

Emergency & Humanitarian Action

# FOCUS



Volume 1, 2007



## Flood Fury

A recurring hazard

Emergency & Humanitarian Action



Monsoon Floods: A Recurring Hazard ►

Notes From the Field ►

Benchmarking Progress for Preparedness ►

We need to keep ourselves constantly updated on all aspects of management of emergency.

Let us keep the momentum moving towards better systems for emergency preparedness and response.

This is with the view to ensuring that we will be able to cope with any emergency in the most efficient and effective manner. Only then can we say that our efforts have not been in vain.

Samlee Plianbangchang, M.D., Dr.P.H.  
Regional Director

(Inaugural Speech, Regional Consultation on Emergency Preparedness and Response: From Lessons to Action. Bali, Indonesia, June 2006)



# LETTER FROM THE Editor



Dear Readers,

For most of us in South-East Asia, the summer monsoon has arrived.

The other day I stole a few moments to enjoy the music the season's first rain was playing on the window pane. Suddenly my mind blocked out the calm notes. Instead it raced to thoughts as dark as the overcast sky outside.

The monsoon ushers in joy. The flipside is flood. The punishing cycle of monsoon floods are a recurring hazard in most countries of South-East Asia. Year after year the monsoon deluge poses a challenge to the affected community, the local disaster management system and specially the local level health systems in countries. Of the 11 countries in the South-East Asia (SEA) Region of WHO, the first half of 2007 has already seen floods, mudslides and tidal waves bring death and ruin in Bangladesh, India, Indonesia, Myanmar, Maldives, Nepal, Sri Lanka and Thailand.

The remaining countries, Bhutan, DPR Korea and Timor-Leste, are also vulnerable to a variety of water-related hazards even outside the monsoon season. Floods, flash floods, cyclones, storms, tidal surges, glacial lake outbursts, mudslides and landslides and beach erosion due to heavy rain not only cause death and disease but also affect the health infrastructure in these countries.

The SEA Region countries have to contend with all types of natural disasters. According to the *World Disasters Report* 2006, about 58% of the total number of people killed due to natural disasters during 1996-2005 were from SEA Region countries. During the decade the Asia Region had the highest number of natural disasters. Reported events: 1273. In 2005 India, Bangladesh and Indonesia featured in the top 10 countries most affected by natural disasters.

Studies by two teams of scientists published in the journal *Nature* predict extreme rainfall and greater flooding in this century. North Asia and South-East Asia in particular are expected to experience increased rainfall and flooding. The scientists have attributed the expected pattern to global warming.

Looking at the impact of flood on the health status of affected populations, the setting cannot be more challenging for the WHO Emergency and Humanitarian Action (EHA) programme in the SEA Region. Well aware that natural disasters cannot be completely avoided, EHA assists WHO Member States to build emergency preparedness and response capacity to address disasters in all its phases. When disaster strikes we should be prepared for it, know how to respond to it, how to recover from it, rehabilitate victims, mitigate suffering and, of course, try to prevent it from happening again.

Through the pages of FOCUS the EHA team will bring into focus the health consequences of various natural as well as man-made hazards and our efforts to mitigate their severity. We will keep you abreast of what we are doing and how we are working to be where most needed. We will share with you our concerns, our field experiences, our trials and triumphs. We will say it with words. And we will say it with photographs.

Do send in your suggestions and comments to [eha@searo.who.int](mailto:eha@searo.who.int) so that this biannual ink interaction with our partners in health does not remain a one way dialogue.

I hope you enjoy the inaugural issue of FOCUS as much as the team has enjoyed putting it together.

**Dr Poonam Khetrpal Singh**  
Deputy Regional Director







# MONSOON FLOODS: A RECURRING HAZARD

By Rashmi Saksena

Flood is a natural hazard which time and again ushers in a humanitarian emergency. Death, disease, injury, displacement of people and economic loss are the usual consequences of flood. Since a deluge puts the health of people at risk, this hazard is a prime concern for the Emergency And Humanitarian Action (EHA) programme of WHO's South-East Asia Region.

