UNIVERSITY OF MALAYA
KUALA LUMPUR
FACULTY OF MEDICINE

INTRODUCTION TO DISASTERS AND MANAGEMENT

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1. INTRODUCTION

Whether naturally caused or man-made, disasters invariably produce casualties. When casualties occur, medical personnel are involved in their care. Disasters also produce uninjured victims who may require temporary shelter, food and water.

As victims crowd together seeking help, and sanitation may not be existent, epidemics of communicable diseases may occur further adding to the havoc already created by the disaster. Medical and Health personnel are required to organize and care for these victims.

2. DEFINITIONS

Disasters are part of the larger category of collective stress. A collective stress occurs when many members of a social system fail to receive expected conditions of life from the system. The term social system refers to a collection of human beings whose interaction maintains itself in identifiable patterns over a relatively long period of time.

Collective stress can arise from the following sources:

a. **External** – largely unfavorable changes in the environment of the system. This includes floods, earthquakes, drought etc.
b. **Internal** – various forms of massive social disorganization including economic breakdowns, riots, banditry etc.

In more Practical terms, disasters may be classed either as ‘natural’ or ‘man-made’, or according to their source, thus:

1. **Natural disasters**- earthquakes, storms, floods, volcanic eruptions, drought etc.
2. **Man-made disasters** – explosions, crashes, collapse of structures, riots, civil wars, terrorist acts, banditry etc.

Classification by source e.g.:

- Meteorological disasters (Weather)
- Topographical disasters (place, position, surface)
- Telluric/tectonic disasters (earth’s structure)
- Accidents

3. DIMENTIONS

In order to study the totally of the disaster situation a number of factors are considered:

a. Scope - geographical extent
- population involved
- economic loss

b. Speed of onset - sudden, gradual or chronic

c. Duration of impact - short, medium or long

d. Social preparedness - low or high

4. EFFECTS

1. Loss or damage to human and animal life. Damage to human lives includes physical injury and psycho-social effects.
2. Loss or damage to food/cash crops.
3. Disruption of community services e.g. electricity, fuel supply, communication systems, water supply, sewage systems, food supply and distribution etc.
4. Damage of private and public property.
5. Spread of communicable diseases.
6. Disruption of normal activities.

5. REACTIONS

Population passes through a number of stages.

1. Impact — Shock
2. Frantic activity — Rumour
3. Panic
4. Disillusionment
5. ‘Emergency social system’
6. Organised effort
7. Return of morale

6. PHASES

a. Warning phase – a forecast of disaster being imminent. Various agencies are involved e.g. meteorological stations, information systems, police etc. If warnings are clear and timely, adequate preparations to face the disaster may be made. Communications are very important. Social preparedness and previous practice of reaction procedures play important roles.

b. Impact phase – very little can be done. May last a few seconds or maybe days or months. Population will react to the disaster.

c. **Rescue phase** – starts after the impact is over. Begins with amateurish attempts by population and continues until adequate organized professional rescue teams arrive and take over.

d. **Relief phase** – where there is proper assessment of needs, relocation of community and immediate aid and supplies are given. Depends much on social preparedness and resources available.

e. **Rehabilitation phase** – longest phase involving rebuilding, rehabilitation, replanting and restoration. This phase ends when normal/expected condition return.

7. ORGANISED RESPONSE

a. **Information** – is of at most importance as this is required to assess the situation after impact in order that needs can be met e.g. medical care, food, shelter, sanitation etc. Information is also needed so that clear and precise warnings and instructions can be given to the population.

b. **Communications** – are important for updating information and normal means e.g. telephone may not be functioning. Alternative means such as two way radios may have to be used.

c. **Resources** – for rescue, medical relief, feeding, camp construction etc. are required. The amount of resources available and their location must be known.

d. **Transport** – for victim and casualty evacuation, conveyance of rescue and relief personnel and equipment, clearing blocked roads etc. are necessary. Transportation includes land, water and air vehicles.

e. **Deployment** – resources should ideally be pre-positioned and be located near to disaster prone areas.

f. **Pre-planning. Co-ordination** and **flexibility** are processes which are required in any organized response procedure.

7.1 ACTIVITIES IN DISASTER M/M

Pre-impact period
- Prevention activities
- Mitigation activities
- Readiness activities

Impact period
- Rescue activities
- Relief activities

Post-impact period
- Further relief activities
- Recovery activities
- Rehabilitation and Reconstruction

8. CASUALTY MANAGEMENT

In normal clinical practices, the casualty with the most critical injury is treated first no matter how poor the prognosis.

Unfortunately, this concept may not be practical in a disaster situation and priority must be given to the needs of many at the expenses of a few.

In order to carry out the procedure of prioritizing care to be given to casualties, a **Triage** procedure is implemented. Triage is a French word meaning 'to pick out or to sort'. It was first used in the English language during World War I when mass casualties were often met with when poison gases were used.

