
UNIT 34 NATURAL CALAMITIES*

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34.1 INTRODUCTION

Floods, fire, earthquakes, cyclones, epidemics and pandemics; natural calamities are estimated to kill 45,000 people globally every year. They also cause economic losses, social disruptions and spread despair and misery in society. Diseases like the plague, tuberculosis and smallpox have caused millions of deaths, wiped out societies, cultures and caused mass migrations throughout history. Yet such calamities are also moments of transformation and social inflection and progenitors of disaster preparedness, technological and social adaptations. Although they are often triggered by natural events like earthquakes and cyclones, a disaster is often the other side of the coin of human civilization. Their abrupt and unexpected nature hides the long and intersecting processes of economy, society, geography and climate that at times cumulatively produce the disaster. Their outcomes — who lives and who dies—is a reflection of inequalities, power arrangements and institutional structures of society. The ways in which societies have faced, suffered and survived disasters provide us important insights about their strengths, weaknesses, ingenuity as well as short-sightedness. As we face multiple and interconnected disasters in the 21st century — pandemics, climate crisis, resource scarcities — it may be instructive to reflect into the past and look at natural calamities in Indian history.

34.2 WHAT ARE DISASTERS?

What are disasters? It's not correct to see disasters only as natural events. If an earthquake occurred at an uninhabited island in the middle of the ocean, it

*Dr. Budhaditya Das, School of Human Ecology, Dr. B.R. Ambedkar University, Delhi. This unit borrows from my paper submitted for publication.

will not be referred to as a disaster. Social scientists understand that disasters involve the juxtaposition of physical or natural forces (like geological or atmospheric forces) and vulnerable human communities. Disasters are often the outcomes of long-term global and social processes that increase *vulnerability* or the potential for losses. Disasters can be classified into three types based on the type of event that triggered the disaster: disasters triggered by geological events (such as earthquakes, volcanic eruptions and landslides); biological events (such as epidemics) and meteorological-hydrological events (such as storms, floods and droughts). Famines are often treated as a separate category, as we will see in this Unit, due to the complexities involved in explaining them.

34.3 THE SORROWS OF FARMING

It is difficult to trace the history of disasters in the archaeological record of ancient India. However, it can be argued that the hunting-foraging-gathering communities of the palaeolithic period experienced disasters of a different nature and magnitude compared to the farming communities that succeeded them. hunting-foraging-gathering communities lived in small groups and moved from one place to another, following food rather than producing them. The absence of permanent settlements and the reliance upon wild foods meant that disasters related to settled life and agriculture, such as droughts and famines were absent. The analysis of bones of our hunter-gatherer ancestors suggest that they ate a high-protein diet that was varied in terms of macro and micronutrients. They were probably less susceptible to diseases arising from nutrition deficiency compared to the early farmers whose diets tended to be high in carbohydrates with an emphasis on cereals and root crops. Hunter-gatherers ate meat and wild foods available in forest and savannah landscapes whereas farmers had a narrow choice of food and fewer options if and when their crops failed. As nomadic groups, hunting-foraging-gathering communities were also less vulnerable to infectious diseases and epidemics than their sedentary agriculturist successors, as the latter lived in more densely populated settlements.

Calamities such as floods, droughts and disease emerge in the archaeological record with the domestication of plants, animals and the advent of settled communities. Smallpox and tuberculosis crossed over to humans from goats and cattle with the domestication of animals ten thousand years ago. Other infectious diseases like mumps and leprosy also appear in the fossil remains of our ancestors four thousand years ago, when sedentary farmers and city dwellers living in close proximity and unsanitary conditions facilitated the spread of microbes. Calamities can be directly related to the spread of farming because of the following factors that were related to each other:

- Unique characteristics of farming (for example, the reliance on rainfalls, inundation and the decline in dietary diversity);
- Increasing complexity of social organisation with *social* differences that emerge due to occupation, wealth and gender;

- Conditions of living in cities, towns and village settlements that increased the risk of natural calamities;
- Climactic factors that simultaneously enabled agriculture and also increased the risk of natural calamities.

