

The number of extreme weather events is rising alarmingly across the world—increase in heat wave frequency and the number of warm days and nights across Europe, hurricanes in the USA and Caribbeans, floods in Brazil and Uganda, flash floods in Nairobi, Kenya, rising sea level in tropical small island developing states, cyclone Pam in Vanuatu, droughts in West Africa, droughts and wildfires in the US, and droughts, floods and heat waves in India and Pakistan are just some examples.

Less discernible yet equally well recorded are the gradual impacts of climate change. Australia recorded its hottest summer ever and the warmest June and August were recorded in many parts of the world. Several events witnessed a departure from what would normally be expected. Globally, 2015 is on course of becoming the hottest ever recorded. The combined average temperature over global land and ocean surfaces for September 2015 was the highest for September in the 136-year period for which the record has been kept, at 0.90°C (1.62°F) above the 20th century average of 15.0°C (59.0°F), surpassing the previous record set in 2014 by 0.12°C (0.19°F). This increasing has resulted in daily temperature extremes and heat waves across the world.

Climate extremes projections at global level

Some of the key projections of the Intergovernmental Panel on Climate Change (IPCC) report on climate extremes are as follows:

- Observations since 1950 show changes in some extreme events, particularly daily temperature extremes, and heat waves.
- It is likely that the frequency of heavy precipitation will increase in the 21st century in many regions.
- It is almost certain that increases in the frequency of warm daily temperature extremes and decreases in cold extremes will occur throughout the 21st century on a global scale. It is almost certain that heat waves will increase in length, frequency and intensity over most land areas.
- It is likely that the average maximum wind speed of tropical cyclones (also known as typhoons or hurricanes) will increase throughout the coming century, although possibly not in every ocean basin.

- However it is also likely—a 66 per cent to 100 per cent probability—that overall there will be either a decrease or essentially no change in the number of tropical cyclones.
- There is evidence that droughts will intensify over the coming century in southern Europe and the Mediterranean region, central Europe, central North America, Central America and Mexico, northeast Brazil, and southern Africa. But there is also some hope that things might not turn out to be as bad as they sound because of definitional issues regarding how to classify and measure a drought, a lack of observational data, and the inability of models to include all the factors that influence droughts.
- It is very likely that average sea level rise will contribute to upward trends in extreme sea levels in extreme coastal high water levels.
- Projected precipitation and temperature changes imply changes in floods, although, overall, there is low confidence at the global scale regarding climate-driven changes in the magnitude or frequency of river-related flooding due to limited evidence and because the causes of regional changes are complex.

Global scenario: Trends of natural disasters

Trends in natural disasters frequency globally between 1970 to 2014

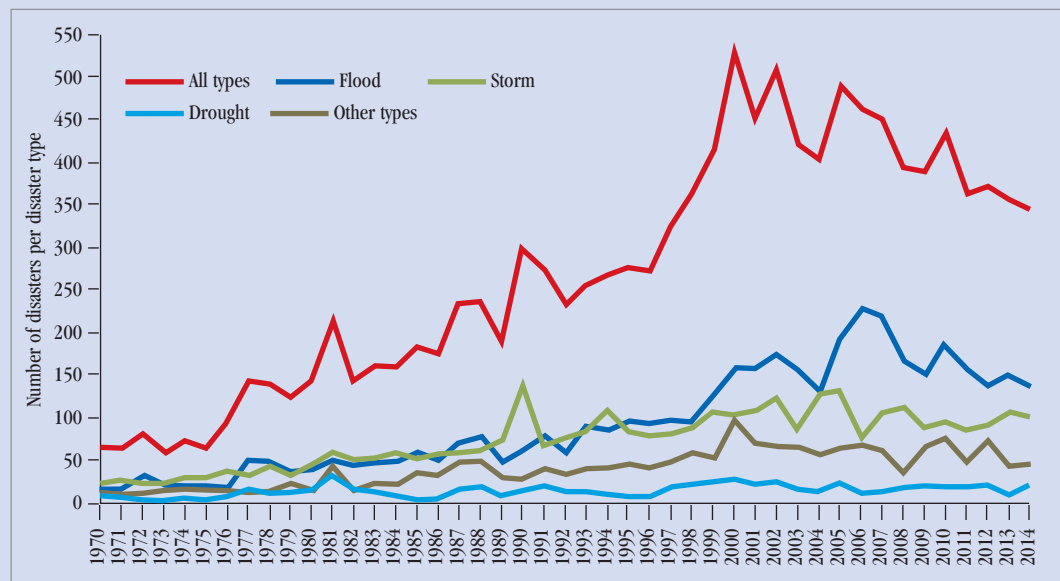
We have used EM-DAT, The International Disaster Database of Centre for Research on the Epidemiology of Disasters (CRED) for this analysis. EM-DAT maintains one of the most credible global databases on disasters reports. This contains essential core data on the occurrence and effects of over 18,000 mass disasters in the world from 1900 to present. The database is compiled from various sources, including UN agencies, non-governmental organisations, insurance companies, research institutes and press agencies.¹