The modern meaning of the word has two components :

1. Sorting of victims according to the severity of injury/illness and
2. Assigning priorities of treatment.

TRIAGE CATEGORIES

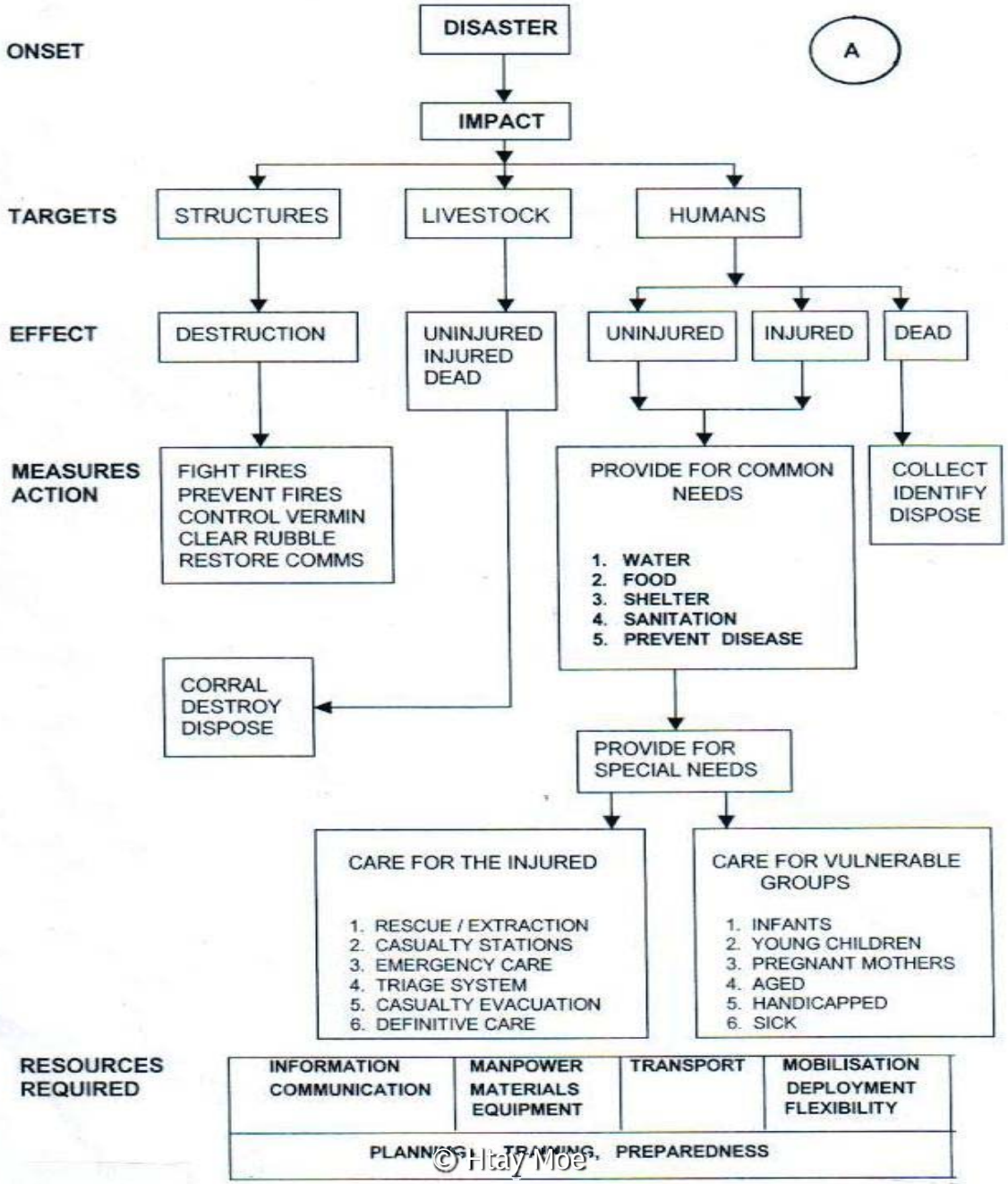
1. Immediate Treatment (Immediate, send first)
   Casualties for whom the available medical care can be expected to save life or function if performed as soon as possible.
2. Delay Treatment (Urgent, send next)
   Casualties who, after emergency medical care incure little increased risk by limited delay in future treatment.
3. Minimal Treatment (Non-urgent, can wait)
   Casualties who do not require in patient treatment and can be discharged following first aid.
4. Expectant treatment (Dying, Hold)
   Casualties so critically injured that only complicated and prolong treatment offers any hope of improving life expectancy.
5. Dead

A triage situation exist temporarity when there is a need to priorities critical care to casualities in the face of limited resources. Triage solutions are usually anticipated and planned for hospital and emergency care systems.

In **Disasters**, the Primary Triage taking place at the site of the disaster area. Usually first aid, resuscitation and stabilization done.

The Secondary Triage taking place at the hospital casualty area. Treatment, admit or discharge done.

The Tertiary Triage taking place at the operating theatre. Whom to operate first.


ONSET
DISASTER
A
IMPACT
TARGETS
STRUCTURES
LIVESTOCK
HUMANS
EFFECT
DESTRUCTION
UNINJURED
INJURED
DEAD
UNINJURED
INJURED
DEAD
MEASURES
ACTION
FIGHT FIRES
PREVENT FIRES
CONTROL VERMIN
CLEAR RUBBLE
RESTORE COMMS
PROVIDE FOR COMMON NEEDS
1. WATER
2. FOOD
3. SHELTER
4. SANITATION
5. PREVENT DISEASE
COLLECT
IDENTIFY
DISPOSE
CORRAL
DESTROY
DISPOSE
PROVIDE FOR SPECIAL NEEDS
CARE FOR THE INJURED
1. RESCUE / EXTRACTION
2. CASUALTY STATIONS
3. EMERGENCY CARE
4. TRIAGE SYSTEM
5. CASUALTY EVACUATION
6. DEFINITIVE CARE
CARE FOR VULNERABLE GROUPS
1. INFANTS
2. YOUNG CHILDREN
3. PREGNANT MOTHERS
4. AGED
5. HANDICAPPED
6. SICK
RESOURCES
REQUIRED
INFORMATION
COMMUNICATION
MANPOWER
MATERIALS
EQUIPMENT
TRANSPORT
MOBILISATION
DEPLOYMENT
FLEXIBILITY
PLANNING, TRAINING, PREPAREDNESS

