

HEAT WAVES

Definition:

Heat-wave is a condition of atmospheric temperature that leads to physiological stress, which sometimes can claim human life.

□ Heat-wave is defined as the condition where maximum temperature at a grid point is 3°C or more than the normal temperature, consecutively for 3 days or more.

□ World Meteorological Organization defines a heat wave as five or more consecutive days during which the daily maximum temperature exceeds the average maximum temperature by five degrees Celsius.

□ If the maximum temperature of any place continues to be more than 45° C consecutively for two days, it is called a heat wave condition.

There will be no harm to the human body if the environmental temperature remains at 37° C. Whenever the environmental temperature increases above 37° C, the human body starts gaining heat from the atmosphere. If humidity is high, a person can suffer from heat stress disorders even with the temperature at 37°C or 38°C.

Causes of Heat waves:

A heat wave occurs when a system of high atmospheric pressure moves into an area. In such a high-pressure system, air from upper levels of our atmosphere is pulled toward the ground, where it becomes compressed and increases in temperature. This high concentration of pressure makes it difficult for other weather systems to move into the area, which is why a heat wave can last for several days or weeks. The longer the system stays in an area, the hotter the area becomes. The high-pressure inhibits winds, making them faint-to-nonexistent. Because the high-pressure system also prevents clouds from entering the region, sunlight can become punishing, heating up the system even more. The combination of all of these factors come together to create the exceptionally hot temperatures we call a heat wave.

Adverse Effects of Heat waves:

□ Heat waves causes serious health risks like dehydration, heat rash, heat cramps, sunburn, heat exhaustion, heat stroke etc.

□ Excessive heat causes psychological stress

□ Abnormally hot temperatures cause electricity demand to increase during the peak summertime hours which leads to electricity spikes due to increased air conditioning use, which can create power outages. As a result, available electricity supplies are challenged during a higher, wider, peak electricity consumption period.

- If a heat wave occurs during a drought, which dries out vegetation, it can contribute to bushfires and wildfires.
- Heat waves can cause roads and highways to buckle and melt water lines to burst, and power transformers to detonate, causing fires.

Mitigation measures:

□ **Establish Early Warning System and Inter-Agency Coordination** to alert residents on predicted high and extreme temperatures. Who will do what, when, and how is made clear to individuals and units of key departments, especially for health.

□ **Capacity building / training programme** for health care professionals at local level to recognize and respond to heat-related illnesses, particularly during extreme heat events. These training programs should focus on medical officers, paramedical staff and community health staff to reduce mortality and morbidity.

□ **Public Awareness and community outreach** Disseminating public awareness messages on how to protect against the extreme heat-wave through print, electronic and social media and Information, Education and Communication (IEC) materials such as pamphlets, posters and advertisements and Television Commercials (TVCs) on Do's and Don'ts and treatment measures for heat related illnesses.

□ **Collaboration with non government and civil society:** Collaboration with non-governmental organizations and civil society organizations to improve bus stands, building temporary shelters, wherever necessary, improved water delivery systems in public areas and other innovative measures to tackle Heat wave conditions.

EPIDEMICS

Definition:

An **epidemic** is the rapid spread of infectious disease to a large number of people in a given population within a short period of time, usually two weeks or less.

An epidemic may be restricted to one location; however, if it spreads to other countries or continents and affects a substantial number of people, it may be termed a pandemic.

Causes of Epidemics:

□ Epidemics relating to the spread of infectious diseases are caused by the lack of knowledge on specific ways a germ is transmitted and the ability for treatments to be effective in controlling the spread of the disease. There are viruses, bacteria, fungi, and protozoa, classifications of disease organisms. Each strain can mutate when exposed in the human body or other living organisms and form new strains of that disease. It is very difficult for scientists and doctors to keep up with this as many environmental factors can influence mutations also. So because of this, until new sanitation preventive measures and treatments are discovered, many diseases spread quickly resulting in an epidemic.

□ The conditions which govern the outbreak of epidemics include infected food supplies such as contaminated drinking water and the migration of populations of certain animals, such as rats or mosquitoes, which can act as disease vectors. Certain epidemics occur at certain seasons.

□ For example, whooping-cough occurs in spring, whereas measles produces two epidemics, one in winter and one in March. Influenza, the common cold, and other infections of the upper respiratory tract, such as sore throat, occur predominantly in the winter. There is another variation, both as regards the number of people affected and the number who die in successive epidemics: the severity of successive epidemics rises and falls over periods of five or ten years.

Typical Adverse Effects of Epidemics:

Direct Effects of Epidemics:

- Epidemics usually affect large number of individuals and can lead to complications including disabilities and death.
- There is always a possibility of existence of sufficient number of disease carriers who may favour the resurgence and spread of disease.
- On seeing the suffering and deaths especially within close relatives, psychological effects are also common during epidemics.

Indirect Effects of Epidemics:

- Social and political disruption due to tension and law and order problems.
- Economic loss arising from lack of strength of cultivates.
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- Scarcity of clean food and water leading to malnutrition and starvation.

