PART II :

PAPERS PRESENTED AT THE WORKSHOP

STRENGTHENING OF THE HEALTH DISASTER PREPAREDNESS AND RESPONSE CAPACITIES IN WHO MEMBER STATES

BY :
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A. BACKGROUND AND JUSTIFICATION

"Natural disasters": Large-scale epidemics of communicable diseases and natural disasters such as earthquakes, volcano eruptions, floods and cyclones as well as drought and consequent famine present a serious and even increasing threat in many parts of the world. The death toll and devastating effects on local and national economies are worst in the developing countries which can least afford it.

"Technological disasters": At the same time, both developed and developing countries are facing another increasing threat of technological disaster, causes by traffic, fires, explosions or by accidental release of chemical substances or nuclear contamination to the environment. War and civil strife, both directly and indirectly, also effect large populations.

Focus on developing countries: While many developed countries have been able to adjust and to introduce effective preventive measures to counter the threats or to mitigate their consequences, the developing countries face serious difficulties in introducing these many times costly measures. Furthermore, the dificient infrastructure and management capacity, as well as communication and logistics problems in developing countries may aggravate the effects of the disasters by preventing prompt national and international relief action.

Preparedness: The national governments and the international community are increasingly aware of the necessity of preparedness for disasters as a mean of reducing their adverse effects. Throug

preparedness activities-planning, organizing, training, communicating, educating, to provide prompt and appropriate response WHO among other organizations supports its Member States in preventing and tackling the health problems of disasters.

Multisectoral cooperation: Disasters seldom affect only health. Mostly their main adverse effects are in other sectors. On the other hand, the corrective action may require means not available in the health sector. Therefore, disaster preparedness and response is always a multisectoral affair, in which sometimes the health sector may play the leading role. WHO, both in the affected country and internationally, cooperates closely with the other UN, bilateral and nongovernmental organizations to provide adequate support, particularly in the health sector.

Integration and community involvement: Efficient disaster response has to be based on the existing local infrastructure and resources. External resources only become available as a second resort. Disaster response capacity has to be improved and integrated in the regular health programme and infrastructure. Decisive in the immediate aftermath of a disaster is community involvement.

Disaster/development linkage: Disasters may disrupt development programmes. However, emergency can lead to the strengthening of the development programmes if, right from the beginning, due attention is given to the rehabilitation of infrastructures and development.

Appropriateness of relief: External disaster relief has little effect or may be even counter-productive if it is not adjusted to the assessed needs and local resources. Too often, unsolicited relief results in waste of resources.

Information and communication: Rapid situation assessment, adequate information on existing resources and prompt communication are prerequisites to appropriate action. Much of the required information may exist, but is not used or not readily available and needs to be organized. Also, more use could be made of studies on previous disasters and their management.

Training and cooperation: Training, research, information systems and support development, development of training programmes and materials requires collaboration with national institutions and international organizations. Sharing of experiences through technical

cooperation between Member States, together with WHO and UN or bilateral and nongovernmental organizations, attempt to make the best use of limited resources.

It is the above aspects that WHO programme for emergency preparedness and response is designed to address, in order to fulfil the obligations set to the Organization by its Member States.

B. DISASTER PREPAREDNESS AND RESPONSE BY WHO

1. Policy basis

WHO's mandate for disasters and emergencies stems from its Constitution which states that one of the functions of the Organization shall be to furnish necessary aid in emergencies.

The guiding principles are set out in resolution WHA34.26 adopted in 1981 which stresses that, despite the undoubted importance and reaffirms that the Organization should assume a leadership role in the health aspects of disaster preparedness.

More recently, resolutin WHA38.29 adopted in 1985, emphasizes the necessity of an integrated response to link emergency measures with long-term development and the need to intensify WHO's technical cooperation at the country level to enable Member States to enhance their disaster preparedness.

2. Past and present activities

In the 1970's and the beginning of the 1980's main disaster activity was relief. Gradually, the emphasis has change to include the involvement in training, in assessments of health situations and needs, and in the coordination of large-scale disaster operations. The WHO regional office for the Americas has spearheaded the development of a full-fledged disaster preparedness and response programme. Recently, the other WHO regional offices have established action programmes for disaster preparedness and response, within a working global programme framework.

The AMRO regional programme has been successful in the development of training materials and programme, in promoting disaster preparedness in the Member States and in supporting the national training in practically all countries of the region in setablishing situation assessment capacity as well as an information and communication network. In the other regions the main activities have been the

publication of guidelines and materials, regional workshop, the coordination of large-scale disaster activities together with other UN organizations as well as emergency mission.

3. Emphasis on preparedness

The emphasis has gradually shifted from the provision of health relief to disaster preparedness. This is bases on the past experience which demonstrates that in the absence of efficient preparedness and management, ad hoc response is undertaken in a haphazard manner, with resulting waste of resouces and delays of response. Preparedness may reduce the adverse effects of disasters on health and the need for external interventions, but it also provides more appropriate assessment of needs and prompt provision of relief whenever necessary. At the other end of the sclae, the linkage between relief operations and the post-disaster rehabilitation is required to secure maximum benefits for long-term development from relief operations.