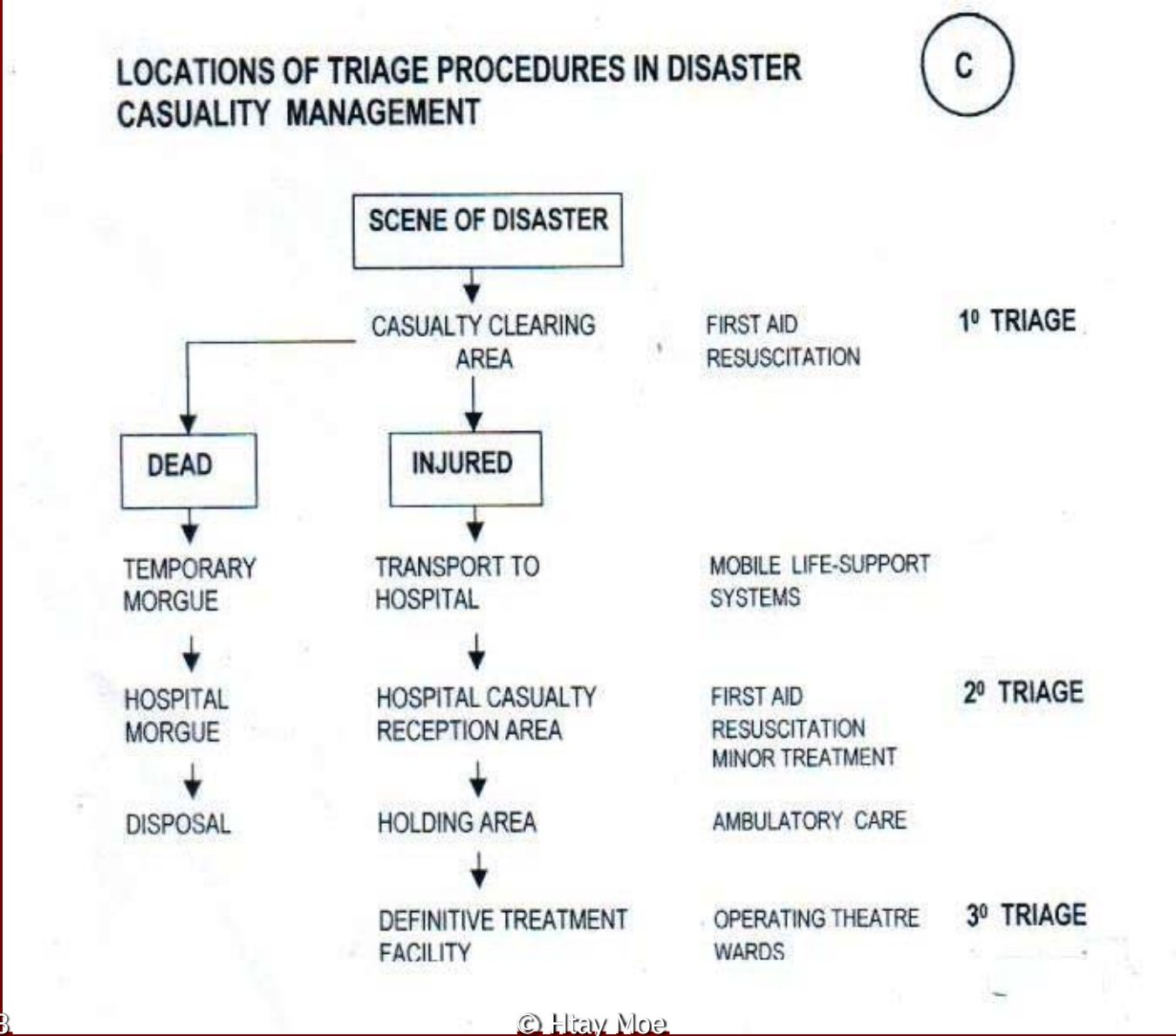
TRIAGE CATAGORIES

TRIAGE CATEGORIES

B

1.	**IMMEDIATE TREATMENT** (IMMEDIATE, SEND FIRST)	Casualties for whom the available medical care can be expected to save life or function if performed as soon as possible.
2.	**DELAYED TREATMENT** (URGENT,SEND NEXT)	Casualties who, after emergency medical care incur little increased risk by limited delay in further treatment.
3.	**MINIMAL TREATMENT** (NON-URGENT, CAN WAIT)	Casualties who do not require in patient treatment and can be discharged following first aid.
4.	**EXPECTANT TREATMENT** (DYING, HOLD)	Casualties so critically injured that only complicated and prolonged treatment offers any hope of improving life expectancy.
5.	**DEAD**	

