BOOK REVIEW

DISASTER MANAGEMENT: ENGINEERING AND ENVIRONMENTAL ASPECTS by H. Sarvothaman and K.J. Anandha Kumar. Asiatech Publishers Inc., Delhi, 2013, 213p. Price: Rs.495.

According to the Oxford dictionary, disaster is defined as "a sudden accident or a natural catastrophe that causes great damage or loss of life". Disasters, natural or man-made are regular phenomena in one part of the globe or the other, which throw life into disarray, economy out of gear. Natural calamities, - we can hardly control, but can mitigate its fall out. However, manmade disasters, sometimes unavoidable consequence of development, can be averted or minimized through our concerted efforts. Mitigation of disasters and their aftershocks is, therefore, the foremost agenda before the world. The book under review meets the expectation and narrates this complex subject in lucid language. Hardly ever we come across such a book, so authoritative and educative.

Tsunami 2004, Kosi flood 2008, Bhopal gas tragedy 1984, Latur earthquake 1993, Chernobyl nuclear accident 1996, Alaknanda landslide 1970, Supercyclone 1999, are some of the worst calamities of the recent times. The developed world has infrastructure to deal with such events in the shortest possible time. For example, post Los Angeles earthquake 1989 in USA, life was put back to normalcy in a week's time. But in the case of underdeveloped countries the fall out lingers, getting compounded, immediate response becomes difficult in absence of any infrastructure. Sheer suddenness of the event numbs our response. When disaster hits remote areas, garnering knowledge of the incidence and its extent takes long time due to terrain inaccessibility and weak communication network. If it strikes a populated region it creates chaos adding more to the havoc. In any such event, the foremost requirement is to move the victims to safe shelter, arrange for drinking water and food, and also medical aids to the victims and the affected. Pollution and lack of sanitation multiply the miseries further with spread of diseases exacerbating the situation.

More than the event marked by its suddenness is the human failure in preparedness and lack of a structured approach to relief resulting in enormous casualty in terms of life and property. Forewarning is basic to coping with such events, which may not prevent the catastrophe, but can at least provide us with confidence to better confront such events or their impact.

The 'Himalayan tsunami' of floods and landslides which ravaged Rudraprayag district of Uttarakhand, unleashing havocs, in June 2013 brings to the fore many such issues in disaster preparedness and response.

The disaster management system is mainly a two-tier system, namely prediction of the event, and coping with its after-effects or mitigation of impact. In India the Disaster Management Act of 2005 was legislated with the objective of holistic disaster management with paradigm shift from 'response to relief' to 'prevention and mitigation'. In this context H. Sarvothaman and K.J. Anandha Kumar have presented a structured strategy to better cope with such catastrophic events. All time preparedness is basic to any structured response which includes early warning system. There are thirty two chapters in the book, organized more or less sequentially, prioritizing management needs in terms of unpredictability, enormity and recurrence of the disasters.

Floods, droughts and cyclones are the three foremost atmosphere related hazards inflicting widespread damages. Floods affect 12% of India's geographical area, while drought prone areas account for nearly one sixth. But the most affected areas are also the most populated. These hydrometeorological disasters are responsible for nearly 80% of the disaster induced damages. Flood forecasting and flood zoning are, therefore, the top priorities amid various structural and nonstructural measures. Drought mitigation, too, needs long term planning for water management and conservation, as also for increasing water use efficiency. All these assume added significance in the wake of global warming and climate change syndrome which are certain to affect rainfall pattern and freshwater availability, heighten frequency of droughts, floods and cyclone.