4. Technical cooperation

The enhancement of the disaster preparedness and response capacities of the Member States is the goal for WHO's disaster preparedness and response programmes. There is a continuous need to improve the capacity of the whole organization and to streamline and build up the disaster management capacities of technical and support programmes, both at the regional offices and headquarters.

In order to support the Member States in disaster preparedness and response, WHO has established global and regional emergency preparedness programmes and plans of action. The emergency preparedness and response unit at headquarters facilitates the coordination between WHO and other organization between WHO and other organizations in full utilization of the technical capacities of the units of WHO.

The regional offices are responsible for WHO's support to the Member States and for the integration of disaster preparedness into the regular health programmes. With the gradual build-up, each regional office will take over the responsibility, which today is shared with EPR/HQ.

The well-established regional programme for the Americas provides models, materials and technical back-up for the other regions.

The region for Africa has the priority in this strengthening process. An emergency preparedness unit at the regional office and a training centre for support of the regional programme will be established shortly. The medical/technical officers assigned already for the three subregions will coordinate the WHO activities in the Member states of the subregion.

The focal point for WHO's emergency preparedness and response in the Member States is the WHO Representative (WR). In the countries where there is no WR, the regional office communicates directly with the Ministries of Health. The WR coordinates his activities closely with the UN organizations, and is supported by the regional office and headquarters. The WR's responsibilities in disaster preparedness and response have been defined, guidelines prepared and background materials provided. A module for emergency preparedness and response is being introduced in staff training and the topic is introduced in regular WR meetings at the regional level.

By the end of 1989, the arrangements will have been completed.

5. Integration and coordination

WHO's disaster preparedness and response is based on the integration of disaster activities in the Organization's regular technical programme activities and on coordination of these activities with the other UN organizations, bilateral and nongovernmental organizations activities. An increasing number of collaborating centers provides additional support.

WHO cooperates closely with UNDRO, UNICEF, UNHCR, the League of Red Cross and Red Crescent Societies, the International Committee of the Red Cross and with bilateral and nongovernmental organizations.

A letter of understanding specifies the roles of UNDRO and WHO. UNDRO relief on WHO in the assessment of the health sector needs and situations in disaster. A letter or understanding betwen UNHCR and WHO specifies the role of WHO as the source of technical expertise in refugee health matters.

Collaboration with UNICEF is very close. The League of Red Cross and Red Crescent Societies, the International Committee of the Red Cross and many nongovernmental organizations that are active in disaster relief have established official relations with WHO.

C. PROGRAMME OBJECTIVES

The overall objective is:

To prevent the health hazards and to reduce the adverse effects of disasters on health or health services, by strengthening national capacities for disaster preparedness and response.

The specific objectives are:

(a) to promote emergency preparedness and response in the Member States within the health for all strategies for health development;

(b) to provide timely and appropriate response to emergencies in collaboration with Member States and other organizations.

D. TARGETS

The overall target by the end of the budget period 1988—1989 is that WHO's internal coordination and communication will have been established and that the highest risk countries in each region are adequately supported. By the end of the 8th General Programme of Work (1990—1995), the majority of all Member States, including all high-risk countries, will be supported by WHO in the four main programme areas:

1. Preparedness planning and management

Member States will have established their disaster preparedness programme. In planning and implementing preparedness activities, Member States will have access to timely, adequate and appropriate technical cooperation with WHO, through the WHO Representatives, regional offices and headquarters.

2. Training and research

The key national staff will have been trained in the health aspects of disaster preparedness and response. Studies and research are undertaken together with collaborating centres, universities, institutes and other organizations. The role and responsibilities of the WHO Representatives, Regional Offices and Headquarters will have been established and regular training and briefing undertaken.

3. Information and communication

Adequate information systems and support, including rapid

assessment capacity and communication lines will have been established in Member States. The technical capacities of WHO will be fully utilized for support to the Member States together with the collaborating centres and other organizations.

4. Response, coordination and cooperation

The national capacities for prompt disaster response will have been improved, external assistance will be effectively coordinated by the recipient governments in conjunction with UN, bilateral and nongovernmental organizations. WHO will have assumed its role in coordinating the health sector emergency response, cooperation with the other organizations will have been firmly established.

E. MAIN PROGRAMME AREAS:

1. Preparedness planning and management
2. Training and research
3. Information and communication
4. Response coordination and cooperation

1. Preparedness planning and management

WHO supports the Member States in their efforts to strengthen the disaster preparedness and management organization and mechanisms. The Organization acts in close collaboration with UNDRO, as the UN organization with a mandate for the coordination of UN disaster preparedness and response, and with UNICEF and UNHCR whenever appropriate, as well as with major bilateral and nongovernmental organizations, such as the League of Red Cross and Red Crescent Societies and the International Committee of the Red Cross.

WHO provides technical advice in overall planning and management through staff members, including consultants and temporary advisers. Technical advice is also disease control, environmental health, drugs and other supplies. Special expertise in the collaborating centres is also made available whenever required.

WHO provides background materials, publications and guidelines and undertakes situation analysis as an element of the planning process, which also includes the establishment of the management infrastructure and regulations and leads to the other main programme areas described below.

