulations controlling livestock industries such as beef and dairy cattle, sheep, pigs and poultry. The enforcement agent was the Australian Quarantine and Inspection Service (AQIS).

Preparation Stage

As discussed above, the AUSVETPLAN was the main technical response plan to deal with the Newcastle Disease. It set out the whole process for prevention of the spread and the elimination of pathogens such as quarantine and movement controls, tracing methods, surveillance requirements, treatment of infected animals, destruction and disposal methods, as well as decontamination procedures. It provided clear guidelines for the operation departments to prepare all their resources for standby purposes. In the outbreak of any animal diseases, the New South Wales State Agriculture Department could mobilize an adequate quantity of equipment and voluntary emergency workers to the affected site to carry out the slaughtering action within a short period of time. Moreover, the plan included strategies for quarantine and movement controls. The criteria for setting up Restricted and Control areas were also clearly laid down. Therefore, once there was an incident, the New South Wales State Agriculture Department could set up the two areas immediately. Furthermore, there was a funding and compensation scheme in the plan. The method of valuation of slaughtered animals had been set up in advance whereas the Commonwealth/States Cost Sharing Agreement covered the disbursement arrangements.

Response Stage

Newcastle Disease was suspected in chickens on a poultry farm at Mangrove Mountain on 29 March 1999. About one third of the chickens in one shed had symptoms of the disease. Diagnostic samples were collected and dispatched by the New South Wales State Agriculture Department to the Australian Animal Health Laboratory (AAHL) at Geelong on 30 March 1999 for analysis. The Commonwealth Chief Veterinary Officer, the New South Wales State Director-General and the Minister for Agriculture, were duly alerted. The affected farm was quarantined immediately and key industry people were advised on the incident at the same time.

Trained officers took up assigned posts in the State Disease Control Headquarters (SDCHQ) and a Local Disease Control Centre (LDCC). The former is situated in the New South Wales State Agriculture Department's office at Orange that is specially equipped. The nominated controller through the District Emergency Management Officer identified a purpose-built control centre and set it up for the Rural Fire Service as the base of operations in the event of positive diagnosis. This control centre was soon in operation and alerted operational staff to have their equipment on standby.

The response operation could be divided into two phases. The first operational phase covered only the depopulation and decontamination works on the first affected farm. However, during the second operational phase, more farms were found to be affected by the Newcastle Disease and therefore the action was stepped up. More resources were deployed to tackle the incident.

First Operational Phase

The disease was initially confirmed by AAHL on 1 April 1999. The Consultative Committee on Emergency Animal Disease (CCEAD) held a teleconference that afternoon. After considering the advice from AAHL, it was decided that the situation should be counteracted by the AUSVETPLAN and financed under the Commonwealth/States Cost Sharing Agreement. Formal agreement of all Ministers concerned was subsequently sought.

The affected property was placed under quarantine. On 2 April 1999, Destruction Orders under the New South Wales State Exotic Diseases of Animals Act (1991) were issued. All the chickens in the affected farm were killed by carbon dioxide and incinerated on the farm. The action was completed on 5 April 1999.

A surveillance program of the farms in the vicinity was implemented at the same time. The farmers were asked to report on any unusual animal sickness or mortality to the veterinarians. In accordance with the AUSVETPLAN, a Restricted Area and a Controlled Area were declared by the New South Wales State Agriculture Department. Decontamination work on the farm was smoothly completed on 14 April 1999. However, it was advised by a veterinarian on 14 April 1999 that a farm adjoining to the first affected farm had chickens with illness showing signs of the virulent Newcastle Disease. The farm was immediately put under quarantine and the Newcastle Disease was subsequently confirmed by AAHL by analyzing the sample collected from that farm. As a result of this, CCEAD recommended expanding the operation and the second operational phase began.

Second Operational Phase

The surveillance program identified nine further suspected farms during the period from 14 to 21 April 1999. The Restricted Area was thus expanded to the entire Mangrove Mountain ridge. Movements of birds in and out of the area were prohibited. A larger Controlled Area was also established to encompass all poultry flocks in the Peats Ridge, Somersby and Kulmera areas. In view of the severe situation, it was decided to de-stock the whole of the Mangrove Mountain Ridge including pet, aviary and backyard birds so as to stop the development of the virus. The operation commenced on 17 April 1999.

On 19 April 1999, the Premier of New South Wales enacted Part 3A of the State Emergency and Rescue Management Act 1989, which endorsed all volunteer emergency workers participating in the operation. The killing rate was about 200,000 birds a day. It was considered too slow to get ahead of the spreading of the virus nor could the disposal by burning be kept up. Dead birds were stored in containers until large sealed burial pits became available.

There was evidence of the low virulent virus present in the Controlled Area. It was decided that the whole control area should be de-stocked. However, no destruction order was issued. All farms in both areas could not restock until the de-stocking operation and approved decontamination had been carried out. There were 990 people working in the Restricted and Controlled Areas as well as the LDCC at Kariong. The Navy was also bought in to speed up the operations with many volunteers joined in. But the press [Daily Telegraph (Australia), 26 April 1999] criticized that there was a lack of people for organized teamwork. The operations were finally completed on 8 July 1999. More than 1.9 million birds on 33 farms and nearly 2,000 aviary birds were destroyed (Australian Associated Press, 28 July 1999).

Recovery Stage

Operations of the LDCC closed down on 23 July 1999 and the New South Wales State Agriculture Department resumed its management of re-stocking controls and the surveillance program. Re-stocking would only be permitted until satisfactory completion of the cleansing and disinfecting process and certification by a veterinary officer. Surveillance and random sampling were carried out during the restocking process. The surveillance program was maintained for six months.

The New South Wales State Government applied to the Commonwealth for a 'special circumstances' assistance package for the farmers. In addition to the ex-gratia payments, owners of the affected poultry were eligible to claim loss of all destroyed livestock and property at the market value under the New South Wales Exotic Disease of Animals Act (1991). The financial arrangement was under the Commonwealth/States Cost Sharing Agreement. The costs were on a shared basis, with the Commonwealth paying 50% and the affected States and Territories bearing the remaining 50% (AUSVETPLAN Leaflet, New South Wales Agriculture Department). However, such an arrangement was only applicable to virulent avian influenza. Nevertheless, the traders and operators still criticized the long and complicated claiming procedures, resulting in the belated receipt of the government assistance (Australian Associated Press, 20 August 1999).

On the other hand, low interest loans up to $20,000 (Australian dollars) were available to affected farmers within both the Restricted and Controlled Areas (Press Release, New South Wales Agriculture Department on 26 May 1999). It could help them through this difficult time, as they needed to rebuild their poultry operations.

Furthermore, a toll-free telephone hotline was established and the officers from Department of Community Services were on the scene to offer counseling to both the property owners and the volunteers. It could alleviate the panic and anxiety of the affected persons from a psychological point of view.

Summary on Case 1 and Case 2

Comparison and contrast in findings on managing biological disasters in Hong Kong and New South Wales are summarized in Table 2 below.

Table 2 - Comparison and Contrast in Findings on Managing Biological Disaster in Hong Kong and New South Wales

Hong Kong	New South Wales
Prevention Stage	Prevention Stage
• Trading of live poultry	• Trading of chilled/frozen poultry
• Inadequate veterinary research and diagnosis capability	• Better veterinary research and diagnosis capability
• Inadequate industrial awareness	• Good industrial awareness

Hong Kong	New South Wales
Preparation Stage • No specific plan	Preparation Stage • AUSVETPLAN to define the role and responsibilities of relevant agencies
Response Stage • No specific plan • No pre-agreed rate for compensation and readily available fund	Response Stage • AUSVETPLAN for establishment of Restricted & Controlled Areas • Pre-agreed rate for compensation and readily available fund
Recovery Stage • Industry stakeholders not willing to make change from traditional practice	Recovery Stage • Industry stakeholders actively involved in the long term recovery stage

In the second part of this chapter, detailed examination and critical analyses of the two selected cases under the category of natural hazard were made. They were the Typhoon York in Hong Kong and Sydney Hailstorm in New South Wales. Brief incident outlines, generic handling procedures under normal situations and specific emergency interventions were covered.

Case 3 - Typhoon York in Hong Kong

With references to the interview with Assistant Secretary Kent Yau of the Security Bureau, the HKSARG Contingency Plan for Natural Disaster and the relevant official weather record and news clippings, background information and courses of action taken for the subject event were recapitulated below.

Tropical Cyclone Warning System

In 1999, 25 typhoons or tropical storms made it necessary for the Hong Kong Observatory (HKO) to hoist the No. 3 or above tropical cyclone warning signals. The hoisting of No.3 signal means that strong winds are expected or blowing in Victoria Harbour with a sustained speed of 41 – 62 km/h. Details of the tropical cyclone warning signals in Hong Kong is at Appendix F. Out of the 25 incidents, Typhoon York hoisted on 12th-17th September 1999 attracted much public attention.

Incident Outline

Typhoon York intensified into a tropical storm on 13 September 1999 and strengthened into a severe tropical storm on 16 September 1999. It gained typhoon strength the following night. Signal No.1 was hoisted at 1045 hours on 13 September 1999, then followed by Signal No.3 at 1015 hours on 15 September 1999, Signal No.8 at 0315 hours on 16

September 1999, Signal No.9 and Signal No. 10 respectively at 0520 hours and 0645 hours on 16 September 1999. York became almost stationary after gaining typhoon strength. The eye of York was closest to the Hong Kong Observatory Headquarters at 1000 hrs on 16 September 1999. Signal No. 10 was in force for 11 hours, the longest on record. All signals were lowered at 0045 hours on 17 September 1999. The last typhoon of similar magnitude was recorded in 1983.

During the passage of York, one man was killed, one wind-surfer reported missing and more than 490 people were injured. 800 signboards collapsed and over 4,000 trees were uprooted. About 90roads were rendered impassable. York shattered the curtain walls of several government buildings in Wan Chai. York also triggered 64 cases of flooding and about 400 fish farms were affected. More than 150 hectares of farmland were devastated. The Fire Services received about 460 calls for assistance, mainly to rescue people trapped in lifts where power failed (Hong Kong Observatory Report on Typhoon York).

On 17 September 1999, the day after the passage of Typhoon York, there was severe traffic gridlock at and near Kwai Chung district throughout the day as the number of container vehicles going to the container terminals at Kwai Chung for collection/delivery of containers increased from the normal 30,000 to more than 74,000. Truck drivers had to wait for eight hours before they could enter the container terminals [Appledaily Newspaper (Hong Kong), 18 September 1999].

Emergency Response System

The Security Bureau acted according to the Hong Kong Emergency Response System (HKERS) and activated the Contingency Plan for Natural Disasters. This contingency plan provides the principles and operation procedures for emergency response with respect to natural hazards, including typhoons. It also details the responsibility of various government departments and non-government agencies that may be involved. In addition, each individual department is required to formulate its own specific departmental guidelines for their internal staff to follow.

