

AFRICAN DISASTER HANDBOOK



WORLD HEALTH ORGANIZATION

panafrican centre
for emergency preparedness and response



The World Health Organization is a specialized agency of the United Nations with primary responsibility for international health matters and public health. Through this organization, which was created in 1948, the health professions of some 165 countries exchange their knowledge and experience with the aim of making possible the attainment by all citizens of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life.

By means of direct technical cooperation with its Member States, and by stimulating such cooperation among them, WHO promotes the development of comprehensive health services, the prevention and control of diseases, the improvement of environmental conditions, the development of health manpower, the coordination and development of biomedical and health services research, and the planning and implementation of health programmes.

These broad fields of endeavour encompass a wide variety of activities, such as developing systems of primary health care that reach the whole population of Member countries; promoting the health of mothers and children; combating malnutrition; controlling malaria and other communicable diseases including tuberculosis and leprosy; having achieved the eradication of smallpox, promoting mass immunization against a number of other preventable diseases; improving mental health; providing safe water supplies; and training health personnel of all categories.

Progress towards better health throughout the world also demands international cooperation in such matters as establishing international standards for biological substances, pesticides and pharmaceuticals; formulating environmental health criteria; recommending international nonproprietary names for drugs; administering the International Health Regulations; revising the International Classification of Diseases, Injuries, and Causes of Death; and collecting and disseminating health statistical information.

Further information on many aspects of WHO's work is presented in the Organization's publications.

The WHO Panafrican Centre for Emergency Preparedness and Response was established in March 1989 in order to serve the African member states in their efforts to build or strengthen their disaster preparedness and response capabilities. The mandate of the Centre, which functions as an integral component of the WHO's global programme for Emergency Preparedness and Response, is to strengthen the emergency management and response capacities of the health sectors of member states. Among the activities of the Centre are producing and disseminating publications on health emergency preparedness and response, organizing training courses and workshops, undertaking field assessment missions, assisting in the formulation of national disaster plans and undertaking health operational research.

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This publication has been produced as a contribution to the International Decade for Natural Disaster Reduction (1990-1999) and to promote the objectives of the 1991 World Health Day *Should disaster strike, be ready!*

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AFRICAN DISASTER HANDBOOK

**prepared by
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1990**

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Foreword

Natural as well as man-made disasters seem to have become more frequent, deadlier and more destructive in Africa and other developing countries. Increasingly it is seen that most disasters have a man-made element precipitating the event. This allows scope for human action to prevent, prepare for and mitigate the consequences of disasters. Among the best defences is a well-informed and prepared community, which is aware of the risks in their area and has the knowledge of preparedness measures to take before a disaster strikes and action to take after impact. This handbook has been prepared for communities in Africa with simple and helpful guidelines, for different types of disasters, that can be followed by every member of the community. Rather than feel that disasters are inevitable occurrences African communities must gear themselves towards building or improving their own coping capacity.

The World Health Organization in Africa has stepped up its efforts to support, at the district level, community awareness as well as community participation in enhancing their own health and quality of life. This handbook is a simple but useful tool for reducing the effects of disasters and can serve as a base from which district health officers and health educators can develop their own guidelines for strengthening the readiness of the community.

I hope that, in the spirit of the International Decade for Natural Disaster Reduction and the forthcoming World Health Day, greater efforts will be made not only at the global level but, more importantly, at the community level to minimize the detrimental consequences of disasters.

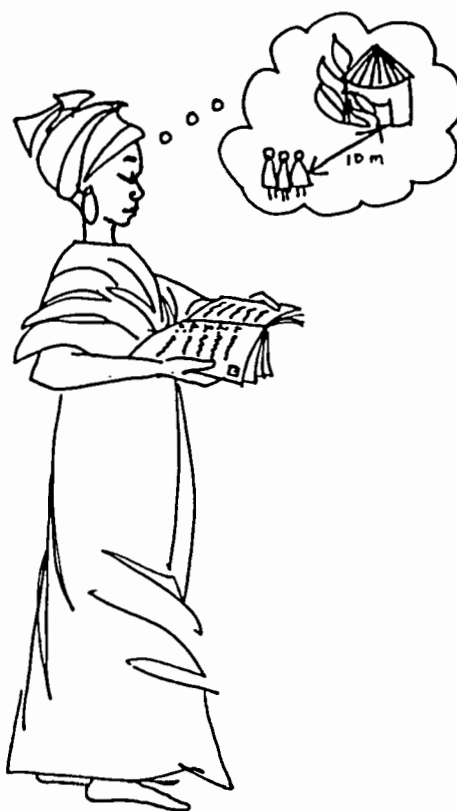


Gottlieb Lobe Monekosso
WHO Regional Director for Africa

INTRODUCTION

Objective

The aim of the handbook is to provide simple, concise, and practical guidelines for action during times of disaster. The handbook is oriented towards the layman rather than organizational authoritative bodies. The need it stems from the recognition that most publications on disasters and related issues thus far have been geared towards academics, international organizations, and/or policy makers. Included in the booklet are recommendations for preparedness, measures to take during a disaster, and actions to take post-impact which should be adapted to local conditions.



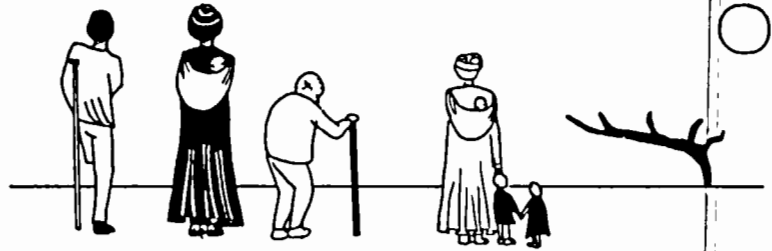
Introduction

The fact that the number of disasters and the severity of their effects on man are both on the increase is alarming and one that deserves prompt attention and concerted global action. A 1984 report by the Swedish Red Cross entitled "Prevention better than cure" shows that there has been an increase, decade by decade, from the 1960s to the 1980s in the average annual number of disasters and in the number of

people affected. Wijkman and Timberlake (1984) point out that while both the number of disasters and the number of people affected were greater in the 1970s than the 1960s, the difference in the numbers affected cannot be explained solely by an increase in the number of disaster events nor by population growth in itself. Thus it appears that **the human population is becoming, or rather rendering itself, more and more vulnerable to the effects of natural disasters.** As Kent (1987) points out the final outcome of a disaster depends on how vulnerable a population is. Vulnerable may be distinguished from disaster prone in that the former is a function of the effects of a disaster while the latter relates to the disaster agent *per se*. Within a population **certain subgroups such as widows, single mothers, children, disabled persons and the elderly, are more vulnerable than others in any disaster situation.**

The following reasons are proposed for the increasing vulnerability of man to disasters:

- **rapid population growth**, particularly in developing countries; urban migration leads to densely populated and crowded areas where the impact of a disaster can claim many more victims;
- **environmental degradation** owing to poor land use; overcultivation, overgrazing, deforestation, all render the land more prone to drought and floods;
- **poverty and inequality** - a comparison of the number of people killed per disaster against the income of the country involved shows a positive relationship between mortality and decreasing income; furthermore, even within countries the poorer people are worst affected.



While it has been argued that climatic and geological changes determine the occurrence of disasters, research into the issue has shown that such changes are not significant enough to explain the present pattern of disasters and their effects. It must be accepted that man is playing a pivotal role in weakening the resistance of his own environment.

Thus, social strategies to mitigate the effects of disasters must include:

- restriction of land use
- development of emergency preparedness and response programmes
- reducing social inequalities
- improving the coping capacity of a community - amongst the ways to do so is to create an awareness and interest amongst the citizens regarding disasters and what they can do to protect themselves. Education has an important role to play.

The costs of disaster preparedness are small compared to the losses incurred (of lives, material items, economic, social) and the subsequent reconstruction process of the affected community. The phases involved in disaster mitigation are:

- hazard and risk assessment
- disaster preparedness
- disaster mitigation.

The different organizational levels that may be involved in the whole process of emergency preparedness and response can be divided as follows:

- governmental and national
- district and regional
- town
- communities
- individual.

While risk assessment, disaster prediction, and disaster mitigation may involve specialized tasks and skills, sophisticated equipment, and considerable funds and are thus dealt with at the "organization" level, each individual can help in the awareness-building and preparedness processes.

The initial emergency response is on-site response. Thus the effect of the immediate post-disaster action will depend on training, speed and efficiency, as well as planning and rehearsal.

The ratios for major disasters striking a continent are as follows: Asia-15, Latin America and Africa-10 and Europe and Australia-1. In Africa alone there have been approximately 410 significant recorded disasters in the 1980s. A ranking of disasters in Africa, in terms of the most detrimental effects on human beings, may be as follows: drought and famine, war and civil strife, refugees, floods, cyclones and seismic disasters, epidemics and lastly infestation.

DISASTERS



What is a disaster?

Disasters must be viewed in the context of the social, political, and epidemiological circumstances in which they occur. Such parameters determine and affect the urgency of the problem, the action that needs to be taken, and the need for external cooperation.

Definitions of the term disaster may vary according to the person or authority that uses the term, which in turn is dependent on their judgement of the criteria that need to be satisfied in order for an event to be termed a disaster.

Amongst the proposed definitions are:

- ... any occurrence which causes damage, ecological disruption, loss of human lives, deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community. (WHO)
- ... the result of a vast ecological breakdown in the relations between man and his environment, a serious and sudden event (or slow, as in drought) on such a scale that the stricken community needs extraordinary efforts to cope with it, often with outside help or international aid. (Gunn, 1990)
- ... the product of the impact of a natural event upon a vulnerable population to cause disruption, damage and casualties beyond the unaided capacity of locally mobilized resources. (quoted by Davis, 1990)
- ... an occurrence or imminent threat of a widespread or severe injury or loss of life or property resulting from any natural or man-made cause... (U.S Office of Emergency Preparedness, 1972)

Types of disasters

Disasters have traditionally been classified as natural or man-made though many disaster events have both components. Thus one may add a third category 'natural and man-made' in the classification of disasters. Within these categories disasters can be sub-divided into those that are of sudden or slow onset. Even here certain disasters do not fit discretely into one slot; for example, a traditionally slow onset disaster like famine may be rather sudden if there is an abrupt termination of food supplies to part of a population. Wherever there is a man-made element precipitating a disaster there lies the scope for community action to reduce or eliminate this factor.

CLASSIFICATION OF AFRICAN DISASTERS

NATURAL CAUSES	SUDDEN ONSET	EARTHQUAKE VOLCANIC ERUPTION HEAVY RAIN TROPICAL STORM AND HURRICANE FLASH FLOOD BUSHFIRE
	SUDDEN ONSET	FIRE LANDSLIDE
NATURAL AND MAN-MADE CAUSES	SLOW ONSET	DROUGHT DESERTIFICATION FAMINE FLOOD EPIDEMIC INFESTATION
	SUDDEN ONSET	TOXIC WASTE TRANSPORT ACCIDENT TECHNOLOGICAL AND INDUSTRIAL ACCIDENT
MAN-MADE CAUSES	SLOW ONSET	WAR AND CIVIL STRIFE REFUGEES ENVIRONMENTAL POLLUTION ECONOMIC CRISIS

WHEN and WHERE?

It is generally difficult to give precise information as to when a natural disaster may occur or strike. It may be an easier task to map out the areas most vulnerable to certain types of disasters given previous history, geographic location and meteorological and seismographic indicators. **Disaster preparedness programmes aim to monitor various key indicators that assist in the prediction of oncoming disasters and also to formulate plans to mitigate their effects.** The mapping of hazard prone areas and risk factors aids in alerting people of the possible dangers and risks they may be faced with.

The terms most relevant to our document are the following:

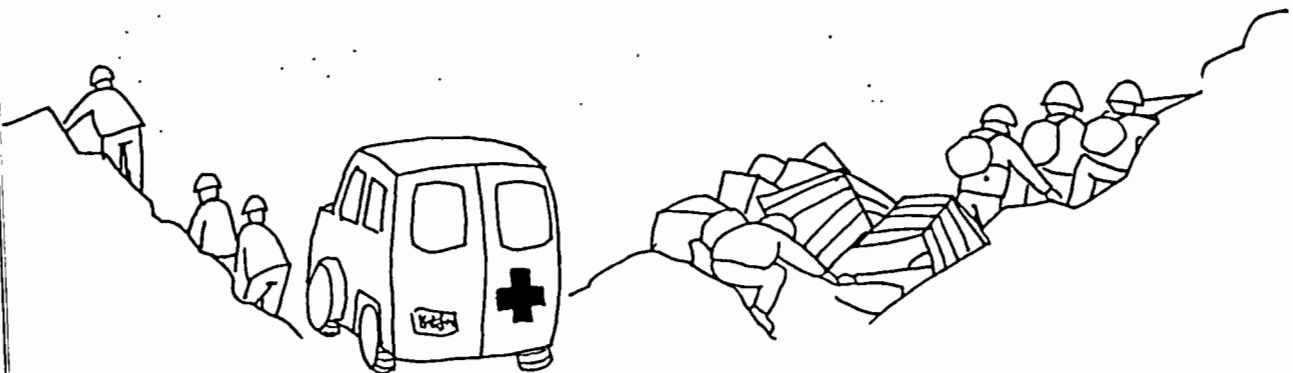
Hazard: the occurrence, within a specific period of time in a given area, of a potentially damaging phenomenon.

Specific risk: the expected degree of loss due to a particular phenomenon and is a function of both hazard and vulnerability.

