Tapping Traditional Environmental Knowledge: Lessons for Disaster Policy Formulation in India

SWATI TRIPATHI
MANAGEMENT FACULTY
JIWAJI UNIVERSITY, GWALIOR

MEGHA SHAKYAWAL
MANAGEMENT FACULTY
JIWAJI UNIVERSITY, GWALIOR

Abstract

The paper seeks to find answers to the question as to why India's disaster management policies have been unable to deliver the desired results. Are the shortcomings in policy formulation, effective policy implementation or timely prevention mechanisms? Or is there a fundamental issue of policy formulation which sparsely takes into account the cultural specificities and uniqueness, technological know-how, educational, religious and attitudinal capacities of the target population into consideration? India was slow in legislating disaster policies but more than that the reason for lesser success of disaster polices seems to be the gap between policy and the people.

We not only keep hearing about the failure of governmental efforts but also how the local communities deal far more efficaciously with disasters utilizing their traditional knowledge. The 2004 Indian Ocean tsunami which killed 250,000 people (approx.) could not kill the tribal communities who saved themselves due to their age-old traditional knowledge. This large scale disaster, considered as a landmark event in history of disasters in the twenty-first century, can be attributed in bringing and confirming the importance of Traditional Environmental Knowledge in managing disasters.

This brings forth the importance of cultural and traditional know-how in dealing with natural disasters and one is forced to question as to why shouldn't traditional environmental knowledge (TEK) be taken into consideration while formulating India's disaster resilience policies? Though at the international level, many scholars have explored the connectedness of disaster to cultural dimensions and several research examined how culture acts as a stimuli in perceiving disasters and their management (Clifford, 1956; Mcluckie, 1970; Koentjaraningrat, 1985; Peacock, 1997; Elliot *et.al*, 2006; Aruntoi, 2008; Kulatunga, 2010). But in the Indian context, this field of inquiry i.e. linking disaster policies with tradition and generational understanding has seldom received attention of the government, decision-making authorities, disaster managers and even in the academia.

The present study attempts to fill this gap in research and scholarship by presenting an historical analysis of disaster and its cognition by cultural communities in India. The paper seeks to interlink the cultural comprehension of Indian tribal communities with scientific-technology towards more constructive disaster policies in India.

Keywords: Culture, Traditional Knowledge, Disasters, Local communities, India.

Introduction

India is a land of varied cultures, languages, topography, biodiversity and climate. It is a hazard prone country with 54% of landmass prone to earthquakes, 40 million hectares of landmass is prone to floods, 8000 kilometres of coastline making it vulnerable to cyclones and approx. 68% of total geographical area is drought prone. (NDMA, 2011) There is hardly

any year when India does not face these wraths of nature, leading to huge loss of human lives and property and impeding economic development.

Twentieth century has been a century of significant changes in scientific inventions-bombs, nuclear armaments, vehicular pollution, deforestation due to large scale urbanization, modernization, rapid growth in human population surpassing earth's carrying capacity. This has resulted in unsustainable development adversely affecting our planet's environment. Natural disasters are not a new phenomenon, and are intrinsic to earth's fundamental character. The matter of concern is the frequency of disasters, which have enormously increased throughout the world due to unlimited scale of scientific and technological interference by humans with environment. We must understand that nature is beyond human supremacy and the human desire to control. What lies in our hands is the ability to mitigate, respond and recover from such natural disasters events effectively.

Traditional environmental knowledge (TEK) and its importance began to penetrate in the field of disaster management in 1970s and 1980s. Its importance was acknowledged in process of development, natural resource management and environmental issues and was widely recognized at the global platform, among the funding agencies (World Bank, UNESCO, FAO, IDRC, and UNEP), academia, policy makers, governments and civil societies. Considering the relevance of TEK in sustainable development, the international community took several initiatives from time to time such as Our Common Future, World Commission on Environment and Development, 1987; Agenda 21 of the United Nations Earth Summit, 1992; World Conference on Science, 1999; Johannesburg Plan of Implementation, 2002; United Nations Millennium Development Goals and Hyogo Framework for Action, 2005-2015. (Dekens, 2007). Recently the Sendai Framework for Disaster Risk Reduction (2015-2050) also acknowledged its importance in the process of disaster risk reduction and recommended its inclusion within the disaster management framework.

