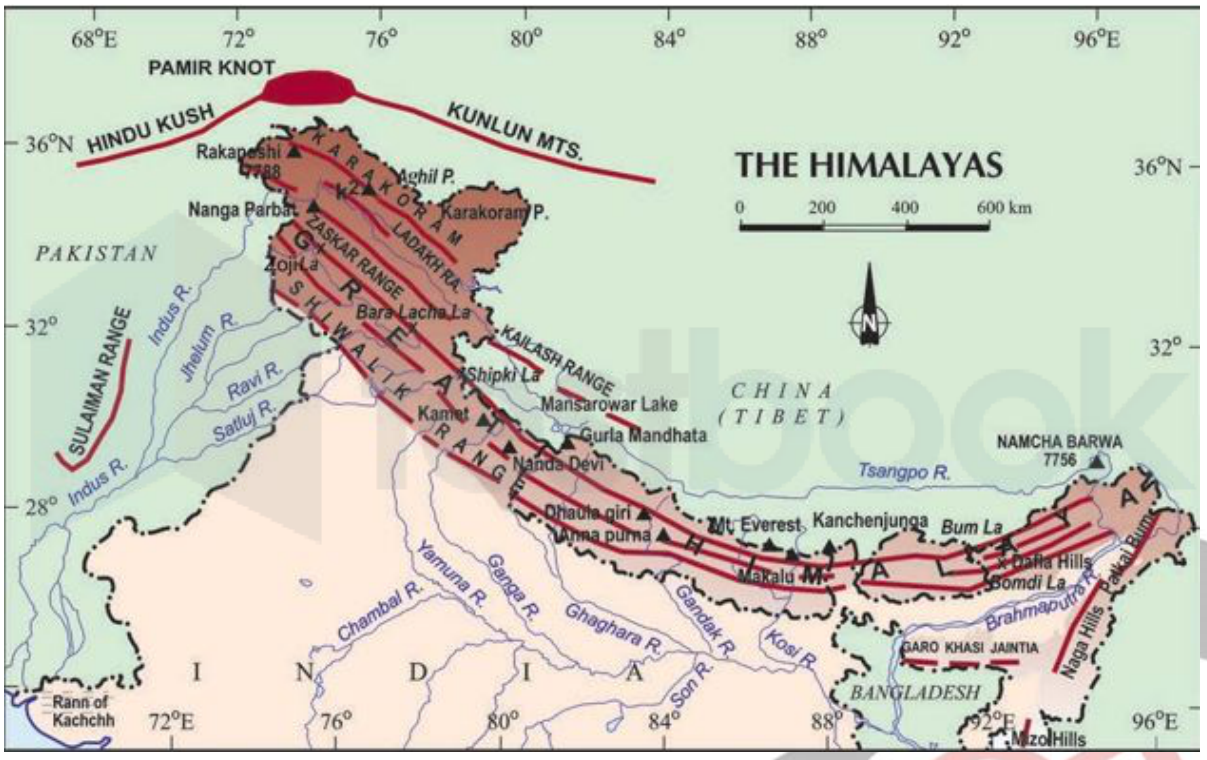
The Himalayan Tipping Point

This editorial is based on "Himalayan springs are drying. It's a threat to India's ecological stability and national security" which was published in The Indian Express on 03/07/2025. The article brings into picture the escalating ecological crisis in the Indian Himalayan Region, where nearly 50% of springs have dried up. This water scarcity, along with climate change and unsustainable development, forces women in Darjeeling to walk long distances to fetch water.

For Prelims: Indian Himalayan Region, Southwest monsoon winds, Bhakra Nangal Dam, Daebuk-Shyok-Daulat Beg Oldie (DSDBO) road, Border Roads Organisation, NITI Aayog, Kishanganga Hydroelectric Plant, Hindu Kush Himalayan, Nanda Devi Biosphere Reserve, Indus Water Treaty.

For Mains: Significance of Himalayan Region for India, Key Issues Related to the Indian Himalayan Region.

The **Indian Himalayan Region,** known as the "**water tower of South Asia,**" faces an escalating ecological crisis as **nearly 50% of its springs are drying up or have already dried.** What was once a region abundant in freshwater now forces **women in Darjeeling villages to walk over an hour each morning to fetch water from failing springs**. Beyond water scarcity, the region grapples with broader ecological challenges including climate change impacts, unsustainable development practices, and the urgent need for comprehensive conservation strategies to protect this ecologically fragile yet strategically vital landscape.