The Indus valley civilization presents the earliest example in South Asia of the occurrence of these interrelated factors. Beginning five thousand years ago, dense agricultural settlements started emerging in the valleys of the Indus River, the Ghaggar-Hakra River and their tributaries. Climate scientists believe that the drying of climate at this time due to the weakening of the monsoon and the stabilization of the Indus fluvial system played an important role in the proliferation of Harappan settlement sites, as access to water for irrigation became more reliable. The annual floods, silt deposits and inundation of floodplains were key to farming for Harappan communities as they grew winter crops such as wheat and barley. Floods were an economic lifeline for the Indus civilization even as they periodically caused havoc in dense urban settlements.

Agricultural production was accompanied by social differentiation and differentiated risk of disasters for women and non-elites in Harappan society. For example, the biological analysis of human skeletons excavated at Harappan sites suggests that there were significant differences in tooth conditions (linear enamel hypoplasia) between men and women. This shows that a greater percentage of women were affected by nutritional deprivation and serious illness than were men.

If the Harappans suffered more from natural calamities like floods and epidemics, they also found new ways of coping and disaster management. The most remarkable example of such innovations is the sophisticated hydraulic constructions among the city-dwellers in the Mature Harappan period (2600 — 1900 BCE), including networks of drains, sewers and culverts. Public drains were designed to take domestic sewage out of the city and were likely devised as sanitary measures to prevent the spread of infectious diseases. Sites like Mohenjo-daro, Harappa and Lothal were prone to floods and archaeologists believe that the outer walls and fortifications in these cities were designed as protection against floods. The excavations at Mohenjo-daro shows that the settlement suffered floods many times throughout its occupational history, and the city was destroyed by major floods and was successively rebuilt many times. The historian George Dales argues that “flooding was the principal enemy of the Mohenjodarians and all the Harappan period inhabitants of the lower Indus valley”. (Dales, 1965)

34.4 ELEMENTS AND EPIDEMICS IN THE CLASSICAL TEXTS

The history of natural calamities in the cultures and societies that came after Harappa can also be traced in the epigraphs and written texts. The oldest surviving texts in the Indian subcontinent are the Vedas, composed in Sanskrit language. Vedic hymns are centred around powerful deities and

forces of nature. A great flood and an impending deluge (*pralaya*) are at the centre of creation myths in the *Shatpatha Brahmana* and *Matsya Purana*, where Vishnu takes the avatar of a fish and saves the world and all humans. *Harivamsa*, a Sanskrit text considered to be an appendix to the Mahabharata, describes Krishna's battle with the terrifying fever-demon *Jwarasur* — a metaphor for fever caused by infectious diseases.

Other religious communities also sought divine protection from calamities. The Mahavastu, a Buddhist text written in Sanskrit, Pali and Prakrit, describes how an epidemic had broken out in the city of Vaisali ruled by the Lichchhavi clan and the Buddha visited the city, cured its residents and saved their lives. Famine and food scarcity are important elements of the story in *Manimekalai*, a Tamil-Buddhist epic composed in the 5th-6th century CE and part of the Sangam literature. The woman protagonist Manimekalai, who wishes to become a Buddhist nun, possesses a magic bowl that she uses to distribute food to the poor. After many twists and turns, her journey towards renunciation ends in the famine-struck city of Kanchi where her magic bowl ends hunger and her charity brings rain and prosperity to the city.

Religious and medical texts of ancient India also provide important clues relating to societal attempts to understand and respond to natural calamities. By the first century CE, we see institutionalised responses to disease as rulers and religious communities invested in measures for public health, medicine and medical treatment. There are references to *arogyasala* (halls for health) in Sanskrit and Pali literature and to infirmaries in the context of Buddhist monasteries. When the Chinese Buddhist pilgrim Fa Hsein visited the city of Pataliputra sometime during the first decade of 5th century CE, he described one of the earliest accounts of a civic hospital system anywhere in the world:

“The heads of the Vaisya [merchant] families in them [all the kingdoms of north India] establish in the cities houses for dispensing charity and medicine. All the poor and destitute in the country....and all who are diseased, go to those houses, and are provided with every kind of help, and doctors examine their diseases”.