Within the academia, studies on TEK and its role in disaster preparedness and response began to gain momentum since the mid-2000s and after the 2004 Indian Ocean Tsunami. There are many such efforts which have been undertaken worldwide such as in Vanautu, an island in South Pacific Ocean, the disaster authorities have incorporated traditional knowledge with volcanology for disaster preparedness by formulating participatory volcanic hazard awareness and education among the people. Similarly in Washington, USA, traditional knowledge of the Native Americans have been incorporated into earthquake and tsunami hazard education. (Hiwasaki, et.al. 2014:16)

Even at the India level, there have been ample instances in different parts of India wherein the local community with the help of their traditional knowledge have adapted themselves to live with disasters since a long time. Tribal communities such as the Jarvas, Little Andamanese, Shompens and others have successfully responded and managed different kinds of disaster by tapping their traditional knowledge based on observations and beliefs.

The *Mokens* (sea gypsies), a native community of Andaman's and Nicobar Islands and Thailand identified signs such as unusual behaviour of animals, birds and low tide as indications for a Tsunami from their traditional stories and moved away from the sea towards protective areas (Aruntoi, 2008:73), contrary to the other communities, migrants and tourists who were caught unaware. The habitants of Majuli Islands, located at the confluence of Brahmaputra and Subansari

rivers in Assam, an area highly prone to floods, cyclones, earthquakes, riverbank erosion and embankment breach, have adapted themselves to live amidst disasters by using their traditional knowledge and locally available resources through which they constructed disaster resilient houses (Das, P., *et.al.* 2009). They have also adopted their own traditional and folk beliefs to forecast floods and heavy rainfall successfully saving lives and property from floods.

The Himalayan belt of India, also showcase a rich traditional knowledge base ranging from architecture, medicine to agro-forestry typical to the ecological conditions prevailing in the region. Forests which have been a major source of livelihood and income for this region are worshipped by the villagers and considered as '*dwellings of gods and goddesses'*. Sacred groves are distributed in patches throughout the state is one of the oldest and traditional form of conservation followed by the mountain community. People plant and protect trees as they believe that the deities present in these patches of forests would protect them, their cattle and their fields from natural calamities and other dangers. Such sacred groves are found in Almora and Pithoragarh district (Nagarwalla and Aggarwal, 2007).

In these sacred groves, people are forbidden to cut trees, green leaves and hunt for wild animals. Villagers do not enter these sacred groves unnecessarily as they do not want to make the deities angry. The local people follow their own unwritten rules for the management of natural resources like forests and believe that if any rule is violated then they have to face the anger and wrath of the deity. People believe that these sacred groves and the deities present in them will save them from natural disasters. For example, the *Bhujani* sacred grove forest which is located above the *Martoli* Village in *Johaar* Valley protects the downstream villages from avalanches and landslides during winter season (Negi, C.S., 2012). *Hariyali, Bhumiyal Devta*, *Jangli Devta* and *Airadeo* are all deities who are considered to be both protector and supervisor of the hills. It is the belief of the hill people that such deities will be kind to those who are caring, respect forests and use it prudently whereas those who misuse the forests are given signals/warnings by the deities. If such warnings are not taken seriously, then it will result in a natural calamity.

In Odisha, the women of the fishing community of Badahalapada and Balisahi villages of Kendrapara district uses an innovative and age old tradition of storing food items so to as overcome food scarcity during and post-floods i.e. drying and storing vegetables and food items in a *doli* and hangs them at a higher place. Therefore this shows that how the indigenous knowledge of this fishing community have enabled them to prepare, cope with and adapt themselves from floods (Parida, J. and Mishra, N., 2014:105).

The *Lepcha's* of Sikkim applied their local knowledge of constructing houses on rocks and higher reaches helps them avoid floods and flash floods. The floor of these houses are built 2-3 feet higher than the ground with little space below the ground known as *Tanhanp*. This practice is done so the flood or rainwater can flow from the beneath the house without causing much damage to the house. (Jha, V. and Jha, A., 2011:180)

In Nandeswar, which is a village in the Belgaum District of Karnataka depicts how farmers have planted bamboo on canal bunds to reduce the risk of breaching and damage by floods. To have ample supply of bamboo, they have adopted the local techniques like planting more grasses to bind soil and pits to ensure good growth of bamboo which later can be used for construction and crafts. On the other hand in Rajasthan, tribal communities have their own local early warning signal like height of birds nest near rivers which enable them to estimate flood peaks. They construct their houses in stilts using lightweight materials which can be easily removed and dismantled before a flood strikes. (Lebel, L. 2013:1065)