LOCATIONS OF TRIAGE PROCEDURES

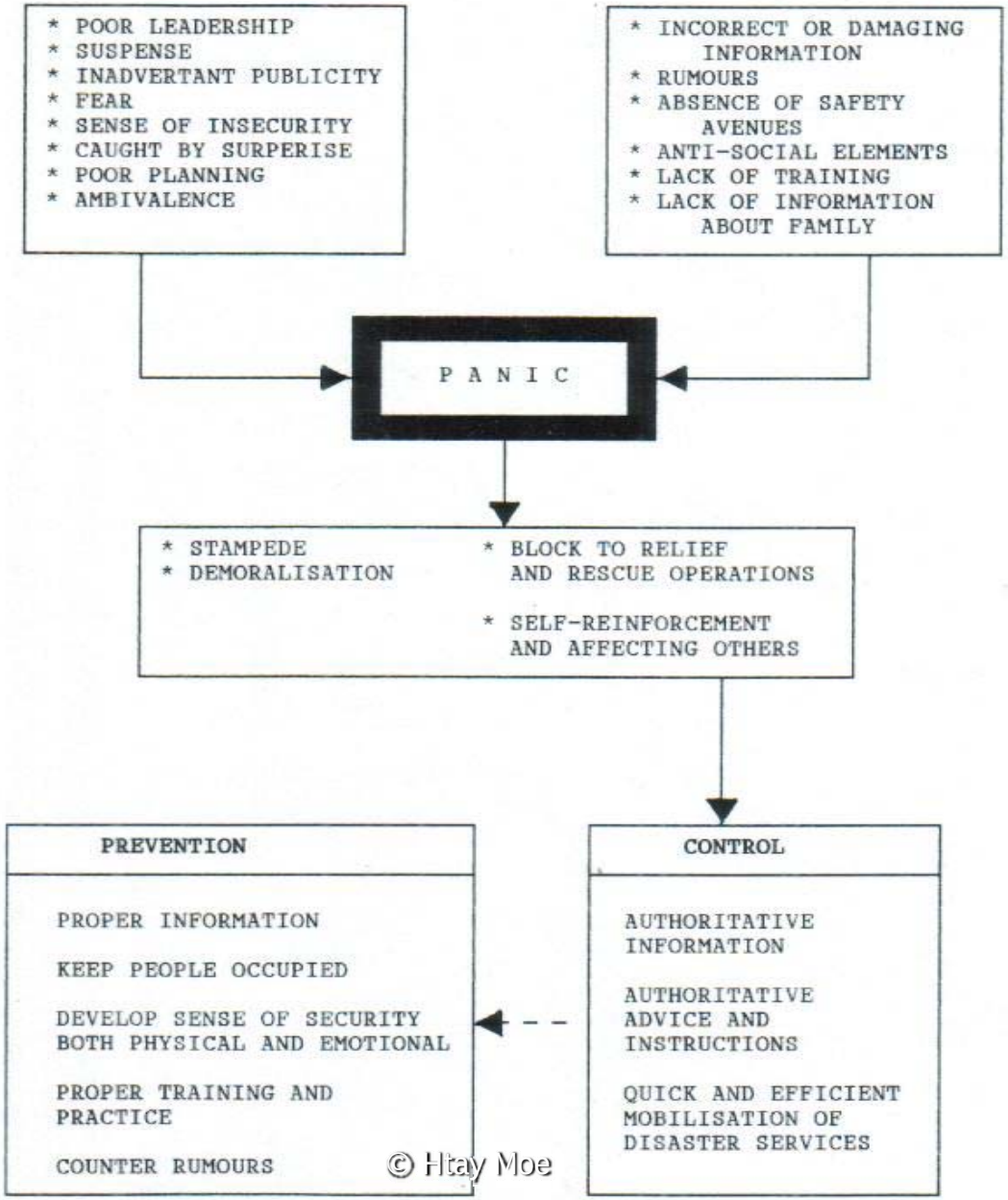


9. SOCIAL PREPAREDNESS

It is an organized community which prepare for the situation in case of disasters. The community needs to set up a good effective and organize response system to meet with disaster situations particularly elaborate warning system based from the past experience. The community must have a good communication for dissemination of information and clear role for individuals, families and relief agencies.

All denote High Social Preparedness. The opposites are Low Social Preparedness.

ANNEX - SUMMARY ON "PANIC"



10. NATIONAL SECURITY COUNCIL DIR. 20.

Directive 20 aims to put in place a comprehensive emergency management programme which seeks:

1. To response to emergencies and provide assistance
2. To mitigate the effects of various hazards
3. To prepare measures which preserve life and minimize damage to the environment
4. To establish a recovery system, ensuring quick return to normalcy for affected communities

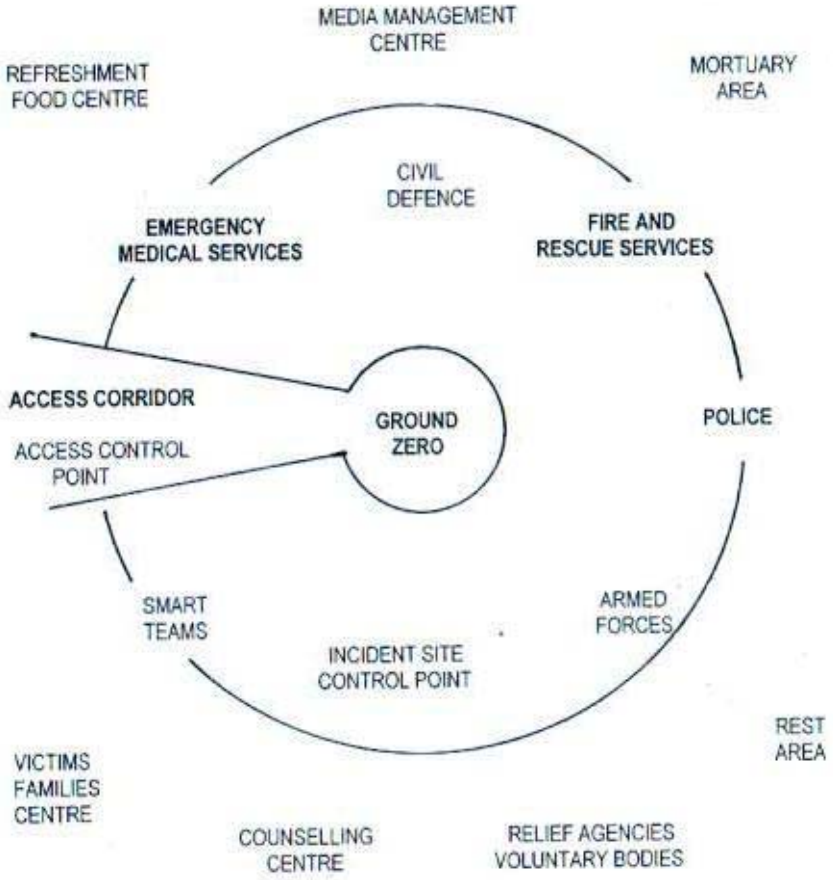
It defines **Disaster** as an emergency situation of some complexity that will cause the loss of lives, damage to property and the environment and hamper local social and economic activities.