The *Charaka Samhita* and *Susruta Samhita* are well known texts of Ayurveda provide evidence that some diseases were known to cause epidemics and disease vectors or conditions aiding epidemics were sometimes described. The *Charaka Samhita* translates epidemics as *janapada-uddhvamsa* and devotes an entire chapter to epidemics and the common conditions that cause the “epidemic destruction of a locality”. Epidemics were linked to environmental causes: wind, water, land or place and time or seasons. Corrupt water, rats and mosquitoes were associated with epidemics whereas “corrupt rulers”, unrighteous subjects and immoral conduct were believed to be the root cause of epidemics. The concept of contagion, that is infectious diseases that are spread by transmission of a pathogen through direct and indirect contact with an infected person, is noted as *upsarga* in the *Susruta Samhita*.

The destruction caused by natural calamities led ancient societies to attempt to forecast such calamities by means of divination. They represented the

earliest attempts of preventing disasters by means of prediction and identifying signs in nature. The *Brihat-samhita*, a text composed in the 6th century CE, draws up a meticulous list of signs that indicate the arrival of rains, floods, droughts and earthquakes. In a chapter titled *utpata-adyaya*, the text discusses signs (portents) connected with fire, rainfall, water, wind, animals and birds, and discusses how certain signs signal impending calamities.

The *Yuga Purana* probably composed sometime between 1st century BCE and 2nd century CE informs us important ways in which communities survived famines and food scarcities. Written in the mode of prophecies, it describes many historical events that occurred, including a severe drought that lasted for twelve years followed by an epidemic. The text prophesises that communities who live along coasts and by means of fishing, those who live in forests and consume lotus-fibres, lotus-flowers, fish, birds and boars will survive the famine. Wild foods and uncultivated landscapes were important sources of sustenance and survival for agrarian communities, especially in times of distress, as they would continue to remain so even in contemporary India.

34.5 DROUGHTS, FAMINES AND THE STATE IN ANCIENT AND MEDIEVAL INDIA

There was a severe famine recorded in the final years of the reign of Chandragupta Maurya (r. 324/321 to 297 BCE) that lasted for twelve years and which may have prompted the emperor to abdicate his throne and accompany a Jaina saint southward to Shravana-belagola in Karnataka. *Arthashastra* has a chapter titled “Remedial Measures against Disasters” beginning with the assertion that “There are eight great dangers arising from fate: fire, water, disease, famine, rats, vicious animals, snakes, and demons. [The ruler] should protect the countryside from these”. The chapter goes on to list both practical measures and ritual measures to be taken to propitiate deities and avoid disasters. The former includes advice to villagers to live away from the floodplains during the monsoon, and advice to king to store food during a famine and distribute it in exchange for work on forts and irrigation projects. It is also recommended in *Arthashastra* that taxes realized in the form of grains should be kept as buffer stock to be used in the time of food shortage. The king should also grant tax exemptions to regions suffering from disease or famine. The Sohagaura bronze inscription discovered in Gorakhpur, Uttar Pradesh, composed in Asokan Prakrit and inscribed in the Brahmi script of third century BCE, records an order by state officials to distribute and not withhold the contents of the granaries and storehouses in case of the outbreak of drought. Similarly, the Mahasthangarh limestone inscription in Bangladesh also lists steps to be taken in order to alleviate distress caused by famine, including advancing loans and distributing paddy from the granary.

Drought, famine and food scarcities were a regular feature of agrarian societies and rulers as well as cultivators attempted to harvest and store water for irrigation as well for periods of scarcity. The Mauryan state supervised, administered and levied taxes on supra-local irrigation projects as well as small-scale irrigation works like wells and tanks. The Junagarh inscription of Rudradaman famously describes the construction of a water reservoir and dam known as Sudarshana Lake by a provincial governor of Chandragupta Maurya. The same rock inscription records that the reservoir, whose water was used for irrigation and for stimulating agricultural growth, was damaged by storms and repaired at least twice over the next eight hundred years.

Religious traditions accorded high moral and cultural value to practices of charity and alms giving in Indian society. The historian Sanjay Sharma has shown the significance of *dana* (donation/alms), *Dakshina* (offering), *paropkar* (doing good for others) and *zakat*, *khairat* (charity) across religions, epics and oral traditions. The charitable acts of rulers as well as religious institutions were a part of their claims to sovereignty and legitimacy to rule, and can be seen as co-evolving with the incidence and suffering caused by natural calamities.