This is in keeping with the UNESCO, 2011 report which emphasises that "disasters are embedded within a natural, social and cultural knowledge and give rise to response, recovery and anxiety" (UNESCO, 2011). Hence, scientific knowledge alone is not sufficient to deal with them. The other form of knowledge which is equally crucial for managing

disasters in India is the age-old traditional knowledge of the population/communities at risk. As pointed out by Ellen, R. (2007) that TEK is an important factor which can increase the resilience of vulnerable communities in combination with scientific knowledge has helped communities to manage and cope from natural disasters, economic problems and political conflicts. Not only this, TEK also has the potential to equip both communities and decision

makers with a comprehensive knowledge base which can enable them to make judicious decisions in context to disaster management. (Hiwasaki, et.al. 2014)

Such examples bring forth the significance of cultural uniqueness and traditional knowledge. The problem which hence comes to the forefront is that so far, Indian efforts to manage disasters through their policies and programmes have not been able to reap the foreseen benefits, why despite of advancement in science and technology, the government has not been able to effectively respond to disasters. So much so that India didn't even had a disaster policy until 2009. The answer to these questions lies in our understanding that the efficacious management of disasters does not solely rests on science and technology but necessitates a collective effort involving state, disaster management authorities, institutions along with civil society organizations and importantly the local community which is at risk.

With this background, the paper highlights how the term disaster in India has a religious-cultural connotation attached to it. Further, it also examines how historically traditional environmental knowledge of the local communities have played a crucial role in managing disasters in India.

Disaster Policy Making: The Journey

The foundation for dealing with disasters began, in India, as early as 1871, the time when India was affected by a series of deadly famines (1770s; 1875-1902) which killed 26 million people. This compelled the British administration to set up the Department of Revenue, Agriculture and Commerce. India continued following the British framework with regard to disasters and its management. It was after Independence, the government of India took several initiatives to mitigate disasters like Drought Prone Area Program (DPAP), Desert Development Program (DDP), National Watershed Development Project for Rain-fed Area (NWDPRA) and Integrated Water Development Project (IWDP). This clearly indicates how the Indian government aimlessly toed the British policies with all its apprehensions and shortcomings and only focussed on floods and droughts.

The British policy's understanding of disaster was narrow and parochial because they viewed only floods and droughts as disasters neglecting other forms of natural disasters such as earthquakes, cyclones, landslides etc. Despite their short-sighted disaster policies, one of their most important and valuable traits was that they were meticulous documenters. Sir William Wilson Hunter (1840-1900) in 1881 published the Imperial Gazetteer recording geological, meteorological and zoological data. Culture as an important determinant of disaster management and response did find a mention in the Imperial Gazetteer and it was noted that "inter-community differences were witnessed with respect to the response towards famines which struck the Maratha of Deccan's and Gujarat. It asserted that the people of Deccan region had greater power of resilience than the softer people of Gujarat" (Kapur, 2010:136). But it is sad that this useful document did not receive any attention while the Indian state was formulating policies towards famine and drought relief after independence.

Even after the birth of the planning commission in the year 1950, the issue of disaster was given a miss and was not placed under the commission's mandate. It was not even a part of the seven point agenda of the Planning Commission (Kapur, 2010:137).This shows the ignorant nature of the Indian state to disaster and its effective management. In 2002 after nearly six decades of its inception, the Planning Commission, for the first time, showed its concern to disaster by

devoting a separate chapter on "*Disaster Management: The Development Perspective"* in the tenth five-year plan annual report (Planning Commission, GOI. 2002). Hence, it is a clear indication of the short-sightedness of the government in its understanding of disaster and the attention it demanded.

Despite of several institutions being set up such as Department of Agriculture, Ministry of Agriculture since the colonial era, not only India lacked a vision to deal with disasters but there was no single comprehensive law and policy document for approaching and managing disasters. Prior to 2005 when the first disaster management act was enacted, one could only find traces of disasters in the environmental laws (Northern India Canal and Drainage Act, 1873; Forest Act, 1927; Mines Act, 1957; Atomic Energy Act, 1962; Specific Relief Act, 1963; The Water Prevention & Control of Pollution Act, 1974; The Forest Conservation Act, 1981; The Air Prevention & Control of Pollution Act, 1981), laws which dealt with relief and compensation and insurance laws. It was only in the form of insurance laws which were formulated after the Bhopal Gas Tragedy (1984) which opened up a policy window for disaster management. (Kapur, 2010:140-141)

It is an apathy on the part of the Indian government which took more than 50 years since independence to prioritize the issue of disaster management, even though being a signatory to legally binding international treaties from time to time such as Tampere Conventioni(1998), Yokohama Strategy and Plan of Action (1994), International Strategy for Disaster Reduction (1990-1999)ii, Johannesburg Plan of Implementation of the World Summit on Sustainable Development (2002), Hyogo Framework for Action (2005-2015)iii A series of deadly natural disasters such as the Super Cyclone (1999), Bhuj Earthquake (2001) and Indian Ocean Tsunami (2004) which shook the Indian government not only in terms of human loss but also economic losses. This made the government realize the importance and urgency to deal with the issue of disasters and in 2002 the subject of disaster management came under the purview of Ministry of Home Affairs (MHA) which deals with sensitive and important issues of the country. This came to be seen as decisive effort of recognising disaster management and providing it with immediate treatment.