Directive 20 identifies the main players and their functions during emergencies. The leading agencies being the Police, Fire and Rescue Department and Medical Emergency Service, supported by the Special Malaysian Disaster Assistance and Rescue Team (SMART) and the Armed Forces.

There are **3** disaster management **levels**: District, State and National. The directive also outlines the chain of command at each level. This is because it is the district or State-level authorities which will have to cope with the crisis within the first few hours of it happening.

Catastrophes covered by Directive 20 include natural disasters, major industrial accidents, extensive fire involving large areas, dam and building collapse and nuclear and radiological mishaps.

LOCATIONS OF RESPONDING AGENCIES (after ARAHAN 20)



INCIDENCES OF DISASTERS IN MALAYSIA 1988 - 1998

DATE	DISASTERS	CASUALTIES	LEVEL OF DISASTER*
31 July 1988	Collapse of Sultan Abdul Halim Jetty, Butterworth, Penang	2 dead; 1,674 injured	II
7 May 1991	Fire and Explosion of Bright Sparklers Fireworks Factory, Sg. Buloh, Selangor	22 dead; 103 injured	II
5 April 1992	Fire at Sultan Abdul Aziz Shah International Airport	3 dead	II
20 Jun 1992	Choon Hong III Ship, Explosion and Fire, Port Klang, Selangor	13 dead	I
11 Dec 1993	Collapse of Highland Towers Condominium, Hulu Klang, Selangor	52 dead	III
30 Jun 1995	Landslide, off Genting Highland Road, Pahang	20 dead, 22 injured	I
15 July 1996	Tourist Bus Accident, Ravine, Km 15, Genting Highland, Pahang	17 dead	I
29 Aug 1996	Mud Slide, Natives Resettlement Village, Pos Dipang, Kg Sahom, Kampar, Perak	44 dead	II
26 Dec 1996	Tropical Storm GREG (Typhoon), West Coast of Sabah	230 dead; 4,925 houses damaged	II
1-30 Apr 1997	Enteroviral Outbreak, Sibu, Sarawak	25 dead	II
20 Sept 1997	Haze Emergency in Sarawak and Peninsular Malaysia	Environmental damage, health problems & economic losses	III
24 Dec 1997	Fire and Explosion, SMDS, Bintulu, Sarawak	5 dead; property damage	II
Feb-May 1998	Forest and Peat Fires Throughout the Country	–	III

SOURCE: Fakhru'l-Razi Ahmadun, Universiti Putra Malaysia

* *based on Directive 20 criteria*

A CENTURY OF NATURAL DISASTERS

A chronology of some of the major natural disasters which have taken place this century

Year		Location	No. killed
A 1902	VOL	*Mont Pelee*	40,000
B 1908	EAR	*Messina*	160,000
C 1911	FLO	*Chang Jiang*	100,000
D 1916	AVA	*Italian Alps*	10,000
E 1920	EAR	*Kansu*	180,000
F 1923	EAR	*Tokyo*	142,807
G 1927	EAR	*Nan-Shan*	200,000
H 1931	FLO	*Huang He*	3,700,000
I 1939	FLO	*Henan*	200,000+

Year		Location	No. killed
J 1941	AVA	*Huaras*	5,000
K 1942	FLO	*Bengal*	40,000
L 1960	TSU	*Agadir*	12,000
M 1960	TSU	*Pacific Islands*	5,000
N 1963	FLO	*Bangladesh*	22,000
O 1965	FLO	*Bangladesh*	30,000
P 1965	FLO	*Bangladesh*	17,000
Q 1970	FLO	*Bangladesh*	400,000+
R 1970	LAN	*Yungay*	17,500

Year		Location	No. killed
S 1976	TSU	*Philippines*	5,000
T 1976	EAR	*Tang-shan*	242,419
U 1985	VOL	*Nevado del Ruiz*	22,940
V 1990	EAR	*Iran*	40,000
W 1998	TSU	*Papua N Guinea*	8,000
X 1999	EAR	*Izmit*	17,118
Y 1999	CYC	*Orissa*	9,885+
Z 1999	LAN	*Caracas*	30,000

Source: The Top Ten of Everything 2000 (DK)

World assesses Asian disaster damage

Toll from Dec. 26 quake, tsunamis stands at 145,853 as of Wednesday, 1100 GMT

Source: AFP/Govts. 050105 AFP

DISASTER STATISTICS

Total death toll

Indonesia	94,200
Sri Lanka	30,196
India	15,782*
Thailand	5,246
Somalia	176
Myanmar	90
Maldives	82
Malaysia	68
Tanzania	10
Bangladesh	2
[illegible]	1