Prevention Stage

Most of the people in Hong Kong live in high-rise concrete buildings. It is expected that these buildings are not susceptible to typhoon damages. For the houses built on low-lying areas that are prone to attack by flooding, the Government had initiated some drainage improvement programs to reduce the risk of flooding. The Government had also initiated some slope improvement programs to ensure slope stability to minimize potential danger to the public.

Preparation Stage

Since the contingency plan has been in place for years, government departments are well conversant with the response procedures whenever the plan is implemented.

As regards the warning system, the Hong Kong Observatory (HKO) is responsible for preparing the weather forecast. Whenever a tropical cyclone is centred within 800km of Hong Kong, HKO starts issuing warning signals to the public and to various government departments at frequent intervals so that all parties could be well-prepared if the typhoon really hits Hong Kong. Warning bulletins are issued to the Information Services Department who would coordinate all other government information for distribution to the

mass media and for immediate broadcast by radio and television stations, both in English and Chinese. The warning bulletins contains information on the position, intensity and expected movement of the tropical cyclone, and advice on precautions (such as staying indoors) to be taken. The weather forecasts are also available to the public via Internet and a telephone hotline. Once HKO hoists the No.8 typhoon warning signal, schools and offices are closed and public transport services such as ferries gradually suspended. The stocks exchange, futures market, banks and courts also close. The Government open temporary shelters to house the homeless and those who could not head for home in time. All these arrangements help to mitigate the damaging effects to the society.

Response Stage

The Hong Kong Police Force and the Fire Services Department were the primary agencies to deal with emergencies. Other government departments including the Home Affairs Department, the Hospital Authority, the Social Welfare Department, the Housing Department and the Works Group Departments also rendered necessary logistics and support. Typhoon York resulted in severe damages and disruptions. Amongst others was the severe traffic congestion on 17 September 1999 when the truck drivers all headed to the container terminals at Kwai Chung to clear the container backlogs. The Government activated the Emergency Monitoring and Support Center (EMSC) under the 'Three Tier System', and manned it with 20 staff to coordinate its response to the typhoon. The EMSC facilitated the pull-in of resources from different departments and non-government agencies, including the Transport Department, the Police, and the Mass Transit Railway Corporation to resolve the problems. The traffic congestion problem was eased later that evening.

Recovery Stage

Major recovery works required to be done after the typhoon included:

(1) Removal of toppled trees;
(2) Removal of dangling signboards and neon lights;
(3) Clearance of road blockages;
(4) Repair of windows of government buildings;
(5) Provision of housing for those whose accommodations were affected by the floods or landslides; and
(6) Provision of relief funds for farmers whose farmland had been affected.

The Home Affairs Department coordinated the relief measures, especially those related to the provision of temporary housing. The Social Welfare Department provided food, water and blankets to those made temporarily homeless, and provided assistance from emergency relief funds to cover personal injuries and deaths. Other government departments also assisted in the recovery measures according to their roles as specified in the HKERS. Some of these departments indeed were involved at the response stage. The recovery stage for Typhoon York was satisfactory.

Case 4 - Sydney Hailstorm

With references to the interviews with Mr. Ross Brown (Secretary of the New South Wales State Emergency Services Management Committee), Mr. John Purdie-Smith (CEO of the Southern Sydney Recovery Task Force) and Mr. George Irwin (Hazard Reduction Officer of the New South Wales Fire Brigade) as well as relevant newspaper clippings, official weather record and researcher's direct observation, background information and courses of

action taken for the subject event were recapitulated below.

Incident Outline

On the evening of 14 April 1999 at about 1930 hours, a severe hailstorm damaged the roofs of properties in the densely populated inner Sydney localities of Woollahra, Waverley, Randwick, Botany, South Sydney, Marrickville and Sutherland. The hailstones were the size of cricket balls up to 9 cm in diameter. The storm that lasted about 15 minutes was the most devastating one that had happened in New South Wales. The total property loss including motor vehicles, commercial and aviation claims estimated at more than AUS$1.5 billion is regarded as the most expensive natural disaster in Australia. There was no official storm warning given from the Bureau of Meteorology. The hailstones peppered many roofs and damaged 23 planes at Sydney Airport. Aircrafts damaged in the hailstorm were estimated to cost $95 million. Traffic lights were out at many intersections and more than 15,000 homes had power cut off. The raw power of the storm carved a random pattern of destruction which saw entire streets unroofed and neighboring ones left relatively untouched. Dozens of people were treated for minor injuries but fortunately there was only one hailstorm-related fatality. An angler aged 45 was struck by lightening in an aluminum fishing boat anchored 100m offshore. His body was found the following morning [Daily Telegraph (Australia), 16 April 1999].

The storm began in the Wollongong area about 0430 hours, tracked out to sea then suddenly swung back in over the Royal National Park at Bundeena about 1930 hours. The Bureau of Meteorology initially expected the storm would probably produce hailstones about pea size. But when it did not hit by 1530 hours, the Bureau eliminated the probability of hitting the city at all. Forecasters tracked the storm by radar and predicted it would head harmlessly out to sea after striking Nowra and Wollongong, south of Sydney (Appendix G). A forecast issued at 1920 hours did not even mention hail, yet at that time hail was hitting Cronulla on Sydney's southern outskirts. The Senior Forecaster on duty at the time, Mr. Evan Bathe, said that he was aware of the storm but decided against a warning. He thought that it was going offshore but it came inland. A Weather Services Supervisor, Mr. Andrew Watson of the Bureau, said that upgraded satellites and technology could only indicate the location of the storm. It would be extremely difficult to forecast the routing of the hailstorm as it does not always behave in a linear fashion. He said that storms could form and decay in a short time. Weather forecasts could only confidently predict wind gusts and rains about two hours ahead and six hours at best. The Bureau missed forecast 5 per cent of the time but were close to accurate 95 per cent of the time. A slight variation in wind direction could significantly change things [Advertiser (Adelaide), 17 April 1999].

The New South Wales State Government moved quickly to declare the hailstorm a disaster the next day. Emergency services were put to the test resulting in the deployment of 200,000 tarpaulins, over 200,000 sandbags and 9,600 kilometers of rope. The State Emergency Service received 1,500 calls on the first night and attended over 44,000 calls for assistance in the first three and a half weeks (Insurance Research Letter, August 1999). Problems ranged from the total roofing destruction of the South Sydney Council Chambers to water damage of mechanical plant, computer and visual arts equipment within the University of New South Wales Mechanical Engineering and Fine Arts Departments. Other businesses affected included several large printing and publishing houses with severe water contamination to printing machinery and graphic arts equipment and major water damage to gaming and wagering production machinery. There were approximately 75 disaster sites with varying degrees of water damages.

Emergency Response System

The State Disaster Plan (DISPLAN) details emergency preparedness, response and recovery arrangements for New South Wales State to ensure coordinated responses to emergencies by all agencies having responsibilities and functions in emergencies. The overall operation control for emergencies of flooding and storms is vested on the Director General of the State Emergency Service. In flood or storm emergencies, the DISPLAN for any Local Government Area or District to which the emergency applies is to be automatically activated. The Local or District Emergency Operations Controllers are obliged to provide logistics and support as requested by the appointed Local/Division State Emergency Service Controller in accordance with the flood or storm Sub-plan of the Local or District DISPLAN according to the laid down procedures in New South Wales State DISPLAN Part One.

Prevention Stage

At the time of this hailstorm, there was no specific Sub Plan for hailstorms. As a hailstorm of this magnitude was unprecedented in Sydney, the Weather Bureau lacked the experience to make accurate forecasts.

Preparation Stage

There were no preparation measures to speak of at the time of the hailstorm. No agencies were prepared for such an occurrence They were caught off guard and had reacted to events.

Response Stage

An emergency services force comprising the New South Wales State Emergency Service (SES), the New South Wales Rural Fire Service (RFS) and the New South Wales Fire Brigade undertook the rescue and emergency repair efforts. Six hundred State Emergency Service and Rural Fire Service volunteers had worked around the clock in the first few days. The State Parliament Opposition Leader called for the Army to join in the rescue effort but the State Emergency Service Chief Major-General Hori Howard initially refused. More than a week later it was agreed that the Army should be brought in to help with the relief effort. More than 5,000 army workers were brought in. An extra 160 SES volunteers were also brought in from Queensland and South Australia. In the first two weeks, emergency personnel had door-knocked over 100,000 homes in the affected areas to gauge the magnitude of the damage [Sunday Telegraph (Australia), 27 June 1999]. Emergency services were unable to keep up with the demand for tarpaulins.

Recovery Stage

The Federal Government had ordered a review of the Bureau of Meteorology's severe weather forecasting services. The Bureau itself had ordered an internal inquiry. The Bureau Director, Dr. John Zillman, in his report indicated that the Weather Bureau staff "had done the best that they could with the science, technology and experience available to them …. in an extremely challenging situation.". Dr. Zillman agreed that the professional judgments of the forecasters that the storm would move offshore and abate were not unreasonable on the evidence before them. His report recommended reforms aimed at

improving initial responses. These included intensive staff training on using radar to monitor severe thunderstorms, and extra direct telephone lines between key operational centres to overcome problems caused by callers overloading the phones [Sunday Telegraph (Australia), 16 May 1999].

On 23 April 1999, the Minister for Emergency Services formed the Southern Sydney Recovery Task Force (herein after referred as "the Task Force") to undertake the second "Recovery" phase of the works. The overall objective of the Task Force was to facilitate and coordinate the recovery works for the provision of safe power and weatherproof shelter to properties damaged by the hailstorm. A particular role of the Task Force was to work with industry to improve the supply of critical materials and resources. A target was set for completion of the recovery works by mid-November. The Task Force undertook an assessment of the demand and supply of roofing materials. It also consulted a number of slate suppliers and roofing contractors in order to quantify accurately slate supply and demand issues within the affected area.

The Chief Executive Officer (CEO) of the Task Force Mr. John Purdie-Smith remarked that the Task Force was not a Government department but was set up as a direct response to the hailstorm. Ninety percent of the staff of about 60 including the CEO were recruited from the private sector and most have backgrounds in the building and maintenance disciplines. SES had handed over the overall command and responsibilities to the Task Force on 16 May 1999. Thereafter Mr. Purdie-Smith was the principal spokesman on all matters relating to the hailstorm and he gave regular press briefings.

The Task Force did not rely on volunteers because they wanted people with the best skills and a professional background, especially in the building and maintenance industry. They also wanted to be able to hold people accountable because of tight deadlines. It would be hard to hold volunteers accountable. The Task Force kept their staff focused on specific tasks to overcome obstacles such as varied prices of roof tiles, heritage and conservation laws. The Task Force liaised closely with the community on a daily basis with feedback through community focus groups. It had set up seven zone offices, one in each local Government, in order to enhance communication.

The Task Force adopted two approaches to damaged homes depending on whether they were insured or not. Eight and a half percent of homes were uninsured. The Task Force undertook free-of-charge repair work for uninsured homes. But such repair work would only cover the minimum weatherproof work. No painting work or other repairs to the interior would be done. The Task Force worked closely with the insurance industry according priorities to damaged homes. Homes of the elderly, the sick and those with small children were accorded higher priority. The Task Force proactively participated in insurance disputes and helped to settle insurance claims. The Task Force maintained good relations with the insurance industry and coordinated work on public buildings.