A glance at disaster reports from the beginning of 2007 show that floods triggered by various factors, including heavy seasonal rain, have taken a toll in a number of countries in the SEA Region. Sri Lanka had flash floods in January followed by floods in May which displaced 132 000 people and killed 17. In February, Jakarta was virtually under water. As many as 40 people died and 400 000 were affected. In May, Maldives saw powerful swells and an unusually strong tidal wave. The degree of flooding is said to be almost unprecedented. As many as 88 islands in the country suffered severe damage. In the same month, southern Thailand reported high tides leading to urban inundation.

Heavy seasonal rain in May caused the Mahakam River in the East Kalimantan Province of Indonesia to overflow. As many as 59 villages were flooded and water stood one meter high. Two people were electrocuted and 101 952 affected by rising waters. Skin disease, acute respiratory tract infections and diarrhoea were reported. Limited access to safe water and inadequate sanitation also resulted from flooding.

Bangladesh, a country very vulnerable to floods, saw flash floods and landslides in the Chittagong district take as many as 100 lives and injure more than 60 people. Fish farms and rice fields were devastated and jute agriculture suffered. The capital city of Dhaka was in knee-high water during a recent flood. An active monsoon this year has given Bangladesh an above average rainfall. Water levels in the majority of rivers are fast approaching the danger mark threatening to inundate more districts and areas.



In Nepal 26 districts have been affected by floods so far, leaving 72 dead and affecting 213 127 people. A number of states in India are bearing the brunt of the monsoon. Bihar, Andhra Pradesh, Kerala, Maharashtra, Goa, Karnataka, Orissa, Rajasthan, Tripura and Assam are facing floods, landslides and flash floods caused by torrential rain.

Floods are a sudden-onset phenomena. There are various types of floods and they may come with different speeds. Advance warning unfortunately is only possible for seasonal floods.



Flash floods are caused by intense storms dropping large amounts of water within a brief time span. A warning of the impending danger is possible only minutes before a flash flood occurs. River floods are mostly seasonal and triggered by heavy rains or a rapid snowmelt that raise water levels. Coastal floods are associated with tropical cyclones, tsunamis and storm surges. Tidal surges and flash flooding may at times also cause coastal floods. In such cases, too, a warning can be sounded only minutes before. The depth of water created by a flood, its duration, velocity, the rate of rise of water, frequency of occurrence and season determine the severity of the hazard.

Large-scale flood plain management, flood detection, warning systems, and public education can go a long way in reducing the impact of floods on human life, health and property. Significantly, a host of man-made factors are responsible for making people more vulnerable to floods.

Over the years flood plains have been taken over by human settlements. Traditional flood detention areas are now residential. Erosion, large-scale felling of forests and the spreading of concrete have left the land with little capacity to absorb rainwater. Beside the fact that there is a lack of awareness of flooding hazard, there is a crucial need for warning systems. With monsoon rains disrupting everyday life, urban flooding is making news. Big cities find it increasingly difficult to cope with a deluge. Buildings and their foundations are often constructed without flood inundation in mind.



Drowning is the leading cause of death in cases of flash floods and coastal floods. Glass debris and nails found in all sorts of floods cause small lacerations or punctures. Sometimes fatal injuries can occur during evacuation or during cleanup activities. Electrocution and electric shocks can take place when there is flooding.

In the short term, the impact of floods on the transmission of communicable diseases is limited. Rarely has there been an outbreak of communicable disease after a flood. There is, however, an increased risk of water and vector borne diseases.

Because floods damage and at times destroy health infrastructures and lifeline systems, they have a massive long-term impact on health. Basic public health services like water are affected. Limited access to safe water and inadequate sanitation and food shortages (because of damage to crops and loss of livestock) can lead to health problems.

With floods often come the immediate need for search and rescue operations, medical assistance, evacuating and managing population displacement and reducing the risk of individuals being exposed to water and vector-borne diseases. There are long-term needs, too. Primary among these are raising awareness on the risk associated with cleanup activities and maintaining food security conditions over a period of time.