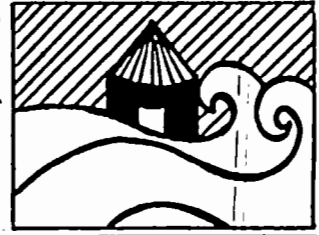
Risk: the expected number of lives lost, persons injured, damage to property and disruption of economic activity due to a particular phenomenon, and consequently the product of specific risk and elements at risk.

Individual preparedness measures involve:

- **being informed** about the specific risks involved one's community and area;
- **learning** about what measures to take in preparation for a disaster; action to take during a disaster; and finally, what to do in the aftermath of a disaster.



FLOODS



How and why do floods occur?

Floods have a variety of causes and are estimated to account for 40% of all the world's natural disasters.

The known trigger mechanisms include:

- heavy rainfall
- dam or levee failures
- torrential rains of hurricanes
- tsunamis
- ocean storm surges
- rapid snow melts
- ice floes blocking a river
- burst water mains

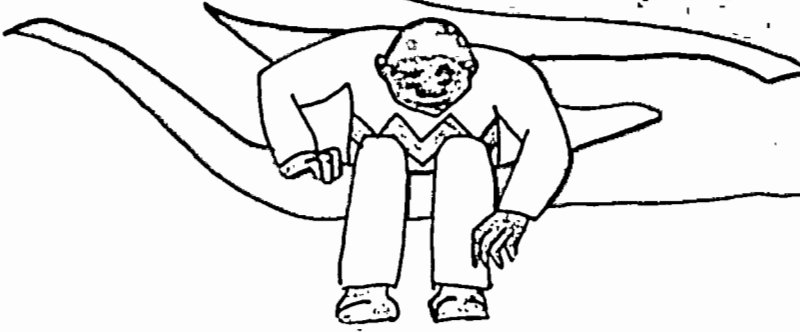
The meteorological processes can be fast or slow leading to **sudden flash floods** or the more predictable **river and coastal flooding**.

Types of floods:

- **flash floods** - may be defined as floods that follow within a few hours of heavy or excessive rain, a dam or levee failure, or a sudden release of water impounded by an ice jam;
- **river floods** - reasons may be same as above; urbanization; snowmelt;
- **coastal floods** - storm surge resulting from tropical storms or hurricanes; tsunamis.

Preparedness and prevention for floods

- Preventive measures include - community action, legislation, warning systems, combatting deforestation problems.



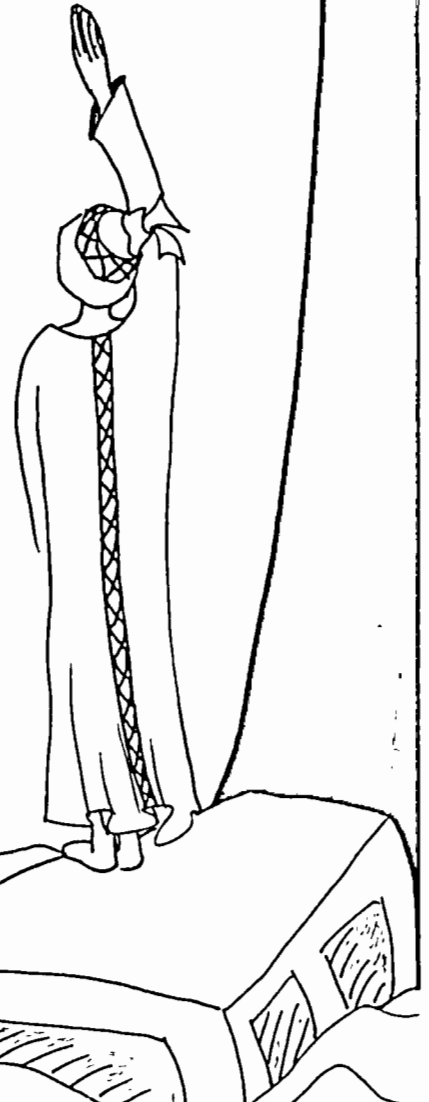
- Preparedness requires three elements:
 - efficient forecasting services, linked to
 - effective warning systems, backed by,
 - well-equipped flood-fighting organization

- Early warning can allow:
 - people to leave low-lying areas
 - harvest of valuable crops
 - effective flood fighting

- Flood fighting consists of:
 - operation of existing flood control works
 - repair, strengthening, and raising of flood control works during flood
 - building of emergency works, e.g embankments

Measures to take before floods:

- be informed about the risks of flooding in your area
- keep an emergency bag ready (containing waterproof gear)
- identify areas where you can take refuge if water level rises too much
- keep items such as sand bags, plastic sheets, pieces of wood handy; anything that can block the water flow
- when you hear a flood warning fill up containers with water since services may be suspended
- store some easy-to-prepare food
- try to determine whether your house is in risk of total flooding; see measures to take if that is the case
- prevent dangerous pollution by removing weedkillers, insecticides etc.



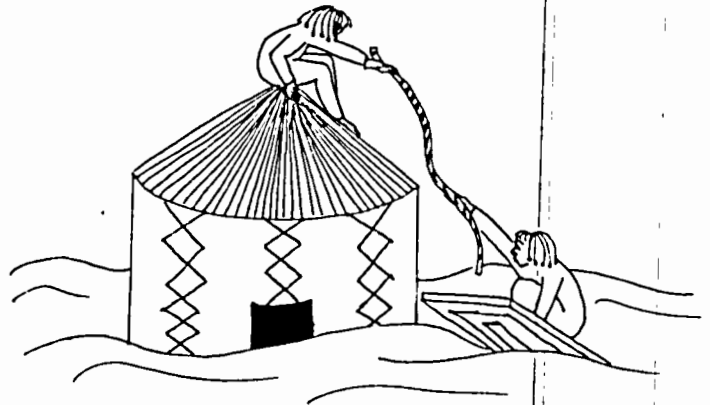
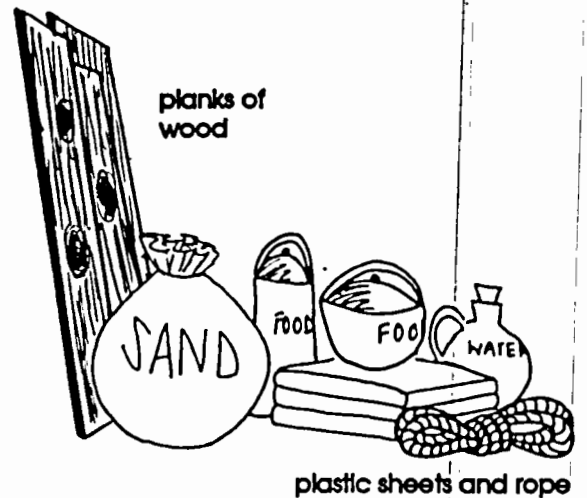
Measures to take during a flood

If your house is surrounded by water:

- try to avoid blocking little leaks since huge influxes of water can suddenly occur
- go upstairs and to roof if necessary
- if the roof crumbles hold on to a secure structure and flow with the current on this
- take on more people on your life saving carrier only if it does not compromise your safety
- avoid trying to rescue people who are in a panic - they could drag you down
- throw out ropes, life saving devices etc. to those who are at risk of drowning

If you encounter floods while on the road:

- take shelter by climbing upon a tree; or take shelter behind a wall where the current is not as strong;
- do not try to wade across the water if the water level is above your knees
- do not try to drive through a flooded area - you could get trapped
- if your car gets stuck, get out immediately and go to a higher place
- secure the car to a tree if possible; close all windows, leave it in low gear, and have the handbrake on;
- avoid places that are at risk of sudden flooding



Action to take after the floods:

- although the water level may be less than your height it is not safe to attempt to cross over; it is often difficult to assess your footing; a fall in such circumstances could be dangerous;



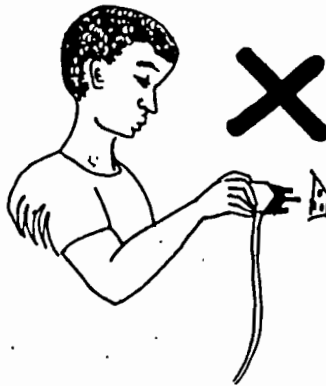
do not drink flood water - It may be contaminated

- do not wade about in the water as you could be swept away
- do not drink flood water as it may be contaminated and you could fall seriously ill



do not eat fresh food that has been in contact with flood water

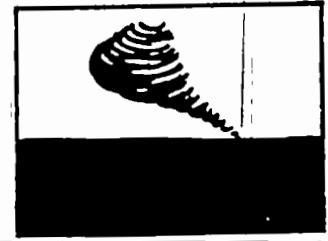
- if you can use vehicles go very slowly; there is the danger of water seeping into the engine or exhaust pipe and stalling the motor, and also of brake failure
- before going into the house be careful of any vulnerable structures; also if the foundation has weakened there is the risk of the house collapsing
- if the floods last long and you are not sure of help arriving soon, construct a make-shift raft using a strong door etc.



do not handle electrical appliances in wet areas

- one can use such a raft to move around on if the currents are not very strong
- do not eat any fresh food that has been in contact with flood water
- make sure the water has been tested and certified as safe before drinking
- do not visit flooded areas; you may be obstructing rescue operations
- do not handle electrical appliances, cables etc. in wet areas; use battery operated tools to examine buildings etc.; no electrical gadgets or lanterns are to be used since there is the possibility of leakage of inflammable materials in the air;
- inform appropriate authorities of problems in main water, electrical and gas supply lines.

HURRICANES and STORMS



General

A hurricane is defined as a rotating wind system that whirls counterclockwise in the northern hemisphere, is formed over tropical water, and has sustained wind speeds of at least 74 miles per hour (46 km/hr).

The forces to contend with are **wind and water**. Although hurricane winds do much damage, wind is not the biggest killer - **most victims die by drowning**. Flooding associated with hurricanes comes from the "storm surge." Winds and low pressure around the hurricane eye tend to raise the level of the ocean 1-2 feet. When the dome of water reaches shallow coastal areas the decreasing water depth transforms it into a storm surge that can rise well above normal sea level and cause inland flooding.

The destruction caused by a hurricane depends upon the storm surge, the wind and a combination of other factors. A five-category disaster potential scale is used to classify hurricanes - category 1 is a minimum hurricane and category 5 a maximum one.

Forecasting and prediction

Hurricanes are difficult to predict since their paths can be erratic. By monitoring the weather conditions that usually precede hurricanes (e.g thunderstorms) it may be possible to identify geographical areas at high risk of being struck by a hurricane. While such prediction and warning systems are fairly well connected and operational in the industrialized countries, this is generally not the case in the developing countries where the people affected are often not warned in time.

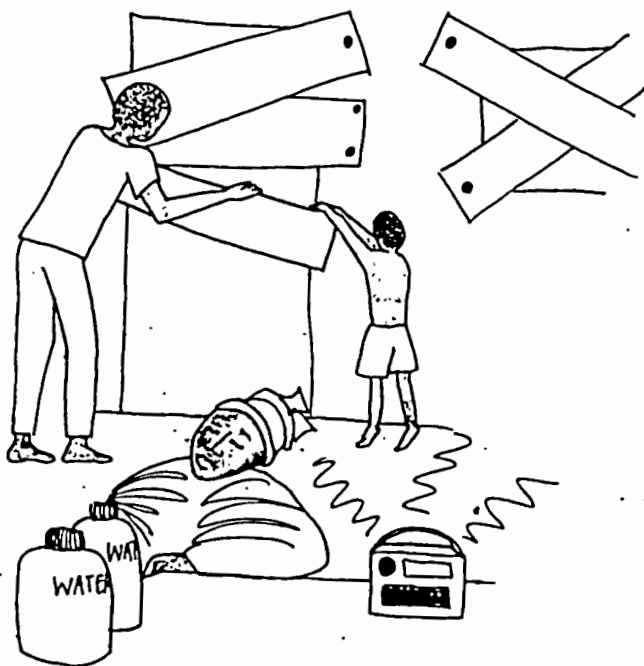
National meteorological services need to be developed in high-risk countries so as to be able to monitor and predict storms and hurricanes. The national offices must be linked to local stations which are then able to relay the information to the public and set in motion the contingency plans.