A network of collaborating centres is being established for pro-

gramme support. From the two collaborating centres that have existed for several years (the Centre for Research in the Epidemiology of Disasters (CRED) at the University of Louvain, Brussels and the Refugee Health Group at the London School of Hygiene and Tropical Medicine), the number will gradually increase so that by the end of 1989, there will be at least six centres with defined action programmes.

Collaboration with national institutions and universities will complement the work of the collaborating centres and frequent communication between these will be encouraged.

WHO also supports the disaster preparedness planning and management by encouraging technical cooperation between the Member States, by organizing interregional meetings and supporting international participation in planning workshop, etc.

2. Training and research

WHO supports the Member States in training of health staff as one of the key elements of their disaster preparedness programmes. Disaster specific modules or specific courses will be introduced in under and post-graduate training. Courses and workshops will be developed for all levels of health staff, within an overall multisectoral training approach. Specific areas of disaster preparedness, such as hospital preparedness, environmental sanitation, chemical and nuclear hazards will be addressed.

WHO provides technical advice through WHO staff, including consultants and temporary advisers for the review of the needs, planning of the programmes and for development of training materiasl if necessary. Audiovisual materials and publications of WHO or collaborating centres will be widely distributed and their production promoted.

For training material and training programme development, the experinces and expertise of the regional office for the Americas will be fully utilized. The collaborating centre network provides another source of expertise as back-up. WHO will provide technical advice in adapting the existing materials for the needs of the Member States.

WHO gives support by providing technical advice and limited funds for the country, regional and interregional workshops and seminars which are held in order to share the experiences, and en-

courages and facilitates technical cooperation between the Member States. Guidelines for the prevention or management of the adverse effects of disasters will be developed in coordination with the other organizations.

Special courses are organized together with the other organizations and with the collaborating centres in key areas of disaster preparedness and response. Multisectoral training is encouraged. WHO staff will be trained in disaster preparedness and response, whenever possible together with the national health staff.

WHO conducts or supports case studies on disasters, to learn from past experiences and to create institutional memories. It supports operational research for the development of more effective and efficient disaster response mechanisms. Research on some key areas, such as information systems and support is encouraged.

WHO provides technical advice and limited funds for the sensitization and public education, in order to create large public awareness of disaster preparedness and response, to gain political acceptance and support for the programmes, and to involve the community.

Library and bibliography services are operated by the regional office for Americas and by the collaborating centres. These and other sources within WHO and in other organizations and institutions are used for the support to Member States whenever required.

3. Information and Communication

WHO supports through technical advice the Member States in strengthening of disaster-related information support and communication mechanisms, by using the existing health information systems and communication means for disaster preparedness and response purposes and by introducing the necessary adjustments in identifying and processing the data necessary for disaster management.

WHO collaborates with other organizations, including nongovernmental organizations to identify additional data sources and to utilize these. WHO has established contacts and utilizes global and regional data banks and facilitates effective use of disaster and health related data from these sources. Mechanisms for feed-back of information to the Member States and to the producers of data are studied.

WHO supports studies and develops rapid assessment methods and indicators, in collaborating with other organizations or institutions and collaborating centres. WHO staff will be provided with instructions and guidelines for data collection, processing and communication.

Telecomunication via satellite will be experimented. However, the main emphasis will be placed on gathering and processing valid and reliable data at the local level and its reliable communication using telex, telephone and electronic mail through the ordinary channels.

Information on WHO's disaster-related activities will be improved. Public information will be provided through WHO's own publications and through media service.

4. Response coordination and cooperation

WHO supports the Member States disaster response, in cooperation with the UN, bilateral and nongovernmental organizations, concentrating on prompt technical advice to the Ministries of Health by WHO staff members, including consultants and temporary advisers, at the request of the governments of affected countries.

The WR provides the immediate response through resources available to him. Additional support will be made available by the regional offices and by headquarters if necessary.

The areas of response include rapid situation and needs assessment, periodic surveys and surveillance, coordination of international response in acute and long-term disasters, identification and planning of rehabilitation of health facilities and services, and monitoring of relief programmes.

WHO may provide technical advice to the orther organizations in health aspects of their relief programmes. Such collaboration is well developed with UNHCR with several on going and planned projects.

WHO does not ussually provide clinical staff for emergencies. Coordination of this aspect with the Red Cross is well-defined.

THE FRENCH NATIONAL AND GLOBAL DISASTER MANAGEMENT ORGANIZATION

Dr. MICHEL JOLI

I. INTRODUCTION :

Happily, France is not, like many countries as Indonesia, threated by major natural disasters from the earth or from the sky. But since the begining of the century the Manmade disasters have been multiplied.

- Technological and chemical hazards.
- Trafic Accident : Roads
  Railways
  Planes
  and Boats.

. . . . . and last terrorism.

The existence in our country of many huge technological plants and of more than thirty nuclear sites have prompted our nation to begin looking at our national disaster plans including the role of medical services and the training to provide this service.