## Diseases related to flooding:

### Water- and food-borne

- Cholera
- Typhoid
- Hepatitis A
- Diarrhoea
- Dysentery

### Vector-borne

- Malaria
- Dengue/dengue haemorrhagic fever

### Due to direct contact with contaminated water

- Dermatitis
- Conjunctivitis
- Ear, nose and throat infections
- Wound infections
- Leptospirosis

### Due to exposure to water/rain

- Hypothermia
- Respiratory tract infections

### Effects on mental health

- Sleep disorders
- Excessive grief and depression
- Exacerbation of existing illnesses





# WHO-EHA prepares for floods

WHO-EHA prepared for monsoon floods ahead of the recent rains to be able to effectively address health needs arising out of the seasonal deluge. Emergency health kits containing medical supplies to cater to the basic health needs of 10 000 people, diarrhoea kits and cholera kits were procured and pre-positioned down to the district level in Bangladesh and Nepal.

In Bangladesh, the exercise started last year. In Nepal, pre-positioning of supplies began this February. In India, WHO is working with the Government and the UN Disaster Management Team to provide back-up support.

WHO-EHA is collaborating with partners to provide support to Member States as the situation evolves and is closely monitoring flood preparedness, response measures, possible outbreak of diarrhoea, dysentery, acute respiratory infection and skin, eye and ear infections in flood affected areas.

## Major floods in the SEA Region 2003-2007

YEAR	COUNTRY	IMPACT
2003	Nepal	239 Killed 284 injured 15 575 homeless 43 395 affected
	Indonesia	241 killed 30 injured 1468 affected
	Sri Lanka	235 killed 695 000 affected US\$ 29 000 damage
2004	Bangladesh	730 killed 36 000 000 affected US\$ 2 200 000 000 damage
	Nepal	185 killed 15 injured 800 000 affected
2005	India	1200 killed 55 injured 20 000 000 affected US\$ 3 330 000 000 damage
2006	Thailand	116 killed 342 895 affected US\$ 25 000 000 damage
	Indonesia	236 killed 56 injured 670 homeless 28 505 affected US\$ 55 200 000 damage
	Thailand	164 killed 2 212 413 affected US\$ 9 940 000 damage
	Sri Lanka	25 killed 2 injured 333 000 affected US\$ 3 000 000 damage
	India	350 killed 65 injured 4 000 000 homeless US\$ 3 390 000 000 damage
2007	Indonesia	40 killed 1 injured 400 000 affected US\$ 695 000 000 damage

Source: "EM-DAT: The OFDA/CRED International Disaster Database  
www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium





## The Monsoon Dance

The monsoon winds blow from the south-west one half of the year and the north-east the other half. This unfailing pattern is reflected in the etymological origin of the name. Monsoon is derived from the Arabic word "mausam" meaning "season". The south-west monsoon passes over the Indian subcontinent from June to September. It is caused when the air heats up over the hot land mass in summer. This causes the air to expand and rise and creates a low pressure area over the northern and central parts of the Indian subcontinent. Moisture-laden winds from the Indian Ocean rush into the subcontinent to fill up this void. The hot air mass is gradually replaced by the cooler, moist and heavier air from over the ocean, and the wind movement shifts. During the dry season the wind pattern is reversed and the wind blows from land to sea. With the gain in altitude by the clouds, temperatures drop and precipitation occurs.

# NOTES FROM THE Field

**Dilip Hensman**, Geographic Information Consultant, WHO Sri Lanka.

As I headed towards Nuwara Eliya, Sri Lanka's holiday destination in the highlands, all that I could visualize was an expanse of mud sliding down the hill to bury homes that lay in its path. The central province of Sri Lanka, the island's hill country famous for its tea, is most vulnerable to landslides. A major landslide here in February 2007 displaced more than 2000 people. My destination was the remote village of Ukuthule to assess health conditions following the landslide.

The jeep I was travelling in along with the Government Medical Officer for Health of the area, gave up during the climb en route to Ukuthule. The seasonal rain that had triggered the landslide had turned the ground slushy. The metalled road was no longer visible; instead it had turned into a stretch of rocks brought down by the landslide. We left the jeep and began the tedious trek uphill negotiating boulders and jumping across cracks in the ground formed by fresh silt.