Methods of protection

- meteorological services may be able to predict the arrival of a hurricane
- the population, alerted by radio or T.V., may have to leave their homes or take measures to protect themselves

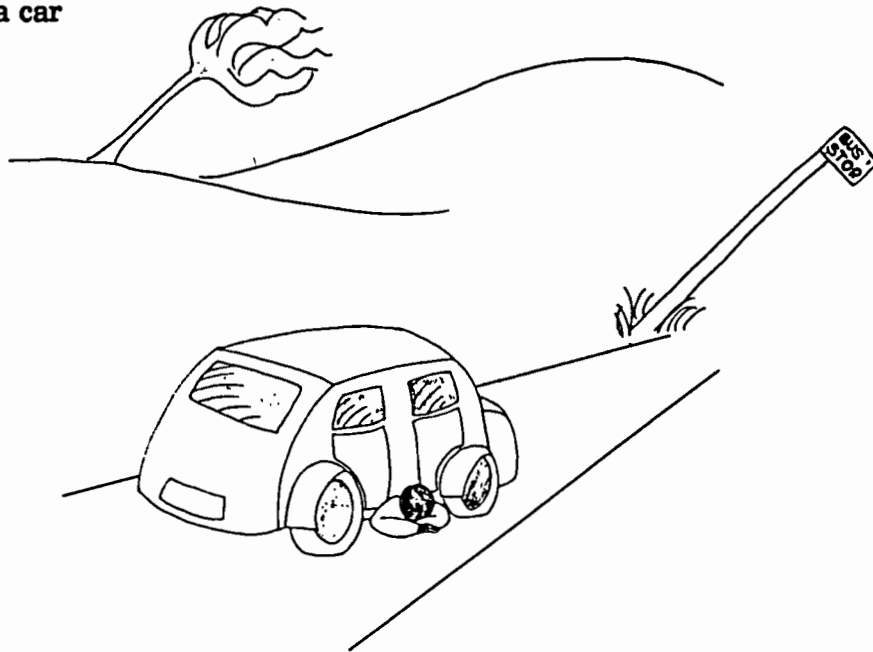
Measures to take before the hurricane strikes

- leave beaches and other areas that can be struck by high waves
- if your house is situated in an elevated area, you may remain there
- if you remain at home, or even before evacuation, take the following steps:
 - block and protect doors and windows using masking tape or wooden planks and nails - this will offer protection from the force of the wind and also other things carried by the wind
 - bring inside anything that can be broken or destroyed during the hurricane
 - keep some clean water in reserve; after the hurricane, water sources can be contaminated and services suspended
 - keep listening to the news on a battery operated radio

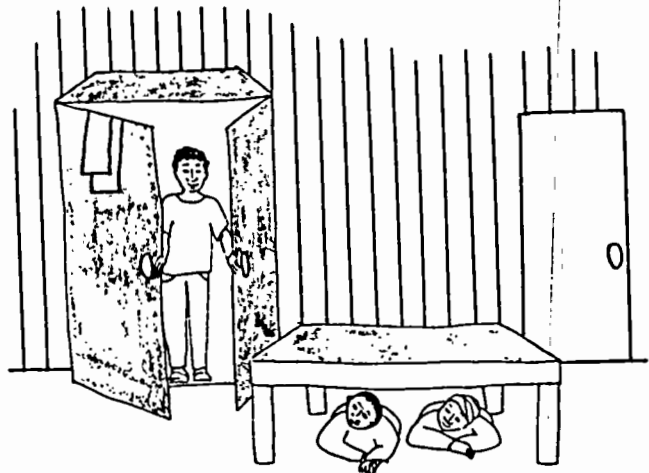


Action to take during a hurricane

- take cover inside buildings, away from objects dragged by the wind
- inside the building you should stay in the corridors, an interior room, basement or even a closet
- stay away from telephone booths, bus-stops etc.; if there is nowhere else to go take cover under a car

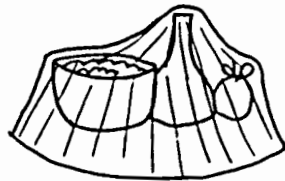


- remember that the "calm" after the storm is only because the eye of the hurricane has moved; opposite winds may appear soon after - so do not rush to leave your cover
- if your shelter shows signs of breaking up, take cover under a heavy object e.g. table, bed, or stand under a door frame
- if you are driving in a rural area drive in a direction perpendicular to the path of the hurricane; if that is not possible leave the car and take shelter in a ditch or gully
- driving in urban areas - leave the car and take refuge immediately

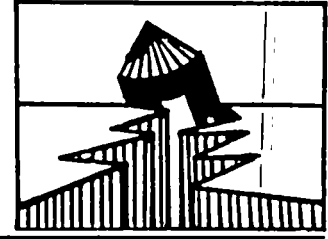


Measures to take **after** the hurricane passes

- be careful when re-entering buildings since the structures may have been weakened by the hurricane; also there are risks of gas leaks and damage to electrical cables
- do not carry cigarettes, matches, gas lanterns etc. or anything that may increase the risk of combustion
- if there is a gas leak, detected by smell rather than lighting matches etc., do the following:
 - open all doors and windows
 - close off all gas sources
 - leave the house immediately
 - inform the gas authorities as well as the fire-station
 - do not re-enter until authorities have given you permission
- if any electrical items have got wet then shut off the mains; unplug the appliance, dry it, re-plug, and finally switch on the mains; do not do any of this if you are wet or in contact with water
- seek medical help for injured persons
- check food and water before using them; if the food needed refrigeration be careful before eating or drinking since the electricity may have gone off for a while; also do not eat fresh food which has been in contact with rainwater
- stay away from worst-hit areas since your presence may hinder the rescue and emergency operations
- do not drive unless absolutely necessary; be aware of dangers and refer problems to the authorities
- refer breakdowns, leaks etc. to the proper authorities



EARTHQUAKES



How do they occur?

The earth's outer shell is divided into seven major and some smaller plates which are constantly in a dynamic state, pushing against, pulling away from, or grinding past one another. Forces build up as the plates attempt to move in relation to each other. When the adhesions along the fault give way, stored energy is released in the form of earth tremors, volcanic activity etc.

Types of plate movements and principal effects:

- oceanic plates pulling away from each other leads to hot volcanic material being expelled from cracks to form mid-ocean ridges
- oceanic plates colliding with and forced under continental plates leads to mountain ranges being pushed up, accompanied by earthquakes and volcanic eruptions
- collisions of continental plates force up mountain ranges; release compression energy in quakes

Hazard prone areas

The major earthquakes in the past have occurred in certain well-defined areas:

- in the "Ring of Fire" around the Pacific - an area stretching up the west coasts of South and North America into Alaska, across the Aleutians, down through Japan offshore of the continental landmass, through the Philippines, Indonesia, and out through New Zealand
- zone stretching along the plate boundaries from Indonesia, along the Himalayas and the axis of the Mediterranean
- in the western hemisphere, on the west coast of Central and South America
- zone bordering the Caribbean plate
- though earthquakes are rare in Australia and Africa, there have been major ones in North Africa (Algiers, Egypt, Libya and Morocco) and they are possible along the Rift Valley and in South Africa.

Classification

The strength of an earthquake can be measured by **magnitude and intensity**.

Magnitude is a measure of the physical energy released or the vibrational energy of the shock. It is commonly measured on the Richter scale which is an open-ended logarithmic scale (base 10). An increase of a single number on the scale indicates a release of energy 10 times the amount of the previous figure. Thus the amplitude of a magnitude 7.0 earthquake is 100 times that of a 5.0 earthquake. Problems encountered in using the scale arise from the fact that the magnitude is dependent on the distance from the earthquake epicentre to the damage area, soil and rock conditions, density of population, and types of buildings at the site.

The intensity of an earthquake is measured on the Modified Mercalli (MM) scale, ranging from I to XII, and gives a better indication of the human impact. A force of I is barely felt by most people; XII would indicate total destruction.

The Richter and Mercalli scale do not correspond one to one. The intensity of the quake is more relevant to public health than the magnitude.

The casualties of earthquakes may be due to:

Direct hazards:

- total or partial collapse of man-made structures (poor design and construction materials)
- falling debris and dust from rubble
- transportation casualties e.g train derailment, collapse of bridges, capsizing of boats
- floods from collapsed dams or river banks
- release of hazardous substances or gases
- rock, land, and mud-slides, or avalanches - important in hilly areas
- tsunamis; loss of life by inundating low-lying coastal areas

Indirect hazards:

- fires
- release of hazardous chemical or radioactive substances
- electrocution
- injury during clean-up and rescue operations
- exacerbation of chronic diseases
- anxiety and mental health problems

Primary effects of earthquake:

- total or partial destruction of structures
- blockage or breakage of transport activities
- interruption of water supply
- breakage of sewage disposal systems - health consequences
- loss of public utilities e.g electricity, gas

Prediction and mitigation

Scientists continue to work towards a satisfactory and accurate model for earthquake prediction. While considerable data has been gathered in this field there remains debate regarding their interpretation and predictive value.

Mitigation: should deal with construction of resistant buildings or those that will cause least damage. A thorough knowledge of the area is needed for sound structural engineering activities.

Preparedness measures to take before an earthquake:

- be informed about risks in your own area
- be informed about the safety of and construction materials used for your own house
- think about contingency plans
- identify the safest areas in your house
- make sure the furniture, lamps, pictures etc. in your house are securely placed
- move any inflammable materials away from heat sources
- make sure that the gas mains conform to the safety regulations and that they have been installed in a safe place

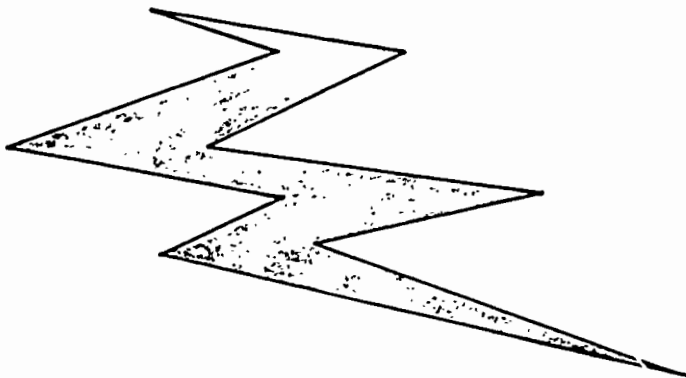
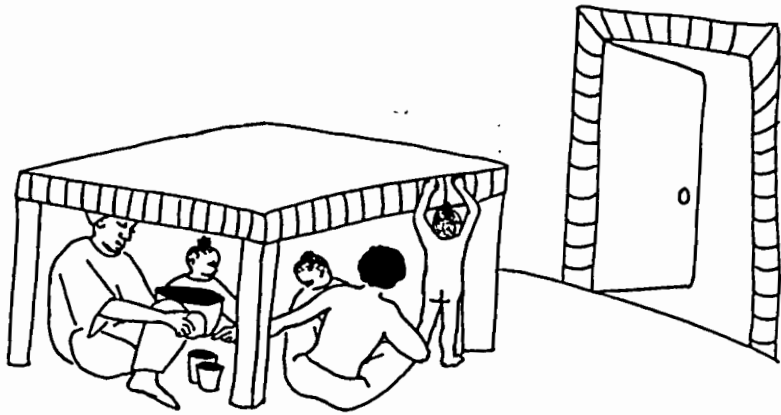


- find out where the main electricity, water, and gas connections are and who could operate them in case of an emergency
- have a list of emergency telephone numbers ready
- prepare an emergency bag

Measures to be taken during an earthquake

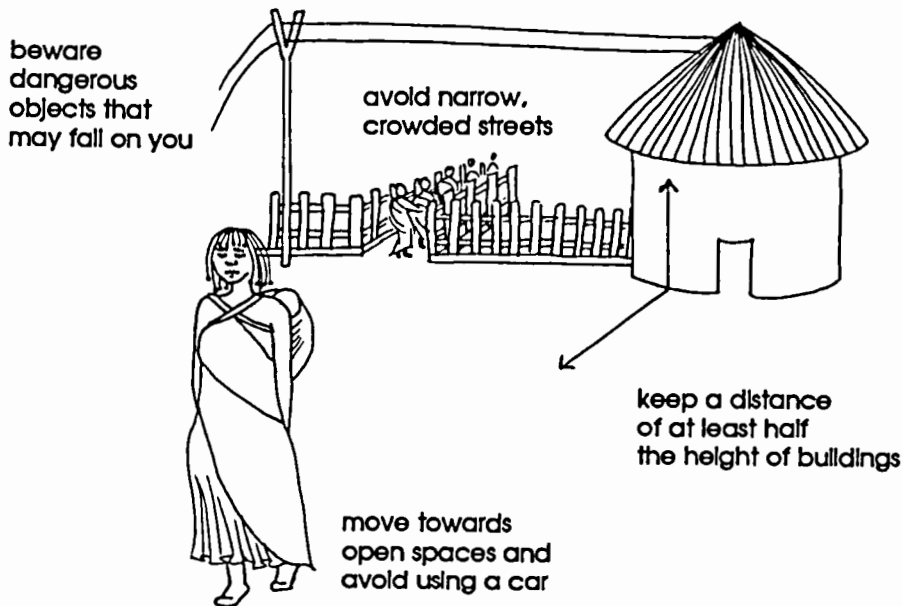
If you are at home:

- remain calm - panic will only hinder your actions towards safety
- open the door - movements may cause jams
- do not rush towards exits
- do not go on to balconies
- move away from windows, mirrors, glass, and heavy objects that may fall
- take cover under heavy or sturdy objects e.g table, bed, door frame
- do not use matches, candles etc. and shut off all possible sources of fires
- put away all possible sources of fire
- do not use lifts



If you are outdoors:

- stay away from walls, buildings, electric cables
- stay away from buildings - keep a distance of at least half the height of the structure
- move away from objects that may fall on you



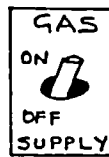
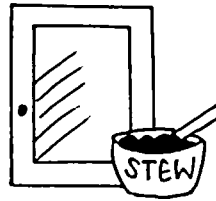
- be careful of dangerous objects on the ground e.g electric wires, glass
- move towards open spaces
- while escaping, try to avoid narrow streets
- avoid those streets that are crowded with people or littered with debris
- try to avoid the use of the car as much as possible
- if it is impossible to go to open spaces, lie flat under heavy parked vehicles
- help as much as possible with first aid

In rural areas:

- do not go towards steep places
- get away from rivers and coasts and try to reach higher ground
- stay away from landslide areas and rocky places
- be careful of electric cables or lines
- do not go towards animals that appear frightened or disturbed

Action after the earthquake:

- do not take hasty decisions since a following tremor may cause standing buildings and structures to collapse
- before moving away see if people need your help
- check the injured; do not move those who are seriously injured unless it is an emergency
- check if there are fires or any risk of fire
- wear shoes especially if there is glass about
- if there is a gas leak shut off the main supply; the same applies for electricity
- do not use matches or lighters until you are sure that there is no gas leak or escape of inflammable materials
- get a reserve water supply in case services have to be cut off; do not get too much since it can interfere with fire-fighting activities; also consider alternative sources of water e.g hot water tanks, septic tanks
- do not drink or eat anything that was stored near windows etc.
- check your house; if there are damages or you think it necessary leave with your family, stay outdoors and away from buildings
- be aware of possible subsequent tremors
- do not start evacuation too quickly
- do not phone unnecessarily - leave lines open for emergency services
- lock up scared animals
- listen to instructions carefully
- do not go to the beach - the earthquake may provoke tsunamis etc.
- when in a car, drive slowly, careful of what is lying on the road; avoid bridges etc. and stay away from unstable structures; do not leave the car in an obstructing position; help the emergency services as much as possible
- remember that citizens who are helpful can save lives.