Therefore, the genesis of India's disaster management policy is comparatively new with the first Disaster Management Act being passed in 2005. It was introduced under Entry 23 (Social Security and Social Insurance) in the Concurrent list of Indian Constitution. The Act provided a legal and institutional framework for managing disasters. It specified the creation of a hierarchy of institutions at three levels- Centre, State and District and channelized their roles respectively for managing disasters holistically.

Further, in 2009 a National Disaster Management Policy was approved by the Central Government. The policy envisages "a safe and disaster resilient India by developing a holistic, proactive, multi-disaster oriented and technology driven strategy through a culture of prevention, mitigation, preparedness and response" (NDMA, 2005). The relief and rehabilitation measures are to address all sections of the society (differently abled persons, women, children and other disadvantaged groups). This inclusive policy was conceived with the objective of bringing in transparency and accountability in all aspects of disaster management by coordinating among community, community based organizations, Panchayati Raj Institutions (PRIs) and local bodies and civil society.

Despite the efforts taken by the Indian government, the element which was missed out in this public policy on disaster was the cultural aspect. Though policies did take into account the different vulnerable groups who were at greater risk from disaster and tried to integrate community based approach and other local bodies under the same umbrella but largely neglected the cultural, linguistic and regional diversities of India. The role of traditional ecological knowledge (TEK) within the field of disasters was not given due attention and acknowledgement.

Concept of Disaster and its management: Religious-Cultural Interpretation

In India, since times immemorial disasters, particularly natural disasters have been conceived as an 'act of god' and has religious, cosmic and mythological comprehensions attached to it. In Hindu religion, there are several gods like Lord Shiva, Goddess Kali, Lord Vishnu, Lord Ganesh, Lord Krishna and Surya who are considered important in context of disasters. People believed that worshipping these gods and pleasing them would help them avert disasters. The *Bhagvad Gita*, mentions how lord Krishna saved the people from heavy rains caused by Lord Vishnu by holding the mountain named Govardhan on his little finger as a shield to protect people from a flood disaster.

Lord Ganesh according to Hindu scriptures also called Vighnaharta *(destroyer of hurdles)* and it is believed that by worshipping Lord Ganesh one can not only bring success and prosperity but also avert any disaster to occur on earth. Goddess Kali who is one out of 108 avatars of Shakti, is associated with both the destroyer and protector of disaster. People in West Bengal, Orissa, Bihar and Uttar Pradesh worship Goddess *Kali as Rakshakali or Kali the protector* (Scrase, R.G. 2001). A specific mantra is recited to please and pray *Rakshakali* which is as follows:

"Om Kreem Kreem Kreem Kalika Kleem Kleem Sarv Shatruunaam Praharya Bhanjaya Maraya Visfotya Kleem Kleem Kleem Kreem Kreem Kreem Phat"

Deity worship in context to disasters is very common in India. The "Naga tribes of Manipur believe that a deity named *Kampinu* made the hills for the Nagas to live in and an earthquake happens when a piece of rock is cut away to mend the deity's house below". In the Himalayas, "the *Gaddi* tribe always carry a sickle which according to them symbolizes the *Kalubir* (the father of all serpent gods) and it's believed that if and when *Kalubir* is not duly propitiated, a landslide occurs" (Hudson, T.C. 1911).

On the other hand, the aboriginals of Andamans believe that the "earth rests on a palm tree and there is a cane bridge which stretches between this world and heaven. When a male spirit of a deceased ancestor shakes the tree in anger as his resurrection has been delayed, that's when the earth trembles". In West Bengal, to avert a threat of flood, women perform a ritual named as *Batiphotaiv* wherein the lady who only bears a daughter and not son can perform it. Her daughter is selected by the villagers to recite a few mantras into the bowl and it is buried under the earth to stop the rain (Kapur, 2010:104,114).