When we reached the village we found it had been cut off from the rest of the world for the last six days. Residents had fled their homes and taken shelter in a temple. When the landslide came hurtling down about 40 of them had camped in a couple of rooms with just two toilets to share, this being one of the camps in the area affected by the landslide. We found the Ukuthule camp without rations and potable water. Our team distributed water purification tablets, water testing kits and fly control material and assessed the situation for outbreak, diseases and accessibility to health facilities. It was decided to contact NGO partners on return for supply of temporary toilets and shelters.

For the people of Ukuthule, running away from landslides and living in camps has become a way of life. Seasonal rains trigger landslides every year. But they have to return to their paddy fields which stand on what were once tea plantations. The switch from tea to paddy and vegetables has resulted in soil erosion and now mild showers bring about a landslide. One of the farmers said: "My family lives in the camp during the night but every morning we go back to our land. This is what feeds us".

**Laila Ali**, National Professional Officer, WHO Maldives

A strong wind sweeping across the atolls to turn the tranquil blue sea into sinister dark hues, is commonplace in the Maldives. But the winds unleashed between 27 and 31 May were unusual. "Never seen before in living memory" was how an old man described the intensity of the May-end wind. It turned the seas stormy and rough. I had





no inkling of how choppy the waves really were till the captain of the speedboat that was to ferry me for a field assignment refused to negotiate the swirling waters.

Ministry of Health officials and I were forced to make an unscheduled night stay at Haa Dhaalu Hanimaadhoo where we had flown in from Male in the morning. From Haa Dhaalu we were to sail to three islands of Shaviyani Atoll for an awareness campaign on non-communicable diseases. A launch from Shaviyani was to be sent to fetch us from Haa Dhaalu Hanimaadhoo where there is a domestic airport. But the launch did not leave the shores of Shaviyani Atoll because the captain confessed the seas were simply too rough to negotiate.

We had little choice but to wait the storm out. At Hanimaadhoo everyone spoke of the "highly unusual" strong wind that was blowing. The wind had turned the sea exceptionally rough. Even long-time residents found the event remarkable and unprecedented. Everyone was curious about the unusual intensity of the wind. Roofs of houses were blown away; the high winds felled a large number of fruit





laden trees and breadfruit, papaya as well as bananas lay scattered all over. The Jamburoalu fruit with its crunchy, white flesh found many takers among children.

The atoll chief had to stay up all night responding to calls for help. The next day the wind subsided a little and the sea became calmer. The speedboat arrived to take us to our destination. We witnessed scenes of destruction on several islands of Shaviyani Atoll that the high winds had brought in their wake. The damage wrought by the wind was considered severe enough for the Government to send a ministerial fact-finding team to assess the loss and pay compensation to those affected.

### **Norbu Wangchuk, National Professional Officer, WHO Bhutan**

"Chhurue" is a dreaded word in Bhutan. It comes without warning and is on you within minutes. When water suddenly gushes down mountains bulldozing whatever lies in its path, it is "chhurue" in action. Dangerous flash floods or "chhurue" are common in the central and southern part of Bhutan. The summer months from end-May to September bring rain that triggers flash floods. Early October with its persistent rain can be the worst for these flash floods.

A friend of mine in Khaling once saw his house by the river afloat minutes after he had left it. Most people in Bhutan have a "chhurue" experience to relate. I had a brush with a flash flood in Gelephu, a sub-district in southern Bhutan.

I had been on a visit to Norbuling village with a consultant to introduce smokeless stoves to the people. Norbuling is on the other side of the river and it is normally easy to drive across to it via Sershong village. As on many occasions earlier we drove our landcruiser onto the riverbed. Suddenly there was a rumble of thunder and it started to rain high up on the mountains. As we were half way across, the river began to swell and get muddier. In an instant we found ourselves trapped mid-stream. We quickly rolled up the car window. Within a few seconds the water level had reached the windscreen. We decided to scramble up to the roof of the car through half-opened windows to escape the rising waters. I tentatively dipped my foot into the water to gauge the depth of its flow. To my surprise it was only ankle-high.

The flash flood had washed down enough silt to bury our landcruiser. Locals saw our plight and came to our rescue. In a two hour operation we shovelled the silt to enable our car to move. The "chhurue" may well be feared but the people of Bhutan have learnt to live with it. Flash floods are dealt with as fast as they come and are forgotten almost immediately. Perhaps it is time to document lessons learnt from each of them and use the knowledge to deal with them better in the future.