LANDSLIDES



Definition

Landslides can broadly be defined as downward and outward movements of slope forming materials (either rock and soil or artificial fill) by falling, toppling or sliding along a slope or lateral spreading or flowing.

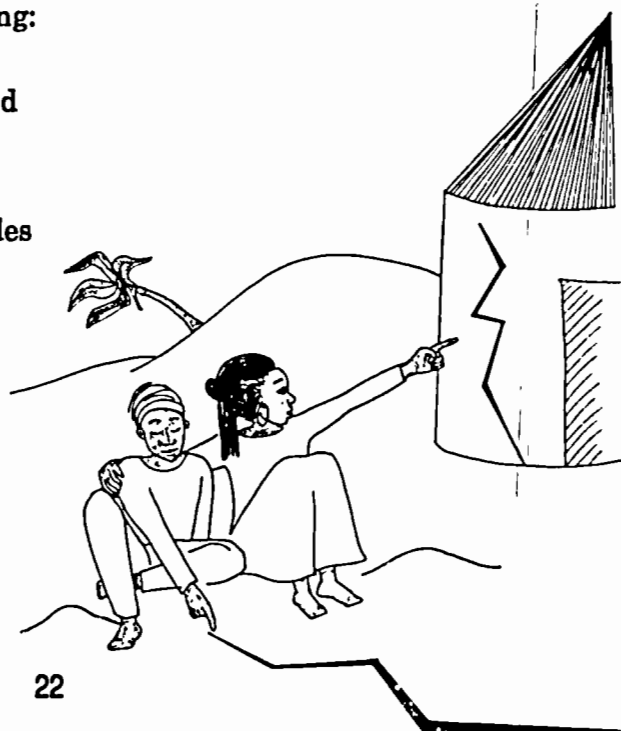
Preparedness and action during landslides

It is important to map out areas most at risk from landslides. The basic information needed is:

- knowledge of where past landslides have occurred, derived from local records; geological conditions e.g certain types of rocks are more prone to landslides;
- how and why they occurred;
- when the events occurred.

The following indicators may be used to assess whether land movements of potential danger are about to occur or are occurring:

- cracks in the ground (surface)
- swelling of certain parts of the ground
- sloping trees
- cracks in buildings, walls and other structures in areas at risk of landslides



It is difficult to predict the actual intensity of the landslide from early events and thus it is generally useless to try to brace up structures that are in danger of falling or collapsing.

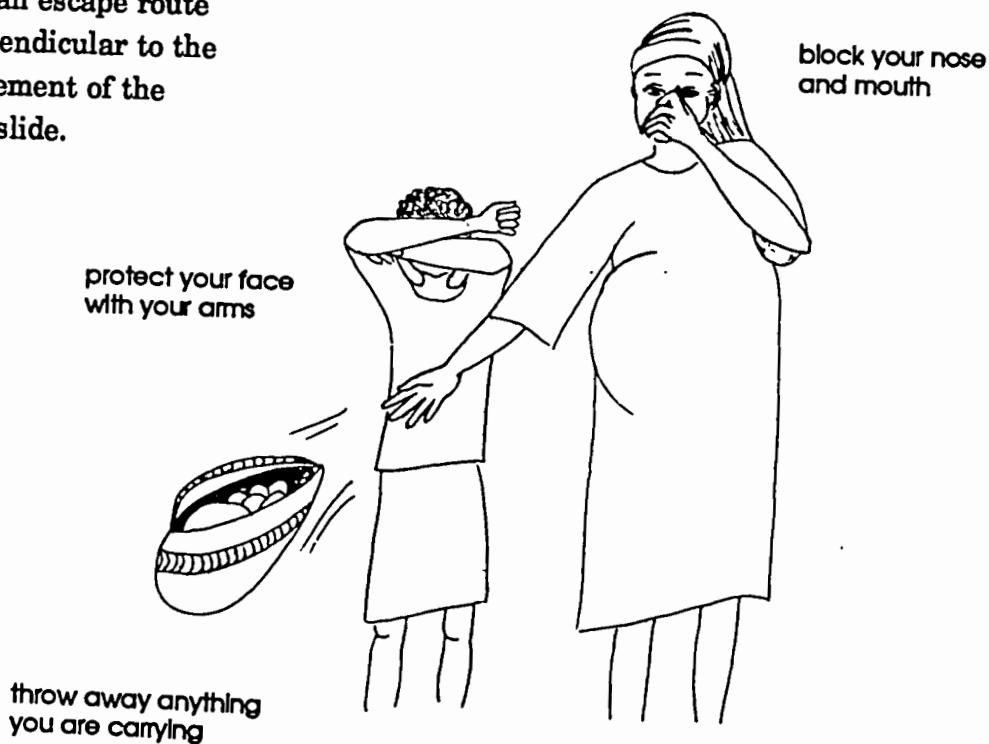
A simple way of measuring earth movements is to use wooden pegs or sticks as landmarks and measure the distance these have moved at regular intervals.

If you are out in the open:

- be informed about the stability of the slope
- throw stones on the paths to assess the stability of the ground
- if travelling in a group stay a little dispersed in order to reduce the risk of provoking land movements
- do not use mountain climbing ropes etc. for levering on slopes

In the event of a landslide:

- throw away anything you may be carrying - make yourself lighter
- protect your face with your arms
- try to block your nose and mouth in order to avoid breathing in particles that may block air passages and thus cause suffocation
- use an escape route perpendicular to the movement of the landslide.



VOLCANOES



General

Volcanic eruptions are probably the least "serious" of the natural hazards in Africa. In comparison with other types of disasters, **mortality from volcanic action is low**. However, the high-risk areas around volcanoes can be densely populated because of the fertility of volcanic soils. Currently active volcanoes in Africa are mainly in the Eastern and Central regions.

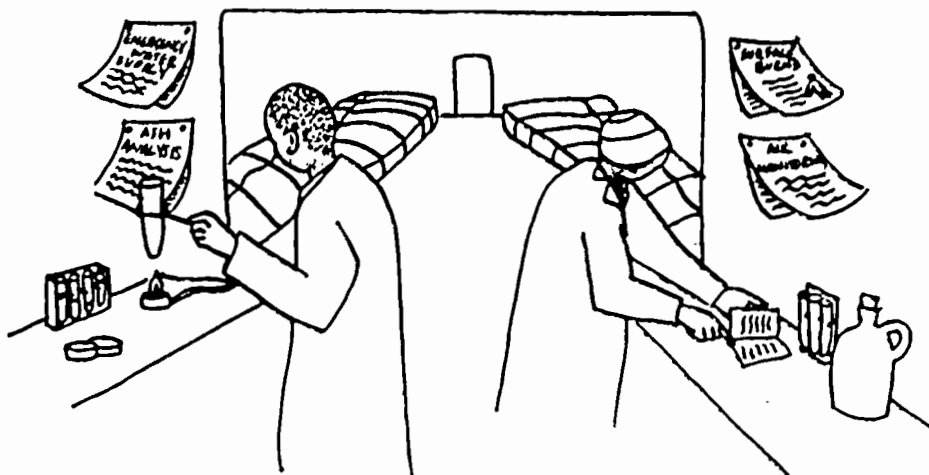
Prediction and mitigation

The goal of predicting the timing, size, and nature of an eruption is difficult to achieve. Prediction of the general behaviour of volcanoes utilizes available information on geological characteristics and past activity. However, impending volcanic activity is preceded by warning signs such as small earthquakes, emissions of gas and ash over weeks, and these need to be carefully monitored and interpreted.

Significant volcanic activity is generally preceded, accompanied, or followed by earth tremors of varying intensities.

The only adequate measures against volcanic consequences are evacuation and the demarkation of restricted zones when an area is threatened by eruption.





Hazards of volcanic activity

- blasts and projectiles - large projectiles can damage buildings; if these are hot they can start a fire
- mud flows (*lahars*) - frequently accompany volcanic eruptions and can be lethal; water from melted glaciers, snow, accompanying heavy rainfall, and other sources e.g crater lakes, can mix with volcanic rock and debris to form a near-solid flow which engulfs all in its path
- pyroclastic flows - mixtures of hot gases, ash, fine pumice, and rocks; danger lies in the density and temperature of the ash and rock fragments; hazards include body surface burns, inhalation injuries and asphyxia (suffocation)
- gases - these may be asphyxiants which are concentrated near the volcanic crater or fissure or respiratory irritants which are more dispersed can be harmful at lower concentrations
- lava flows - very dangerous; these travel at a slow speed and may allow people to escape
- local earthquakes - possible loss of human life and property
- tsunamis - occurrence unpredictable; can destroy coastlines

Thus, volcanic activity can cause damage to health:

- directly from blasts, ash flows, and other effects
- indirectly by causing tsunamis, local earthquakes, population movements

Apart from the immediate effects, large volcanic eruptions may have long-term effects, including climatic change and disruption of agriculture.

Community preparation

- demarkation and evacuation of areas at risk
- formulation of and familiarization with search and rescue plans
- preparation of hospital emergency plans to cope with large influx of patients with body surface burns, lung damage from inhalation of toxic gases and suffering from trauma
- identification of facilities to collect and analyze ash for toxic elements and also drinking water quality
- facilities and equipment for monitoring air
- emergency arrangements in case of breakdown of water supply
- plans for procurement of emergency supplies

Individual protection

- take heed of warnings and escape from area as quickly as possible
- if there is a warning system in your area listen to the radio for information and advice
- find shelter but NOT in a building with low pitched or flat roof if heavy ash is falling
- avoid basements and closed spaces where gases may accumulate
- move to the ridgeline if you are in the open
- wear protective clothing over head and body if you have to move in an ash shower
- breathe through a handkerchief
- always carry a torch - also during daytime



FIRES



General

Wildfires are uncontrolled fires that spread freely throughout the environment. The causes are either natural or man-made. Natural causes include lightning, earthquakes and volcanic activity. The man-made causes are either due to carelessness or deliberate e.g arson.

There are three things needed to start a fire: the igniting material, e.g oxygen, the combustible materials and the source of ignition.

Forest fires

Forest fires can be divided into three types: those that remain on the lower ground, or creep along the roots; those which go along the grass and weeds with the potential of catching tree branches; and those which spread from bottom to top.

In wild areas fires cause damage to:

- timber and forage
- animal habitats
- soil nutrients

Rapid run-off from burned areas can contribute to flooding and the erosion of exposed soils can lead to landslides.

Causes of forest fires

CAUSES OF FOREST FIRES		
NATURAL CAUSES	MAN-MADE CAUSES	
	ACCIDENTAL	NON-ACCIDENTAL
HURRICANES, CYCLONES, STORMS SPONTANEOUS FIRES FIRES STARTED BY GLASS	UNEXTINGUISHED CIGARETTES BURNING STUBBLE IN FIELDS BY-PRODUCTS OF INDUSTRIAL PROCESSES FIRE FROM MILITARY EXERCISES FIRES DUE TO CHILDREN'S GAMES FIRES CAUSED BY CAMPERS, HUNTERS, TOURISTS CLEARING OF OVERGROWTH BY BURNING BURNING OF RUBBISH	ADVENTURE EXPANSION OF FIELDS FIRES TO KEEP OUT BIRDS AND GAME REVENGE SOCIO-CULTURAL CONFLICTS CREATING WORK AREAS

Factors that may precipitate forest fires:

- ignorance and carelessness
- population spread in such areas
- greater mobility of people
- increased tourism
- climatic factors
- expansion of wood-cutting

The development of a fire depends upon the **climate** - wind, temperature, and rainfall; and the **ground** - composition, conformation, and obstacles in the way.

Measures to take to prevent forest fires:

- **coordinate various activities** in order to prevent industrial hazards etc.
- **make sure there is a person or persons who patrol the area**
- **try to make the forest "resistant";**
 modify vegetation;
 have controlled burning;
 thinning of vegetation and replacement with more resistant species; create breaks in large areas of natural fuel.



During a forest fire

- **when the fire is at the initial stage it takes few people and resources to quench it; try to quench a small fire rather than escaping from the site**
- **ways to quench a fire are:**
 - suffocating it by beating the flames with clothing, sheets etc. but not synthetic materials
 - use water
 - use a fire extinguisher
 - cut the vegetation in order to stop the fire spreading
- **if the fire has spread**
 - move away so as not to be surrounded by flames
 - do not get entangled in the undergrowth since you can get easily trapped and reached by the flames

- escape by using the open spaces and along water courses
- protect yourself from the fumes and smoke by covering your mouth and nose with handkerchiefs or any wet cloth - this also protects you from heat
- do not take shelter in crevices or pits in the ground since one can be suffocated by the smoke in such enclosed places
- you can only escape from a ring of fire if the fire is burning low - cover the exposed parts of your body and hold your breath while you cross the fire

Measures to take if the fire threatens your home



- get rid of any vegetation that quickly catches fire; do the same with rubbish and other combustible materials - anything within 8-10 m of the building
- have a source of water ready and pipes that can reach high places e.g roofs
- close all the windows and if possible remove them; also remove curtains, carpets, furniture near the windows, and things that can catch fire easily

After the fire

- extinguishing flames does not necessarily imply the end of the fire; there can be burning particles under the ashes
- carefully survey the areas affected by fire and go through the ashes and debris to check for potential sources of re-ignition

Fires in buildings and other structures

To prepare buildings for fire safety

- empty the attic and cover the floor with a layer of sand
- keep a sack of sand on every floor of the building - 5kg for every 20 square metres to be protected
- also keep a reserve of water - 1 litre per square metre
- windows with a white coating reflect a lot of the heat produced
- inflammable items should be removed from the vicinity of the windows
- useful equipment includes: mops, damp cloths.