France is a little country and an old democraty whose administrative organization is two centuries old. French revolution and after Napoleon set up a long time ago the main rules of states citizens protection.
Since the eighteens, France has been improving this protection with new laws and organization rules and it created a specific Ministry for prevention of major hazards. Mr H. Tazieeg, the famous volcanoes specialist was, during three years, in charge of this Ministry.

We are here three doctors. Dr. Hrouda is civilian. He works as resuscitation specialist in the main medical relief service of Paris district.

He is also specialist of disaster medicine.

Dr Richten work in the firemen brigade of Paris. They will participate at panel discussions about Bophal, Mexico and French International resume team.

To day I am going to tell you what is the French theoritical approach of the field medical care—after me Dr. Hrouda will explain the French organization face of global disaster.

II. FIELD MEDICAL CARE A NEW APPROACH.

The role and Place of the Physician during emergency situations in war or in times of peace has formed, a long time ago, the subject of a theoritical debate.

The problem is to know when the physician has to take charge of the victim and when to start specialized care:
- whether in the hospital emergency service, or
- on the accident or disaster site itself?

Since the sixties, after the cruel experience gained in Algeria, French Physicians admit that first aid must be done on the ground by specialized doctors or under their direct supervision.

We call that 'Medicalisation Primaire Des Secours'.
In 1966, in the South of France (Montpellier and Toulouse), Anesthesiologist witnessed trauma victims arriving at the hospital in such a condition that the physicians decided to begin going to the scene themselves to prevent added complication.

In this way, the transposed in civilian practice a leading principle of military medical health service: a physician must be able to work out-side the hospital. This was the begining of the emergency and intensive care mobile units known as smur.

In practice, doctors travel to the scene of an emergency in a fast car, ambulance or helicopter and attend to the victim with the assistance of a registered nurse specialized in Anestheisa and resuscitation, a medical student and a driver trained in first aid. They begin, on the ground, the intensive care before evacuation.

The past decade has witnessed an worldwide incerase of natural and technological disasters such as Bhopal, the gulf of Bengal, Mexico

84 and 85, Armero, Thernobyl terro . . . . all these names remind us that an assistance plan can't be achieved in the absence of adequate organization, specialized resources suitable transport evacuation facilities and trained staff . . . . . or in the absence of any consistent logistics.

As a result of increasing population density and improved communication, major disasters involving international aid now occur several times a year. Disasters at national, states and local levels occur daily and society is no longer willing to accept their impact felt.

In France, during disaster situation we try to keep up the same principle has held which is: 'Medicalisation primaire des secours'. Medical primary relief.

This, modern field medical care results from the addition of medical military know how with civilian intensive care technics and disaster experiences. Nowadays, it covers a very wide competent fields but also in disasters, emergency and humanitarian actions as well as some aspects of medical cooperation.

They have in common such problems as access to the victims, work in multispecialized teams, the use of telecommunications and transport, mobility of technical resources, general organization, and in short: . . . . . logistics.

The existence of such a great number of extra medical difficulties has brought together these different emergency situations. A new approach to field medical care has emerged, characterized by technics and resources specifically designed to cope with difficult conditions and by the professionalisation of medical personnel.

Disaster medicine training in France reflects the demand for improved emergency and disaster medical services. This particular course was developed by emergency physicians, and anesthesia reanimation specialists in conjunction with the army health service. Today, French Universities give disaster medicine training.

THE USE OF SATELITE IN DISASTER MONITORING

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Introduction

1. Since the successful launch of the first artificial satellite in 1957, space science and technology development have been advancing rapidly. Within the period of 30 years of its development, it should be noted that parts of the wide range of space technological activities, certain types can be alleged as development and operation of application satellites in direct use of space technology performing useful functions on earth.

2. This paper deals with the use of satellite systems in disaster monitoring in preventing and controlling exposures to natural hazards and limiting morbidity, when natural disaster occur. From this brief presentation it is expected that further relations with health management could be explored pursuant to effective and efficient disaster relief activities.

Terms and Definitons

3. The terms and their definitions used in this paper are noted in the attached listing.

Satellite as Space Technology Application Platform

4. Besides its use for space research, satellites are soon used also for more direct applications. To mention one such application satellites are the generation of the communication satellites that have become invaluable and integrated part of international, regional and domestic telecommunication networks.

5. They are followed closely by weather and environmental observation satellites, generating most meaningful synoptic and real-time data of cloud formations and other meteorological elements. And later on came also the satellite systems dedicated to observe or monitor the earth surface.

6. **Communications Satellite.** Communications satellite systems have been developed starting from 1960 and have proved to deliver three types of services, which are fixed (point to point) communications, mobile communications and direct broadcasting systems.

7. International communications by satellite (fixed services) have been established by Intelsat and Intersputnik networks. In domestic system, one of such operational and meritful examples is the Indonesian Domestic Satellite Communication System PALAPA established since 1976.

8. For marine communication the Inmarsat is now globally accessible in mobile operations. Direct broadcast satellites have been applied in a number of countries domestically to serve television programmes. This direct broadcasting system will eventually be reaching out to wider coverage.

9. **Earth Resources Satellite.** Earth resources satellites or known as remote sensing satellites are satellite systems which incorporate sensor devices to observe the earth from space and enable us to gather information to conduct monitoring of characteristics and dynamics of the earth surface features.