The record of calamities becomes more frequent and reliable in the period from twelfth century onwards and the suffering they caused becomes visible to us through the narratives of contemporaneous historical texts. Kalhana's history of Kashmir, *Rajatarangini*, composed in 1150 CE, speaks of 'havoc caused by water' or floods (*toyaviplava*) and the 'grim and awful terror' (*mahabhayaghora*) of famines. Kalhana records a famine in the Kashmir valley occurring in 917 — 918 CE, followed by one in 1099—1100 CE and another in 1123 — 1124. The second famine was caused by inundation, "which turned land into a sheet of water" and in all the three famines, human corpses dumped into the streams obstructed their course. Wars and taxation disrupted agricultural production and accentuated the impacts of rainfall variability. Epidemics followed famines as infectious diseases like smallpox, malaria and plague spread much more rapidly due to poor nutrition and weakened immunity. Muhammad Tughlaq (1290 — 1351 CE) had to leave Delhi and live in a camp on the banks of the Ganges near Kannauj for two and a half years due to a famine that killed thousands of people in Delhi and ravaged the Gangetic Doab region for seven years at the beginning of his reign. Irfan Habib records 29 famines in the seventeenth century in different parts of India and notes that parents were forced to sell their children, famines drove large-scale migrations and caused food riots and perhaps even cannibalism. Many farmers sold themselves or their wives and children in exchange for food.

34.6 CALAMITIES IN A CONNECTED WORLD

Transoceanic and intercontinental movement of people, commodities, plants and animals increased the possibilities of one kind of natural calamity:

epidemics. Disease vectors like lice, fleas and mosquitoes travelled along with caravans, ships to distant landscapes and infected populations who had no previous exposure to diseases like smallpox and malaria. Increased human-to-human transmission became possible as more cities, densely populated ports and trading centres emerged in this age of globalization. With the “microbial unification of the world” in the early modern period, natural calamities acquired the potential to become global calamities — a possibility that was almost impossible previously in human history.

The first instance of microbial unification was the trading network of Mongols, which became the vehicle for the quick transmission of bubonic, pneumonic and septicaemic strains of the plague across Afro-Eurasia in the fourteenth century. The Black Death was a lethal pandemic causing estimated deaths of 75 to 200 million people; among infected populations death rates ranged from 25 to 50 per cent. For comparison, the death rate in the covid-19 pandemic was 1.2% in India and reached a maximum of 5.5% in Syria and 4.8% in Egypt (John Hopkins Coronavirus Resource Centre, Mortality Analyses). The Arab historian Ibn Khaldun (1332 — 1406) wrote: “Cities and buildings were laid waste, roads and way signs were obliterated, settlements and mansions became empty, dynasties and tribes grew weak. The entire world changed”. Ibn Battuta, the Moroccan traveller was in Madurai in 1344 CE, the capital of the Madurai Sultanate and a major town of southeastern India. He found the city’s population suffering from an epidemic so lethal that “whoever caught infection died on the morrow, or the day after, and if not on the third day, then on the fourth”. However, historians speculate that this might not have been the plague, and that India avoided the pandemic in the fourteenth century.

Epidemics also wreaked havoc in the Americas in the sixteenth century after Christopher Columbus’s expedition to the “New World” in 1492. The indigenous populations were exposed to “Old World” diseases to which they had no previous exposure or immunity. As you are aware, historians have referred the movement of previously unknown plants, animals and microbes between Afro-Eurasia and the Americas as the Columbian Exchange. Europeans took away potatoes, corn, tomatoes, beans, peanuts and tobacco from the Americas and introduced cattle, sheep, pigs, horses, wheat, grapes and sugarcane to the continent. However, the “portmanteau of biota” that the Europeans brought over in their ships also included smallpox, measles, chicken pox, whooping cough, typhus, bubonic plague, cholera, malaria, influenza and yellow fever. Since the indigenous Americans had no immunity against these diseases, they quickly became epidemics and devastated societies. Ninety per cent of the native population of Americas died in the 16th century, as a result of epidemics and ecosystem alterations caused by biological invasions of rats, pigs, feral cattle, horses and weeds.