To slow the spread of fire

- shut all the windows
- remove all combustible materials from the vicinity of the windows
- remove any accumulated rubbish stored near your house
- wet the external surfaces of your house with buckets of water
- move everyone to a safe place

If you are trapped within a building on fire use whatever is at hand to combat the flames:

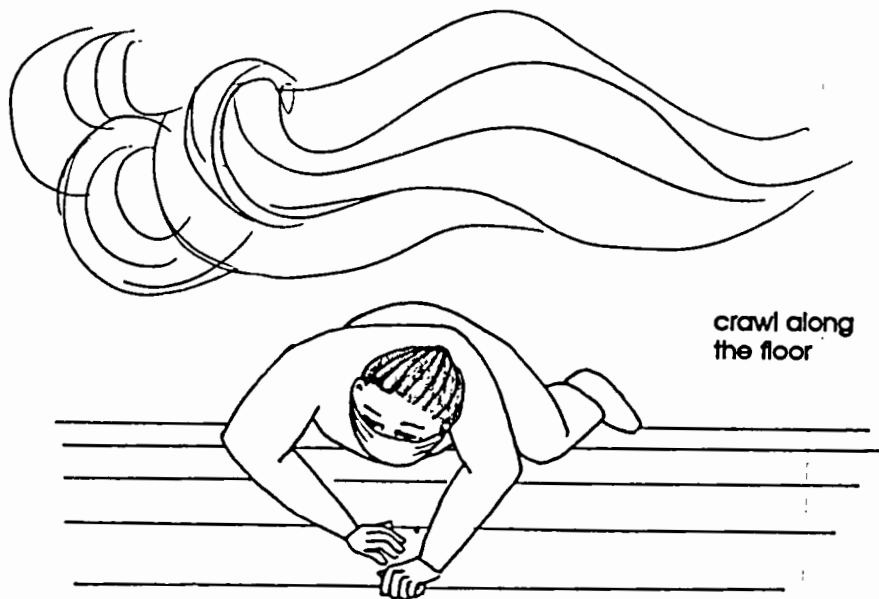
- to quell the fire - if you are using water direct the jet of water to the base of the flames
- suffocating the flames - beat the flames with woollen covers, wet mops, jute sacks, curtains etc.
- removing the combustible materials: remove all combustible items from the source of the heat.

If it becomes difficult to contain the flames try to slow down the spread by closing all windows and doors. Closed doors can act as effective barriers especially if they have been dampened. Block any cracks under doors with wet cloths, curtains etc.

If the fire gets between yourself and the exit take refuge in the bathroom - only if it has a large enough opening to the outside. The bathroom generally has few combustible materials and also water in reserve - throw out any combustible items that you find.

Do not take shelter in small spaces without openings to the outside or in areas above the fire - smoke soon reaches such areas.

Golden rule: while combatting a fire and awaiting help, lie down or crouch to avoid inhaling the fumes and other toxic materials released upon the combustion of various materials. Put a damp cloth over nose and mouth.

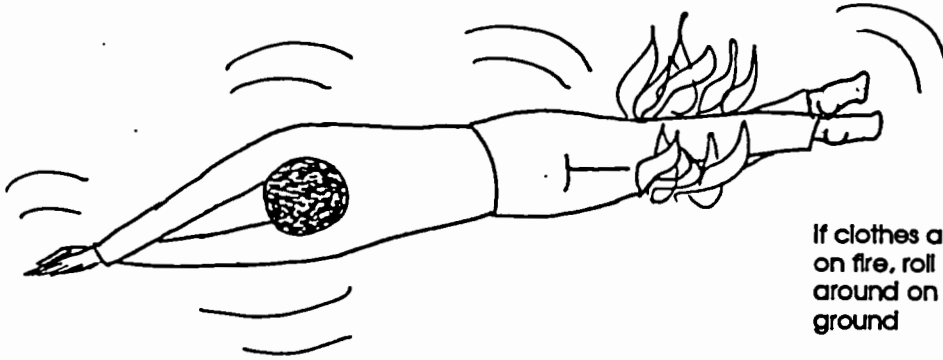


If you are in the upper sections of a high building it is better to wait out on a balcony rather than jump down - the

latter often results in serious injuries and even death.

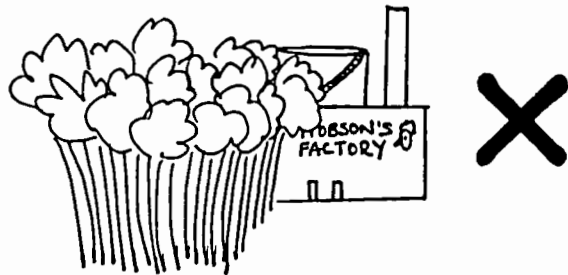
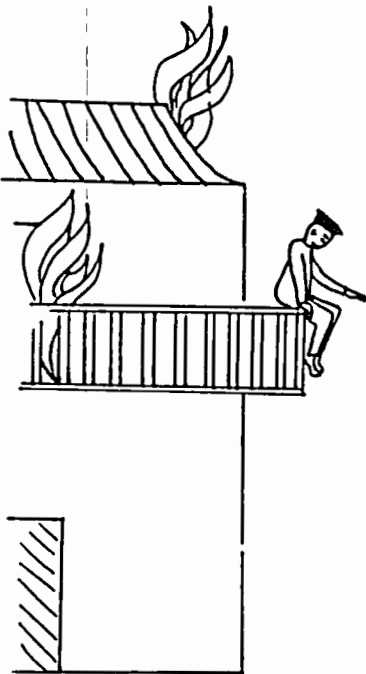
Only cross the fire if you are sure of an exit in the direction you are going.

Do not try to cross the flames without adequate protection. Protect your body with layers of woollen garments or wet clothing. While crossing the flames hold your breath and keep your mouth closed.



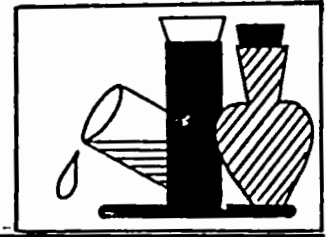
If clothes are on fire, roll around on the ground

If your clothes are on fire after you have crossed the flames roll on the ground until the flames are extinguished.



this industrial plant is a hazard built so close to a forest

CHEMICAL and INDUSTRIAL ACCIDENTS



This section will deal with releases of toxic gases and chemicals and industrial waste. Nuclear accidents are dealt with in the next chapter.

General

Chemical accidents can occur in the following circumstances:

- production of materials in industrial plants
- storing of substances near or in plants
- transport of materials
- disposal of byproducts and waste

Other precipitating factors include lightning, floods and earthquakes.

The effects of an accident will depend on:

- the substances involved
- the type of accident
- location of plant in relation to other centres
- wind direction and force
- possibilities of contamination
- population density
- preparedness and mitigation activities

The harmful effects of such accidents on man and the environment are due to: fire, escape of toxic substances, and explosions.

Health effects

- dependent on route of exposure - direct inhalation of toxic substances is most common in the early phases; with time dermal (skin) contamination becomes more significant
- dose of contaminant is critical - certain non carcinogenic substances have threshold levels above which they are harmful to man; different organs in the body may have different threshold levels above which the chemicals are not tolerated
- better protection is offered in closed places

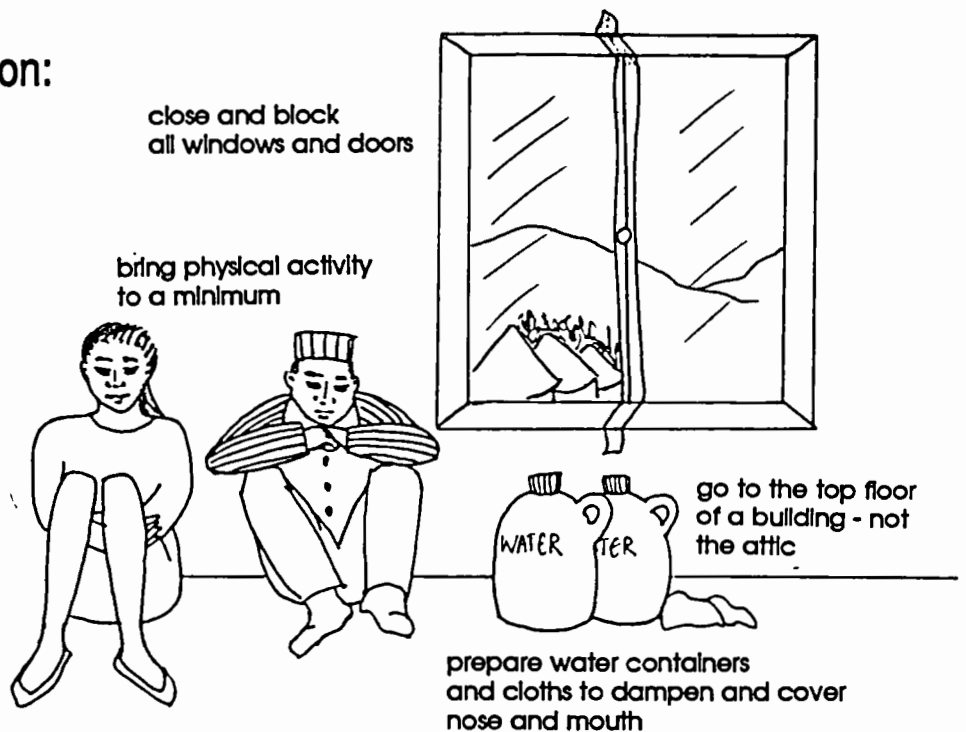
Atmospheric contamination:

Atmospheric

contamination: the most dangerous elements are gases, vapours, volatile liquids and suspended particles in the air; these can diffuse quickly into the air and reach concentrations that are toxic to man.

Action to take:

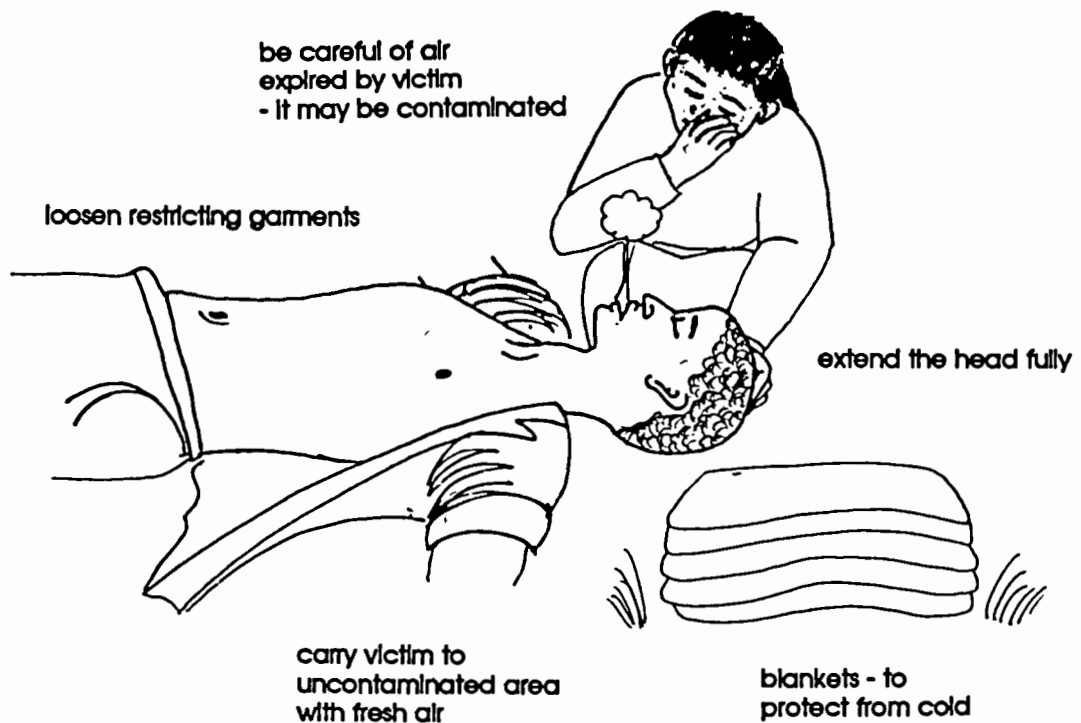
- close all windows and doors
- block off any other openings to the outdoors
- extinguish any naked flames
- go up to the top floor of the building, not to the loft, taking refuge in the areas not exposed to the air
- reduce oxygen consumption by bringing physical activity to a minimum
- have ready containers full of water and cloth to dampen and cover nose and mouth



If the **contamination is confined** to a small area it is possible to help others in the following way:

■ **self-protection measures:**

- enter the affected zone wearing protective clothing with damp cloths over face and after having spent enough time (hyperventilated) in fresh air
- do not use lighting apparatus with naked flames
- do not act on your own



■ **first aid to the victim:**

- take the victim immediately to an uncontaminated area with plenty of fresh air
- loosen any restricting garments and prohibit any physical strain by the victim
- protect them from the cold
- clear the air passages by removing any dental wear and food that may have been regurgitated or vomited
- extend the head fully to "move" the base of the tongue away from the posterior part of the pharynx
- if there are breathing problems then resort to artificial mouth-to-mouth or mouth-to-nose respiration
- be careful of secondary contamination due to direct contact with the victim's skin or clothes; also careful of the air expired by the victim which may be contaminated


Contamination via consumption


It is possible to be contaminated via the consumption of contaminated foods or contact with dirty hands, utensils etc.