Total number of globally reported natural disasters (flood, storm, drought and other types) between 1970 and 2014 are shown below.²

Figure 1 clearly shows the following:

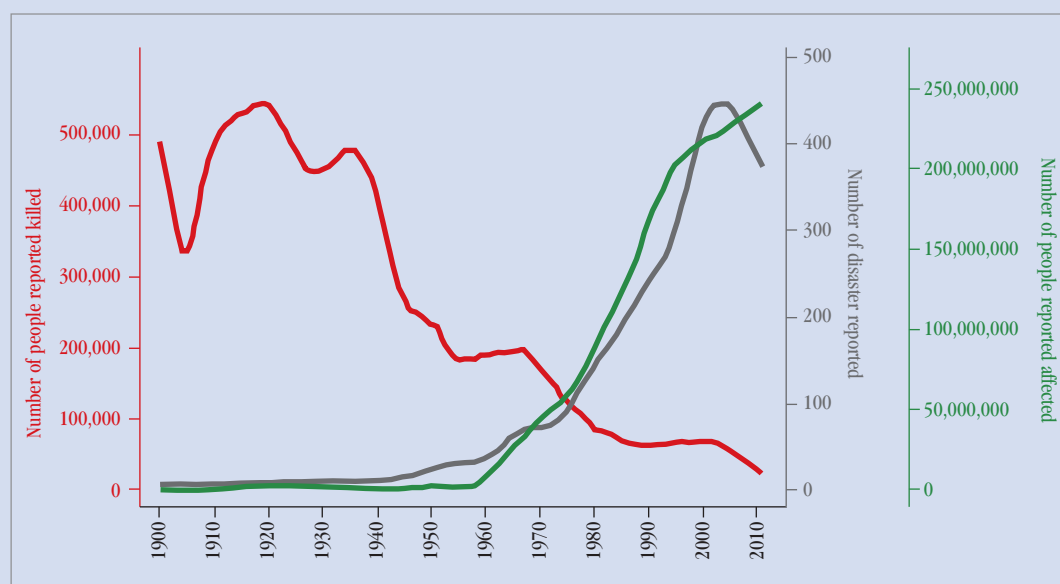


Figure 1: Natural disasters frequency globally between 1970 and 2014



Source: EM-DAT

Figure 2: Natural disasters summary globally between 1900-2011, in terms of number of disasters



Source: EM-DAT

- Globally, all types of natural disasters, whether floods, storms or droughts, have increased in frequency from an average of 50-plus events during 1970s to 350 events in 2014, even touching 500-plus mark in 2000.
- The number of floods increased from less than 50 in 1970 to 226 in 2006 and 218 in 2007.
- The number of storms increased from less than 50 in 1970s to more than 120 in 1990 and 2005. Between 2000 and 2010, it remained above 50 every year.
- Drought frequencies, but not intensity or spread area, have also increased, crossing the mark of 20 in 1981 and 2000s.