The period 1350 to 1750 has been characterised as the Little Ice Age (LIA), a period of regional cooling of the Northern Hemisphere from about 1300 to 1850 CE marked by increase in glacierization in Alaska, Central Europe and Southern Tibet. Climate historians have recently argued that LIA may have been a global phenomenon as annual temperatures on every continent were on average cooler c. 1400 — 1850 than in any other long period of at least the past two millennia. Several causes have been proposed for the LIA,

including cyclical lows in solar radiation, heightened volcanic activity and variations in Earth's orbit and axial tilt. However, most interestingly for us, the decreases in human population due to epidemics and increased carbon sequestration caused by succession vegetation in the Americas is said to be one of the causes for the LIA. The LIA is associated with severe and prolonged droughts in many parts of Europe, decline in crop yields due to shortening of the growing season, harvest failures and disruptions in the agrarian economy, food shortages, epidemics and famines. The historian Geoffrey Parker has argued that the increased frequency of social and political unrest, wars and revolutions in the seventeenth century world, referred to as a Global Crisis, can be partly attributed to this extreme climate event.

There were major famines in Gujarat in 1556 and 1595 during the Mughal emperor Akbar's reign, each lasting three years. Landless peasants and labourers, called *kamins*, and village artisans suffered the most during such famines. Abul Fazl, the court historian records that "men ate their own kin and the streets were blocked with corpses". The Deccan famine of 1630 — 32 occurred during the reign of Shah Jahan and caused devastation in Golconda, Ahmednagar and parts of Malwa. Peter Mundy, a British traveller, recorded the famine and its effects in Gujarat. It began with a drought, followed by attacks on crops by rodents and locusts in the following year and then excessive rain. When food prices rose and the purchasing power of households declined, the demand for services and manufactured goods fell — trade, industries like textiles and artisans suffered in a downward spiralling economy. It is estimated that three million people died in Gujarat in 1631 and a further million died in Ahmednagar.

How did states and societies respond to such natural calamities? There were both short-term responses for mitigation as well as long-term adaptive responses. The economic and social resilience in the face of climate change was maintained in part through shift in cropping strategies possibly supported by patterns of transhumant pastoralism. Emperor Shah Jahan responded to the Deccan famine by establishing soup kitchens and alms-houses, distributing cash to the poor and foregoing tax revenues worth seven million rupees. During the 'Chalisa' famine in north India (1783 — 84), Nawab Asaf ud-Daula reportedly gave employment to 40,000 people on construction sites in Lucknow. There were also other cruel responses to social suffering as well, such as debt bondage, survivors selling themselves into slavery to escape starvation and slave trading. During the Golconda famine of 1685 — 88, there was a boom in the slave trade and factories of the Dutch East India Company (VOC) bought thousands of slaves from Coromandel to send them to Ceylon and Indonesia.

34.7 FAMINES IN COLONIAL INDIA

Natural disasters were ubiquitous during colonial period and they became the focus of intense debates, public policy and action, scientific research, knowledge creation and political conflicts between the colonial state and its opponents. The most famous example of this is perhaps the nationalist leader Dadabhai Naoroji who argued that famines were caused by colonial economic policies, especially the export of food to Britain during periods of

scarcity. There is a rich debate and considerable disagreement among historians who have studied famines and the colonial economy. The debate broadly revolves around three questions: (a) what was the cause of famines in colonial India? and whether they were ‘natural’ or ‘manmade’ disasters; (b) how far did the colonial state help in preventing famines or reducing excess mortality; and (c) why did the occurrence of famines cease in India after the 1943 Bengal famine. As we will see, these are inter-related questions that are in turn based on contested views about the causation of a complex calamity like famine and what role the state ought to perform in an economy. You have read about the debate and issues associated with it in **Unit 11: Famine and Epidemics, MHI-107- Indian Economy-2 C.1700 to 2000.**