Action to take:

- primary action is to remove the material from the stomach by induced vomiting;
- however, it is not advisable to vomit out the material when:
 - materials have been ingested in order to reduce the lesions or perforations caused by caustic materials
 - one has taken unknown materials
 - one has ingested petroleum products - danger of stomach contents contaminating the air passages and thus blocking the cough reflex
 - in case of convulsions; vomiting can increase the frequency and severity
- after throwing up administer a laxative; one half teaspoon of sodium sulphate dissolved in half a glass of water; the laxative takes effect after 30-60 minutes, removing the undigested material from the stomach
- also dilute the toxin and slow down its absorption by:
 - taking activated carbon
 - drinking milk; however, this may be harmful if the ingested substance is liposoluble (e.g petrol) since it will enhance absorption
 - common antidote made up of 2 parts of carbon, one part tannic acid, and one part magnesium oxide (2 tablespoons in one glass of water); or, 2 parts burnt toast, 1 part milk of magnesia, and 1 part strong tea.

general antidote
to slow down absorption

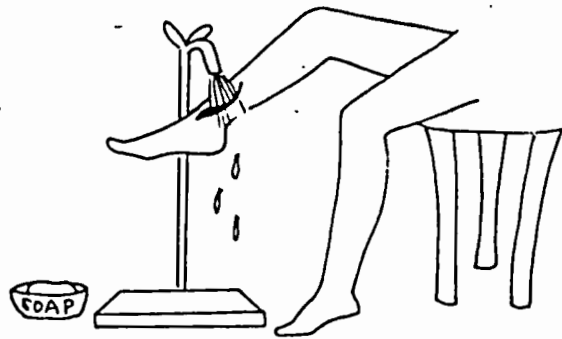
2 parts carbon =  2 parts burnt toast

1 part tannic acid =  one part strong tea

1 part magnesium oxide =  one part milk of magnesia

Contamination of the skin

- wash the affected parts with lots of strong jets of water to dilute and remove the toxin
- remove all clothing while washing; the rapidity of action and the volume of water used are very important in reducing the lesions and harmful effects caused by the toxin
- next, use soap and water and wash body carefully
- do not use chemical antidotes; the heat generated from the neutralizing reaction may make the lesion worse



wash affected parts with strong jets of water

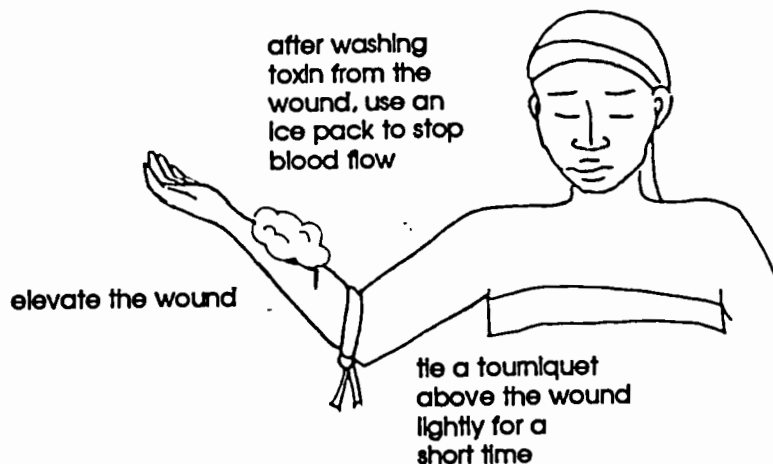
next - use soap and wash carefully

Contamination of wounds

The aim is to stop or slow down the entry of the toxin into the blood circulation.

General instructions:

- tie a tourniquet above the wound lightly for a short period
- elevate the wound
- wash the wounded area in order to drain the toxin
- put ice pack on the area in order to stop blood flow into the area



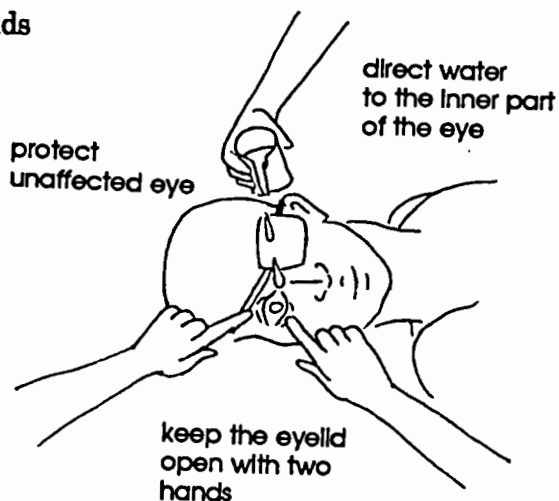
after washing toxin from the wound, use an ice pack to stop blood flow

elevate the wound

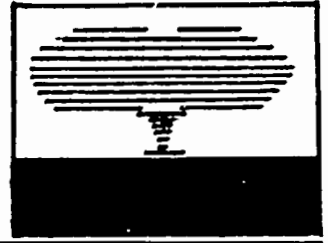
tie a tourniquet above the wound lightly for a short time

Contamination of the eyes

- rinse the eye with running water (slow jet) for 5 minutes if the substance is acid and twenty minutes if it is alkaline
- preferably two helpers should assist the victim in washing the eye; try to follow these instructions:
 - the victim lies down on his/her back
 - the head is turned towards the side of the affected eye
 - a helper keeps the eyelids open with two hands
 - the other person directs the water from the inner part of the eye, so that it crosses the eyeball area, towards the outer corner
 - the victim has to be told to move the eye in all directions
 - protect the unaffected eye
 - do not use chemical neutralizing agents due to their heat generating effects.



NUCLEAR ACCIDENTS



General

Nuclear accidents are a type of chemical accident but given the nature of the phenomenon and the public concern over radioactive exposure this hazard deserves particular attention.

The **processes involving the generation of nuclear energy** can be divided as follows:

- extraction of radioactive minerals
- transport of materials
- production of energy
- disposal of waste materials.

The **risks related to nuclear plants** are twofold:

- radiation emitted from the minerals used and from other substances
- general hazards of any industrial plant.

In case of an accident the **harmful effects of nuclear radiation** can be:

- **acute**; persons contaminated with an acute heavy dose of radiation usually die soon after
- **long-term**; the majority of persons affected by nuclear accidents suffer from the long term chronic effects of radioactivity. The long term consequences include various cancers, genetic defects and thyroid gland disorders.

Preparedness measures and action to take in case of a nuclear accident or toxic dumping

- It is imperative that a community be informed about the establishment of a nuclear plant nearby. Community members must know what is produced in the factory, the frequency of transport operations involving radioactive materials and who is responsible for managing the plant. Thus, **dissemination of information is extremely important.**
- In the event of a nuclear accident external radioactive contamination will spread in the form of a **radioactive cloud**. If there is sufficient time to issue a warning **authorities may order evacuation of the area.**



dissemination of information about the nuclear plant is extremely important

Otherwise, residents must stay indoors and shut all openings to the outside instead of attempting to flee from the site since one cannot predict the direction of the radioactive cloud.

This will minimize external and internal (via inhalation) contamination.

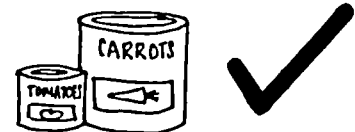
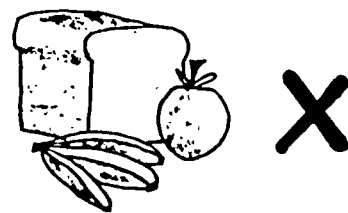
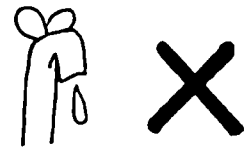
stay indoors and shut all openings to the outside



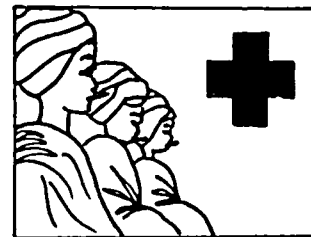
stable iodine compounds should be administered before the time of exposure

- **Administration of stable iodine compounds** (e.g potassium iodide or iodate). These are best taken before or at the time of exposure as they will reduce the uptake of radioactive iodine by the thyroid gland. Stable iodine compounds should be distributed to households or readily accessible focal points before exposure. There must therefore be a stock of these compounds in an community at risk of being affected by a nuclear accident.
- **In case of external contamination** wash hair and body with a mild soap, scrubbing the areas which were most exposed. It is important not to cause abrasions while scrubbing.
Mouth: rinse your mouth well with a dilute solution of hydrogen peroxide.
Eyes: immediately wash the eye with normal saline solution or tap water.
- The next hazard is **radioactive material** which will be **deposited on the ground**. This will be a long term hazard to residents and ground levels of radioactivity must be constantly monitored.
- To reduce the number of people exposed it is **important to control access to and from the affected area**. Inhabitants and visitors must be informed about the risks.
- **Controlling food and water supplies**. Contaminated food should be destroyed or banned; in some instances they can be stored until the radioactivity has reached an acceptable level or can be converted to another product (e.g milk into cheese). Contaminated water should not be used for any purpose whatsoever. These measures can cause food and water shortages in affected areas and contingency plans must be in place to bring in, manage and distribute supplies from other areas.

Given the serious nature of nuclear accidents, their tragic consequences and the potential to affect a wide area it is **imperative that stringent safety measures be enforced at nuclear plants. Safety mechanisms must be frequently tested and all employees trained in their operation**. If possible these installations should be established in remote or sparsely populated areas so as to minimize the numbers at risk.



EPIDEMICS



General

Definition: an epidemic of an infectious or parasitic disease is the occurrence of a number of cases of a disease, known or suspected to be of parasitic or infectious origin, that is unusually large or unexpected for the given place and time. An epidemic often evolves rapidly so that a quick response is required.

An outbreak may occur unconnected with any other disaster event but may constitute an emergency in itself. Also an emergency may promote the conditions under which an outbreak occurs and spreads.

As stated by Brès (1986) "an emergency can only be defined in the context of the social, political, and epidemiological circumstances in which it occurs..." as these will have a bearing on the urgency of the problem, the action that is to be taken, and the need for external cooperation.

The types of situations that may be classified as emergencies will differ from country to country and depend on two local factors: the pre-existing state of endemicity, and the presence or absence of a means of transmission.

The effects of epidemics are manifold. They include increased morbidity and mortality, physical and mental incapacities, economic losses and may create administrative difficulties.

In investigating and defining an epidemic, information has to be gathered in terms of who, where, and how many are affected.

Control at three main levels:

1. Elimination or reduction of the source of infection:

- treatment of cases and, at times, carriers
- isolation of cases, depending on the nature of the epidemic
- surveillance of suspects
- notification of cases to authorities
- control of animal reservoirs of disease

2. Interrupting transmission:

- environmental health measures including water supplies, excreta disposal, food hygiene
- personal hygiene
- vector control
- disinfection and sterilization of surroundings
- reduction of population movements and migration

3. Protecting those persons at risk:

- immunization
- chemoprophylaxis (prevention of disease by drugs)
- personal protection
- better nutrition



Often it may take a considerable amount of time to fully learn the determinants and natural history of the epidemic, identify carriers and the sick, and to implement relevant control measures e.g vaccination. Thus, in emergency situations the target is generally to interrupt transmission.

General guidelines for control of epidemics:

- personal hygiene especially hand washing
- avoidance of cases or suspected cases
- education and information
- sanitary disposal of excreta
- food safety - preparation and handling
- water supply (quality control of main source and also boiling for personal consumption)

1 CHOLERA

Cholera is transmitted via the faecal-oral route, by contaminated water food contaminated by flies, dirty hands etc. Older children and adults form the majority of patients. It is a serious bacterial disease that can spread quickly in large populations, rapidly weaken individuals and cause death due to extreme dehydration (caused by the characteristic profuse watery diarrhoea and possible vomiting).

Measures for preventing and controlling outbreaks are:

- **Proper environmental sanitation.** Proper disposal of excreta and use of latrines is a community responsibility.
- **Personal hygiene.** Washing hands after going to the toilet reduces chances of transmission.
- **Adequate safe water supplies.** Community members should ensure that authorities are controlling the safety of the water e.g chlorination if possible. Families should boil water before drinking. For effective cholera control safe water is necessary for all purposes e.g washing, bathing.



kitchen hygiene is highly important - hands must be washed before preparing food

- **Food safety.** It is important to emphasize the following in order to limit transmission: eating hot foods, proper kitchen hygiene, proper food handling and preservation and washing hands after going to the toilet and before preparing food.

- **Treatment of cases.** The essential treatment is **rehydration**, which should **begin as soon as possible** in order to keep deaths from cholera to a minimum. Preparation of basic **home-based rehydration solutions** should be made familiar to all families.
- **Chemotherapy** should be instituted following standard medical guidelines.
- **Isolation** of suspected and confirmed cases is recommended even though this may be difficult at times.
- **Epidemiology.** It is important to identify the source of infection and trace all persons who may have been in contact with cholera cases so that preventive drugs can be given.
- **Chemoprophylaxis.** Mass distribution of antimicrobials is usually not feasible and has never been done satisfactorily. It may be justified in closed groups e.g refugee camps.
- **Vaccine.** The cholera vaccine gives limited protection and immunization is generally considered inappropriate. It may be of value for example if an epidemic is expected and has not reached a refugee camp.
- **Health education.** Dissemination of information to community members via primary health care and inclusion of basic principles of disease control in community school curricula will help prevent and control epidemics.

rehydration solution

1. Boil a little more than 1/2 litre of water



2. Pour 1/2 litre into a bottle (e.g. a beer bottle)



3. While water is lukewarm, add one pinch of salt (as much as you can between thumb and two fingers)



4. Add a four-finger scoop of sugar



5. Shake the bottle well to dissolve the salt and sugar



Too much salt is dangerous. It should taste less salty than tears.