* Dead or missing

Foreign tourists

	Dead	Missing
Asia-Pacific		
Australia	14	77
China	3	15
Hong Kong	9	62
Japan	23	236
Philippines	3	20
New Zealand	3	4
Singapore	9	175
South Korea	12	9
Taiwan	3	0
Europe	282	5,661
Americas	24	4,273
Africa	9	7
Middle East	3	7

Foreign debt

held by countries affected

Indonesia	US$130.8bil
Sri Lanka	7.7
India	82.9
Thailand	58.2
Myanmar	4.1
Malaysia	48.3
Maldives	0.2
Bangladesh	11.0
Somalia	2.5
Tanzania	1.8
Kenya	4.5

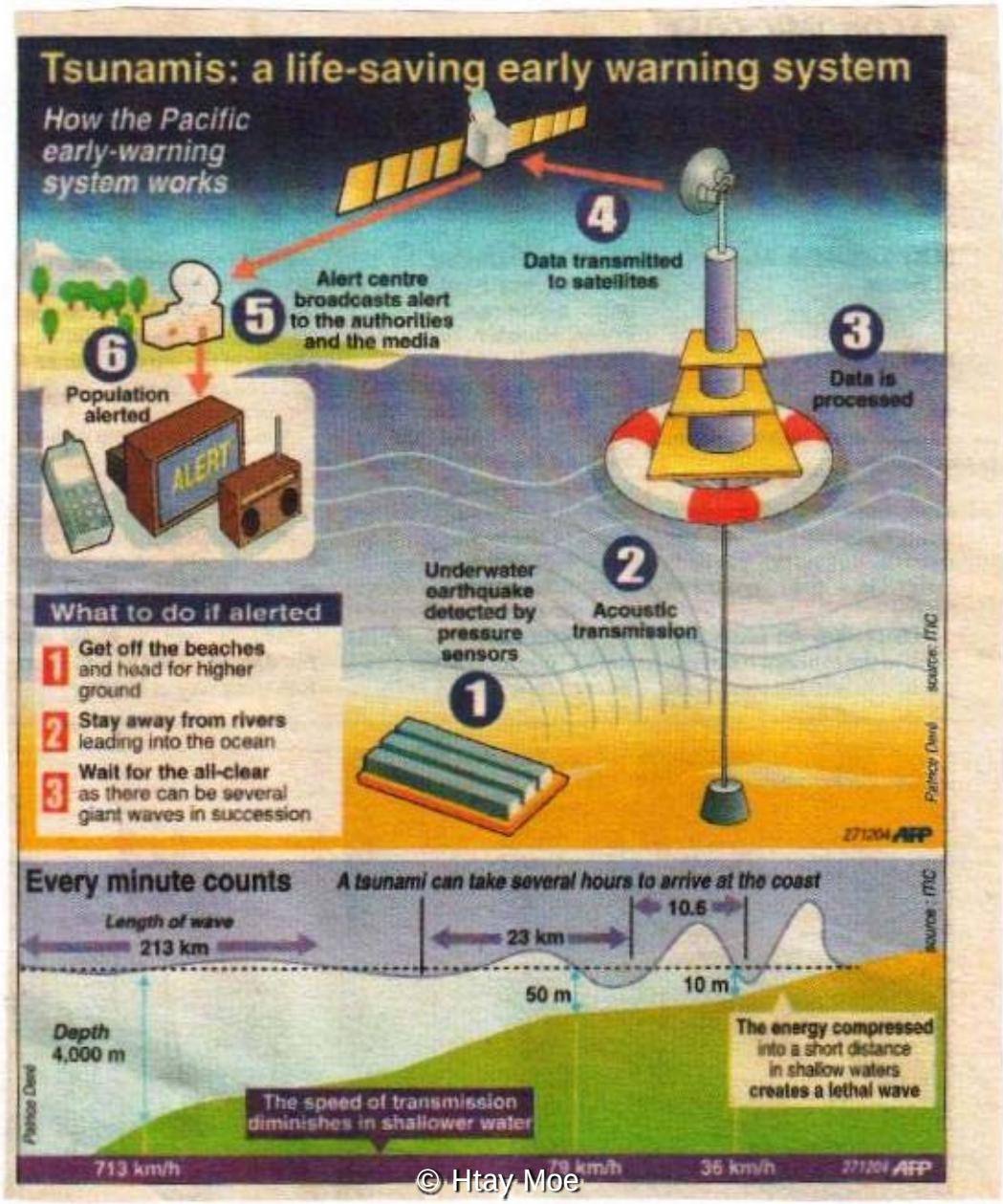
Based on World Bank data for present val[illegible]