34.8 COMBATING CALAMITIES IN THE TWENTIETH CENTURY

There have been no major famines in India after the famine of 1899 — 1900, with the notable exception of the famine in Bengal during the Second World War. The Bengal famine of 1943, in which 3 to 5 million people died, was different from the nineteenth century famines because it was a *war famine*. Why did the repeated occurrence of famines cease in India in the twentieth century? To state briefly, advances in *communication, political institutions and collective action*, and *science and technology* increased the capacity as well as the willingness of governments to anticipate famines, address their root causes and prevent excess mortality. For example, Tirthankar Roy argues that water availability was the critical constraint in India’s monsoon economy; famines were first and foremost “water famines” that had unequal impacts on communities on the margins who were traditionally excluded from public wells and water sources. Lack of clean drinking water also meant mortality due to water-borne diseases like cholera. This limiting factor eased in late nineteenth century due to a number of factors. In the Deccan region, there was greater exploitation of *subsoil* water (groundwater) and emphasis on digging wells in colonial famine relief policy. In the Punjab region of northwestern India, canal irrigation transformed erstwhile savannah grasslands into a new agrarian frontier, turning single-cropped land into multi-cropped land and increasing food production.

Tirthankar Roy shows that total water use increased from 50 billion cubic meters (bcm) in 1885 to 324 bcm in 1968, and the per capita water use increased from 192 cubic meters to 606 cm in the same period.

Politics was important too — Dr. B.R. Ambedkar’s struggle for equality and movements like the Mahad satyagraha advanced the radical idea that water was a public good, that should be accessible to all irrespective of caste or creed. Similarly, the reports of several inquiry commissions (Indian Famine Commission of 1880, 1898 and 1901; Indian Irrigation Commission (1901—1908)), reports in English and vernacular newspapers, and scrutiny by nationalist leaders generated pressure on the colonial government as well as the British Parliament to act for famine prevention and mitigation. Historians

debate about the impact of increasing density of the railway network on famine prevention — while historians like Mike Davis argued that the increased connectivity often took foodgrains *away* from famine districts and made it less available for the poor and hungry, others like Michelle B. McAlpin, Robin Burgess and Dave Donaldson have shown that increasing trade broke the link between weather shocks and excess mortality i.e. railroads protected against the worst effects of droughts by providing mobility and opportunities outside drought-hit regions. Finally, the Nobel laureate economist Amartya Sen famously argued that major famines ceased in independent India (after 1947) because of *democracy*. Democracy reduces the incidence of famines because information about distress is widely available and citizens or voters have the power to criticise and punish their elected representatives for non-performance.

Even though the incidence of famines reduced, there were other devastating natural calamities in the twentieth century: epidemics, earthquakes and cyclones. The influenza pandemic of 1918 — 1919 engulfed the world with remarkably high morbidity and mortality. John Aberth has estimated that 20 million people died in India and 50 million died around the world. Cholera continued to wreak havoc too: it is estimated that at least 23 million people died of the disease in British India between 1865 and 1947. Due to constraints of space, we will not be able to discuss these calamities and their outcomes in detail. The poor, the undernourished and the marginalized communities (Dalits, Adivasis) were disproportionately affected.

Epidemics were associated with divine wrath and punishment and deities were propitiated to avoid them. Perhaps the most famous was the Sitala Mata, who rode a donkey, carried a broom and a pot in her hands and was the goddess of smallpox.

There were other features specific to epidemics that were quite different from famines. For example, the historian David Arnold argues that cholera was a ‘cantonment disease’ and spread across India in the nineteenth century with colonialism and the spread of British military troops living in overcrowded and unsanitary cantonments. The response to epidemics often presented divergent *or* overlapping responses within indigenous medical systems (Ayurveda, Unani, folk medicine) and Western medicine. For example, there is evidence that variolation — the process of injecting the small pox virus material in a healthy person, which often leads to mild disease and prevents from future serious disease — was practiced in India and China since around 1000 AD. There are accounts of *tikadars* going from village to village and house to house inoculating people against smallpox in eighteenth century Bengal. This popular practice came into conflict with vaccination campaigns of the colonial government after Edward Jenner’s discovery of the cowpox vaccine in 1796. European medical science, and the development of sciences in general (like meteorology and geology), were crucial milestones in combating calamities. However, their progress was not linear and was shaped by imperial imperatives, interactions with colonized populations and indigenous resistance to Western medicine. The focus of the colonial state turned towards sanitation, hygiene, vaccination programmes and clean drinking water — in other words, *public health* — in the twentieth century.