Geohazards, - namely earthquakes, tsunami and landslides, - are ranked next in importance, because of the suddenness and fury associated with them. Six major earthquakes occurred in India in the last 15 years. Tsunami of 2004 was also triggered by mega thrust earthquake wreaking unprecedented havoc. Half of the world's population living in the coastal areas is vulnerable to tsunami. A noteworthy aspect of the book is its science-based approach for a better understanding of genesis of disaster as basic to its prevention. The authors have dealt with these aspects in fair detail, e.g., plate tectonics, seismic hazard zoning, tsunami, their prediction and preparedness. A real time network has been established by National Institute of

Ocean Technology to detect, measure and monitor tsunamis. Tsunami barriers, buffer-zones, bio-shields are some of the measures to thwart tsunami devastation. The chapter on earthquake resistant constructions is a welcome addition to this book. Due emphasis has also been given to the landslides.

In contrast, air, noise and water pollution, ozone depletion as also global warming are all silent killers. These are mainly human induced being products of urbanization, rapid industrialization and sudden economic development. Their impacts do not manifest immediately, but have long term effect on health and environment. Air and noise pollution, though least discussed, are posing increasing threats to the public health. It is only when smog engulfs the capital city of Delhi, that air pollution captures media headlines. Also the people are often helpless victims of noise pollution in the neighborhood, now stymied to some extent by court orders.

Nearly 80% of water borne diseases owe to water pollution. Water pollution is mostly due to untreated domestic and industrial waste waters and effluents, and lack of sanitation facilities entailing open defecation. Sadly, Class I and Class II cities in India have treatment capacity of only 18.6% of waste waters generated. The rest are discharged untreated to the open land, lakes or rivers contaminating both surface water and groundwater. In this context the Yamuna and Damodar rivers or Hussaini Sagar Lake make a good study of water pollution. Fluoride, Arsenic and nitrate in groundwater are also lethal pollutants derived from geogenic or anthropogenic sources. The pollutants in water enter the food chain and end up in our body after its consumption. Dilution through artificial recharge, and chemical processes provide practical remedies. Justifiably, full chapters of the book are devoted to water quality, sanitation, solid waste management, septic tanks, engineered landfills and waste water treatment system.

The authors are aware that in any disaster restoring water supply is the first step in relief works. Hence they have devoted a large section of the book to the subject – surface water and groundwater, their occurrence, management and augmentation with priceless information and illustrations. The book has dealt with water supply issues in right earnest. What is important is judicious use of this basic amenity. Scarcity of water for drinking and sanitation is more than a hazard.

No study on disaster management is complete without reference to the nuclear accidents or chemical disasters. People in Chernobyl nuclear reactor accident zone or nuclear bombing catastrophe in Second World War, or in Bhopal gas tragedy have been still suffering from the fall outs. The worst part is non-transparency of the cause and prevention mechanism of the accidents, prompting fierce public opposition to nuclear power projects or chemical industries. A Standard Operation Procedure (SOP) to respond to the exigencies in nuclear power plants is now in place. A network of 18 unit Emergency Response Centres has been established by Bhaba Atomic Centre.

Disasters occur when human efforts of development impinge on nature's order. The chapters on environmental impact assessment, environmental appraisal procedures and EIA audit render valuable guidelines to avert disasters as sequel to development. Closely follow the chapters on Do's and Don'ts, as also engineering and management interventions.

These are some of the highlights of this book providing an insight into the complexities of the subject. The book is highly useful for students, teachers, civil society, and disaster managers to respond to disasters with alacrity. However, notwithstanding the issues being complex and of serious nature, the book provides an enjoyable reading with commendable flow in writing. The Index furnished at the end guides the readers in accessing the informations. The questionnaire after each chapter will also be helpful to the students. This book is truly a tribute to the authors' valuable career experience used in this write up.

Disaster manage-ment requires multidisciplinary proactive approach. As stressed by the authors, scientists, engineers, development managers together with community, civil society organizations and media have key roles in achieving the goal of moving together towards a safe world. Before concluding, the last words of the authors setting the basic rules are worth quoting:

> *"Every ethical person would in no way create any situation or hazard, or be a cause which would disturb or endanger the citizens' life, peace and emotions. That should be our first lesson in the Disaster Management."*

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