There were ten million roof tiles stockpiled in warehouses around Sydney but there were not enough tilters to make repairs to the 20,000 damaged roofs. There were only 1,539 licensed tile-masons in Sydney and roofing companies could not get enough workers to satisfy demand. Tile-masons had to be brought in from around the country and from as far away as England.

Psychologists had reported treating hail victims for problems including anxiety to acute stress disorder. The Department of Community Services said that more than 3,500 families had required assistance including mental health services, community health and housing.

Summary on Case 3 and Case 4

Comparisons and contrast in findings of the two incidents are summarized in Table 3 below.

Table 3 – Comparisons and Contrast in Findings on Typhoon York in Hong Kong and Sydney Hailstorm

Typhoon York in Hong Kong	Sydney Hailstorm
Uneventful occurrence	Unprecedented event
Contingency Plan for Natural Disaster has been in place for many years	There was no specific Sub-plan to deal with this incident.
Ample warnings from the Hong Kong Observatory were given	No warning from the Weather Bureau was made
It needed no concerted efforts in response and recovery from government departments as the damages were insignificant	There was public outcry against the handling of the hailstorm. A Task Force, consisting mostly of the private sector, was set up to deal with the recovery.
Information Service Department was responsible for information release to the media and the public	At the initial stage, individual agency directly handled the media. After the Task force was formed, the CEO of the Task Force acted as the only spokesman.
There was scant public education as the public at large are having indifferent attitude	After the incident, public education blitz with television spots was launched to appeal for the population to build or redevelop houses with hailstone-proof roofs.

Discussion

For Case 1 – H5N1 Avian Flu in Hong Kong

Lack of Specific Plans

The most prominent feature of Hong Kong's system for responding to biological disasters was the absence of a set of specific contingency plans. More common poultry diseases like the Newcastle Disease were effectively prevented and controlled by the A&FD alone in a relatively routine manner. However, unprecedented or complex cases like the Avian Flu involving multi-agency responses had to be escalated to higher levels under the 'Three Tier System' for policy decision and mobilization of other agencies involved (HKSARG, 1999). This inevitably limited the preparedness, speed and effectiveness in managing emergencies as evidenced by the Avian Flu case.

Prevention Stage

Hong Kong was highly susceptible to outbreaks and human infection of poultry disease since:

(1) It was amongst the very few metropolitan centres in the world that allowed import and trading of live poultry at both the wholesale and retail levels. Consequently, direct contact between human beings and live poultry was frequent; and
(2) 75% of the live poultry consumed and most day-old chicks were imported from the Mainland. Such imports were inevitably outside Hong Kong's control. Hence the risk of infiltration of exotic chicken diseases was high.

Before the outbreak of the Avian Flu, the prevention measures of Hong Kong appeared to be adequate and effective. In fact, only the Newcastle Disease was a frequent threat to poultry health in Hong Kong and Southern China, but such a disease did not affect human beings. Animal health authorities in both places had sufficient prior knowledge, experience and resources to deal with it swiftly and effectively. In fact, infection of most strains of the Newcastle Disease could be effectively prevented by vaccination that was a common practice in Hong Kong. However, in the case of the Avian Flu, the prevention measures were not adequate in that:

(1) H5N1 virus was the first time identified in Hong Kong and caused human infection and fatality;
(2) Its behavior and impacts on human health were largely unknown; and
(3) The incident was not just an animal health hazard and the effort and preventive measures of the A&FD alone could not be sufficient.

Preparation Stage

Agencies involved were relatively less prepared than they were in dealing with more common diseases like the Newcastle Disease since the demand for readiness and resources were much more pressing given the magnitude and complexity of the incident. There were many possible paths (such as waterfowls and migrating birds) through which the Avian Flu could be transmitted to chickens. These media of transmission carried and spread the disease but their own health was not affected. Consequently, it was extremely difficult to identify the primary source of the disease and control its outbreak at the source. Furthermore, the veterinary diagnosis and testing resources of the A&FD were not sufficient to identify the genetic nature, sources and media of transmission of the disease. Samples had to be delivered to the Centre of Disease Control and Prevention in the United States for further diagnosis. This unfortunately lengthened the time required to assess accurately the risk and virulence of the disease. The time required to get prepared, to alert the senior levels through the 'Three Tier System' and to inform the general public was quite lengthy.

There were inadequate staff members with relevant training and background in handling livestock diseases. In fact, some 1,800 A&FD staff (80% of total) were deployed for the depopulation operation only after attending a brief demonstration session on slaughtering of chickens using carbon dioxide.

In the absence of an agreed plan delineating the power and authority, roles and responsibilities and inter-agency relation, major decisions on action to be taken had to resolve at a higher level.

Response Stage

Up to 28 December 1997, all evidence suggested that the source of the virus was solely poultry imported from the Mainland (which was suspended on 24 December 1997). However, infection was confirmed on a local farm, and an outbreak of the disease was detected in a wholesale market on the same day. The Administration was therefore accused of not being able to act earlier notwithstanding the fact that most stakeholders, politicians, press media and society at large endorsed the decision on mass slaughtering.

The Administration announced on 28 December 1997 that about 1.5 million birds remaining in Hong Kong would be slaughtered within the next day. However, such a task could not be accomplished within the prescribed 24 hours because:

(1) Concerted efforts of many agencies (Police, Fire Services Department, A&FD, Regional Services Department, Urban Services Department and Environmental Protection Department) were required and thousands of people and a great deal of equipment and materials were directly involved. Without the benefit of a specific plan, there were difficulties in coordinating and mobilizing the huge amount of resources in time;
(2) The decision was made quite hastily and thus did not allow adequate time for preparation;
(3) There was a lack of coordination of logistic support and communication amongst the agencies, especially at the front-line working level. Consequently, some carcasses were left unattended on the roadside, and were caught by the cameras of reporters. This naturally attracted criticism from the press and the general public; and
(4) The slaughtering method adopted was very time consuming and labour intensive. Dying chickens struggling for fresh air could easily break the garbage bags used. Some reporters took pictures of chickens, which managed to survive wandering around, and used them as evidence to support their criticism on the action taken.

Therefore, it took three days instead of one day (as originally planned) to have all chickens slaughtered.

The announcement of slaughtering all chickens in 24 hours had resulted in a public perception that the case was extremely critical and failure to do so could have disastrous effects on public health. So as soon as it became apparent that it was an impossible task, the press, the stakeholders and the general public started to panic and worry about possible adverse effects. Consequently, the Administration was criticized as being unprepared, uncoordinated and over-reactive.

Recovery Stage

The recovery measures were successful in that:

(1) Normal local raising, import, wholesaling and retailing of live poultry, and consumers' confidence resumed shortly after the slaughtering operation;
(2) Raising hygiene conditions of farms and wholesale/retail stalls had been observed;
(3) Quarantine and import control had all improved significantly; and
(4) No similar case had arisen so far.

Fore Case 2 – New Castle Disease in New South Wales, Australia

New South Wales was relatively less susceptible to outbreak and human infection of poultry diseases since:

(1) There was no import and trading of live poultry; and
(2) The vigorous defence by the Australian Quarantine and Inspection Service was very effective in safeguarding the Australian livestock industry from the threat of exotic diseases.

For several decades, only low virulence strains of the virus were recognized as being present in Australian poultry flocks. The occurrence of the virulent Newcastle Disease was very unexpected, although it was to a much lesser extent than the Avian Flu in Hong Kong. The outbreak necessitated the largest and the most complicated exotic animal disease response ever mounted in Australia [Press Release on Recent Newcastle Disease Outbreak in Australia (1999) of the New South Wales State Agriculture Department]..

It was the first time that the New South Wales State Agriculture Department conducted such a large-scale de-stocking exercise. It experienced a major difficulty in slaughtering the birds and disposing of the carcasses swiftly. In the early stage, they used incineration to dispose of the carcasses. It was found that the progress was too slow and could not match the slaughtering speed. Understandably, the slaughtering exercise could not be slowed down, otherwise the spread of the virulent virus could not be kept under control. It was subsequently decided to employ the burial method. Owing to environmental considerations, the burial site had to be carefully selected. To a certain extent, this had hindered the tempo of the disposal process. Pending disposal, carcasses thus needed to be temporarily stored in containers. In the light of this, emergency disposal arrangements have yet to be refined.

In this incident, the New South Wales State Agriculture Department had set up a Media Unit for drafting media releases and Dr. Jane, Chief Veterinary Officer was assigned the key spokesman (Cos, 1994). This approach proved to be successful since the information from all agencies was collated and disseminated by one source. It eliminated the possibility of inconsistent information released by different agencies. Moreover, media releases were conducted on a regular basis to keep the stack holders informed and avoid unnecessary panic (John, 1994).

Unlike the past, supporting agencies were proactively invited to take part in the prevention and preparation stages. This resembles the principles of the all-agency approach (Quarantelli, 1983). This arrangement was agreed upon and was strictly followed. Under this incident, the New South Wales State Agriculture Department needed only to solicit assistance from the supporting agencies as and when appropriate. Such an arrangement proved to be very effective. On the other hand, public awareness should be strengthened whereas the industry itself should play a proactive role in quality assurance and disease prevention (Murray, undated). In this connection, it was necessary to enhance the standard of quality management and bio-security on farms.

For Case 1 and Case 2

Prevention Stage

Similar prevention measures in the form of surveillance and risk assessment, quarantine and import control, and public education are in force in Hong Kong and New South Wales. One lesson to be drawn from the experience of the New South Wales State Agriculture Department is the banning of wholesaling and retailing and even import of live poultry to reduce the risk of outbreaks and human infection of poultry diseases.

Given the huge geographical size and the large livestock industry, the veterinary research and diagnosis capability in Australia is naturally more advanced and comprehensive than that of Hong Kong. The New South Wales State Agriculture Department delivered diagnostic samples to the Australian Animal Health Laboratory at Geelong on 30 March 1999. The Laboratory was able to confirm the disease the next day. The scale of the livestock industry of Hong Kong is much smaller. However, the threat of poultry diseases to human health is more virulent. As such, strengthening of the A&FD's veterinary research and diagnosis capability is necessary.

Another aspect worth exploring is that the poultry industry be actively involved in the prevention stage. The industry people of New South Wales are aware that their unreserved commitment in the prevention of poultry diseases could safeguard their own interests. Building on the New South Wales' experience, operators of the poultry industry should be encouraged to render their proactive support in the prevention stage. Safe practices such as concealed farms, thorough cleaning of personnel, tools and equipment before entering and leaving the farms, and close tracking on the movements of poultry amongst farms should be exercised.

Preparation Stage

Hong Kong's experience in handling the Avian Flu pointed to the need for a specific plan to work out the roles and responsibilities of agencies concerned, warning systems, emergency manpower and other resources, guidelines for emergency management, and criteria for decision making. Undoubtedly, it would be very difficult to prepare specific plans for biological disasters that are so diverse in nature and in most instances to warrant treatments based on individual merits. Nevertheless, a more general plan as a first step is an obvious advantage. Stakeholders from the industry should best be involved in the formulation of the plan. Such consideration could safeguard their needs and concerns in the planning stage. In reciprocating, their cooperation could be secured in the response stage. Although such a plan cannot provide an immediate answer to every issue that might arise, it does provide an effective mechanism through which the agencies can get prepared and respond to emergencies by concerted efforts and in a coordinated manner.