# FLOOD Quiz



**Check for right answer  
at the end of the quiz**

1. Floods can potentially increase the transmission of water- borne and vector-borne diseases. YES/NO
2. Typhoid, cholera, leptosirosis and hepatitis are water-borne diseases. YES/NO
3. Malaria, dengue, dengue haemorrhagic fever and yellow fever are vector-borne diseases. YES/NO
4. Are there any food-borne diseases associated with floods? YES/NO
5. A large number of epidemic-prone infections can be transmitted directly from contaminated water. YES/NO
6. You can help by sending clothes, shoes and shelter to flood affected people. YES/NO

1. Yes. (contamination of drinking water facilities is a major risk factor for outbreaks associated with flooding. Floods expand the number and range of vector habitats).
2. Yes
3. Yes
4. Yes (Floods may contaminate food and may cause outbreaks of food-borne diseases such as diarrhoea, dysentery, cholera, hepatitis A, typhoid fever.
5. No (The only epidemic-prone infection which can be transmitted directly from contaminated water is leptospirosis. Transmission occurs through contact of the skin and mucus membranes with water, damp soil or vegetation and mud contaminated with rodent urine).
6. No (It is more economical, convenient and sanitary to purchase items locally than to ship used items. Temporary resettlement in houses of relatives or in public buildings are far more appropriate than creating population displacement camps.

## Answers

**T**he Earthquake and Tsunami of 26 December 2004 had one significant and lasting impact on the general understanding of experts and laymen alike on how best to respond to emergencies: the realisation of the need to be better prepared. The collective experience of five countries of the WHO South-East Asia Region that were affected by the Tsunami showed that although some capacity was in place to respond to the needs of the affected people, many areas could and should receive more serious attention to avoid repetition of mistakes and optimize the application of existing knowledge and expertise.

With increased recognition of emergency preparedness as a priority area for action came a growing need to be able to evaluate progress and assess continuing gaps. The problem was with the means to measure and monitor the work carried out to achieve preparedness before the next big emergency puts the same to test.

Benchmarking is a strategic process often used by businesses to evaluate and measure performance in relation to the best practices prevalent in their sector. In a novel approach, WHO and its partners decided to apply the process of setting benchmarks for increasing performance in emergency preparedness and response. Twelve "Benchmarks" on emergency preparedness and response were formulated by all 11 SEA Region Member countries at a Regional meeting in Bangkok in November 2005. The Benchmarks are broad in nature as they reflect the consensus of all 11 countries on the performance desired to improve emergency preparedness and response.

The twelve Benchmarks fall into the categories of 1) human resource development, training and education; 2) planning; 3) legislation and policy; 4) funding; 5) vulnerability assessment; 6) information systems; 7) surveillance; 8) absorbing and

# Bench

## Progress for Prep

By Trine Ladegaard

buffering capacities and responses; 9) patient care; 10) coordination.

The idea, while covering a broad range of issues related to preparing communities and systems for emergencies, is that not all countries will devote equal attention to all 12 benchmarks simultaneously. Each country will instead prioritize its interventions based on specific hazard scenarios, high vulnerability areas and existing capacity. Though some similarities are found amongst countries,

<sup>1</sup>See the Special Report Health Aspects of Disaster Preparedness and Response in the journal of Pre-hospital and disaster medicine, volume 21, no 5 Sep- Oct 2006 for further elaboration and discussion of the process of setting the benchmarks.



there are also wide variations. A flexible framework is therefore the key to its applicability.

The strength of a uniform Framework of Benchmarks across countries that all of them are committed to was easily recognised at the time of their formulation. The need to further refine the framework became evident as countries undertook the task of evaluating their progress against the individual benchmarks.

At a regional meeting in Bali, Indonesia, in June 2006, the countries discussed and evaluated the

otherwise. The countries, therefore requested further refinement of the framework.

EHA/SEARO has consequently deciphered each Benchmark into a set of standards and indicators that spell out the best practices implicitly understood in them. Thus, the standards denote the technical reference level of quality or attainment of the benchmark. The standards are qualitative and universal in nature and applicable in any operating environment as they specify the minimum level to be attained. The standards relating to each Benchmark were derived from the Benchmark itself and further defined the technical quality of all components of the Benchmark.

