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ONLY 32% OF INDIA IS RESILIENT TO DROUGHT

Relevant for: Indian Economy | Topic: Different types of Irrigation & Irrigation systems storage

The state of a pond in Chittoor taluk, | Photo Credit: C. Ratheesh Kumar

The increasing variations in rainfall, frequent drought and heat waves along with changes in evapotranspiration tend to alter the hydrological balance. This is turn affects the ecosystem productivity. A study was therefore carried out in India to assess the resilience of terrestrial ecosystem to drought at the district and State level.

Based on data from 2000 to 2014, only 241 of 634 (about 38%) districts were found to be resilient to drought or dry conditions. The remaining 62% of districts were non-resilient to varying degrees — slight (180 districts), moderate (80 districts) and severe (133 districts). While the resilient districts covered nearly 32% of the area of India, the remaining 68% was non-resilient, with the severely non-resilient districts alone covering nearly 30% of India. And only 10 of the 29 States and Union Territories had more than 50% resilient area.

In a paper published in *Journal of Hydrology*, researchers looked at biomass and evapotranspiration to understand how efficiently water was used by vegetation. Based on this, a two-member team led by Dr. Manish Kumar Goyal from the Indian Institute of Technology (IIT) Indore found a large spatial variation in ecosystem's ability to sustain drought.

In general, districts with predominant forest cover had better resilience than those districts were cropland dominated. The study found about 75 districts had forest cover that was greater than 40% of the district area, and more than half of such districts were resilient. In contrast, about 65% of the districts with less than 20% forest cover were non-resilient.

"A resilient ecosystem is one which can absorb drought by increasing or maintaining its efficiency to use water to sustain its productivity," Dr. Goyal said.

Since forests, in general, have greater resilience, most of the districts in the forest-dominated northeast and north India were either resilient or slightly non-resilient. In contrast, the western part of India dominated by arid and semi-arid regions were non-resilient; some parts of eastern States were also non-resilient. Only 35% of cropland-dominated districts were found to be resilient.

At 42%, districts with temperate climate had a higher tendency to be resilient than the ones with tropical (32%) and dry (38%) climate. About 48% of the country's districts have temperate climate followed by tropical (30%) and dry (20%).

Despite the dense forest cover in the Western Ghats, Kerala had only about 19% resilience while Sikkim had 100%. At 17%, Karnataka had even lesser resilience than Kerala. "Solar radiation has much more controlling factor in the Western Ghats. Also, the evapotranspiration is higher in the Western Ghats than in northeast," Prof. Goyal said.

In general, States in the lower Himalayan regions had higher resilient areas. Besides, Sikkim, Punjab (88%), Haryana (76%), Uttarakhand (75%), Himachal Pradesh (73%), and Arunachal Pradesh (64%) had more areas that were resilient. In the South, Tamil Nadu led the table with nearly 57% resilience followed by Andhra Pradesh (53%) and Telangana (49%).

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