The benefits of an agreed plan were well illustrated by the case of the Newcastle Disease. Although the scale and complexity of the outbreak had to be met by the largest and the most complicated exotic animal disease response in Australia, response actions were taken in a swift and coordinated manner in general. The AUSVETPLAN clearly delineates the roles and responsibilities of all agencies involved. The relations between these agencies (line of command and logistic arrangement) were also clearly spelt out. Manpower, equipment, expertise and financial resources could be quickly mobilized upon recognition of the emergency situation, and warnings to parties concerned were issued in good time.

Response Stage

The unprecedented magnitude and complexity of the Hong Kong Avian Flu that had exceeded the means of the DH and A&FD were just one of the reasons why the incident could not be dealt with in the usual efficient manner. Another major reason was the lack of an agreed plan, like the AUSVETPLAN. Escalating the matter to a higher level with sufficient authority to make major decisions obviously took some time. An agreed plan could definitely speed up the response process as all agencies would know how to respond in the first instance. It could also facilitate better coordination amongst agencies concerned to cope with the development of the crisis.

The AUSVETPLAN also details the procedures for quarantine control, slaughtering, and disposal of carcasses. Emergency staff is trained accordingly and hence the effectiveness and efficiency of the operation in the Newcastle Disease case were quite impressive. For instance, the slaughtering method of injecting carbon dioxide into huge metal bins appeared to be more effective than the use of garbage bags.

According to the AUSVETPLAN, the New South Wales State Agriculture Department could instantly establish Restricted and Controlled Areas to implement quarantine and movement controls. Supported by the strong veterinary diagnosis ability, the New South Wales State Agriculture Department quickly delineated the Restricted Areas being infected by the virulent disease from the Controlled Areas being infected by non-virulent disease. This arrangement would substantially help reduce the number of birds to be slaughtered as well as resources commitments and subsequent monetary compensations. Clear distinction between the Restricted Area and the Controlled Area is worth noting in future operations in Hong Kong.

Recovery Stage

The recovery actions taken in the Hong Kong case achieved very satisfactory results. However, all the actions were initiated and taken by the government. Given their traditional nature and many years of trading practice, a significant proportion of the stakeholders in the industry were still reluctant to change even after the incident. Unless stakeholders and government work together to improve farming and trading practice as well as food safety, consumers' confidence could not revive fully and permanently. Therefore, a common lesson is the emphasis on the importance of awareness and commitment on the part of the industry itself.

Under the AUSVETPLAN, the rate of compensation is pre-agreed at market rate and funds are readily available. These significantly reduce the lead-time for effecting compensation payments and avoid certain kinds of disputes and grievances. Consideration should be given to having such a standing arrangement in Hong Kong.

For Case 3 – Typhoon York in Hong Kong

Prevention Stage

For managing natural hazards like tropical cyclones which are unavoidable, prevention could be achieved by reducing the risk of damage of the hazards caused to properties and human beings.

During the passage of the Typhoon York, there were many cases of flooding and landslides. It was evident that the drainage system in the New Territories had to be improved to reduce the risk to properties and lives. As criticized after a preceding typhoon incident (Typhoon Sam which attacked Hong Kong during the period of 19th – 23rd August 1999), the anti-flooding work was considered not satisfactory. Even worse, it revealed that some government departments were not clear about their own responsible areas. As reported in the news [South China Morning Post (Hong Kong), 27 August 991], an official from the Drainage Services Department claimed that it was the Home Affairs Department's responsibility to fix and manage drains in the New Territories villages. An official from the Home Affairs Department (HAD) responded that the HAD had no idea who was responsible. The latter argued that HAD had no engineers and did not have enough resources to handle all

cases in the 111 villages. The spokesman also remarked that HAD had encountered many hurdles in carrying out the anti-flooding projects since much of the land in the New Territories was privately owned. Unclear delineation of responsibility among government departments undoubtedly affects the overall efficiency and effectiveness in the course of managing an emergency relating to the territory-wide flooding problem.

Another issue identified from the Typhoon York was that the education of the public on what should be done and what should not be done might not be effective enough. The HKO used to remind the public to stay indoors when typhoon Signal No.8 or above is hoisted. However, there were still some people who ignored the advice and went out windsurfing. Education for the public about the potential danger of the natural hazards should therefore be strengthened.

Preparation Stage

An important issue in determining the preparedness is whether ample warning could be given to the public and to the government departments concerned to deal with the emergencies.

During the period when Typhoon York was attacking Hong Kong, people complained that there was insufficient warning. The Director of the General Chamber of Commerce [South China Morning Post (Hong Kong), 17 September 1999] commented that the decision making process for typhoon warnings needed “tinkering”. He said that he had received many informal complaints from business people about the raising of the No.8 typhoon signal for a tropical storm. The territory went to sleep on 15 September 1999 with a No.3 signal hoisted but awoke to the fury of York’s 140km/h winds.

According to an official response from a Senior Scientific Officer of the HKO, York (then a severe tropical storm) was stationary 160 km out to sea and the weather conditions in Hong Kong were very quiet. The hoisting of a higher warning signal on the night of 15 September 1999 was not necessary. He said that the storm began to move after midnight, intensified into a typhoon and sped up. It was quite erratic and changed direction and speed frequently. The spokesman stressed that the HKO in general could provide reasonably accurate estimates of the timing and intensity of meteorological developments up to several days ahead. However, the forecast of mesoscale features such as tropical cyclones, thunderstorms or squall lines still could not be accurately made. In fact, the HKO was aware of this and was currently developing a high-resolution numerical weather prediction system that would be capable of simulating small-scale weather features in order to enhance the HKO’s forecasting capability for rainstorms (Tufekei & Wallace, 1998).

Response Stage

The government's response to the severe traffic congestion on 17 September 1999 received some public complaints. There were comments from the public that the government was too slow to react in that situation, thus causing the traffic congestion to continue until the evening [South China Morning Post (Hong Kong), 18 September 1999]. As a matter of procedures specified under the HKERS, the "Tier Three System" would be activated upon the direction of the Secretary for Security or a designated senior Security Bureau official. At the initial stage, only the EMSC was set up. As the EMSC is not a standing committee, whether the response could be made in time depends very much on the experience of the duty staff manning the centre.

For Case 4 – Sydney Hailstorms in New South Wales, Australia

Prevention Stage

The hailstorm was unprecedented and the New South Wales Government was not fully aware of the devastating effect of the hailstorm. Indeed, the Australian Bureau of Meteorology only had limited forecasting capability in detecting the location of hailstorms. Owing to technology constraints, the Bureau was unable to forecast accurately the routing of hailstorms. Besides, there was no specific training to enhance staff awareness and expertise in the course of forecasting hailstorms. Overall speaking, a staged warning system was not in place.

Preparation Stage

Both the New South Wales State Government and the population at large were totally unprepared for the hailstorm at the time. On the government side, there were no assigned combat agencies to handle incidents caused by hailstorms. The essential resources (including ropes, sandbags and tarpaulins) were indeed stocked up by the State Emergency Service for handling emergencies of flooding and storms. In the absence of assigned combat agencies and an established emergency-reporting channel, most of the emergency calls were directed to and initially responded to by the New South Wales Fire Brigade. For the public at large, they were not aware of the devastating effect of hailstorms. The roof tiles being used were perishable by hailstones. In the outbreak of the hailstorm, people did not know how to seek assistance but only resorted to the local fire brigade.

Response Stage

There were many criticisms from the public and the media on the handling of the hailstorm. The first was that the State Emergency Services made an "inadequate assessment". Indeed, thousands of residents were slow to report damaged homes to the SES and many were actually discovered by SES door knocks. Furthermore, damaged roofs were hard to assess at ground level. The extent of the damage had to be assessed by helicopter reconnaissance.

Another criticism was that the Army should have been brought in earlier. The day after the hailstorm, Prime Minister John Howard rang Premier Bob Carr to offer the army. Acting on advice from the head of the SES, Major-General Hori Howard, the Premier said the army was not necessary. Nine days later, Mr. Carr conceded that the army had been called in too late [Courier Mail (Brisbane), 24 April 1999]. One contention was that SES performed the vast majority of the works. Therefore the Army would not have made much

difference to the operation's completion time even if they had been brought in earlier. However sometimes perception is reality. Common sense would suggest that 5,000 Army workers would have made an impact both in reality and on the public's perception.

Mr. Ross Brown, Secretary of the State Emergency Management Committee (SEMC) stated that the SEMC only responded to the request of the SES, the combat agency in the hailstorm. During the first few days after the hailstorm, SES did not request support from the SEMC, and the SEMC did not see fit to take the initiative. At a later stage, the combat agencies involved were not entirely forthcoming in the disclosure of information. The emergency number '000' was directly linked to the Police/ambulance/fire service and SES had no frontline staff to answer incoming calls relating to the hailstorm. The damage assessment was difficult to make at street level and they had to wait for aerial surveys by helicopters. Furthermore many homeowners were away on holiday and did not make immediate reports of damage. On the other hand, Mr. Brown was of the opinion that there was much play of politics involved in the hailstorm equation. Many of the criticisms were politically motivated. Head of the SES Major-General Hori Howard was not a media person and had received much flak in the press and from opposition politicians. The public at large did not understand the operation of the SES and their expectations were unrealistically high. Mr. Ross Brown during the interview on 3 November 1999 indicated that a Sub-plan specifically for the hailstorm was in the pipeline and SEMC was working on the prevention of hailstorm damage to roof tops by ensuring that new and redeveloped homes would meet certain standards.

The call-receiving equipment was antiquated as many SES units run on a shoe-string annual budget of around $15,000. Inadequate funding meant that there was no central call centre. Residents had to contact an individual unit for help. The corollary was that the calls could not be promptly received and the SES did not know the full magnitude of the problem. There was some truth to this assertion. SES is the combat agency for floods and storms which are the two most costly types of disasters. However, SES only receives a fraction of the funding allocated to the Rural Fire Service. Furthermore, the SES is merely a volunteer organization. Most SES units only have 10 to 30 active members. An individual unit is often responsible for areas containing more than 40,000 residences. More resources for the SES would have solved many of the perceived failings.

Sydney prides itself as the multicultural capital of Australia. Yet for two weeks after the hailstorm, there was no facility that would allow people with poor English to contact emergency personnel in their native language. There were segments of the population who spoke other languages that posed a communication barrier in the early days. To overcome this, the Task Force made community announcements in schools so that children when returning to home could tell their parents. They also delivered announcements to radio stations serving the ethnic minority.