The fishing community of Badahalapada and Balisahi villages of Kendrapara district of Odisha which are flood prone have utilised their traditional knowledge to predict floods by identifying the early warning signs. agricultural practices, Indicators like two snakes playing in the field denote normal weather whereas excessive production of tamarind, colour of clouds, their location and intensity, behaviour of animals (appearance of black ants, nesting and cawing of crows at night, croaking of frogs, floating of *Singi macha* (scorpion fish) at the top level of water and the appearance of *Kau macha* (climbing fish) signifies heavy floods and rainfall (Parida and Mishra, 2014:104).

People living in the Koraput district of Orissa has the presence of huge number of '*sacred groves'* which according to the villagers would protect them from famine and other epidemic diseases. It is the belief of the villagers that these groves prepare them mentally and physically to face natural disasters with a lot of confidence and courage. People offer their prayers every day to the sacred groves and no single tree can be cut or felled from among the sacred grove area without taking permission from the village priest (http:cciori.org/sacred-groves.htm). Incense sticks popularly known as '*dhoop*' is burned every day in the houses and

temples in India. It is considered auspicious and ward off the evil. Along with *dhoop* the other 16 items which are offered to *Agni devta* are betel leaves, betel nuts, camphor, cardamom, cloth, cloves, diya, grain, *naivedhyamv* sweets, sandalwood paste, water, resins ,twigs, foodstuffs, roots, seeds and ghee, so as to satisfy gods for ushering prosperity and avoiding a disaster (http://cyclepure.in/incense-trail).

The Indian Ocean tsunami of 26th December, 2004 was regarded as the outcome of bad sins by many of the survivors. The fishermen who were affected in the coastal areas of India- Kerala, Tamil Nadu, Andhra Pradesh and Pondicherry believed to be an 'act of god' and the result of displeasure and anger of the sea god due to bad karma. Rituals were performed to satisfy and please Goddess Ganga who is considered to be the goddess of sea and water (Paul, B.P. 2013).

Disaster and Ancient Indian Texts

The notion of managing disasters can be traced back to the ancient texts of traditional India such as *Arthashastra* and *Brihat-Samhita*. *Kautilya* (350-275 B.C) in *Arthashastra* termed disasters as "*providential visitations*" (Shamasastry,1923:99) and identified eight types of disasters- fire, flood, pestilential diseases, famine, rats, tigers, serpents and demons. For each type of disaster he meticulously listed several remedial measures such as for fire, he suggested that during summers, villagers should cook outside their houses and prayers and offerings should be given to *Agni devta* (Fire god). To avert a flood situation, villagers who live in close vicinity to water bodies should stay away and store in advance wooden planks, bamboos and boats. They should also continuously monitor the water level of the nearby water bodies. Rivers and other water bodies should be worshipped on new and full moon days. Hymns and mantras should be chanted by learned persons to please rain god.

Similarly *Indra devta*, the god of fertility, the Ganges, mountains and *Mahakachchha* (sea or ocean) should be worshipped when affected by a drought. For famine, *Kautilya* stated that the king should show concern and favour to his people by giving then seeds and provisions, seek help from his friends who are also kings and the king should emigrate to another kingdom with his people where there is presence of abundant harvest. Similarly to ward off other disasters caused by rats, tigers, demons and snakes, measures were listed to prepare people on how to respond and face them. (Shamasastry, 1923: 295-298). **Table 1: Indicators for forecasting Disasters according to Brihat-Samhita**

Type of Disasters	**Indicators**
Rain	Frogs rejoice and repeated croaking's, tasteless water, the colour of the sky
	becomes like cow's eyes, uncontaminated directions, moisture of salt, calm
	wind, tumbling of fishes ashore, cats scratching the earth with their nails,
	accumulation of rust on iron or bronze vessel with a rusty smell, construction and climbing down the trees, cow stampede, birds bathe in water or dust, chameleons perched on the tops of the trees fix their gaze on the firmament.
Floods	Dogs stand on the roofs of the houses and bark continuously looking up towards the heaven, lightning flashing from the north-east

	at the daytime, and glow worms at night near the clouds.
Drought	Howling of jackal in the evening, greyish tawny russet, variegated, mader- hued, green and spotted rays stretching all over the sky
Earthquakes	Wind blowing lashing with the dust of the earth, breaking trees, Sun does not cast bright rays and quarters are covered with smoke.
Hurricane	Harsh cries of birds facing the sun

Conclusion : There are several measures to be taken by the government as well as disaster authority to control all the disaster or given prior notice to the citizens, so that they are aware about these calamities and taken some effective solutions to fight with them. Government and NDRF giving their lots of contribution to rescue the persons who are affected by the calamities. Government also focus to recreate their property or home for rescued persons. Hence the main solution to aware about the calamities.