Mitigation measures:

- Investment in improved sanitation, provision of clean water and better urban infrastructure can reduce the frequency of human contact with pathogenic agents.
- Building strong health systems and supporting proper nutrition will help ensure good baseline levels of health, making people less susceptible to infectious diseases.
- Investment in reliable disease surveillance in both human and animal populations will help in reducing epidemics.
- Technological solutions can help minimize the burden of sizable outbreaks and epidemics.
- Better and less costly treatments including novel antibiotics and antiviral to counter resistant diseases, are sorely needed. New and improved vaccines are even more important.

FOREST FIRES

Definition:

The most common hazard in forests is forest fire. Forest fires are as old as the forests themselves. They pose a threat not only to the forest wealth but also to the entire regime to fauna and flora seriously disturbing the bio-diversity and the ecology and environment of a region. During summer, when there is no rain for months, the forests become littered with dry senescent leaves and twigs, which could burst into flames ignited by the slightest spark. The Himalayan forests, particularly, Garhwali Himalayas have been burning regularly during the last few summers, with colossal loss of vegetation cover of that region. Forest fire causes imbalances in nature and endangers biodiversity by reducing faunal and floral wealth. Traditional methods of fire prevention are not proving effective and it is now essential to raise public awareness on the matter, particularly among those people who live close to or in forested areas.

Causes of Forest Fires:

- Natural causes- Many forest fires start from natural causes such as lightning which set trees on fire. However, rain extinguishes such fires without causing much damage. High atmospheric temperatures and dryness (low humidity) offer favorable circumstance for a fire to start.
- Man made causes- Fire is caused when a source of fire like naked flame, cigarette or bidi, electric spark or any source of ignition comes into contact with inflammable material.

Causes of forest fire can be categorized into two groups:

- (i) Environmental causes(which are beyond control)
- (ii) Human related causes (which are controllable)

Environmental causes: These are largely related to climatic conditions such as temperature, wind speed and direction, level of moisture in soil and atmosphere and duration of dry spells. Other natural causes are the friction of bamboos swaying due to high wind velocity and rolling stones that result in sparks setting off fires in highly inflammable leaf litter on the forest floor.

Human related causes: These result from human activity as well as methods of forest management. These can be intentional or unintentional, for example:

- graziers and gatherers of various forest products starting small fires to obtain good grazing grass as well as to facilitate gathering of minor forest produce like flowers of *Madhuca indica* and leaves of *Diospyros melanoxylon*
- the use of fires by villagers to ward off wild animals
- fires lit intentionally by people living around forests for recreation

fires started accidentally by careless visitors to forests who discard cigarette butts.

The causes of forest fire have been increasing rapidly. The problem has been accentuated by the growing human and cattle population. People enter forests even more frequently to graze cattle, collect fuel wood, timber and other minor forest products. It has been estimated that 90% of forest fires in India are man-made.

Adverse Effects of Forest Fires:

Fires are a major cause of forest degradation and have wide ranging adverse ecological, economic and social impacts, including:

- Loss of valuable timber resources
- Degradation of catchment areas
- Loss of biodiversity and extinction of plants and animals
- Loss of wildlife habitat and depletion of wildlife
- Loss of natural regeneration and reduction in forest cover
- Global warming
- Loss of carbon sink resource and increase in percentage of CO₂ in atmosphere
- Change in the microclimate of the area with unhealthy living conditions
- Soil erosion affecting productivity of soils and production
- Ozone layer depletion
- Health problems leading to diseases
- Loss of livelihood for tribal people and the rural poor, as approximately 300 million people are directly dependent upon collection of non-timber forest products from forest areas for their livelihood.

The Need of Fire Management:

The incidence of forest fires in the country is on the increase and more area is burned each year. The major cause of this failure is the piecemeal approach to the problem. Both the national focus and the technical resources required for sustaining a systematic forest fire management programs are lacking in the country. Important forest fire management elements like strategic fire centres, coordination among Ministries, funding, human resource development, fire research, fire management, and extension programs are missing. Taking into consideration the serious nature of the problem, it is necessary to make some major improvements in the forest fire management strategy for the country. The Ministry of Environment and Forests, Government of India, has prepared a National Master Plan for Forest Fire Control. This plan proposes to introduce a well-coordinated and integrated fire-management program that includes the following components:

□ Prevention of human-caused fires through education and environmental modification. It will include cultural activities, engineering works, people participation, and education and enforcement. It is proposed that more emphasis be given to people participation through Joint Forest Fire Management for fire prevention.

□ Prompt detection of fires through a well coordinated network of observation points, efficient ground patrolling, and communication networks. Remote sensing technology is to be given due importance in fire detection. For successful fire management and administration, a National Fire Danger Rating System (NFDRS) and Fire Forecasting System are to be developed in the country.

□ Fast initial attack measures.

□ Vigorous follow up action.

□ Introducing a forest fuel modification system at strategic points.

□ Fire fighting resources.

Each of the above components plays an important role in the success of the entire system of fire management. Special emphasis is to be given to research, training, and development.