At the same time, colonial officials continued to harbour prejudice against indigenous responses, blamed victims of calamities for their vulnerabilities and believed in the superiority of European practices and belief-systems. While the state was successful in reducing morbidity and mortality for many epidemics, our vulnerability to disease has continued — as shown by the epidemics in the 1970s and 80s and most recently, the covid-19 pandemic.

34.9 SUMMARY

Are natural calamities *natural*? Yes and no. There are climactic, environmental, meteorological and geological forces that act *independently* of human existence. Storms, droughts, cyclones and earthquakes predate homo sapiens and will continue long after we cease to exist. Yet, it is the conjunction of these natural forces and human societies that result in *calamities*. The social and political institutions, modes of resource use, production and labour processes, hierarchies and inequality that characterise different societies crucially shape the form, incidence and outcome of natural calamities. Therefore, it makes sense to understand disasters in the context of human societies — politics, power and political economy — rather than think of them as episodes of random misfortune. We have also seen how human action and socio-economic systems can lead to natural calamities — whether it is agriculture, long-distance trade or European colonialism.

Lastly, let us ask, why is this historical account of natural calamities an *environmental history*? There is of course the role of environmental processes, pathogens and climate in producing disasters. There is also the intertwining of human society and non-human nature — the inseparability of nature and culture — that is characteristic of the field of environmental history. That human action and use of biophysical environments produce consequences that ultimately affect and shape human society is a fundamental insight of environmental history.

34.10 EXERCISES

- 1) How natural are Natural Calamities? Examine
- 2) What has been the role of agriculture in shaping the nature of calamities?
- 3) Write a note on the calamities during ancient and Medieval times in India.
- 4) Do you agree that interconnected World has facilitated spread of epidemics? Justify.
- 5) Why have famines declined in the twentieth Century?

34.11 RECOMMENDED READINGS AND REFERENCES

Aberth, John, (2011) *Plagues in World History*. Plymouth, Rowman & Littlefield Publishers, Inc., UK.

Bavel, B.V., Curtis, D.R., Dijkman, J., Hannaford, M., Keyzer, M.D., Onacker, E.V., Soens, T., (2020) *Disasters and History: The Vulnerability and Resilience of Past Societies*. Cambridge University Press, Cambridge.

Bhattacharya, Sanjoy, Mark Harrison and Michael Worboys, (2005) *Fractured States: Smallpox, Public Health and Vaccination Policy in British India, 1800 — 1947*. Orient Longman Private Limited, Hyderabad.

Conrad, L.I. and Wujastyk, D (Eds) (2000) *Contagion: Perspectives from Pre-Modern Societies*. Routledge, London and New York.

Davis, Mike, (2002) *Late Victorian Holocausts: El Nino Famines and the Making of the Third World*. Verso, London and New York.

Fagan, Brian, (2009) *Floods, Famines and Emperors: El Nino and the Fate of Civilizations*. Basic Books, New York.

Hall-Matthews, David, (2005) *Peasants, Famine and the State in Colonial Western India*. Palgrave Macmillan, Basingstoke.

Kapur, Anu, (2010) *Vulnerable India: A Geographical Study of Disasters*. Sage Publications, New Delhi.

Mukherjee, Ayesha (Ed), (2019) *A Cultural History of Famine: Food Security and the Environment in India and Britain*. Routledge, Oxon.

Mukherjee, Janam, (2015) *Hungry Bengal: War, Famine and the End of Empire*. Oxford University Press, New York.

O' Grada, Cormac, (2009) *Famine: A Short History*. Princeton University Press, Princeton and Oxford.

Parker, Geoffrey, (2013) *Global Crisis: War, Climate Change and Catastrophe in the Seventeenth Century*. Yale University Press, New Haven and London.

Roy, Tirthankar, (2012) *Natural Disasters and Indian History*. Oxford University Press, New Delhi.

Roy, Tirthankar, (2022) *Monsoon Economies: India's History in a Changing Climate*. The MIT Press, Cambridge.

Satya, Laxman D., (1997) *Cotton and Famine in Berar, 1850—1900*. Manohar, Delhi.

Sen, Amartya, (1982) *Poverty and Famines: An Essay on Entitlement and Deprivation*. Clarendon Press, Oxford.

Sharma, Sanjay, (2001) *Famine, Philanthropy and the Colonial State: North India in the Early Nineteenth Century*. Oxford University Press, New Delhi.