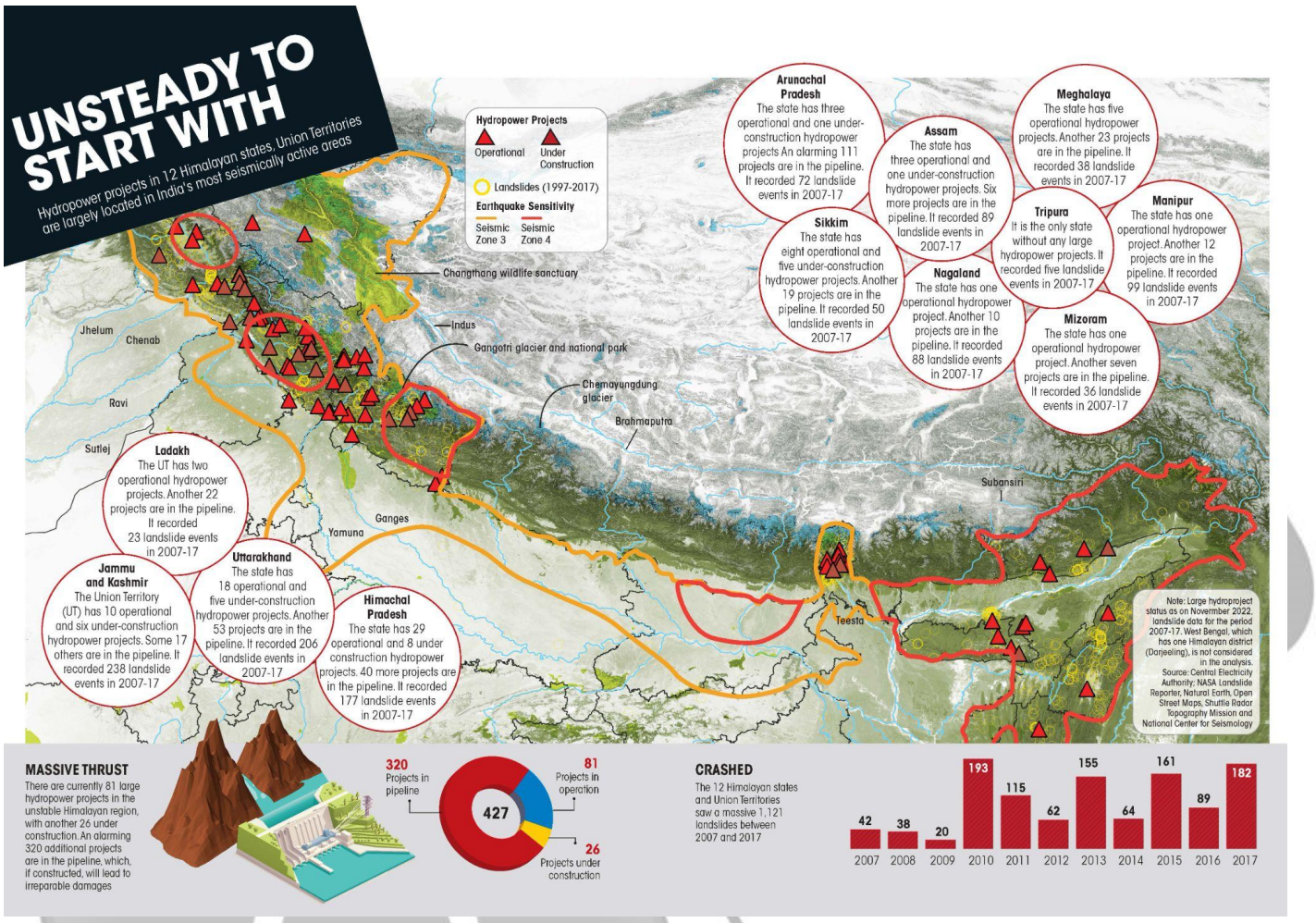


What is the Significance of Himalayan Region for India?