Each standard has in turn been equipped with tools to measure the progress towards achieving them i.e. a set of indicators. The idea of formulating indicators is to provide a way to measure and determine progress in achieving the standards. A corresponding set of specific indicators is in the process of being developed at the country level to monitor the country-level progress towards attaining the standards and Benchmarks.

It is still too early to measure the impact of the Framework of Indicators and Standards as a useful tool to support planning, monitoring and evaluation of the process towards reaching the Benchmarks in all 11 countries. However, the process itself, and the fact that it is receiving wide and adamant support from Government counterparts and international organizations, is the first comprehensive step to actually turning best practices for emergency preparedness and response into real and tangible successes at the country and community level.

In the next issues of Focus, each of the 12 Benchmarks will be elaborately discussed.

# marking redness

progress made. Although all countries could report some new initiatives, it became clear that they had understood and interpreted the rather broad formulations differently. They also had to evaluate very diverse institutional set-ups and hazard scenarios against one generalising formulation. This resulted in evaluations that were too general in approach to provide real substance to in terms of assessing actual progress, and made the vital task of assessing gaps very difficult. The strength of the framework as a planning tool became its weakness as a tool to monitor and evaluate progress or

<sup>2</sup>For more information on the 12 benchmarks and the work of the Emergency and Humanitarian Action programme of WHO, visit the website [www.searo.who.int/eha](http://www.searo.who.int/eha)





**WHO** works closely with the governments of Member States to strengthen their health systems during all phases of the disaster cycle, i.e. Preparedness, Response, Recovery, Rehabilitation, Mitigation and Prevention.

Preparedness is cost-effective disaster management. It helps the vulnerable population get timely public health support and enables health systems to become self-reliant and more confident about dealing with future disasters.

Preparedness has evidently reduced deaths, controlled spread of disease and consequently reduced human suffering.



# CASE study: Bangladesh

- The 1970 cyclone death toll: 500 000 people

The Bangladesh Preparedness Programme of the Government of Bangladesh and the Bangladesh Red Crescent Society is launched

- The 1991 cyclone death toll: 136 000
- The 1994 cyclone death toll: 127 people

Following the 1970 cyclone the Government of Bangladesh and the Bangladesh Red Crescent Society together began work to improve coastal warning systems and evacuation mechanisms. Since the 1991 cyclone the government also strengthened necessary emergency preparedness initiatives at the national level with the help of the UN System. WHO supported the Ministry of Health in many of these preparedness activities.

The Government's Cyclone Preparedness Programme currently covers 11 districts with 3500 villages. Its activities include issuing warning, building and operating shelters (there are 1350 along the coast, some built by other agencies), assisting with evacuation, search and rescue, first aid, relief and rehabilitation, and building community preparedness capacity.

A corps of 32 000 village volunteers, both men and women, organized into local teams of 12 each form the backbone of the programme. They are equipped with radios to monitor weather bulletins, megaphones and hand-operated sirens, first-aid kits, rescue equipment and protective clothing.

The volunteers receive only travel costs and daily allowances to attend training sessions. The Red Crescent staff trains them. They receive a three-day basic training regime in cyclone preparedness, with refresher courses every five years. Specialist training in radio use, first aid and leadership is provided separately.

The volunteers organize regular rehearsals and demonstrations in villages. The project aims to hold at least 260 mass community awareness demonstrations each year. Plays scripted for the programme disseminate information about storing emergency rations, and providing safe shelter and basic hygiene. More than 200 000 people have viewed these plays. Awareness is also raised with the help of folk songs, wall paintings, video shows and posters.

The village volunteer groups are linked to each other and to Red Crescent offices right down to the field level through a network of radio stations. This network is maintained throughout the year, and runs 24 hours a day during a warning or emergency period.

It is expensive to run this system and it requires continuous funding from the Government and the International Red Cross/Red Crescent movement. Extending its coverage and improving operational effectiveness are continuing challenges. However, its effectiveness has been widely acknowledged to be highly effective.