10. It should be noted that certain advantages are obvious like the very large coverage, resulting in synoptics information, and repetitive coverage while capable of covering remote areas.

11. Started with the ERTS/Landsat-1 being launched in 1972 followed by Landsat-2 and –3, the earth resources satellite systems currently in operation are Landsat-4 and –5, then by SPOT–1 and MOS–1. Those satellites have a near polar orbit, whereby global coverages are obtained.

12. Landsat-4 and –5 carry two types of sensors which are a Multi–Spectral Scanner (MSS) and a Thematic Mapper (TM). The MSS systems deliver MSS data in the visible and near-infrared spectral bands in 80 meters spatial resolution, while the TM sensor produce TM data in the visible and near-infrared in 30 meters spatial resolu-

tion. Landsat-4 and –5 have both their imaging system in temporal resolution of 8 days, which mean that their revisit sensing cyclus over the same area is in 8 days periods.

13. The Landsat data can be ordered from the EOSAT Company, USA, which may be fulfilled in about 2 months time. Real-time data reception is possible at the existing ground stations. The groundstation in Indonesia is located at Pekayon, nearby Jakarta.

14. The SPOT–1 operating since early 1986 has generated higher resolution data that is 20 meters in color images and 10 meters in panchromatic. With its off-nadir viewing mechanism the SPOT can offer stereoscopic data. The SPOT data products can be ordered through the SPOT Image Company in France.

15. Meteorological and Environmental Observation Satellite. Technically speaking, this meteorological and environmental observation satellite belongs to the remote sensing satellite family, for it senses the earth atmosphere and the earth surface and records their parameters. The sensors on this satellite is basically capable to work in the visible and infrared spectral bands, which allow the system to carry out data acquisition during daylight and nighttime. There are two types of meteorological and environmental observation satellites that are the geostationary orbiting and the polar ones.

16. The geostationary meteorological satellite is placed on the geostationary orbit, which is an equatorial orbit at an altitude of 36.000 km above the earth surface, having a 24 hours orbital period identical with that of the earth itself, thus viewed from the earth surface the satellite would seem to be stationary (of geostationary in this case). With that unique position, the satellite is capable to gather synoptic data and more outstandingly carry out uninterrupted observation of the growth and movement of weather phenomena, which is most advantageous to monitor hazards and weather itself.

17. In addition to that, the geostationary spacecraft carry a data collection system (DCS) instrument, an onboard UHF transponder enabling the spacecraft to send and receive messages to and from ground platforms. There are 5 geostationary satellites, one of them covering the South East Asian Region i.e. the GMS series.

18. The polar orbiting meteorological satellites are placed in lower orbital altitudes, i.e. 850 to 900 km and produce higher resolution

data (in comparison to those from the geostationary satellites). In fact the satellite orbit is near-polar, with the main objective of gathering daily global cloud cover, surface temperature and vertical variation of the atmospheric temperatures and vapour.

19. Besides that, the polar orbiting meteorological satellites can have additional capability to perform as data collection and platform location, thus provided with access to receive data from ground, ocean surface or atmospheric platforms. In such way data is acquired from in-site sensors which are not measureable by imaging remote sensing, like surface winds and pressure, rainfall amount, river levels, seawater salinity, subsurface temperature and other parameters.

20. Furthermore, when such ocean or atmospheric platforms are freely floating their position can be determined. By such platform location capability the fluid motion can be determined.

21. At present the NOAA–9 and NOAA–10 are in operation.

Natural Disaster Monitor Satellite

22. Previously it has been already described that technological development in the field of satellite applications have paved the way to improve the availability, reliability and accuracy of most valuable data and information of the earth surface and environment, and similar access was made to communicate those data and information and other data. Those development efforts involving prevention, preparedness an relief either in shorter term as well as in the assessment of possible long duration or continuing disasters.

23. **Communications Satellite.** All data relating to disasters from wherever it may be collected including those from remote sensing satellite systems would only be effective when it is timely communicated to relevant and competent authorities and accurately transmitted to the people in distressed areas. That should require effective and efficient assessment of data and information, which is just the role of communication satellite.

24. **Earth Resources Satellite.** This type of remote sensing system has been already described as having high spatial resolution (up to 10 meters), but with lower temporal resolution. Now we would recall the general behaviour of disaster incidents, that involve certain delineable areas and could take place most suddenly and swiftly.

25. In such cases it may generally seem to be less compatible to use the earth resources satellite system that operates in low temporal resolution as monitoring tool for disaster management, but rather more suitable in applying the said system as source of data in prevention measures against disasters.

26. The application of earth resources satellite data in prevention activities includes also the construction of hazard maps (such as tectonic maps and flood maps), land use maps, vulnerability assessment and planning with regard to disaster control measures and land use.

27. **Meteorological and Environmental Observation Satellite.** In this type of satellite system one can identify quite different options in comparison to the earth resources satellite system. The weather and environmental satellite data is given in low spatial resolution (around one km) but in high temporal resolution (four coverages in daytime), which makes it more suitable for short term as well as longer term disaster warning and monitoring systems, such as related to tropical cyclones, floods, volcanic eruptions, drought and forest fires as well as SAR (search and rescue).

