



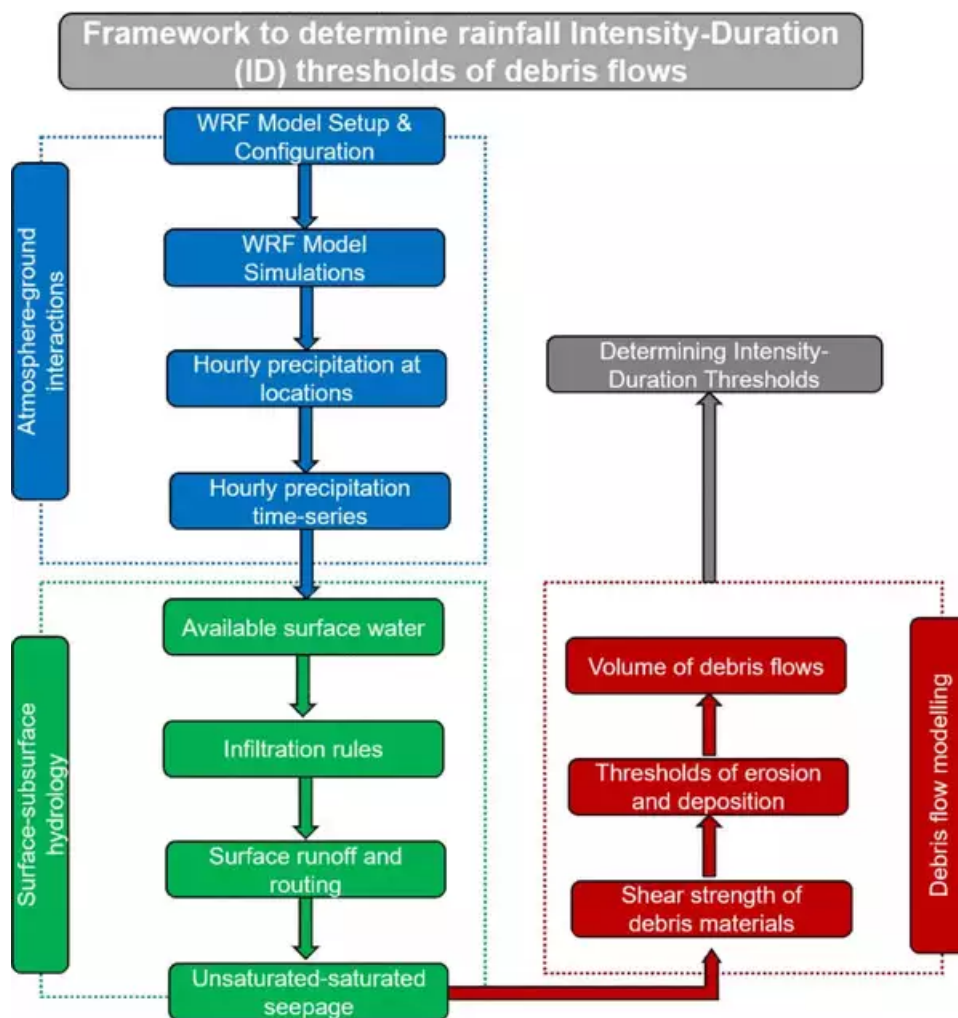
Early Warning System by IIT-Roorkee Researchers

Why in News?

Recently, researchers from **IIT-Roorkee** have developed a framework to **predict** [landslides](#) in [the Himalayan region](#) before they occur by **analyzing rainfall patterns**, giving at least a six-hour early warning.

Key Points

- This study has been published in a peer-reviewed scientific journal and is considered the first of its kind in India.
- The combined expertise of specialists in various fields like **meteorology, hydrology, geomorphology, remote sensing, and geotechnical engineering** has led to the creation of a method that combines **meteorological modeling with numerical simulations of debris flows**.
- Researchers will **gather real-time data** on rainfall patterns in the hills from **weather research agencies**.



Landslides

- These are **natural disasters occurring mainly in mountainous terrains** where there are conducive conditions of soil, rock, geology and slope.
- A **sudden movement of rock, boulders, earth or debris down a slope** is termed a landslide.
- **Causes:**
 - Natural causes that trigger it include **heavy rainfall, earthquakes, snow melting and undercutting of slopes** due to flooding.
 - They can also be caused by **anthropogenic activities such as excavation, cutting of hills and trees**, excessive infrastructure development, and overgrazing by cattle.
 - Some of the main factors that influence landslides are **lithology, geological structures like faults, hill slopes, drainage, geomorphology**, land use and land cover, soil texture and depth, and weathering of rocks.
 - All these are factored in when a **landslide susceptibility zone is earmarked for planning and making predictions**.