2 TYPHOID FEVER

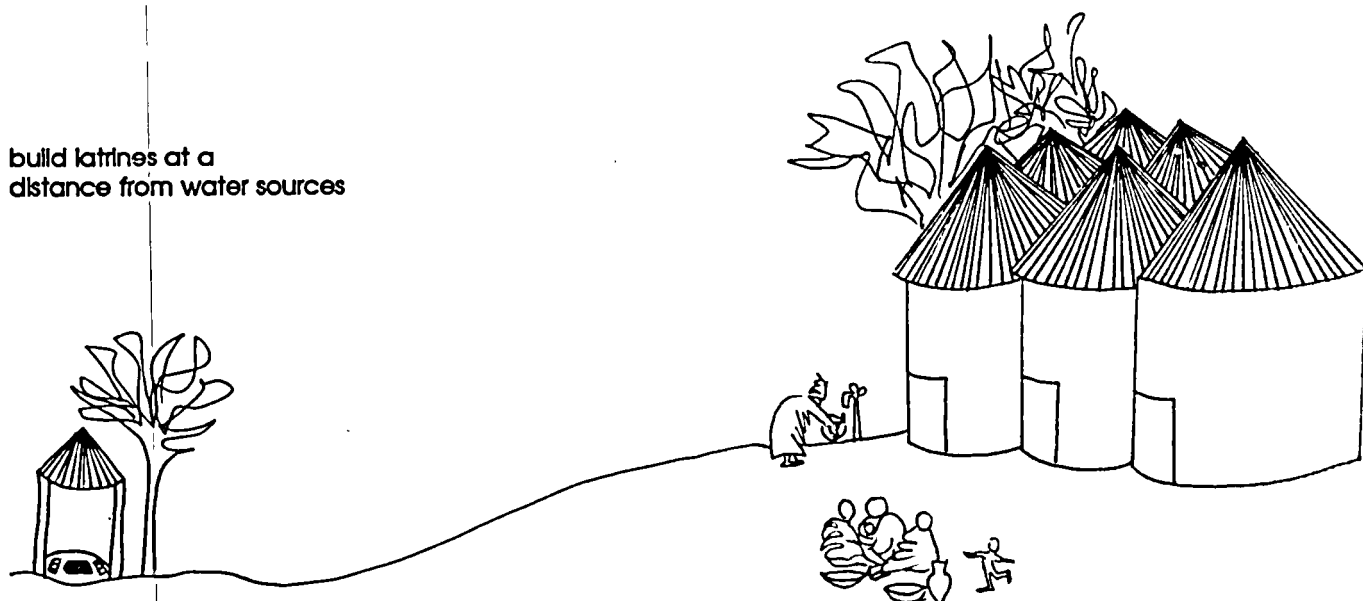
Typhoid fever is a major symptom that accompanies this bacterial infection of the gut which affects the whole body.

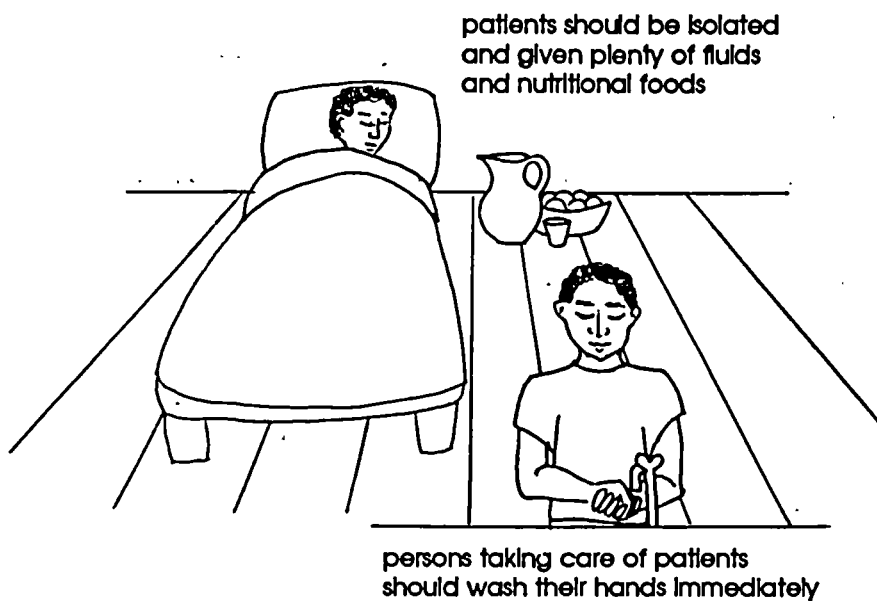
The infection is transmitted via food or water that has been contaminated by faeces or urine of patients or typhoid carriers.

Prevention and treatment:

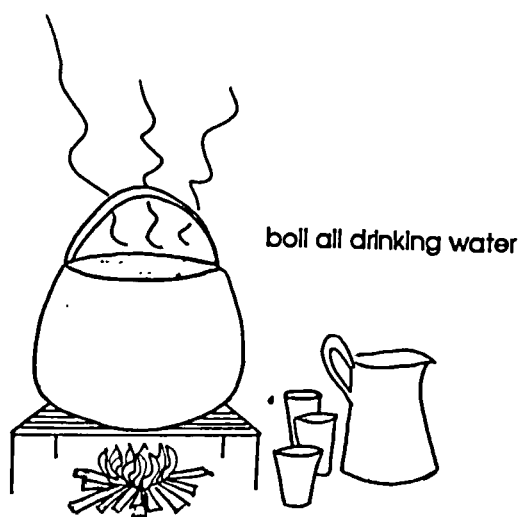
- **Avoid contamination of food and water by human excreta.** Thus latrines must be built at safe distances from community water sources and they must be used properly.
- An epidemic of typhoid may occur after a natural disaster like a flood. During such times ensure that the **drinking water is clean**. Boil all drinking water.
- Patients are treated with chloramphenicol or other antibiotics. Give them plenty of fluids and nutritious foods (in liquid form if necessary); take measures to lower the fever and prescribe rest.
- **Isolation of patients** will help minimize the spread of the disease. The plates and utensils used by patients must not be used by other persons. Persons taking care of the patient must wash their hands immediately afterwards.

build latrines at a
distance from water sources





- **Personal hygiene and care are important even after a person has recovered from typhoid fever since they may still carry the disease. If possible such persons should not work in public places handling food for some time.**



3 MENINGOCOCCAL MENINGITIS

This is a serious bacterial infection of the brain which is most common in children. Countries in the meningitis belt in Africa stretching from the semi-arid Sahelian zone south of the Sahara and north of the equator have frequent outbreaks of meningitis, particularly in the dry season.

Transmission of the disease is via direct contact, droplets in the air, and discharges from nose and throat.

Prevention and treatment

- **Education.** In areas where meningitis outbreaks are common, community members must be taught to **recognize the signs and symptoms** of the disease and made aware of its fatal nature. They must seek medical help immediately. Health education should emphasize personal hygiene, reduction of direct contact with patients, measures against droplet infection (e.g covering nose while sneezing), and the importance of proper nutrition.
- **Avoid conditions of overcrowding** within homes, schools, at work, refugee camps, or on transport.

- **Surveillance and immunization.** Meningitis outbreaks occur in a cyclical pattern in the meningitis belt and thus it may be easier to predict when immunization is most needed. Timely procurement of vaccines and immunization is an effective control strategy in such cases. However, this requires a good health infrastructure with an efficient reporting system and laboratory facilities capable of identifying the bacterial groups involved. No effective vaccine is currently available for Group B meningococci and that for Group C meningococci is unsatisfactory for under two-year-olds.

It is important to have sufficient vaccine stocks for the community at the nearest health facility or at least plans to obtain them when needed. If vaccines are in short supply then they should be used only for households with patients.

measures against
droplet infection -
cover the nose
when sneezing



■ **Chemoprophylaxis.**

Preventative drug treatment e.g with sulphonamides.

Although there are many areas where sulphonamides are ineffective it may be one of the possible ways to reduce the number of carriers.

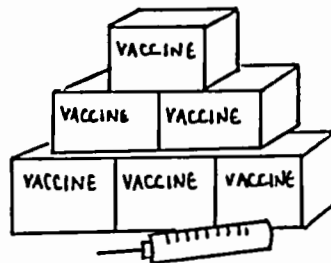
- **Isolation. Cases should be isolated until at least 24 hours after beginning drug treatment. After this period they are generally non-infectious.**



wash hands



no overcrowding







make sure sufficient stocks are available



4 VIRAL HAEMORRHAGIC FEVERS (VHF)

There are many kinds of viral haemorrhagic fevers (onset of fever with subsequent bleeding) caused and transmitted by different organisms (viruses). The infections are transmitted by arthropods (mosquitoes and ticks) and rodents.

TRANSMISSION AND ETIOLOGY OF VIRAL HAEMORRHAGIC FEVERS (VHF)

PRIMARY MODE OF TRANSMISSION	VECTOR	DISEASE
MOSQUITO - BORNE		DENGUE HAEMORRHAGIC FEVER RIFT VALLEY FEVER YELLOW FEVER
TICK - BORNE		CRIMEAN - CONGO HAEMORRHAGIC FEVER KYASANUR FOREST FEVER OMSK HAEMORRHAGIC FEVER
RODENT - BORNE		JUNIN HAEMORRHAGIC FEVER MACHUPO HAEMORRHAGIC FEVER HAEMORRHAGIC FEVER WITH RENAL SYMPTOM LASSA FEVER
UNKNOWN		EBOLA VIRUS FEVER MARBURG VIRUS FEVER

SOURCE: *Viral haemorrhagic fevers*. WHO Technical Report Series 721, World Health Organization, Geneva

Protection and control

- **Vector control.** For those VHF spread by mosquitoes measures should be taken to protect individuals from mosquito bites by using bed-nets, insect repellent sprays, mosquito coils etc. Covering sources of water is a simple protective measure. Also encourage use of insecticides in mosquito breeding sites in non-drinking water sources.

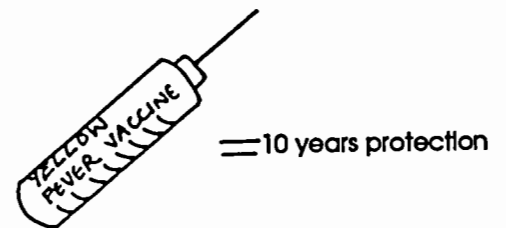
Ticks. In some places acaricides (tick killing substances) may be used against ticks. In some circumstances repellents are available for treating clothing.

Rodents. Use of rodenticides. Rodent traps may be useful in places where the rodents are often found inside houses.

Training in the safe use of insecticides, rodenticides and vector control equipment, for all those (e.g community members) involved in rodent control is important.

- **Surveillance and reporting.** In endemic areas health workers and key community members should be well trained to recognize the symptoms of VHF and report cases as soon as possible. Close contacts of cases should be kept under close surveillance.

- **Immunization.** Immunization on a general basis is available for yellow fever only. The vaccine provides protection for 10 years. Mass immunization is very effective in stopping transmission. The cold chain requirement of the live vaccine can be a limitation for its general and widespread use.

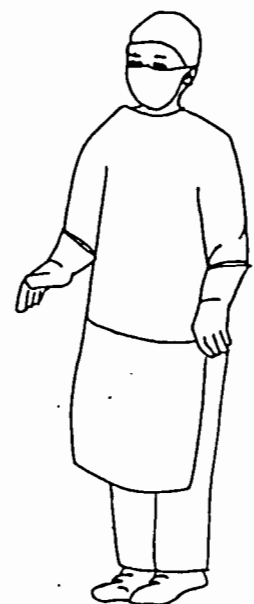


- **Mobile units** should be formed with trained personnel to investigate suspected cases and initiate control measures.
- **Medical care.** There are no drugs available for specific VHF and the aim should be to treat the symptoms and prevent deterioration.



patients should be isolated from other hospital wards

Containment. For infections such as Lassa fever, Ebola and Marburg virus diseases, the medical personnel should wear protective clothing including a face mask. Protective clothing can be made out of plastic sheets if none are available. The rooms where such patients are kept should be isolated from other hospital wards so as to avoid air flow from one section to another.



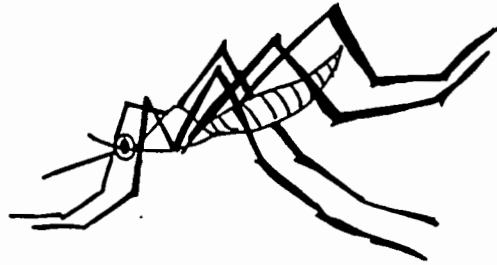
medical personnel should wear protective clothing - if none is available, use plastic sheets

5 MALARIA

This can be a common early problem with refugees or displaced persons who travel from a non-malarious area to endemic areas (areas where a disease is continually present). Furthermore certain disasters e.g floods may create conditions favourable for mosquito breeding.

The malaria rate in a population can be determined by:

- parasite rate - the percentage of blood smears with parasites; can be used to determine the frequency of malaria in the sample;
- spleen rate - the percentage of various age-groups whose spleens are sufficiently enlarged to be palpable through the abdominal wall, and
- malaria seropositivity rate - the percentage with detectable antibodies to malaria parasites in finger-prick blood samples collected in capillary tubes or as spots on filter paper.