28. **Tropical Cyclone.** By using multi temporal data obtained from the geostationary satellite such development and position of tropical cyclones are readily observed and moving direction as well as prediction of effected areas can be determined.

29. **Floods.** Identification of rain infested cloud formations can be done on satellite imagery and may even give sufficient indication as to predict potential flood occurence due to excess precipitation.

30. **Volcanic eruption.** Satellite imagery can easily detect the magnitude of volcanic lava and ash deposition in larges areas.

31. **Drought.** Drought phenomenae can be monitored by analysis of vegetation indices.

32. **Forest Fire.** Hot spots and smoke outflow patterns can be observed on satellite data.

Related Options for Health Management

33. The role of application satellites, their capabilities, and limitation satellites, their capabilities, and limitations to support activities in disaster prevention, preparedness and relief, is already briefly described in previous paragraphs. That role includes the development of hazard mapping, vulnerability assessment, early warning, moni-

toring of disaster incidents and their impact on the habitat and communicating the data and information on the disaster threat and relief addressed to responsible authorities in decision making to give timely warning to the inhabitants of distress areas.

34. The question is what options in space technology application could be offered in relation to the interest in the management of health/medical relief and welfare rehabilitation. That is presumably the focus of discussion in this workshop.

35. Each disaster would typically bring about sudden changes and occurence of imbalance in natural or man made livelihood at limited or larger scale whereby disruptions are sizeable in the environment including the inhabitants. From the practical point of view such conditions may entail in the disruption of health and disease control.

36. A long drawn period of drought can cause the outbreak of disease that is typical with water crisis conditions. Adversely, in flood disasters other types of disease may break out in a habitat struck by floods and polluted water. Still more differently are the effects of forest fires bringing thick smoke high in the atmosphere that interfere with the air traffic and the smoke and gases present in lower air flows over inhabited areas will endanger breathing.

37. In the event of volcanic eruption we can monitor the spread of volcanic ash and the outflow of lava to allow efficient assessment of the danger zones and subsequent measures of health relief accordingly.

38. The availability of good hazard maps and precise analysis of vulnerability will be most helpful to plan well oriented and effective health relief activities. Just as well, with availability of DCS capability in communications and weather satellite systems, those could be applied for the purpose of medical data communications.

39. Non medical information can be given through the use of space technology which in the health sector could allow effective and efficient steps to be taken in the preventive, alert and relief measures against natural disaster and the impact.

Concluding Remarks

40. Once again, it is expected that from this brief presentation further relation with health management could be explored.

Reference

1. UN, Report on the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space 1982.

2. UNDRO, Space Applications for the Acquisition and Dissemination of Disaster-Related Data, 1983.

3. Mahsun Irsyam, Pemanfaatan Antariksa untuk Penanggulangan Bencana, 1984.

TERMS AND DEFINITIONS

1. **Disaster**: an event concentrated in time and space, in which a society (or a community) undergoes severe danger 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 is prevented.
2. **Disaster management**: a comprehensive term which refers to all activities concerned with prevention, preparedness and relief.
3. **Disaster prevention**: measures designed to prevent natural or man made events from causing or resulting in disasters or other related emergency situations.
4. **Disaster preparedness**: actions designed to minimize loss of life and damage and to organize and facilitate timely and effective rescue, relief and rehabilitation in case of disaster.
5. **Warning**: pre-disaster information that a situation may soon (from several hours to several months) develop into a disaster.
6. **Alert**: post-disaster information on a situation which may require emergency assistance (disaster relief).

(From : UNDRO, Space Applications for the Acquisition and Dissemination of Disaster—Related Data).

THE PROBLEMS OF DISASTER AT SEA

J.E. HABIBIE

I. Introduction

The Department of Communications of the Republic of Indonesia has the responsibility of Maritime Safety to protect life at sea and the environment, carried out by the Directorate General of Sea Communication.
One of the Maritime Safety Missions is Maritime SAR (Search and Rescue).
But to carry out this mission, Indonesia have a national system that cover maritime, aeronautical including land SAR subsystems coordinated by the National SAR Agency which is also under the Department of Communications.

To ensure an efficient SAR system, it should includes all national resources available efficiently and effectively where one of them is medical services which could provide medical advices to ships at sea through radio communication and also services during evacuation of survivors in SAR operations.

As requested by the Organizer of this very important International Workshop on Disaster Preparedness and Health Management, this presentation will focus on the specific instructional objectives the participants will obtain knowledge of problems of disaster at sea, the Organization and Management of Search and Rescue at sea.

But before I go into the specified focus, it is worth ofcourse to give a general view of the situation and condition of the Indonesian waters.

2. GENERAL VIEW OF THE SITUATION AND CONDITION AT INDONESIAN WATERS

The Indonesian archipelago consisted of more than 13000 islands lies in the cross road between two Continentals and two Oceans. This situation is understandable that shipping traffic is quite dense with international and domestic shipping following the rapid development of maritime industries since the last decade.