US$4.5bil in tsunami aid

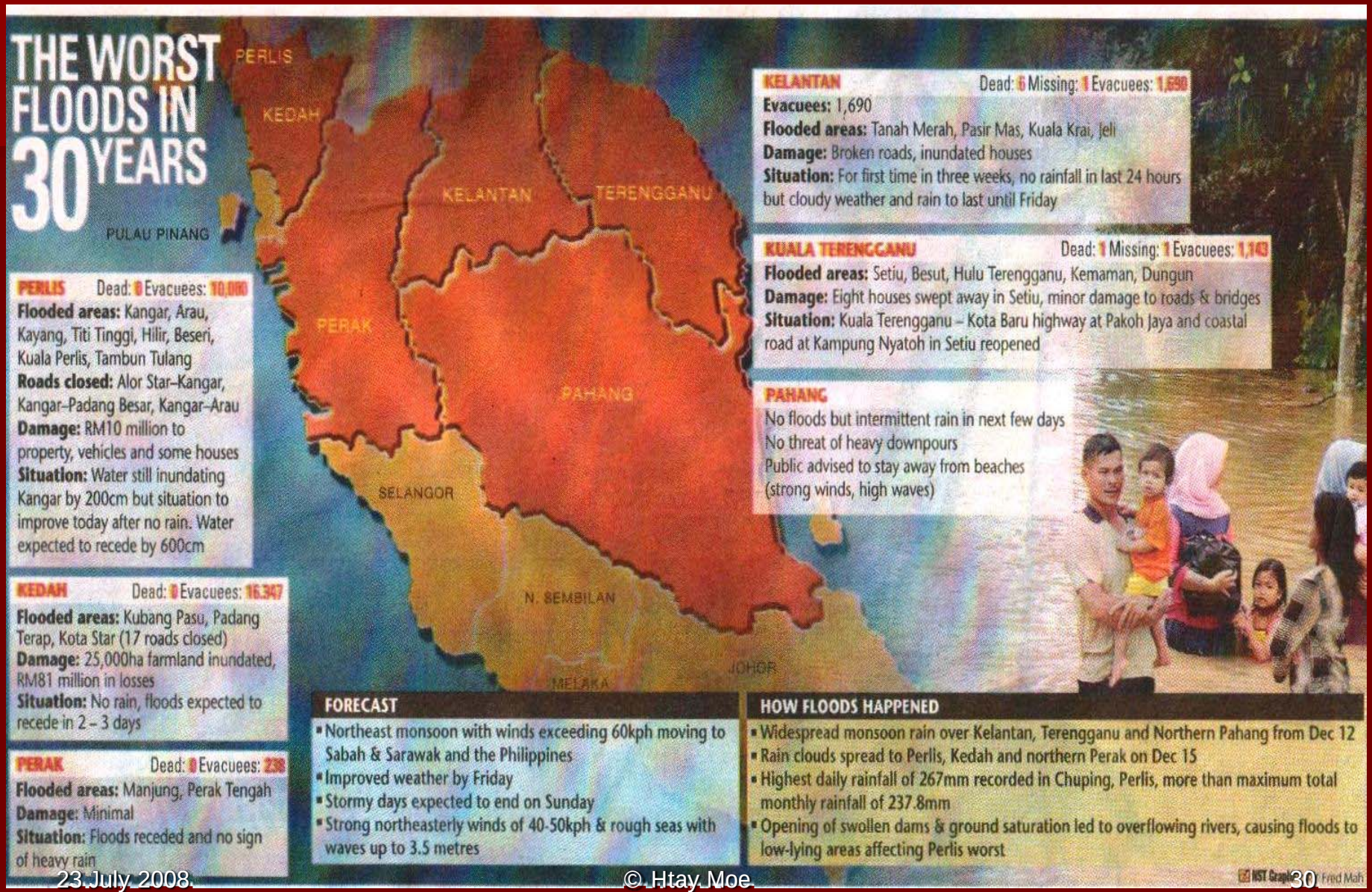
Country	US$ millions
African Union	*0.10*
Algeria	*2.00*
Australia	*764.00*
Private donations	*76.85*
Austria	*10.88*
Private donations	*13.60*
Bahrain	*2.00*
Belgium	*16.32*
Bulgaria	*0.14*
Canada	*66.00*
Private donations	*53.11*
China	*60.42*
Private donations	*3.00*
Cyprus	*0.37*
Czech Republic	*0.67*
Private donations	*2.68*
Denmark	*76.83*
European Union	*31.29*
Finland	*6.12*
Private donations	*17.68*
France	*66.38*
Private donations	*49.00*
Germany	*660.00*
Private donations	*130.00*
Greece	*1.35*
Private donations	*9.30*
Hungary	*1.20*
Ireland	*13.62*
Italy	*95.00*
Private donations	*20.00*
Japan	*500.00*
Kuwait	*10.00*
Libya	*2.00*
Luxembourg	*6.80*
Netherlands	*34.00*
Private donations	*35.00*
New Zealand	*3.60*
Norway	*181.90*
Private donations	*30.00*
Poland	*1.00*
Private donations	*1.30*
Portugal	*10.88*
Private donations	*2.72*
Qatar	*25.00*
Saudi Arabia	*30.00*
Singapore	*3.10*
Slovakia	*0.23*
Slovenia	*0.11*
South Korea	*50.00*
Private donations	*13.00*
Spain	*68.02*
Sweden	*80.00*
Private donations	*60.00*
Switzerland	*23.81*
Private donations	*39.24*
Taiwan	*5.25*
Turkey	*1.25*
UAE	*20.00*
United States	*350.00*
Private donations	*200.00*
United Kingdom	*96.00*
Private donations	*146.00*
Venezuela	*2.00*
World Bank	*250.00*