Hundreds of thousands of people can now be evacuated from the path of cyclones. In May 1994, three-quarters of a million people were safely evacuated during a cyclone; only 127 died. A review in 2000 found that cyclone warning and response have become a part of people's daily lives as a result of the programme. The programme is under continuous upgrade and development.

## Source:

- John Twigg-Good Practice Review  
Humanitarian Practice Network, Overseas Development Institute, No. 9, March 2004
- Report and Documentation of the Technical Discussions held in conjunction with the Forty-first Meeting of the CCPDM, New Delhi, 19-21 July, 2004
- WHO-SEARO Reports 1991-1992

# FLOODING

## Frequently Asked Questions

### What are the dangers of flooding?

Urban Areas	Rural Areas
<p>Massive amounts of erosion can be caused by flood waters. Erosion can undermine bridge structures, levees and buildings causing their collapse.</p>	<p>Flooding of farmland usually results in crop loss. Livestock, pets and other animals are often carried away and drowned.</p>
<p>Water entering human-built structures cause water damage. Even with minor flooding of homes, furniture is ruined, floors and walls are damaged and anything that comes in contact with the water is likely to be damaged or lost. Flooding of automobiles usually results in damage that cannot easily be repaired.</p>	<p>Transportation systems may be disrupted, resulting in shortages of food and clean-up supplies. In developing countries food shortages often lead to starvation.</p>
<p>Gas and electrical service may be disrupted.</p>	<p>The affected communities living in temporary shelters and resettlements have limited or no access to safe drinking water, food etc. In addition, prevailing unhygienic sanitary conditions make these settings conducive for the spread of food and water-borne diseases.</p>





### **Health hazards of Flooding Common to both rural and urban areas:**

- People caught in the high-velocity flood waters often drown.
- Flood waters can concentrate garbage, debris and toxic pollutants that lead to the secondary effects of health hazards.
- Drinking water supplies may become polluted, especially if sewage treatment plants are flooded. This may result in disease and other health consequences.
- Hypothermia may also be a problem, particularly in children, if trapped in floodwaters for lengthy periods. There may be an increased risk of respiratory tract infections due to exposure to flood water and rain and because of lack of shelter.
- Effects on mental health include Post Traumatic Stress Disorder, excessive grief, sleep disorder; exaggeration of existing illness, loss of will to live and suicidal thoughts.
- Pregnant mothers and newborns become vulnerable and require additional care.

### **What measures can be taken to ensure water safety?**

- The most practical forms of free chlorine for household water treatment are liquid sodium hypochlorite, solid calcium hypochlorite and bleaching powder (chloride of lime: a mixture of calcium hydroxide, calcium chloride and calcium hypochlorite).
- The amount of chlorine needed depends mainly on the concentration of organic matter in the water and has to be determined on an individual basis. Thirty minutes after treatment, the residual concentration of active chlorine in water should be between 0.2-0.5 mg/l, which can be determined using a special test kit.
- Drinking water should be stored in clean, covered and narrow-mouthed containers.
- If water is stored in a wide-mouthed container, it should be drawn through a tap or with a ladle.

### **What measures can be taken to ensure food safety?**

- Avoid raw and uncooked food unless it can be peeled or shelled.
- Cook food thoroughly and eat it hot.
- Cooked food should not be stored for a long time. Keep food covered and reheat thoroughly before consuming it.

### **What measures can be taken to prevent vector-borne diseases?**

- Insecticide-treated mosquito nets (ITN) are suitable if nets are in use by the residents, and if residential structures allow mosquito nets to be supported or hung.
- Indoor spraying of residual insecticide ("house spraying") has been the method of control used most often.
- Implementation of preventive measures such as indoor residual spraying of insecticide, or the retreatment/distribution of ITNs in areas where their use is well-known are recommended.
- Foods such as soups and stews must be boiled continuously for at least 15 minutes.
- Cooked food should generally be eaten immediately. If necessary, preserved cooked food should be thoroughly reheated until it is steaming hot.

Those who face the fury of the monsoon also reverentially sing in praise of its glory. Folk songs abound in praise of monsoon showers that rejuvenate the earth that is scorched by an intense summer sun. Washed clean by the rain a parched earth turns green again. Countless poets have celebrated the dark clouds, the patter of the raindrops, the beauty of new blooms, the cool breeze, the coming alive of rivers and Nature's creatures calling out to loved ones in verse since time immemorial .