Recovery Stage

All 250 SES units as well as the 18 divisional headquarters across New South Wales State separately held stocks of emergency items such as sandbags, tarpaulins and ropes. When all stock in the Sydney area had been used, new supplies were drawn in from across New South Wales and other states with replenishments flown and shipped in from overseas. It was considered necessary to have one place big enough to store all the goods needed in containers that could be easily mobilized to any emergency area. Planning of a large warehouse building at Unanderra was in the pipeline to centralize the emergency stock (THE ILLAWARRA MERCURY, 3 August 1999). Such an arrangement enables the SES to have adequate back-up stock under its direct control.

One important factor in disaster management is that there would be a second wave after the disaster resulting from the public reaction, anguish, frustrations and lack of confidence in the Government's actions. The Task Force had mostly preempted this and there was no second wave in the hailstorm. Roofing work equivalent to a year's work by the roofing industry in Sydney was completed in 6 months. The Task Force, upon completing its mission, also recommended the Government to draw up a plan for the Disaster Recovery Centres in the future. Some of the guiding principles are:

(1) Set up the Task Force earlier, such as 2 or 3 days after the disaster;
(2) Make the Task Force a joint Government and private sector enterprise;
(3) Make the Task Force a professional business project with benchmarking and other business practices;
(4) Work closely with the Department of Community Services; and
(5) Set up the Task Force in the area of damage.

The Task Force also recommended that the insurance industry treat the hailstorm as a single disaster and not conduct thousands of separate assessments on damaged homes. The Task Force therefore categorized the damage according to its extent, such as under $1,000, between $1,000 and $2,000 and so forth. An Insurance Disaster Response Organization was later formed to this effect. As a result, the insurance industry (with the involvement of 40 insurance companies) precisely saved about AUS$200 million on assessment costs. To facilitate the repair process, the Task Force also sent out letters appealing to people who had ordered roof tiles to give way to people in more urgent need.

The Task Force was formed specifically for the hailstorm. No similar Task Force had been set up in the past for previous disasters. They did not follow any foreign model but only adhered to the principle of addressing personal needs of the residents as their primary task. The Task Force disbanded on 12 November 1999 leaving only a skeleton team to follow up minor outstanding tasks. The use of the Task Force recruited mostly from the private sector proved to be a resounding success. In future it would be up to the Minister of Emergency Services to make a judgment call as to whether to form a Task Force after a disaster.

For Case 3 and Case 4

Although there are significant differences between the Sydney hailstorm and typhoons in Hong Kong, they are comparable with each other by incident relating to severe weather conditions. One major difference is that typhoons are a regular occurrence in Hong Kong and a fact of everyday life whereas the Sydney Hailstorm was virtually unprecedented with only five notable hailstorms in the last 200 years.

Prevention Stage

The Hong Kong Emergency Response System (HKERS) issued by the Security Bureau together with the Contingency Plan for Natural Disasters set out the principles and operation of the emergency response in the case of natural hazards including typhoons. It details the responsibilities of the various government departments and non-government organizations, and each department has its own internal guidelines. The HKERS has been in place for many years and has stood the test of time. In contrast, the Sydney Hailstorm was unprecedented. At the time there was no specific Sub Plan in place under the DISPLAN. As supplemented by Mr. Ross Brown (interview on 26 October 1999), a specific Sub Plan would be issued.

Preparation Stage

As typhoons visit Hong Kong several times a year, both the Government and the public at large are well prepared physically and psychologically. It has become almost a life interlude. If a tropical cyclone comes within 800 km of Hong Kong, the Hong Kong Observatory would issue warnings to the public and government departments at regular intervals. Ample warnings sometimes up to several days ahead would be given about an approaching typhoon. By the time the typhoon reaches Hong Kong, it would almost become a non-event. In the Sydney Hailstorm, there was no warning from the Weather Bureau. There was no preparation measure to speak of and no agency was prepared for a hailstorm.

Response Stage

Typhoon York did not cause too much damage. Only the traffic conditions and some business activities were interrupted, but they resumed normal conditions before long. Because of the minimal effect caused, there were no major issues requiring concerted efforts from government departments to follow up. In contrast, there was a major public outcry against the handling of the Sydney Hailstorm. There were criticisms about inadequate assessments of the damage, belated call-in of the army, antiquated call-receiving equipment, insufficient emergency stock and poor communication with those non-English speaking persons/victims seeking help.

Another major contrast was the setting up of the Task Force recruited mostly from the private sector to deal with all recovery aspects of the hailstorm. The Task Force operated like a private business enterprise that had its defining characteristics. Another unique aspect of work of the Task Force was its close cooperation with the private industry and the insurance industry. Until now, Hong Kong has never tried this concept that proved to be a resounding success.

For Typhoon York, the Hong Kong Observatory passed relevant information to the Information Service Department (ISD) for media release and alerted both the public and government departments. The Observatory also made regular storm warnings direct to the public through the mass media, notable radio and television stations. In the Sydney Hailstorm, there were initially many voices from different agencies to deal with the media. This presented a problem as some of the agencies contradicted one another and there was public bickering in apportioning blame. After the Task Force was formed, the CEO of the Task Force then acted as the spokesman on all matters related to the hailstorm.

Effective damage assessment system is important so that the extent of damage can be ascertained for recovery actions. It is often the case that the combating departments concentrate their efforts on the immediate response actions without an overview of what the total damage is. This may delay the subsequent recovery process as reflected from the case of traffic congestion after typhoons in Hong Kong. For widespread/territory-wide incidents, aerial survey could surely enable quicker and more accurate assessments.

Recovery

Typhoons in Hong Kong often result in flooding in the rural areas and raise public concern on the government's drainage strategy. There were also instances of "buck-passing" between the Drainage Services Department and the Home Affairs Department

as to which department should be responsible for tackling the territory-wide flooding problems.

The havoc created by the Sydney Hailstorm was of a different nature as the main challenge was how to repair damaged roofs as soon as possible. Towards that objective, the Task Force worked closely with the roofing industry to resolve roof tiles supply at reasonable prices. The Task Force also involved itself directly in insurance claims so as to expedite the repair process.

There was scant public education on typhoons in Hong Kong as the population at large have an indifferent attitude. In contrast, the SES and the Task Force following the Sydney hailstorm carried out a public education blitz with television spots to appeal for the population to build or redevelop houses with hailstone-proof roofs. Booklets giving advice on general matters including the disaster welfare recovery service, property repairs and insurance matters were produced and distributed to the communities.

Summary

Both the governments of Hong Kong and New South Wales have devised their own unique emergency management system to handle emergency situations. Although there are a number of differences in terms of organizations, legal background, activation procedure and system management, they commonly adopt the comprehensive approach and the all-agency approach. Adoption of these two approaches is clearly spelt out in the DISPLAN. In spite of not being documented in the Hong Kong Emergency Response System, the spirit of these two approaches is followed through. In general, both the emergency management systems in Hong Kong and New South Wales have their own merits. More importantly, both countries managed most of the natural and biological disasters effectively and efficiently, especially for those identified disasters having specific contingent plans in place.

Recommendations

Disasters have no respect for geographical boundaries, local politics or level of community structures. Nevertheless, it is possible to plan how their effects may be tackled or mitigated. The adage “it will be all right on the night” can only be subsumed in time if a more professional approach to contingency planning is exercised (Tucker, 2000). It is obvious and assertive that ensuring a sophisticated and workable emergency management system in place will safeguard public safety and order, and minimize the loss and adverse impact from any outbreak of disasters.

As observed in the cases under study, both governments concerned were well aware of the importance of crisis communication and had effected necessary arrangements to maintain information flow. There was also an increasing concern both from politicians and the green power. Indeed, their influence was becoming more significant. In the wake of this, more consideration, liaison and communication should be applied when preparing the strategy of managing an emergency. On the other hand, wider applications of the Incident Command System and computerized technology should be made to strengthen the overall effectiveness and efficiency of the emergency management system. To ensure an early start of the recovery process, an initial recovery stage (in addition to the commonly adopted four stages) should be specifically incorporated into the response stage.

Although it is difficult to establish an all-scenario emergency management system, the comprehensive and all-agency approaches are good models to follow. Notwithstanding the inexhaustible areas needed to be probed into when drawing up relevant contingency plans, a set of general guideline to facilitate contingency planning is drawn up at Appendix H. For those identifiable hazards requiring special attention or counter-measures, specific contingency plans in line with the spirit and arrangement of a corresponding emergency management system should be formulated. Additional hints as learnt from the selected cases for the preparation of specific contingency plans pertinent to biological hazard and natural hazard are appended below for merit consideration.

Managing Biological Hazard

As identified from the cases of Avian Flu and Newcastle Disease, a designated coordinating agent is necessary whenever there exists ambiguity of responsibility. Besides, a specific contingency plan (such as the AUSVETPLAN) in supporting the emergency management system is most important. Throughout the whole process of managing biological disasters, sophisticated veterinary research and diagnosis capability (similar to the Australia Animal Health Laboratory in Geelong) should be provided. Improving industry awareness and commitment could also help to reduce unavoidable risks. Instead of enforcing regulatory actions, it would be more effective if the industries themselves took the initiative to implement some preventive measures to avoid potential hazards. This would be most significant in the case of biological hazards when industry practice itself has a significant impact on the potential risk. In drawing up the contingency plan, participation and commitment of the industry operators could be an obvious advantage to safeguard the interest of those traders/operators. In return, the government could secure their cooperation when there is an occurrence of a biological disaster. On the other hand, a pre-agreed rate of compensation with a secured source of funding (such as the Commonwealth/States Cost-sharing Agreement) should also be established in the planning stage to enable the earliest recovery.

Managing Natural Hazard

As demonstrated in the cases of Typhoon York and Sydney Hailstorm, an effective staged warning system to ensure prompt dissemination of incident information to those emergency agencies and the community should be established. Besides, education to the public about the alerting system and potential danger of the natural disasters should be fostered and promoted. The public should be aware of what should be done and what should not be done. Indeed, there has been a strong argument about whether or not to render assistance to those people risking their lives in inclement weather at the expense of the personal safety of the emergency workers. Some even go on proposing to impose heavy penalties on these “foolish” people. Turning back to the industry, their commitment is of paramount importance. If the building industry is aware of and understands the potential hazards, buildings and structures may be constructed in such a way that they can withstand the hazard and/or built in areas that are less prone to hazards. On the other hand, government departments concerned should keep pace with technology development to effect appropriate provision of hazard predication systems for enabling accurate weather forecasts. Certainly, the ultimate achievement with the benefit of modernized weather forecasting equipment relies much on sufficient and regular staff training. It is also worthwhile to recognize that the damages done by natural disasters often have far-reaching consequences, particularly during the recovery stage. The obvious one is the protracted engagement of operational/emergency resources. This may have an adverse effect on the overall

effectiveness and efficiency of the designated combating agencies for natural disasters when another new wave or the second wave of a natural disaster attacks the community. The establishment of a dedicated task force by the private sector with professionals from relevant disciplines (such as the Southern Sydney Recovery Task Force) also merits special consideration so that the operational resources would not be unreasonably tied up. For accurate and quick damage assessments, aerial survey would be an obvious advantage.

