Data as a tool to deal with natural calamities

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The easy availability and access to technology has been a major driver of human progress in the 21st century. The biggest advantage it has created is the easy availability of information at human's fingertips. However, this advantage is neither equally distributed nor available. While the human race in general has been able to use technology to reach even outer space and prepare for various sorts of catastrophe scenarios, the technology and knowledge divide across countries and regions within geographies is also a reality. The fallouts of the climate crisis pose the greatest challenge to the continuation of human existence. While a lot of strides have been made in accurately predicting impending natural disasters, the skill, the expertise and the technology are far from the grasp of the developing world in particular.

As many as 17 NDRF teams have been deployed in Uttarakhand in view of the natural calamity.

In 2024 alone, some unprecedented natural disasters driven to a large extent by the climate crisis have been witnessed. Dubai, Oman, Bahrain and Qatar saw unprecedented floods, while southern China was devastated by deadly floods. California struggled in the grip of wildfires, while an earthquake of magnitude 7.4 on the Richter scale struck Taiwan, causing

immense damage to lives and property alike. In May, torrential rain fell on the island of Sumatra in western Indonesia, causing severe flooding, which in turn triggered cold lava flows from Mount Marapi volcano located to the west of the island.

While the losses in each of the myriad cases are enormous, specific case studies of countries that are at a geographic and locational disadvantage to start with become important. In this context, a closer look at how Taiwan has been using data and technology-based information becomes important. Taiwan, located in the Western Pacific between Japan and the Philippines is an island nation, with a population of 23.57 million. Taiwan is in a seismically active zone, on the Pacific Ring of Fire. Geologists have identified 42 active faults on the island. Most of the earthquakes detected in Taiwan are due to the convergence of the Philippine Sea plate and the Eurasian plate to the east of the island.

Climate change in Taiwan has caused temperatures to rise by 1.4 degrees Celsius, in the last 100 years. Sea levels around Taiwan are predicted to rise at twice the rate of the global sea level. Tsunamis, floods and earthquakes pose the biggest and the most common threats to Taiwan. Between 1901 and 2000 there have been 91 major earthquakes in Taiwan, 48 of them resulting in huge losses of lives. To address the challenge, the Taiwanese government has an earthquake app, which sends out early warnings, felt earthquake reports and tsunami updates. The app is a copyright of the government's central weather administration. What makes the app effective is the easy availability of data on the population density of particular areas, quick communications between various governmental departments and mobile service providers. Mapping out sub-areas of the counties and the easy availability of the forms of human settlements within not just make for an easy understanding of how high the potential damage can be, but also help in better preparation. The easy availability of data on the forms of livelihood and sustenance practised within sub regions can also help in the potential damage that can take place and for preparing forms of evacuation and assistance that may be needed in events of natural disasters.

Another example from Taiwan, worthy of mention in this context is that of the Taiwan Cooperative Precipitation Ensemble Forecast Experiment or the TAPEX. Early warnings, with sufficient lead time along with flood forecasting can help people undertake preparations for disaster scenarios. To provide such a warning, a statistics-based flood forecasting model was developed in Taiwan to evaluate the flooding potential in urban areas using ensemble quantitative precipitation forecasts. Indices such as designed capacities of storm sewer systems, flood inundation potential databases and historical flooding observations to evaluate the potential for flash flooding situations helped. The Taiwan Typhoon and Flood Research Institute had started the TAPEX way back in 2010.

Taiwan's level of economic development is different from most others in the Indo-Pacific region. However, certain natural calamities in Taiwan such as floods have also been a bane for others. Guwahati in India, slated to be a smart city is currently under immense flooding. An arena for scientific cooperation between India and Taiwan through the aegis of India's Act East policy and Taiwan's new Southbound policy could be in understanding how to use technology to better prepare for floods. However, to reach that stage and to successfully utilise technologies, comprehensive data gathering on population, nature of habitation, historical flooding patters, active sewer systems and so on will be needed. The availability of such data helps not just the government to prepare better but also the civil society at large to understand their options in worst case yet frequently occurring scenarios of natural disasters.

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