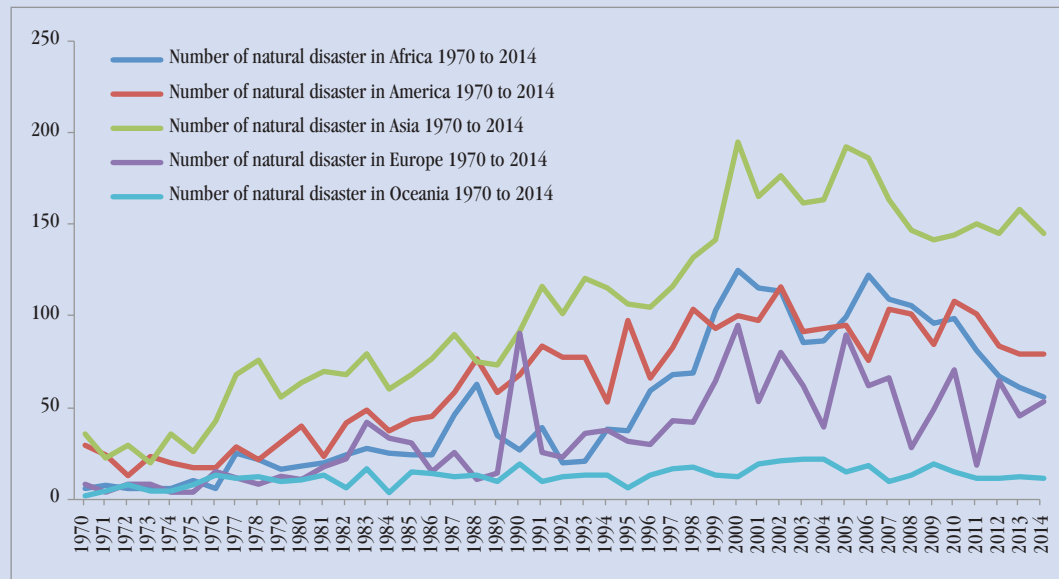
Natural disasters and people affected globally during 1900–2011

Analysis of global natural disasters has been done on the basis of reported number of deaths, financial loss and number of events by EM-DAT, as shown in *Figure 2*. This analysis shows that financial loss increased during this period. However, the number of reported deaths greatly decreased.⁴

Trends in number of natural disasters continent wise between 1970 to 2014

Figure 3 shows the number of disasters reported between 1970 and 2014 in different continents of the world. It can be concluded that:

Figure 3: Number of natural disasters reported in different continents between 1970 and 2014



Source: EM-DAT

- For every year since 1970, the number of disasters in Asia was greater than in any other continent.
- Number of disasters has been increasing in every continent.
- Between 2000 and 2014, Europe faced lesser number of disasters as compared to Asia, Africa and American continents.

systems and in many urban areas. Cyclones mainly affect Madagascar, Mozambique and some of the Indian Ocean islands.⁵ Table 1 lists some major disasters that took place in Africa between 2013 and 2015.

Frequency of disasters in Africa (1970-2014)

Figure 4 shows that the number of disasters reported in Africa has increased significantly, especially since 1970s. Between 1950 and 1964, disaster frequency remained below 10. It crossed 60 in 1988 and 120 in 2000 and 2006. Between 2006 and 2012, the number of disasters decreased a little but still remained above 60 a year.

Africa scenario: Trends of natural disasters

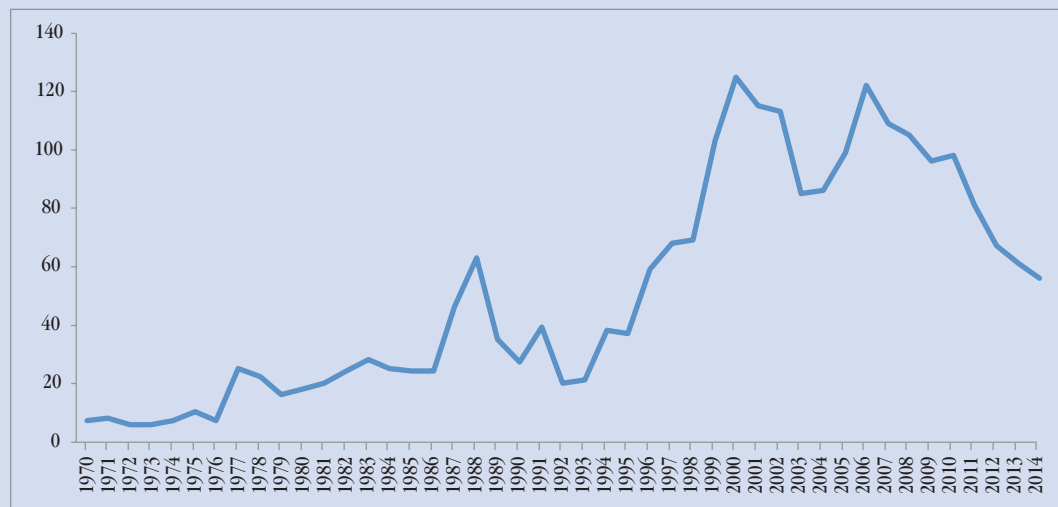
The majority of disasters in Africa are hydro-meteorological in nature, with droughts still affecting the largest number of people on the continent and floods occurring frequently along the major river

