

## Flood Hazards – Effects on Health

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“People think floods are caused by heavier – than – usual rains, but that is not the case” S.R. Jayasekara, a deputy director at the Department of Meteorology. “Because we have either blocked the channels for rainwater or filled them, even 50mm of rain in a single day means a congested city like Colombo can be hit by flash floods”. Irrigation experts say the lack of proper planning is one of the main reasons for the floods. “We are paying a very heavy price for these floods which are not that rare now”. Floods are 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.

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 has 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.

Floods are more of common occurrence in Sri Lanka than the other natural disasters. The water resources map of 1959 identified 103 river basins of which about 10 rivers are considered as major. Among these major rivers Kelani, Gin, Kalu, Nilwala and Mahaweli are vulnerable to floods.

The increase in population and subsequent need for land have forced more and more people to live and work in these vulnerable areas, thereby intensifying the risk to life and property in the event of major floods. Heavy rainfall and run off the large volume of water from the catchment areas of rivers, deforestation, improper land use and the absence of scientific soil conservation practices could be identified as the major factors for floods in Sri Lanka.

Moreover with global heating due to the green house effect, tropical countries and expected to get less annual rainfall, but increased rainfall intensities. The average annual rainfall ranges from 500 mm. to 800 mm. At Kanukken in 1897 and 508 mm. at Nedunkerni in 1911. Due to the Southwest and Northeast monsoon rains, floods occur in the Island.

The districts of Kegalle, Ratnapura, Kalutara, Colombo, Gampaha and Galle are subject to floods on account of Southwest monsoon rains,

while Ampara, Trincomalee, Badulla, Polonnaruwa, Batticaloa, Matale and Monaragala suffer from the Northeast rains.

Death, disease, injury, displacement of people and economic loss are the usual consequences of flood.

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.

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:**

- 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

#### **Health hazards of Flooding**

- 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.

### **Drinking water facilities and sanitation**

The Jaffna Peninsula is an area in Sri Lanka, where the underground water is used for purpose such as Drinking, Agricultural and Industries. Paddy cultivation is rain fed but it is for nearly three months during the North East monsoon period.

Since October 2004, rainfall was appeared up to December 2004. Rainfall in 2004 was very high compared with last ten years in Jaffna District. Due to Tsunami Disaster all the wells in coastal areas of Vadamarachchi North

and Vadamarachchy East have been changed as Salinity. It is a serious problem in these areas. All salinity wells were pumped and chlorinated at many times but salinity did not change.

Fresh water supply facilities have to support the needs for living.

1. It is one of the basic needs for living.
2. Safe drinking water provision for to affected person will improve the living condition and prevent water borne diseases.
3. Drinking water facilities to areas of water shortage will encourage the displaced people to resettle.
4. Facilitate removal of the Human wastage.
5. Relief the shortage of the scavenging labourer.

Sri Lanka has a history of epidemiological vulnerability to malaria, measles, diarrhoeal diseases, acute respiratory infections, dengue/dengue haemorrhagic fever, Japanese encephalitis, rubella, HIV/AIDS, and new and emerging diseases such as avian influenza and chikungunya. In addition, the potent combination of floods, excessive rains and civil strife leading to large groups of IDPs confined to temporary camps creates ideal conditions for the outbreak and rapid transmission of several communicable diseases.

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.

### **Disaster management in the health sector**

The Ministry of Health Care and Nutrition is assigned the responsibility for formulating national health sector policy, and planning and supporting the Disaster Management Centre (DMC) to carry out activities relating to health sector emergency preparedness and response. The Deputy Director General (Planning) is identified as the health sector

focal point in the Ministry of Health Care and Nutrition.

The national hospital based in Colombo has established an emergency health sector plan primarily meant to handle mass casualty situations such as bomb blast, etc. Pre-hospital and community-level health sector activities are not mentioned in the hospital emergency contingency plan. Presently, the plan is confined to the national hospital of Sri Lanka with no organized pre-hospital structure.

The need for a pre-hospital emergency care ambulance service was greatly felt during the tsunami disaster. To address this need, a pre-hospital emergency care training programme was developed in collaboration with the University of Peradeniya, South Australian Paramedics Aboard and WHO. Several 10-day training programmes have been conducted and 334 government health sector officers have been trained.

Promote the establishment of an Indian Ocean Tsunami Warning System (OCTWS) and establish a communication system between the OCTWS and respective disaster

management agencies in the Region. Explore the possibility of using the satellite communication facility available in the Region for post-disaster search and rescue, and relief distribution activities. Reach an agreement to provide real-time data to all agencies involved with issuing disaster warning messages in the Region. Strengthen the capability and capacity for disaster response.

### **Hazard, Vulnerability and Risk Assessment**

It is very important to develop hazard mapping process at national and provincial levels. The Risk Assessment, Data Collection, Research and Analysis Unit should be established in the regional and national level.

### **Disaster Preparedness Planning and Protection of Existing Public Infrastructure**

Disaster Risk Management Framework should be developed to fulfill the need for a multi-disciplinary, multi-sectoral, inter-ministerial and inter-agency approach, with the full involvement of all key sectors.

### **About the author...**



**Dr. Rajendra Surenthirakumaran** studied at the University of Jaffna, where he received the MBBS Degree in 2003. Then he obtained his MSc in Community Medicine at Post Graduate Institute of Medicine (PGIM), University of Colombo in 2006. He also did the postgraduate diploma in applied statistics at Postgraduate Institute of Agriculture, University of Peradeniya in 2007. Now he is reading the MD in Community Medicine at PGIM. At present, he is a lecturer at the Department of Community Medicine, Faculty of Medicine, University of Jaffna. He has taken part in a significant number of local, national and international research projects and is member of national and international scientific associations for Medical and Public Health. His main research interests are Non Communicable Diseases, epidemiological research and research ethics.