The national shipping or commercial fleet itself consisted of thousands of vessels with various in sizes and types. It could be easily forecast that in the near future the numbers of national vessels will become much bigger than at present in view that the government of Indonesia is promoting the utilization of the very rich maritime resources in its yurisdictions namely, fishery, mining and tourism beside the greater needs of sea transportations ensure equal distribution of national development and its industrial products all over the country.

Beside the national fleet, we sholud also add quite a big number of foreign Vessels making inter-island voyage and those that sail pass through on their international voyages.

This condition is potentialy, it may cause and increase the numbers of accidents or even disasters at sea by knowing that quite a big number of ships are very big in sizes and ofcourse carries huge amount of cargoes and or passengers.

Protecting life at sea and the marine environments are not only for the benefits of one country. It is for the benefits of all countries. That is why several international conventions has been issued and several mutual cooperations has been established for that purpose.
Accidents at sea could lead to loss of life or property, or damage to the environment and to protect life and the environment there has been international efforts.
One of the systems to protect life at sea is maritime SAR system.

3. MARITIME SAR

The obligation of ships to respond to distress messages and signals from other ships is one of the oldest traditions of the sea and is also enshrined in various international conventions.

One of them is then Brussels Convention on Assistance and salvage 1910.

Article 11 of that Convention established in international law the tradition of the brotherhood of the sea and stated that every master is bound, so far as he can do with serious danger to his vessel, her crew and her passengers, to render assistance to everybody, even-though an enemy, found at sea in danger of being lost. The Convention also required the Contracting Parties to adopt national laws or regulations to give effect to this provision.

The obligation to provide asssistance to persons in distress at sea had been embodied in other international conventions particularly the International Conventions for the Safety of Life at Sea (SOLAS) and the convention on the High Seas (1958) and the International Law of the Sea (LOS) 1982.
The SOLAS and LOS conventions had been ratified by the government.

Regulation 10 of chapter V of SOLAS 1974 states: "The Master of a ship at sea, on receiving a signal from any source that a ship or aircraft or survival craft thereof is in distress, is bound to proceed with all speed to the assistance of the persons in distress informing them if possible that he is doing so . . ."

The regulation goes on to outline various other obligations with regard to rescue operations and in Regulation 15 the SOLAS Contention gives basic requirements for governments regarding search and rescue operations.

It says: "Each contracting Government undertakes to ensure that any necessary arrangements are made for coast watching and for the rescue of persons in distress at sea round its coasts". This arrangements should include the establishment, operation and maintenance of such maritime safety facilities as are deemed practicable and necessary having regard to the density of seagoing traffic and the navigational dangers and should, so far as possible, afford adequate means of locating and rescuing such persons.
In addition: "Each Contracting Government undertakes to make available informations concerning its existing rescue facilities and the plans for changes therin, if any".

This International instruments operate without prejudice to each other and the repetition of the same principle in more than one

Convention does not introduce any inconsistencies but strengthens the legal obligations which give added force to tradition.

It was recognized that IMO (International Maritime Organization) had a crucial role to play both in providing advice and guidance and also in formulating an international search and rescue plan.

A manual on search and rescue operations was prepared by IMO for the guidance of those requiring assistance at sea or who find themselves in a position to provide assistance to others.

The manual Called MERSAR (Merchant Ship Search and Rescue Manual) which was adopted by IMO assembly in 1971 is primarily designed to aid the master of any vessel who might be called upon to conduct search and rescue (SAR) operations at sea.

It is devided into eight chapters which deal with SAR co-ordination; action by ship in distress; action by assisting ships; assistance by SAR aircraft; planning and conducting the search; communications; and aircrafts casualties at sea.

Beside the MERSAR manual there is also IMOSAR (IMO Search and Rescue) manual which was adopted by the Maritime Safety Commitee in 1987.

The manual provides guidelines rather than requirements for a common maritime Search and Rescue policy, encouraging all Coastal State to develope their organizations on similar lines and enabling adjacent States to co-operate and provide mutual assistance.

Talking into account that maritime and aeronautical search and rescue organizations are complementary, Manual has been aligned as closely as possible with the International Civil Aviation Organization (ICAO) Search and Rescue Manual to ensure a common policy and to facilitate consultation of the two Manuals for administrative or operational reasons.

DGSC is now organizing its Maritime SAR Services through its organization structure that has 9 region offices cover all Indonesian waters under the coordination of National SAR Agency who has 4 RCCs and 15 RCCs.

The total number of ships belongs to DGSC serve for maritime safety are 272 of various sizes and types. Several are still under construction.

SAR procedures and manuals use in operations are, those that refered to national regulations, IMO regulations and manuals.

4. MEDICAL HELP FOR MARINERS

Medical advice to seaman can be provided by physician through telecommunication services! When there is a request from a ship, coastal radio station then pass the message to RCC/RSC of SAR organization who in turn will request physician to handle.

An inter-action then begins between the physician or emergency staff or medical emergency team and the person attending the patient. The doctor speaks to the RCC controller who speaks to the communication station or coastal radio station, who relays to the radio officer at sea.

To streamline this activity, the medical team may request direct contact to the ship. This is recommended as normal procedure, rather than an exception.

