Heavy rains in Hilly areas

Prelims: Current events of national and international importance | Indian and World Geography

Why in news?

Over the past few days, Dehradun and several other districts in Uttarakhand have experienced very heavy rainfall, triggering landslides in multiple areas.

- **Cloudbursts -** It is an extremely high amount of precipitation in a short span of time.
- It is a localised but intense rainfall activity that can cause widespread destruction, especially in hilly regions.

To know more about cloudburst, click here

- **Reasons for heavy rainfall in Himalayan region -**
  - **Geographical location** - The Himalayas lie at the ***intersection of moist tropical monsoon winds and mid-latitude westerlies***, creating strong uplift and instability have experienced very heavy rainfall.
  - **Unstable terrain** - These areas naturally have steep slopes, inherently more susceptible to gravitational movement of rock, debris, or soil.
  - **Tectonic Activity** - These zones are often young, fractured, and highly weathered, making them structurally weaker and more prone to failure during intense rainfall or seismic activity.
  - **Low-pressure systems** - The ***consecutive rain-bearing low-pressure systems formed in the Bay of Bengal*** have travelled farther north than normal, causing intense rainfall in the region.
  - **Atmospheric conditions –** It can help the air rise swiftly, which leads to the formation of massive clouds and cause higher-than-normal precipitation locally over the hilly region.
  - **Monsoon climate** - The Himalayan region experiences heavy monsoon rains during the summer months.

    - **Population density -** The Himalayan region is densely populated, with communities living in valleys.
    - **Anthropogenic activities –** Like constructions on unstable slopes, disrupting natural drainage systems, deforestation, rapid urbanization, etc leading to destabilising the terrain.
- **Vulnerable to disasters –** The hilly regions more vulnerable to disasters such as -
    - **Flash floods and cloudbursts** - Caused by intense rainfall over the mountainous terrain, leading to debris-filled torrents that sweep away infrastructure and cause loss of life.
    - **Landslides** - Often triggered by heavy rainfall and soil instability, exacerbated by deforestation and unscientific construction.
    - **Subsidence** - Events like the sinking of Joshimath are linked to factors like unmanaged tunneling and construction in fragile hill slopes.
    - **Glacial Lake Outburst Floods (GLOFs)** - Melting glaciers can create large lakes, and the sudden breach of their natural dams can lead to devastating floods downstream.
- **Role of climate change –**
    - **Shifting of weather system** - The ***southward shift of western disturbances*** and their interaction with massive southwest monsoonal systems creates complexity to rainfall prediction.
    - **Global warming** - Meteorologists warn that extreme rainfall events will become ***more common in the future*** due to climate change, particularly in hilly regions.
    - **Arctic sea ice melting** – It could represent yet another factor in this deepening mystery of monsoon variations in the hills.

Reference

Indian Express | Heavy rainfall in hilly areas