Table 1: Some of the major natural disasters reported in Africa during 2013-2015

Country	Event	Duration	Total affected	Death	Associated disaster	Total damage in 000 US \$
Malawi	Flood -riverine flood	05-01-2015 to 21-01-2015	638,645	276	Crop failure	
Somalia	Tropical Cyclone	8-11-2013 to 19-11-2013	142,380	162	Flood	
Zaire/ Congo Democratic Republic	Flash flood	25-10-2014 to 28-10-2014	4,750	154	Landslide	15,000
Zimbabwe	Riverine flood	Jan-2013	9,700	125	Excessive rain	
Mozambique	Riverine flood	Jan-2013	240,000	119		30,000
Morocco	Storm	21-11-2014 to 24-11-2014	117,000	49	Flood	300,000
South Africa	Riverine flood	1-03-2014 to 15-03-2014	7,185	32	Landslide	85,000
Niger	Riverine Flood	15-07-2013 to 15-08-2013	165,943	32		64,724
Namibia	Drought	01-2013 to 01- 2014	331,000		Food shortage	64,000
Kenya	Riverine flood	10-03-2013 to 30-04-2013	100,020	96	Landslide	36,000

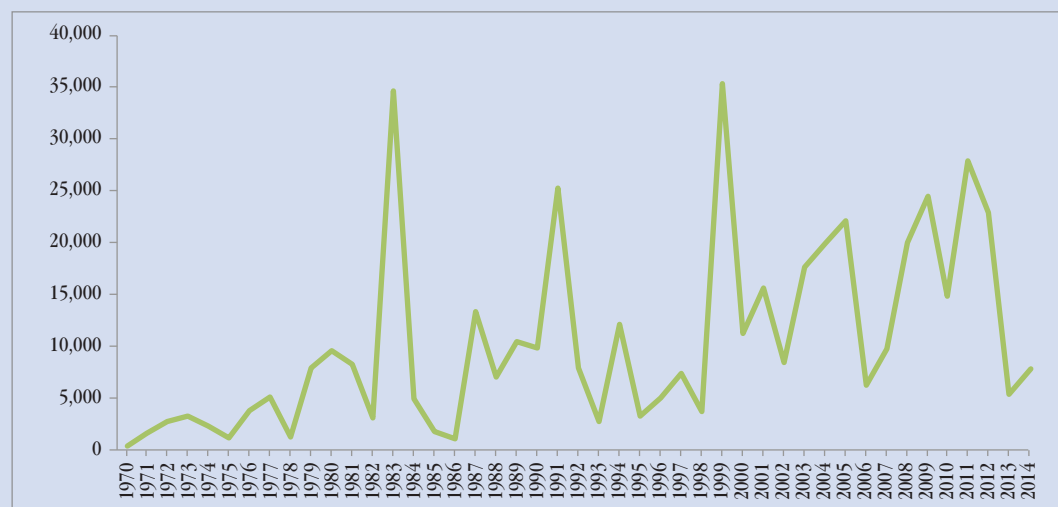
Source: EM-DAT

Figure 4: Number of reported natural disasters in Africa between 1970 and 2014



Source: EM-DAT

Figure 5: Total affected persons in natural disasters in Africa between 1970-2014



Source: EM-DAT

Disaster trends in terms of total affected persons in Africa 1970-2014:

There was an increase in the number of affected people in Africa between 1970 and 2014, as shown in *Figure 5*. There have been some peaks in 1980 and 1999, where the number of affected persons touched the figure of 34 million and 35 million respectively.

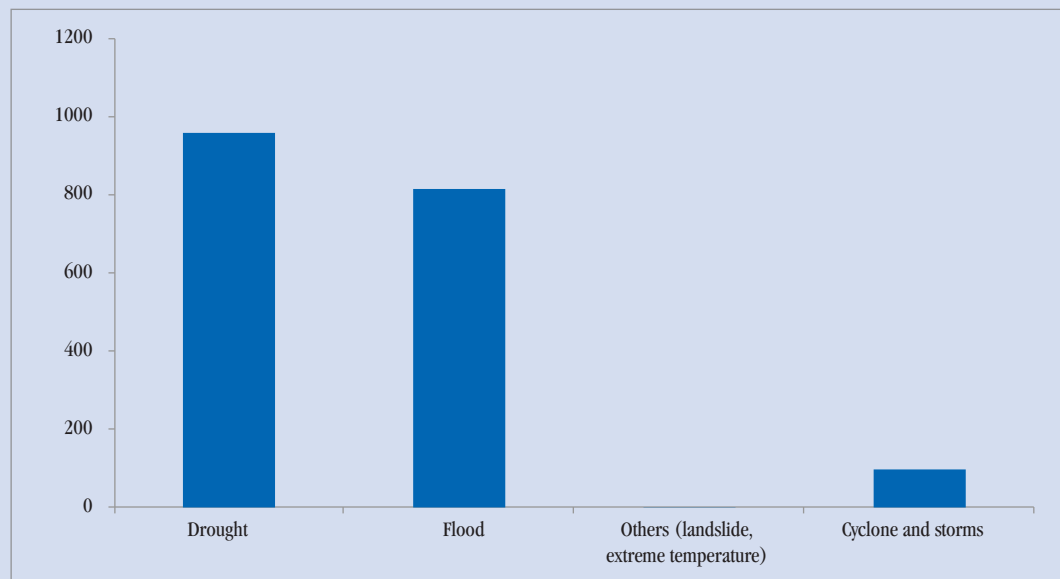
Indian scenario: Trends of natural disasters