Sources: UN, wire agencies © GRAPHIC NEWS

TSUNAMI WARNING SYSTEM



FLOOD


THE WORST FLOODS IN 30 YEARS
PERLIS
KEDAH
PULAU PINANG
KELANTAN
TERENGGANU
PERAK
PAHANG
SELANGOR
N. SEMBILAN
MELAKA
JOHOR
PERLIS Dead: 0 Evacuees: 10,000
Flooded areas: Kangar, Arau, Kayang, Titi Tinggi, Hilir, Beseri, Kuala Perlis, Tambun Tulang
Roads closed: Alor Star–Kangar, Kangar–Padang Besar, Kangar–Arau
Damage: RM10 million to property, vehicles and some houses
Situation: Water still inundating Kangar by 200cm but situation to improve today after no rain. Water expected to recede by 600cm
KEDAH Dead: 0 Evacuees: 16,347
Flooded areas: Kubang Pasu, Padang Terap, Kota Star (17 roads closed)
Damage: 25,000ha farmland inundated, RM81 million in losses
Situation: No rain, floods expected to recede in 2 – 3 days
PERAK Dead: 0 Evacuees: 238
Flooded areas: Manjung, Perak Tengah
Damage: Minimal
Situation: Floods receded and no sign of heavy rain
KELANTAN Dead: 6 Missing: 1 Evacuees: 1,690
Evacuees: 1,690
Flooded areas: Tanah Merah, Pasir Mas, Kuala Krai, Jeli
Damage: Broken roads, inundated houses
Situation: For first time in three weeks, no rainfall in last 24 hours but cloudy weather and rain to last until Friday
KUALA TERENGGANU Dead: 1 Missing: 1 Evacuees: 1,143
Flooded areas: Setiu, Besut, Hulu Terengganu, Kemaman, Dungun
Damage: Eight houses swept away in Setiu, minor damage to roads & bridges
Situation: Kuala Terengganu – Kota Baru highway at Pakoh Jaya and coastal road at Kampung Nyatoh in Setiu reopened
PAHANG
No floods but intermittent rain in next few days
No threat of heavy downpours
Public advised to stay away from beaches (strong winds, high waves)
FORECAST
Northeast monsoon with winds exceeding 60kph moving to Sabah & Sarawak and the Philippines
Improved weather by Friday
Stormy days expected to end on Sunday
Strong northeasterly winds of 40-50kph & rough seas with waves up to 3.5 metres
HOW FLOODS HAPPENED
Widespread monsoon rain over Kelantan, Terengganu and Northern Pahang from Dec 12
Rain clouds spread to Perlis, Kedah and northern Perak on Dec 15
Highest daily rainfall of 267mm recorded in Chuping, Perlis, more than maximum total monthly rainfall of 237.8mm
Opening of swollen dams & ground saturation led to overflowing rivers, causing floods to low-lying areas affecting Perlis worst
NST Graphic Fred Mah

FLOOD

❑ BY SIRA HABIBU, MANJIT KAUR, EMBUN MAJID, IAN MCINTYRE, STEPHEN THEN, CHAN LI LEEN and LEONG SHEN-LI

One dead and 20,000 affected

JITRA: Floods in Perlis and Kedah worsened as almost 20,000 people were forced to leave their homes.

The rising waters also claimed its first victim in Perlis when villagers found the body of Desa Md Arshad, 65, who refused to move out of his house in Tambun Tulang, Kangar, yesterday, according to Bernama.

Many spent the night in cars while others ignored pleas from the authorities to move out in the worst floods to hit the two northern states in three decades.

In Kedah, 11,700 were forced to leave their homes, and in Perlis 10,000.

In **Kedah,** water levels at Sungai Kepala Batas, Sungai Pantai Johor and Sungai Baru reached their danger point.

All flights into and out of the Sultan Abdul Halim Airport have been cancelled until further notice.

Malaysia Airlines Alor Star district manager Ahmad Nasruldin Ahmad Mahayuddin said water from Sungai Kepala Batas had flooded parts of the runway.

It was learnt that the Royal Malaysia Air Force College at Kepala Batas was also flooded.

Sources said 21 Pilatus PC-7 planes used by college students for training were moved to the Butterworth RMAF base, while another seven were moved to the new Sultan Abdul Halim Airport.

Deputy Prime Minister Datuk Seri Najib Tun Razak visited several flooded areas in the state and Perlis yesterday.

UNDER WATER: Aerial view of a partially submerged Jitra and its surrounding areas in Kedah yesterday. — *Bernamapic*

LANDSLIDE

EARTH QUAKE

KILLER QUAKE

7.6 RICHTER SCALE INTENSITY

PAKISTAN, INDIA, AFGHANISTAN HIT

MORE THAN 2,000 FEARED DEAD

ISLAMABAD, Sat. — An earthquake measuring at least 7.6 on the Richter scale caused massive devastation today across a swathe of Pakistan, India and Afghanistan, leaving over 2,000 people feared dead.

The quake struck almost directly on the dividing line between the Indian and Pakistani controlled zones of the Himalayan region of Kashmir, triggering deadly landslides which wiped out whole villages.

The temblor sent people fleeing their homes in areas over 1,000 kilometres apart, from the western Pakistani desert city of Quetta to Kunduz in the mountains of northern Afghanistan.

Senior Pakistani officials described scenes of "massive devastation" and warned of heavy loss of life, especially in the mountains of Kashmir where communications were cut off.

At least 250 people were confirmed dead in Muzaffarabad, the main town in Pakistani-controlled Kashmir with a population of around 125,000, an official said.

Pakistani military spokesman Major-General Shaukat Sultan said over 50 per cent of buildings in the town were destroyed or damaged.

"The death toll could be more than 1,000. There could be massive casualties but we do not have exact numbers," Sultan said.

The Pakistani military said at least one village in Kashmir had been totally "wiped out" and that troops and helicopters had been scrambled to reach the stricken areas.

☐ TURN TO PAGE 7, COL 2

MORE REPORTS & PICTURES: Pages 6/7

9/10/2005 NST

TSUNAMI

DEVASTATION: Fishing boats smashed about like boxes [illegible] the Kuala Cenang fishermen's jetty in Langkawi Island.

THANK YOU