However the direct contact should always be requested through the RCC and the RCC should remain conferenced throughout the case. This will allow timely decisions on the selection of additional resources to facilitate possible medical evacuation, if recommended.

In most serious cases, the medical center attempts to arrange for the patient to be taken to a vessel with physician aboard and, should distance permit, of rescuing the patient by means of air-and-seacrafts to allow for imediate hospitalization.

A medical data check list is very helpful for the physician to be able to make a quick diagnosis or other decisions.

It should cover important informations :

1. Craft with MEDICO (name or type/call sign or number).
2. Craft's position (latitude/longitude or bearing/distance).
3. Date/time of position.
4. Craft's course/speed.
5. Patient's name, nationality, age, sex, rece.
6. Patient's symptoms.
7. Medication given.
8. Standard medicine chest or medication available.
9. Radio frequencies in use, monitored or scheduled.
10. Craft's description.
11. M/V's local agent.
12. Craft's last port of call, destination, ETA.
13. On scene weather and sea conditions.
14. Assistance desired, if not obvious.

15. Assistance being received, if any.
16. Initial report (parent Agency, radio station name/call sign if craft, name/telephone or address if person).
17. Other pertinent information.

Medical cases typecally run several days, monitoring a patient's medical condition.
And medical services could also handle cases in remote places on land where no doctor available as long as there is telecommunication.

After rescue, survivors may require hospital treatment. They must be landed as quickly as possible and the SMC instructed to have ambulances available.
SAR personnel should be alert and ensure that, after rescue, survivors are not left alone, particularly if injured or showing signs of physical or mental exhaustion.

When survivors are delivered to a hospital the person in charge of the delivering unit should provide information on all first aid treatment given to survivors.
This information should include :

1. type of injury suffered by the patient
2. treatment given, particularly morphine and similar narcotic drugs, together with amounts and times when administered
3. times when tourniquets, splints, or compress bandages were applied.

In the case of stretcher cases, this information should be noted and placed in a waterproof pouch, if available, and securely attached to the survivor.
Medical records pertaining to the survivor should be delivered to the hospital as soon as possible.
When medical advice or assistance is required, the following information should be sent by radio to the RCC.

1. name of the SAR unit and radio call sign.
2. positions of the SAR unit, port of destination, estimated time of arrival, course and speed.
3. name of patient, nationality and age.
4. information concerning respiration, pulse and temperature, and also blood pressure, if possible.
5. area and type of pains, and all possible information about the

illness or injury.
6. with accident cases, how the accident occured.
7. medicine available on board.
8. medicine administered.

When dead bodies are recovered during SAR operation, or when a death occurs on board a SAR unit, a waybill should be made out for each deceased person. It should contain the full name and age of the deceased, as well as the place, date, and cause of death. This waybill should be made out in the national language of the SAR unit and/or in English.
Sailcloth for corpses should be carried on board, if death bodies are kept on board for any length of time, they should be properly wrapped and put in a suitable place on the vessel.
Transport of death bodies is not normally carried out by SAR aircraft.
However, SAR aircraft may have to carry corpses if no other means are readily available.
Immediately after return to the port or base stipulated by the RCC, the body must be handed over to the appropriate authorities accompanied by the waybill for corpses.
If it is known or suspected that a deceased person had contracted an infectious disease, all containers, lashing material, onboard nets, and other parts which have been in direct contact with the deceased person must be cleaned and disinfected or destroyed.

5. PROBLEMS OF DISASTER AT SEA

Accidents at sea could lead to loss of life or property, or damage to the environment.
Therefore the objectives of DGSC on Maritime Safety affairs is the improvement of safety and efficiency in shipping and related maritime activities in order to safequard the lives of persons and property sea and to prevent pollution of the marine environment.

If the frequency of accidents at sea are high it may discourage bussinessmen to invest in maritime industries and of course it may affect the government policy in promoting maritime development, especially when there is very poor capability to cope with the accident.

Although resources to cope with those accidents might be available

from several resources but if there is no nucleus organization to handle it then it means not much can be done.

The necleus organization it self need to have proffesional human resources and special design physical resources besides sufficient budget to support the always ready organization to handle such cases at sea.

6. MEASURES TO IMPROVE CAPABILITY TO COPE DISASTER AT SEA

DGSC who is responsible for maritime safety is now giving priority to improve the capability to cope with accidents at sea. A maritime SAR Telecommunication System Project is now on going and expected to be completed at the beginning of 1989 for its first phase.

A study on education and training system for maritime safety personnel is also on going and is expected to be completed also at the beginning of 1989.
The education and training establishment are expected to be implemented right after the completion of the study.

It is hoped that the availability of the said telecommunication system could be as a big step ahead in preparing the capability. And if couple with the establishment of education and training, a big and conceptional improvement could be expected.
With the limited budget available, DGSC is giving top priority on the development of manpower.

7. CONCLUSION

It is great indication that accident or disaster at sea might increase in number as consequent of the increasing of activities at sea.

To enable efficient and effective utilization of national facilities available from various resources required a national nucleus organization specialize on maritime safety to handle disaster at sea.

A reliable medical help service for injured and sick persons on board a ship and after rescued, certainly contribute a great deal for a successfulness of any disaster operation at sea.