In passing, the researcher wishes to emphasis that a crisis, contrary to popular opinion, is not always bad or negative. This point is well illustrated in Chinese where the symbol depicting a crisis, “wei-ji”, is a combination of two words, “threat” and “opportunity”. A crisis could therefore be regarded as a turning point. It is hoped that this study may give insight into present management practices of emergencies, point the way to improvement in managing emergencies in the future, and encourage other researchers to do further study on the topic.

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Appendix A

EMERGENCY RESPONSE SYSTEM IN HONG KONG

A "Three Tier" System

Among the twelve Policy Bureaux in the HKSAR Government, the Security Bureau is responsible for social security and order. A "Three Tier" Emergency Response System spells out the Government's commitment to providing an effective and efficient response to all emergencies that threaten life, property and public security. In its most basic form, emergency is any event of natural or human sabotage that demands a rapid response in order to protect life, property and public security. An extreme emergency or disaster is a serious disruption of life, probably arising with little or no warning that causes or threatens death or injury on a scale exceeding the normal responses required of the public emergency services.

Under the Emergency Response System, the HKSAR Government adopts a bottom-up approach to responding to emergencies. Current policy is to keep the emergency response as simple as possible by:

- Limiting the number of involved departments and agencies;
- Limiting the levels of communication within the emergency response system; and
- Giving as much authority and responsibility as possible to those at the scene of an emergency.

Normally, the vast majority of emergencies are handled by the emergency services, principally the Police and the Fire Services, using their own expertise and resources. These emergency services are trained and provided with adequate resources to work independently of any overall central Government command structure. In certain circumstances, other supporting agencies will be involved. Only in extreme situations is there likely to be a need for the Central Government to become directly involved.

Tier One Response

"Tier One" Response involves the emergency services operating entirely under the direction, monitoring and support of their own command. Emergency services (i.e. the Police and the Fire Services) have permanently manned and control facilities, which are able to receive, and respond to calls for emergency assistance at any time. The usual means for the public to request emergency services through 999 calls will be received initially by one of the Police Command and Control Centres. Incident information could also be channeled through the 999 Telephone Conferencing System to the Fire Services Communication Center for appropriate response.

Tier Two Response

There are standing instructions in the Police and the Fire Services for alerting the Security Bureau Duty Officer (SBDO) about incidents which may need Government Secretariat attention. At this stage, the "Tier Two" Response will be activated. At this level, the Government Secretariat will closely monitor the unfolding of incidents through the Emergency Support Unit (ESU) established within the Security Bureau. The ESU plays a proactive role to ensure proper liaison between departments at appropriate levels in situations that develop rapidly. Incidents coming under this category are those where the scale of the

incident is likely to grow in terms of threats to life, property and security, and which may require a more complex emergency response operation. They are also likely to grow into situations that will generate significant media and community interest.

Tier Three Response

In the case of a major incident involving widespread threat to life, property and security and where extensive Government emergency response operations are required, the "Tier Three" Response will be activated. The Emergency Monitoring and Support Center (EMSC) will be activated upon the direction of the Secretary for Security (Head of the Security Bureau) or a designated senior Bureau official. Departmental Liaison Officers will assist in the work of the EMSC. Nevertheless, the EMSC itself is not an operational coordination or command centre. In discharging its monitoring role, it works closely with other coordination centres in the Police and the Fire Services on issues which require Government-wide attention, with the Information Services Department on matters that have public relations and media implications. Appropriate security committee(s) with details below may also be convened as necessary.

- Chief Executive Security Committee (CESC) – The CESC comprises the Chief Executive and his senior advisors from Government Secretariat and the Police. In the event of an extreme, prolonged and widespread emergency which seriously affects, or has the potential to seriously affect, the security of Hong Kong, the CESC will be convened to direct government security policy.
- Security Control Committee (SCC) and the Regional Security Control Committee (RSCC) – The CESC is supported and advised by the SCC, which is a committee comprising representatives of the Security Bureau and the Police. The SCC will advise the CESC on matters relating to the implementation of policy, and will act as a link between the RSCCs and the CESC. The RSCCs established at the regional level are responsible to the SCC for the local planning, coordination, control and implementation of internal security and other emergency measures within their respective regions.
- Civil Government Emergency Committees – There are a number of other emergency control committees to coordinate Government-wide planning and implementation of the security policy formulated by the CESC. Such committees will advise the CESC on matters relating to the implementation of security policy within their spheres of expertise and experience. They will act as a link between the departments, the public utilities and the CESC. These committees include the Information Policy Committee (IPC), the Aviation Security Committee (ASC), the Food Control Committee (FCC), the Oil Distribution Committee (ODC), and the Joint Emergency Public Works Coordinating Committee (JEPWCC). Other ad-hoc committees may be formed on the direction of the CESC or the Chief Secretary for Administration to deal with any major problems.

Apart from setting out the levels and stages of emergency response, the Emergency Response System also spells out the duties and responsibilities of certain departments, agencies and non-government organizations. A flow chart is attached at Appendix B to facilitate better understanding of the Emergency Response System practiced by the HKSAR Government.

Three Principal Phases

The “Three Tier” System will continue to operate in one form or another through the three principal phases of emergency response. These are the rescue, recovery and restoration phases. However, the roles and responsibilities of involved departments and agencies vary, depending not only on the nature of the emergency, but also on the stages of the emergency response. Nevertheless, the principal responsibility for on-site rescue rests with the Fire Services whereas the Police will carry out a support role in the rescue phase. In the course, the Fire Services Rescue Commander, the Police Field Commander and the District Officer concerned will liaise closely to deal with inquiries from the media and the public on site. An inter-departmental Help Desk will be set up whenever considered necessary. Officers from the Information Services Department (ISD) will oversee press activities and arrange for on-site briefings to be given to the media by the District Officer or the on-scene commander. The ISD officer will also responsible for advising the Government on any public relations activities that may need to be taken immediately. Moreover, the ISD Officer will advise the officials concerned on the most effective way to present the facts to the media, when giving press interviews on site. Furthermore, the on-site ISD officer will act as the point of contact for the ISD Combined Information Center (CIC) that has the overall responsibility for coordinating the provision of information to the media and the public.

As soon as a disaster happens and often long after the event itself has ended, work must go to assist victims of the disaster. The purpose of the recovery phase is to return the community to a reasonably acceptable condition. The arrangements are intended to satisfy the physical, psychological and social needs of the community. An integral part of these services is the establishment of hot-lines so that victims, relatives and friends and other concerned parties can obtain assistance and information quickly and effectively.

Although the restoration of a site after an emergency or a disaster is not strictly an emergency response, the restoration process should often begin while the rescue and recovery phases are ongoing in order to minimize the long-term distress caused by the disaster. To a certain extent, it may also help reduce costs and timeframes significantly.

Emergency Support Unit (ESU)

The ESU established under the Security Bureau formulates government contingency plans for civil and natural emergencies and disasters. In connection with this assignment, the ESU has drawn up a set of contingency plans and follows the spirit of the comprehensive approach (i.e. covering stages of prevention, preparation, response and recovery) and the all-agency approach. These contingency plans include:

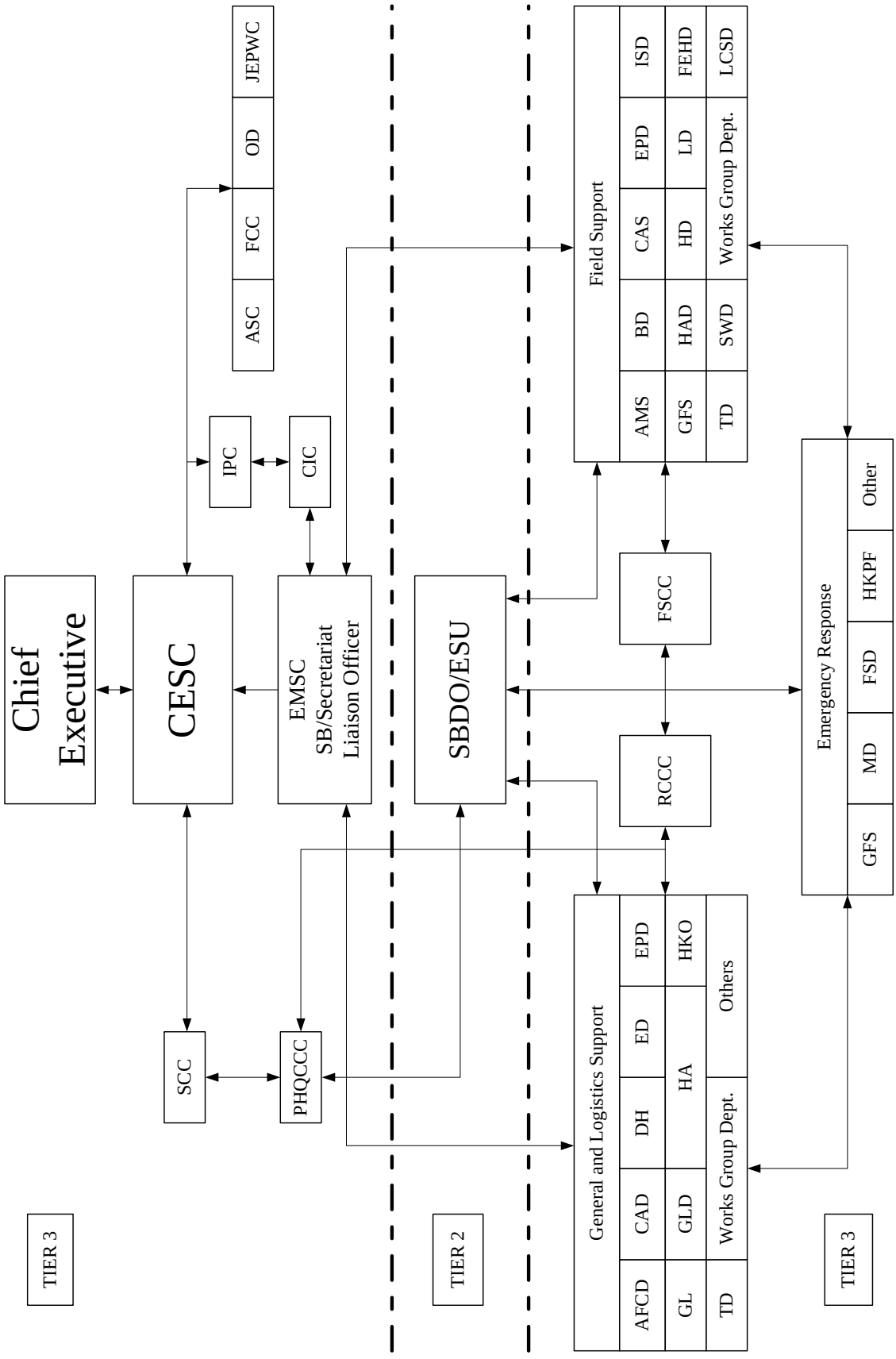
- Contingency Plan for Natural Disasters
- Contingency Plan for Dealing with the Aircraft Crash in Hong Kong Government
- Contingency Plan for the Salvage of Crashed Aircraft
- Contingency Plan for Daya Bay Nuclear Powered Plant
- Contingency Plan for the Public Safety during Visits by Nuclear Powered Warships (PORTSAFE)
- Maritime and Aeronautical Search and Rescue

- Response to Terrorism

The ESU also coordinates public education programs on the Government's Emergency Response System and what the public should do in emergencies.