India and the surrounding areas have witnessed many extreme weather events in the recent past. Floods in Gujarat spread into the Gir wildlife sanctuary killing at least 10 lions, 1,670 Nilgai and other wild animals in the region. Flash floods in Jammu and Kashmir caused massive destruction in 2014 and June 2015. Assam and other north-eastern states were ravaged by flood

with more than 550 villages affected in Assam in June this year. While unseasonal rainfall and hailstorm in February–March this year destroyed crops in 15 states of the country, creating havoc in farmer life, reportedly resulting in the death of approximately 1,153 farmers in Uttar Pradesh alone,⁶ 601 farmers in Maharashtra and various farmers in other states of country. Some farmers died due to shock due to crop loss others committed suicides. This was followed by deadly heat waves which engulfed most of the northern states and caused a death toll of more than 2,100 in the southern states of Andhra Pradesh, Telangana, Odisha and West Bengal in April and June. EM-DAT database depicts India as one of the most disaster-prone countries of the world.

At present, India is facing a monsoon deficit of 14 percent. A total of 302 districts across India, nearly

Figure 6: Persons affected by natural disasters in India between 1970-2014 (in millions)



Source: EM-DAT

half of its districts, received deficit or scanty rainfall this year, according to India Meteorological Department. As of October, 2015, various states of the country including Maharashtra, Madhya Pradesh, Karnataka, Odisha and Andhra Pradesh have been declared drought-hit by the state governments. Other states including Uttar Pradesh, Bihar, Gujarat, Telangana, Jharkhand, Rajasthan and Haryana might soon be declared drought-hit as well as they account for 149 of the 302 rainfall deficit districts of the country.⁷

There is no reliable comprehensive disaggregated database on disasters in India. Many disaster events in India go unreported. Small-scale disasters (where casualties are less than 10) constitute an overwhelming majority of disaster events in India but are not captured by the international database maintained by EM-DAT.⁸ Despite these lacunae, India ranks third, after USA and China, in number of disasters events and fifth in terms of economic damages which shows the extreme vulnerability of the country to disasters.

Total affected persons by natural disasters in India between 1970-2014

Figure 6 gives a fair idea about the number of persons affected by various climate-related disasters occurring in India during 1970-2014. Maximum number of people were affected by drought (961 million). It can be seen from the graph that the number of people affected by flood during 1970-2014 went up to 814 million.

Decadal variation in affected people by natural disasters in India

Figure 7 shows the total number of affected people by natural disasters in India in different decades. Total number of affected people has increased substantially from 1960–69 to 2000–09.