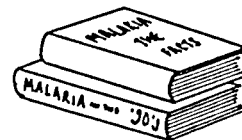
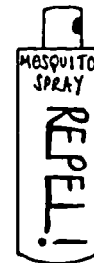
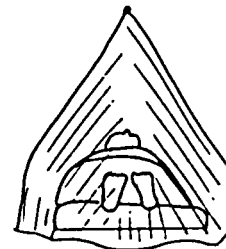


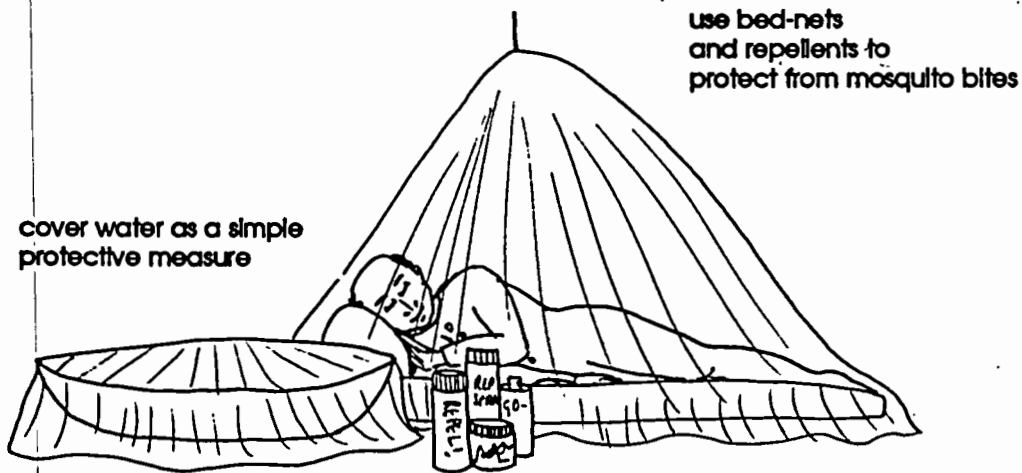
In the absence of laboratory facilities needed to analyze blood samples, the spleen rate will give a rough estimate of prevalence of malaria. However, it must be remembered that the spleen rate is not a specific indicator of malaria since other diseases e.g intestinal schistosomiasis, also cause enlarged spleens.

Malaria control measures include:

- **Health education.** The community and individuals must be aware of the following facts:
 - whether their community in an endemic malarial zone
 - what personal measures can they take against malaria e.g bed-nets
 - how can they help the community to control malaria e.g sanitation, spraying insecticides
 - what are the symptoms of malaria and where to go in such cases
 - information about the correct and safe use of drugs.
- **Reduction of mosquito breeding sites.** The community can reduce the number of breeding sites by **eliminating excess pools of water**; waste water disposal should be confined to certain areas.

- **Less crowded, well-ventilated and well-lit houses have fewer mosquitoes** and should be encouraged. Mosquitoes are found in dark corners and are attracted to crowded rooms.
- **Spraying with insecticides. This is useful where mosquitos bite and rest indoors.** Walls, roofs and other surfaces can be sprayed with a suitable insecticide. The community can be involved in planning the spraying operations and members of the community can take it in turns to spray - this will also reduce the risk of one person's chronic exposure to insecticides.
- **Mosquito nets.** The use of mosquito nets at night will **reduce exposure to mosquitos** and lessen the risk of contracting malaria. Families and individuals must be instructed about the **benefits of using bed-nets, mosquito repellent sprays and mosquito coils.** Their use can be promoted by local health services. It is important that the materials be readily and locally available.
- **Chemoprophylaxis and treatment.** There are a number of drugs used for the treatment of suspected or confirmed cases of malaria. Communities should ensure that there is a **sufficient stock of antimalarials in the clinics.** It is important that any person suffering from the symptoms of malaria go to the nearest clinic and **seek medical help.** In some places it may be more effective to **set up drug distribution centres** where chloroquine or any other antimalarial drugs are readily available.





It is to be noted that some places have chloroquine resistant malaria. Thus communities should be aware of which drugs are most effective against malaria in their area.

Drugs can be use as a preventive measure against malaria. Large scale distribution of antimalarials in areas of high endemicity generally does not offer protection or reduce the rate of transmission. **Chemoprophylaxis** is thus more effective as a **targeted strategy** for these high risk groups:

- pregnant women
- non-immune visitors to an endemic area
- persons living temporarily in closed communities in an endemic area e.g refugees in camps



pregnant women, non-immune visitors and those living in closed communities (eg refugees) are high risk and should take antimalarials

6 DIARRHOEAL DISEASES

Diarrhoea is amongst the primary causes of death in infants and children in the developing world. Death is usually due to dehydration, especially when this is accompanied by vomiting. The outcome of diarrhoea is worse in malnourished persons.

The main diarrhoea causing agents are transmitted via the faecal to oral route. Furthermore, the use of unclean bottles to feed children and unhygienic preparation of formula feeds often leads to diarrhoea.

Control and treatment

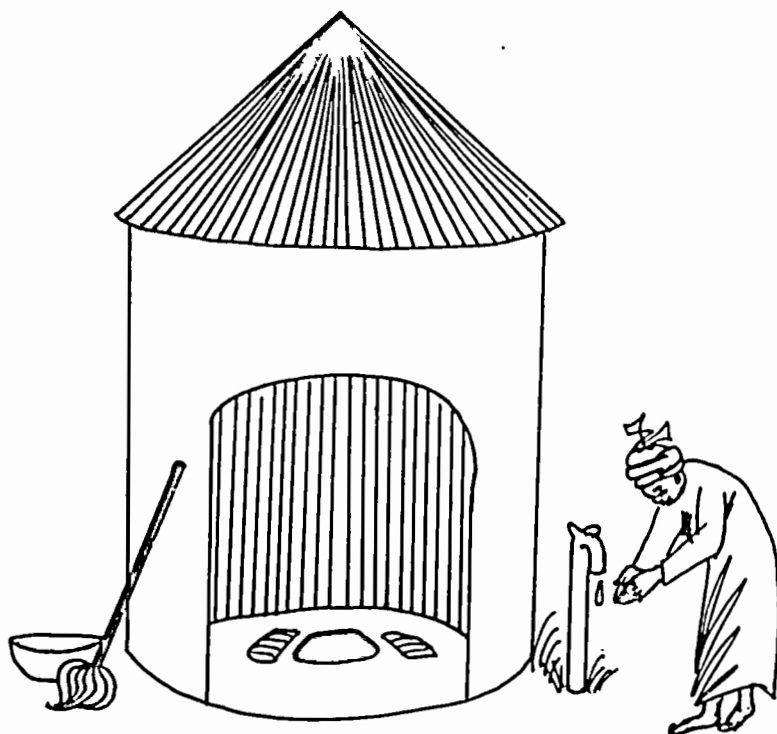
■ Environmental health and sanitation.

Communities must encourage members to **use latrines and keep them clean**. Investing in building simple latrines from locally available materials is worthwhile and strongly recommended.

- #### ■ Improve personal hygiene.
- Diarrhoea-causing pathogens can be transmitted by hand, clothes, or food and thus it is important to keep clean and follow simple guides for hygienic food preparation.

■ Water quality.

Avoiding contamination with waste and human excreta and cover sources of water e.g piped or protected wells instead of open wells will reduce the risk of infection by water-borne pathogens.



- Treatment.** It is extremely important to give plenty of fluids to diarrhoea sufferers. For infants, breast-feeding must continue, contrary to beliefs in many places. Oral rehydration solutions made from locally available materials must be given at frequent intervals.



- Families must be encouraged to make the ORS as instructed at home** (see page 46) and not depend on commercial ORS packets.
- Health education.** Prevention of serious dehydration and death from diarrhoea is simple. It is thus vital that every member of the community be aware of the potential danger of diarrhoea and is instructed on what to do when a family member has diarrhoea. Key caretakers in families must be shown how to make ORS at home and should be asked to practice in the presence of the health worker.

7 Other diseases

which may reach a high incidence rate in certain circumstances:



typhus; hepatitis; influenza; parasitic infections, e.g intestinal worms; tuberculosis; skin and eye infections.

The Centers for Disease Control in their monograph list three categories of indicators that can help detect and prevent famine. These are categorised as:

- "leading" indicators or early trigger events which may trigger or provide clues that a famine may be oncoming;
- "intermediate" indicators are mainly results of the trigger events or the initial social strategies to cope with increasing food shortages;
- "trailing" indicators which are measurable indicators resulting from food scarcity. Response based on the latter is already late since a proportion of the at-risk group will have already died or suffered from increased morbidity and severe malnutrition.

INDICATORS FOR THE DETECTION OF FAMINE CONDITIONS

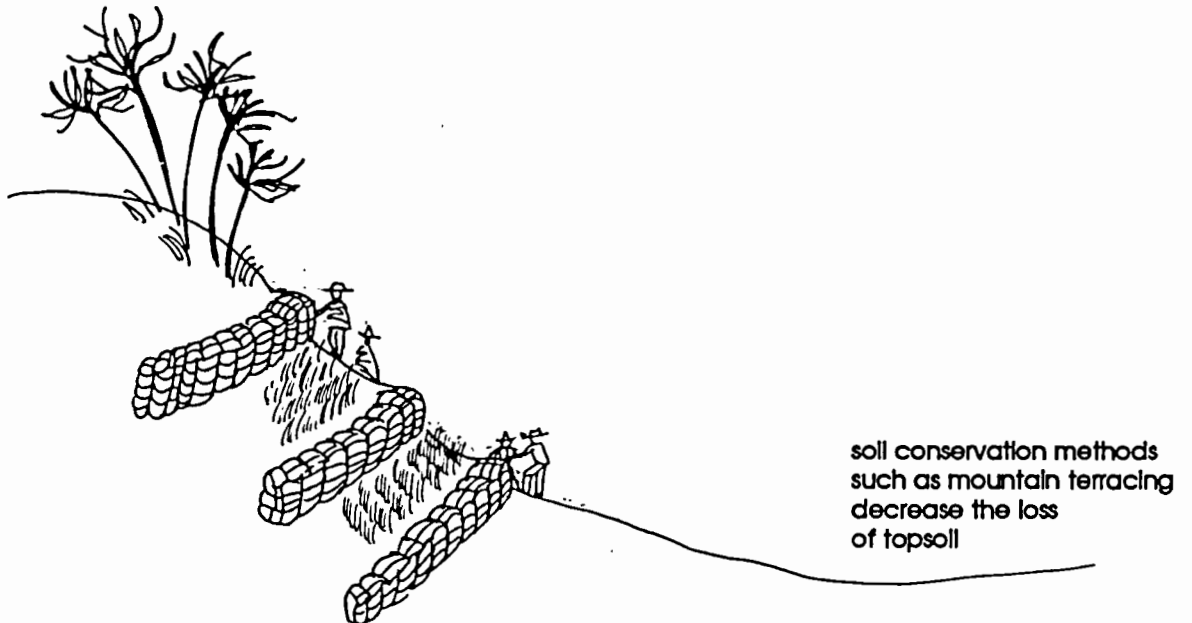
LEADING INDICATORS	LOW ACREAGE UNDER CULTIVATION DROUGHT FLOODS LOW FOOD RESERVES POLITICAL INSTABILITY STRONG BLACK MARKET INSECT INFESTATION (LOCUSTS, FOR EXAMPLE)
INTERMEDIATE INDICATORS	CROP FAILURE INCREASED PRICE OF STAPLES RISE IN RATIO OF STAPLE CROP PRICE TO DAILY WAGE INCREASED LENDING RATES SALE OR CONSUMPTION OF LIVESTOCK DEATH OF LIVESTOCK IN PASTORAL SOCIETIES SALE OF VALUABLE POSSESSIONS (ANIMALS, JEWELLERY, ORNAMENTS) AT LESS THAN MARKET VALUE INCREASED SEED COST SEED SHORTAGE CONSUMPTION OF SEED GRAIN SALE OF LAND POPULATION MIGRATION EXTERNAL MARKET PRICE MANIPULATION
TRAILING INDICATORS	INCREASED RATES OF LOW OR ABNORMAL ANTHROPOMETRY OEDEMA/MARASMUS AMONG YOUNG CHILDREN INCREASED RATES OF VITAMIN DEFICIENCIES INCREASED RATES OF OTHER NUTRITIONAL DEFICIENCIES INCREASED MORTALITY

SOURCE: Famines, In *The Public Health Consequences of Disasters*, CDC, Atlanta, 1989

It is extremely important for governments to monitor and analyze data on the "leading indicators" - effectively, an early warning system - and act to avert famine should the data suggest it is impending.

Community action that may help minimize the risk of famine:

- building of simple irrigation systems to protect land against drought
- adoption of soil conservation measures e.g contour ploughing and crop rotation; a poor soil structure lessens the water-holding properties of the soil and increases the loss of topsoil
- use of natural fertilizer where feasible; this reduces leakage of income for purchasing chemical fertilizers and also lessens dependency on outside inputs
- promoting and establishing community grain stores; each family can contribute a certain amount of grain from their harvest into a community grain reserve which can benefit all in times of food shortage
- construction of better grain stores a few metres above the ground i.e perched on stilts, for protection against rodents, other pests and damp
- establishing seed stores
- ensuring a fair land distribution and tenure system - within a community the landless families often face the worst situations in times of food shortages
- investing in alternative income-generating activities



The above are general guidelines and communities may consider adopting those which are most practical and feasible in their specific situations.

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