Appendix B

FLOWCHART OF THE EMERGENCY RESPONSE SYSTEM IN HONG KONG



Appendix C

EMERGENCY MANAGEMENT IN NEW SOUTH WALES, AUSTRALIA

Overview

According to an information booklet "Emergency Management Arrangements" issued by the New South Wales State Emergency Management Committee, there is a main distinction between an emergency and a usual incident. Owing to the complexity of response and recovery measures, an emergency requires a significant and coordinated response. Accordingly, an emergency occurs when an impact or an imminent impact of a hazard:

- endangers, or threatens to endanger, the safety or health of a person in the State; or
- destroys or damages, or threatens to destroy or damage, any property in the State;

and requires a significant and coordinated response**.**

The State Governments exercise control over most of the functions which are essential for effective prevention of, preparedness for, response to and recovery from emergencies through legislative and regulatory arrangements, and provision of emergency services organizations and supporting functional area agencies. As a result, the main roles and responsibilities are vested in most of the state emergency agencies.

The two main characteristics of the Emergency Management System of New South Wales are:

- the legislative framework which requires the provision of the emergency management system; and
- the comprehensive approach adopted in responding to an emergency.

These two characteristics have substantial implications on the ways adopted by various state agencies to deal with emergencies. They are discussed in detail in the following sections.

Legislative Framework

The legislative provisions to deal with the emergencies are essentially written in the State Emergency and Rescue Management Act, 1989**.** In particular, it specifies:

- The establishment of an Emergency Management Committee;
- The production of Disaster Plans;
- Arrangement for controlling operations; and
- The responsibilities of the Minister.

The Act provides the legislative basis for the preparation of the State Disaster Plan (DISPLAN)**,** which is the key element of planning at State level. The object of DISPLAN is to ensure coordinated response to emergencies by all agencies having responsibilities and functions in emergencies. The usual means for the public to request emergency services is by dialing '000'.

The DISPLAN in particular:

- Identifies, in relation to each different form of emergency, the combat agency (which could be a voluntary body) primarily responsible for responding to the emergency;

- Provides for the coordination of the activities of other agencies (including voluntary agencies) in support of a combat agency in the event of an emergency;
- Specifies the tasks to be performed by all agencies in the event of an emergency; and
- Specifies the responsibilities of the Minister, and the Local Emergency Operations Controllers at State and District levels.

DISPLAN may be activated at State level by the Minister, for any emergency, without the need for a declaration of a "State Emergency". In other words, various agencies may act according to the provisions in DISPLAN as and when they are required to do so.

The significance of DISPLAN is that it is not an operation plan to handle emergencies. Instead, it provides a framework to ensure coordinated response to emergencies. In other words, it sets out the roles, responsibilities and procedures for relevant agencies to prepare emergency action plans. Once DISPLAN is in place, the relevant agencies are duty bound to prevent, prepare for, respond to and recover from the emergencies.

Comprehensive Approach

The comprehensive approach has been adopted throughout the emergency management arrangement set out in the DISPLAN. In essence, the comprehensive approach, which is widely adopted in literature, recognizes four elements to emergency management:

- Prevention - includes the identification of hazards, the assessment of threats to life and property and the taking of measures to reduce potential loss of life or property (mitigation)
- Preparation - includes coordination and management arrangements or plans to deal with the effects of an emergency;
- Response - includes the process of combating the effects of an emergency; and
- Long Term Recovery - includes the process of returning an affected community to its proper level of functioning after the emergency.

The DISPLAN provides the structure for dealing with any type of emergencies. One of the ways to look at the operation of DISPLAN is given graphically in Figure 1.

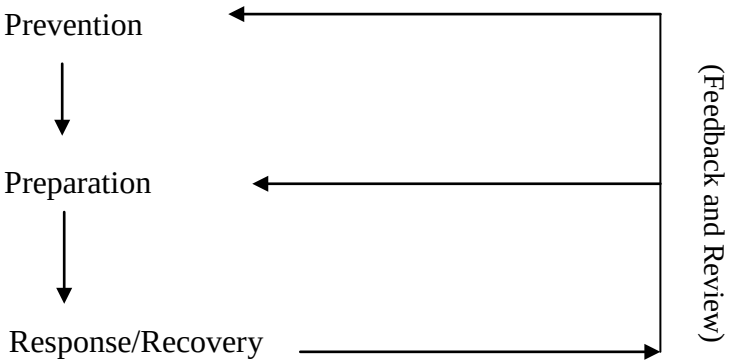


Figure 1

This structure suggests that the first step for handling any types of emergency is a risk assessment of the hazard (i.e. prevention). If there is little or no risk anticipated in the hazard, there is no need to do any plan preparation (i.e. preparation). Where the risk assessment calls for preparation of plans to respond to identifiable hazards, a plan with suitable arrangements for rescue and recovery would be prepared. The drawn up plan would then be implemented when there is an emergency (that is response and recovery) would follow. To allow rooms for refinement of the plan, there is also a feedback mechanism to review the adopted prevention and preparation arrangements.

All-agency Approach

Since the structure identifies very precise functions at different stages, various agencies have been assigned specific duties under the DISPLAN. Of particular interests are:

- The State Emergency Management Committee (SEMC) is the principal committee established under the Act for the purposes of emergency management at State level. Its main duties include the prevention of all kinds of hazards, and review of appropriate emergency management structures at all levels;
- Designated Combat Agencies are responsible for responding to specific types of emergencies. Where there is no designated combat agencies, the State Emergency Operations Controller (SEOC) would take up the duties; and
- There is no designated agency for the recovery works. Nevertheless, the SEOC is charged with the duty of the overall coordination of a recovery operation involving various agencies, functional areas and other supporting organizations.

The organization of the agencies involved in the DISPLAN is best illustrated in Figure 2.

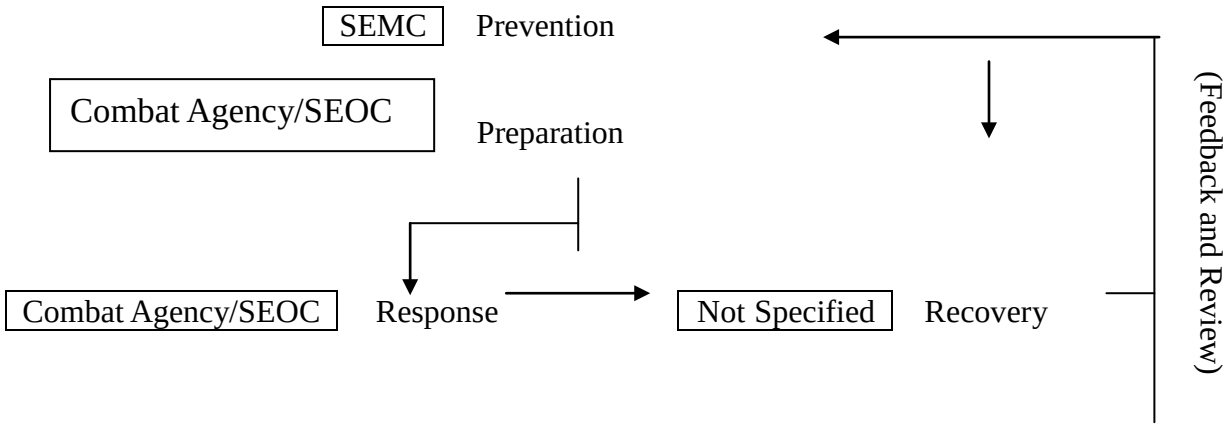


Fig. 2

A total of six combat agencies have been designated to deal with 10 kinds of identified hazards. In particular, the New South Wales State Agriculture Department is the combat agency for animal health emergency, whereas the State Emergency Service is the combat agency for storm/tempest. The roles of these two combat agencies will be discussed in detail in the selected case studies. Up to now, a total of seven Special Hazards Plans have

been prepared at the State level to deal with certain identifiable hazards. They are called Sub-Plan in which the planning required is either more specialized or more detailed. They are:

- Animal Health Emergency (Exotic Animal Disease);
- Aviation Emergency;
- Bush Fire;
- Flood;
- Hazardous Materials Emergency;
- Hawkesbury/Nepean Flood Emergency; and
- Marine Oil Spill.

Appendix D

ANALYSIS OF THE EMERGENCY MANAGEMENT SYSTEMS IN HONG KONG AND NEW SOUTH WALES

Emergency Response System in Hong Kong

The HKSAR Government adopts a bottom-up approach to deal with emergency situations and disasters. Responsibility of contingency planning therefore places much emphasis on the initiative of the individual Policy Secretary concerned. However, there lacks a coordination mechanism among the Policy Secretaries for a crisis touching more than one policy area. As a result, there is so far only a limited set of government contingency plans for tackling civil and natural disasters under the ambit of the Security Bureau. It is therefore advisable to establish a central coordinating committee to identify regularly any upsurge of potential crises entailing contingency planning, especially for a crisis covering more than one policy area. The proposed committee should also gain experience from past crises where there was no dedicated contingency plan to deal with and formalise a corresponding contingency plan accordingly. To assist departments concerned in drawing up a comprehensive contingency plan, frameworks and general guidelines on contingency planning should also be introduced.

Apart from the above observations, the Emergency Response System adopted by the HKSAR Government could be regarded as an effective and efficient system when considering the localization of emergency resources readily available within a tiny place. Its succinct and precise emergency structure together with adequate empowerment to departments/agencies concerned and its sophisticated crisis communication system are undoubtedly meritorious.

Comparatively speaking, the HKSAR Government is situated in a more favorable political environment in which the pressure both from politicians and green power is not too strong. However, these pressures are gaining in momentum and would certainly impose significant impact on the government emergency management system.

DISPLAN in New South Wales

In general, the DISPLAN, which is prepared under a legislative framework, has the following merits in dealing with emergencies:

- The relevant agencies have the statutory obligations to carry out their job;
- The roles and responsibilities are clearly defined; and
- It makes use of resources from voluntary agencies and creates a “partnership” relationship among these agencies.

Nevertheless, there exists an inherent inflexibility in the system as any amendments to the DISPLAN have to go through a tedious legislature process.

As regards the comprehensive approach adopted in New South Wales, it has the following merits in dealing with emergencies:

- It is all embracing, in that the SEOC is there to deal with hazards that have not been assigned to any combat agencies;
- It is easy to understand and to work out systematically the arrangement among the agencies; and

- There is a review mechanism on the adequacy of the existing emergency management structure.

Nonetheless, there are still some outstanding concerns. They are:

- Media strategy is not detailed enough and is not formalized into the DISPLAN; and
- The DISPLAN has placed too little emphasis on the arrangements for the recovery stage.

Appendix E

H5N1 AVIAN FLU IN HONG KONG - INCIDENT DEVELOPMENT AND RESPONSE ACTIONS TAKEN

Incident Development

From end of March to mid-May 1997

The virus killed virtually all the chickens on three farms in the Lau Fau Shan area. The disease was diagnosed at Agriculture and Fisheries Department's Veterinary Laboratory by virus isolation and subsequent virulence testing of the virus in 4-week-old influenza-free chickens. A full investigation of these cases was made but the primary source of the virus was not ascertained.