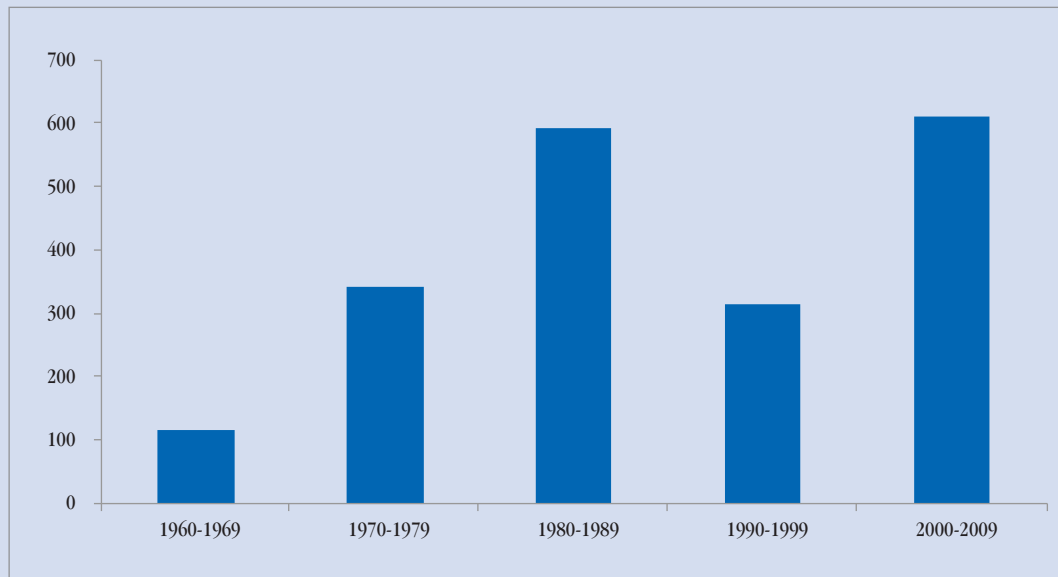
A study by the National Institute of Disaster Management, India (for the period 1974–2003) shows that India ranks ninth (7,413.5) in mean annual number of victims (people killed and affected) per hundred thousand inhabitants. The only countries which rank higher than India are Botswana (13,528.6), Djibouti (12,942.7), Bangladesh (12,388.5), Mauritania (11,853.5), Zimbabwe (8,192.1), Malawi (8,747.6), Antigua and Barbuda (8,248.6) and Mozambique (7,665.5), which are far below India in other indices of development.⁹

Fund allocation for state disaster response fund/calamity relief fund in India between 1995 and 2015

Figure 8 clearly reflects how the fund allocation has been increasing considerably over the years in India. The decision to increase the size of state disaster response fund has been taken by the government of India, acknowledging that there has been “rising intensity and frequency of disasters” in India.

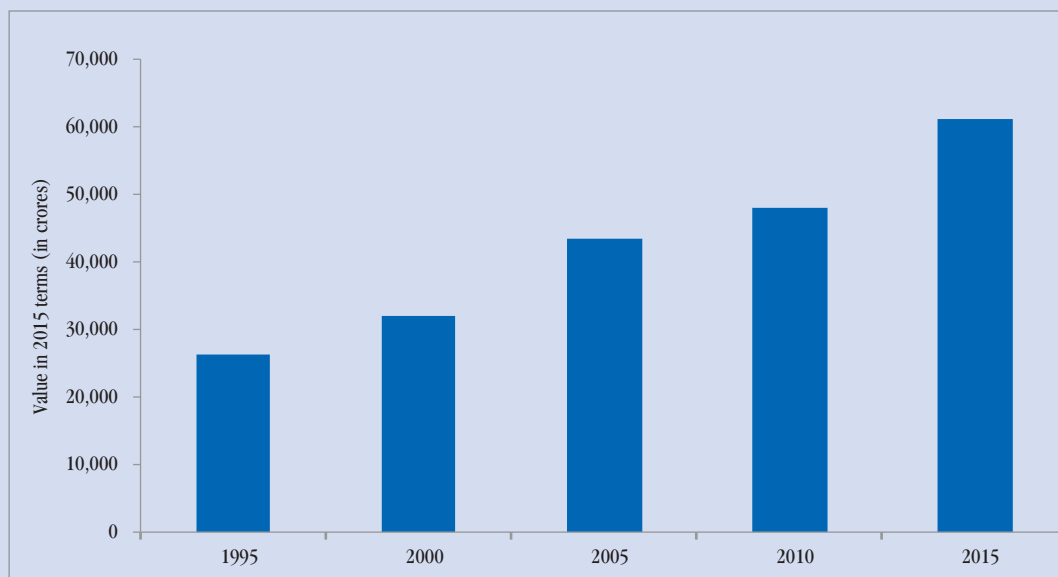
The 10th Finance commission (1995–2000) had allocated Rs. 63,042.7 million (value in 1995 terms) for SDRF, which subsequently increased to Rs. 612,190.0 million (value in 2015 terms) in 14th Finance commission (2015–20) for this purpose.

Figure 7: Affected people by natural disasters in India between 1960-2009



Source: EM-DAT

Figure 8: Fund allocated to State Disaster Response Fund / calamity relief fund by India



Source: Finance Commission of India

References

1. EM-DAT database has considered only those disasters in database, which fulfill at least one of the following criteria: • Ten (10) or more people reported killed. • Hundred (100) or more people reported affected. • Declaration of a state of emergency or Call for international assistance.
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