## *Rom Fon* (Falling Rain)

(Composed in 1941  
by his Majesty the King of Thailand,  
an accomplished jazz musician).

*Rain winds sweep across the plain  
Thunder rumbles on high  
Lightning flashes; hews the grain  
Birds in fright nestward fly  
But the rain pours down in blessing  
Filled with cheer our hearts expand  
As the woods with notes of pleasure ring  
Sunlight streams o'er the land  
Bright the rainbow comes in view  
All the world's cool and clean  
Angels' tears the flowers renew  
Nature glistens in green  
Rain beads sparkle in your hair, love  
Rainbows glitter when you smile  
Thus we soon forget the clouds above  
Beauty so does beguile*



*Baadlo diner prothom kadom  
phul korecho daan*

(O clouds! You have presented me with the first bloom of the season)

Nobel Laureate Rabindranath Tagore (1861-1941)

*If you will never come, if you will ignore me  
How can I bear these days of endless rain?  
My gaze lifted afar, I listen eagerly  
My soul rushing restless in the gusting winds,  
O the clouds keep stacking up so high!*

(Rabindranath Tagore: popularly recited in Bangladesh)

*"Wessa walahaka Deviyani divas hesanu mena"  
(Rain God please give us rain)*

(folk song from Sri Lanka)

*Ghanan ghanan kale megha,  
Paani to barsaao  
Bijlee ki talwar nahi  
Boondoo ke haan chalaao*

*(O dense black clouds  
give us rain  
not the sword of lightning  
but shower the arrows of rain drops)*

(Popular film song from India)

# DOs & DON'T's

## Water-Borne Diseases

### DO's

- Drink water from a safe source or water that has been disinfected preferably boiled or chlorinated.
- Store water in narrow-mouthed containers.
- Cook food or reheat it thoroughly and eat while it is still hot.
- Keep food items covered.
- Wash hands before preparing or eating food and after defecation.
- Increase fluid intake in case of diarrhoea. Use ORS solution or home-made fluids as soon as diarrhoea is detected.
- Refer diarrhoea case to a health facility in case of the following:
  - Child is irritable, restless or lethargic or unconscious.
  - Child is eating or drinking poorly.
  - Child has marked thirst.
  - Child has fever or blood in stool.

### DON'Ts

- Don't drink water from unsafe sources.
- Don't eat uncooked food unless it is freshly peeled or shelled.
- Don't eat cut fruits.
- Don't defecate indiscriminately.

## Vector Borne Diseases

### DO's

- Use insecticide-treated mosquito nets (ITN) or insect repellents while sleeping to keep mosquitoes away.
- Wear clothing that cover arms and legs.
- Keep patients protected from mosquito bites in the acute phase.
- Empty water containers at least once a

week. Cover and seal septic tanks and soak-away pits.

- Remove water from coolers and other places where water remains stagnant.
- All cases of fever to be given presumptive treatment for malaria.

### DON'Ts

- Don't allow water to stagnate.
- Don't allow discarded items such as tyres, tubes, empty coconut shells, and household objects where water may collect to accumulate.
- Discourage children from wearing shorts and half-sleeved clothes.

## Food-borne diseases

KEEP FOOD AT SAFE TEMPERATURES (prevent growth of microorganisms)

- Eat cooked food immediately and do not leave cooked food at room temperatures for longer than two hours.
- Cooked food must be steaming hot (more than 60°C) prior to serving.
- Cooked and perishable food that cannot be refrigerated (below 5°C) should be discarded.

COOK THOROUGHLY (kill dangerous microorganisms)

- Cook food, especially meat, poultry, eggs and seafood thoroughly until it is steaming hot throughout.
- For cooked meat and poultry to be safe their juices must run clear and no part of the meat should be visibly red or pink
- Bring soups and stews to boiling and continue to boil for at least 15 minutes
- Eat food immediately after it has been cooked. If it is necessary to eat later, reheat cooked food until it is steaming hot.

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Designed by FACET Design,  
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