May to Nov 1997
No further cases were detected.

8 December 1997

H5 virus was isolated from chickens that died in a retail market in North District. Local veterinarians were alerted to pay particular attention to sick birds and report any suspected cases to AFD.

Mid-December 1997

The virus was also isolated from birds in Cheung Sha Wan Temporary Wholesale Poultry Market and environmental swabs collected from a retail market in Ap Lei Chau. Further investigations on local farms were undertaken and a survey of 70 farms revealed no serological evidence of infection with H5 virus.

24 December 1997

Mainland authorities introduced a voluntary suspension of poultry exports to HK.

Incident Development

28 December 1997

Infection was confirmed on local farms, and an outbreak of the disease was detected in birds remaining in the Cheung Sha Wan Wholesale Poultry Market. Empowered by Cap 139 of the Public Health (Animal and Birds) Regulations, the Director of Agriculture and Fisheries ordered destruction of all poultry in markets and chickens on local farms. A total of 1.5 million birds were destroyed over the next three days.

9 January 1998

The Finance Committee at the request of Director of Agriculture and Fisheries under [Financial Circular (97-98) 87] resolved to:

- Compensate farms and traders' losses and assist them to re-establish their business. Compensation and ex-gratia grants amounting to $100 million were made to the traders and the associated transport operators affected by the depopulation operation.
- Provide low interest loans to farmers and traders who required financial assistance.

7 February 1998

Importation of live chickens resumed. By the end of March, over 100,000 birds were being imported daily. Legislative amendments were passed to restrict imports of birds from farms free from influenza for the previous 180 days, tested free from H5 virus five days prior to export, examined clinically on the day of export and accompanied by a health certificate issued by a competent veterinary authority.

25 February 1998

Segregation of water fowls, mainly ducks and geese, from all other poultry at all stage of the production and marketing chain.

Early March, 1998

Importation of live ducklings from Mainland resumed.

March 1998

The poultry market of the Western Wholesale Food Market was fitted out for the trading and slaughtering of live ducks and geese only.

Response Actions Taken

Action Plans

A comprehensive action plan was drawn up at a meeting on 10 January 1998 with the

presence of the Chief Secretary for Administration, Policy Secretaries and Department Heads concerned. The plan set out in detail actions required for swift recovery and improvement/prevention. The plan included:

- Provision of compensation/financial assistance to parties affected by the slaughter operation;
- Improvement of sanitary conditions of the wholesale markets and retail stalls/fresh provision shops;
- Replacement of absorptive wood cages by plastic/metal cages that could be cleaned easily to reduce the risk of contamination and infection
- Strengthening import control and quarantine by
  - containing the potential spread of Avian Flu through live waterfowl
  - segregation of chickens and waterfowl
  - central slaughtering of waterfowl
  - temporary suspension of live waterfowl from Mainland until segregation of chickens and waterfowl and central slaughtering of the latter were ready
- Other measures to promote food hygiene and public health included
  - organizing voluntary seminars/courses on food hygiene for operators of poultry farms, wholesale and retail stalls and fresh provision shops
  - reviewing the Public Health (Animal and Birds) Ordinance to ensure that it meets modern requirements
  - requiring the wearing of protective clothing when slaughtering poultry

Public Relation Strategy

A Public Relation Action Plan was drawn up detailing the tasks and strategies of each policy bureau, department and outside agency. Timing and sequence of action were carefully thought and arranged in logical order. A very active and positive approach was adopted so that the information could be diffused to the right persons (including the Legislative Council, Urban and Regional Councils) at the right time through the media. Release of information was focused on making known to the public the way forward, and progress of recovery and improvement measures.

Measures in Poultry Farms

Thorough cleaning and disinfection were done according to international guidelines for control of avian influenza. Solid livestock waste was removed and all farm structures and equipment were sprayed with hypochlorite solution to provide preliminary disinfection.

This was followed by thorough washing of all structures with water and detergent, and a second disinfection using hypochlorite. Monitoring and testing programs were instituted on all poultry farms.

Measures in the Wholesale Poultry Market

Prior to resumption of import and trading, all wholesale market premises were completely cleaned, renovated and disinfected to the requirements set by veterinary experts and advised by the World Health Organisation. Improvement works were initiated and made to market premises.

To ensure that live chickens were sold in a hygienic place, and to facilitate the strengthened import control and quarantine systems, the Cheung Sha Wan Temporary Wholesale Poultry Market was designated under the law as the only wholesale market for live chickens in Hong Kong under the law.

Manpower and management of the market were substantially strengthened. Vehicular movements were closely controlled. Each cage of chickens entering the wholesale market was labeled by A&FD staff. In the event that the quarantine test revealed any signs of infection, the whole consignment could be traced back even from the retail markets.

To ensure hygienic conditions and adequate measures to prevent infection and contamination, additional poultry farm licensing requirements were imposed and enforced vigorously. To date, most (about 90 numbers) of the poultry farmers have successfully obtained the licenses, meaning that some two-fifths of the farmers have decided not to continue with poultry farming after the incident.

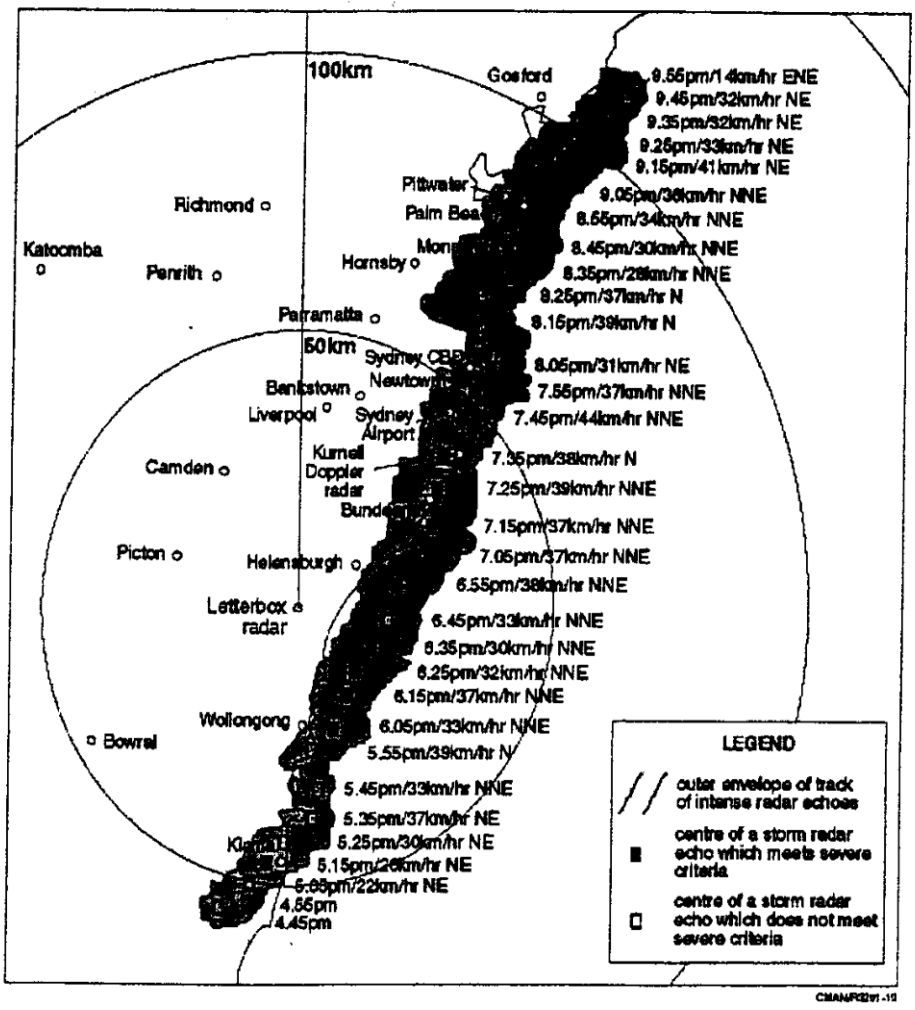
Appendix F

TROPICAL CYCLONE WARNING SIGNALS IN HONG KONG

Signal No.	Meaning
1	This is a stand-by signal, indicating that a tropical cyclone is centered within 800km of Hong Kong and may later affect the territory
3	Strong winds are expected or blowing in Victoria Harbour, with a sustained speed of 41-62 km/h (kilometres per hour). Gusts may exceed 110km/h. Winds are normally expected to become generally stronger in the harbour areas about 12 hours after the hoisting of the signal.
8	Gale or storm force winds are expected or blowing in Victoria Harbour, with a sustained wind speed of 63-117km/h. Gust may exceed 180km/h.
9	Gale or storm force winds are increasing or expected to increase significantly in strength.
10	Hurricane force winds are expected or blowing. Sustained wind speeds are reaching upwards from 118 km/h. Gusts may exceed 220 km/h.

Appendix G

MOVEMENT OF SYDNEY HAILSTORM



Appendix H

GENERAL GUIDELINES FOR FORMULATING CONTINGENCY PLANS

	Stage	Objective	Areas of Concern
Comprehensive Approach	Prevention	Eliminate hazards that constitute a significant risk and reduce the effects of unavoidable risks	Establishment of disaster prevention strategy to prevent hazards or minimize damage, which should ● Improve industry awareness and commitment ● Educate public to take responsibility for their choices, including ● Debriefing after emergency events to evaluate past mitigation strategies and res ponding plans ● Adoption of an all-hazard approach if specific contingency plan is unlikely to be drawn up ● Awareness of the increasing concern both from the politicians and the green power ● Ensuring adequate laboratory/research support
	Preparation	Ensure the full and effective utilization of all resources and services for response and initial recovery	Central coordinating committee to identify potential emergency situation and disaster scenarios Risk assessment Comprehensive written plans, with • Aims and conditions under which it comes into force • Clear roles and responsibilities of parties concerned • Emergency contact list • Coordination mechanism between parties involved Adequate hazard prediction and staged warning system Emergency disposal arrangement Staff training, test runs/ evaluation and updating of plans Enhance civic awareness and encourage industry commitment so that they react rationally and cooperatively in case of emergencies
	Response/ Initial Recovery	To minimize the effects of an impending or actual emergency	Emergency control centre with adequate telecommunication support and preferably with computer networking with departments/agents concerned Establishment of multi-user database for efficient transfer of information Use of geographical information system Quick and accurate damage assessment (do not hesitate for the benefit of aerial survey) Media strategy • Set up of emergency press center (such as the Help Desk) • Information dissemination by one spokesman. The spokesman should be skilled in public relations and have received media training • Well defined roles and responsible of staff in terms of media communication Establishment of task force with private sector involvement if necessary Application of the Incident Command System for better coordination and control of incidents
	Long Term Recovery	To restore the affected communities and restore the emotional, social, economic and physical well-being	Clear delineation of responsibilities Psychological assistance to victims and emergency workers Establishment of procedures for compensation