- **Climate Regulation and Monsoon Dynamics:** Acting as a geographical barrier, the range blocks the **southwest monsoon winds, causing heavy orographic rainfall on the southern slopes,** particularly in the **Himalayan foothills and northeastern India,** while creating a rain shadow effect in regions like Tibet and the Thar Desert.
    - The mountains influence the monsoon onset and intensity, directing moisture-laden winds across the **Gangetic plains and Indo-Gangetic basin, which are vital for agriculture.**
    - Additionally, the Himalayas block frigid winds from Central Asia, especially Siberia. Without them, India would experience much colder winters, and a significant part of the country could turn into a **cold desert.**
- **Source of Major Rivers and Freshwater Resources:** The Himalayas are the source of some of India's most important rivers, including the **Ganges, Brahmaputra, and Indus.**
    - Dams and water reservoirs along these rivers, such as the **Bhakra Nangal Dam on the Sutlej River,** harness the power of fast-flowing Himalayan waters, contributing significantly to India's energy needs.
- **Ecological Balance and Biodiversity:** The Himalayas, often regarded as the **"ecosystem powerhouse,"** contribute significantly to maintaining ecological balance and fostering biodiversity.
    - They host unique flora like the **Himalayan blue poppy and medicinal plants such as cordyceps**, while animals like the **snow leopard, Himalayan monal, and red panda** maintain the region's ecosystem.
    - Species like the **Himalayan tahr and vulture** play important roles in maintaining vegetation and cleaning the environment.
- **Strategic Defence and Border Security:** The Himalayas play an essential role in securing India's borders, acting as a **natural defence barrier against external threats.**
    - The **rugged and challenging terrain of the Himalayas impedes offensive operations**, making it difficult for adversaries to launch large-scale attacks
    - The region's strategic importance is amplified by ongoing tensions with neighboring countries like **China and Pakistan**.
    - The Indian Army's push for better infrastructure, including the construction of the **Darbuk-Shyok-Daulat Beg Oldie (DSDBO) road**, aims to improve connectivity and operational readiness.
        - The **Border Roads Organisation** under the Ministry of Defence has built

over **60% of roads bordering China** in the last 3 years.

- **Hydropower Potential and Economic Development:** The Himalayas are a significant source of hydroelectric power, with untapped potential capable of driving India's renewable energy future.
    - The region houses many of India's most important hydroelectric projects, like the **330 MW Kishanganga Hydroelectric Plant in Jammu and Kashmir.**
    - Government estimates show that the Himalayas, with an installed capacity of 46,850 MW, have a potential to **generate 115,550 MW.**



- **Livelihoods and Agriculture:** Farmers rely on the seasonal monsoon rains and meltwater from Himalayan glaciers to irrigate crops such as rice, wheat, maize, and barley.
    - The diverse **agro-climatic zones,** from the **temperate lower foothills to the alpine meadows,** allow for the cultivation of a wide variety of crops and fruits.
    - In addition to agriculture, the Himalayas support the livelihoods of millions through activities like pastoralism, where communities raise livestock such as yaks and sheep for **wool, milk, and meat.**
        - Mountain ecosystems also provide **valuable resources like medicinal plants, herbs, and timber,** which sustain local economies.
- **Tourism and Cultural Significance:** The region's majestic beauty is vital parts of the local economy and social fabric. Also, the **Buddhist monasteries and Hindu temples** scattered across the mountains hold deep **religious significance and contribute to cultural tourism.**
    - The Himalayan region is a major hub for both cultural and eco-tourism, drawing millions annually to sites like **Amarnath, Badrinath, and Kedarnath.**
    - According to **NITI Aayog, tourism contributes over 10% to the Gross State Domestic Product (GSDP)** in states like Uttarakhand, West Bengal, Tripura, and Assam.

What are the Key Issues Related to the Indian Himalayan Region?

- **Water Scarcity and Depletion of Springs:** Water scarcity in the Indian Himalayan Region (IHR) is rapidly escalating, driven by the depletion of freshwater springs that have historically sustained local communities.
    - According to a **2018 NITI Aayog report, nearly 50% of springs in the IHR have already dried up,** with devastating consequences for over 200 million people who depend on these resources.
        - **Sikkim and Darjeeling a**re examples where reduced spring discharge has forced women to walk for over an hour daily to fetch water, disrupting daily life and agriculture.
- **Climate Change and Glacial Retreat:** The Himalayas are warming faster than the global average, with significant impacts on the region's glaciers, which are retreating at an alarming rate.
    - This **glacial melt not only affects water availability for millions but also contributes to unpredictable weather patterns** and extreme events.
    - Studies indicate that the mean retreat rate of **Hindu Kush Himalayan** glaciers is **14-15 meters annually.** Recent studies also estimate that about **90% of the Himalayan Region will experience drought lasting over a year** if global warming increases by 3°C.
- **Deforestation and Ecosystem Degradation:** Deforestation in the IHR threatens biodiversity and accelerates soil erosion, which in turn impacts agriculture and water quality.
    - The Himalayas are home to rich ecosystems, but unchecked urbanization and illegal logging have caused forest cover to shrink.
    - A decline of **902 square kilometres** in forest cover was recorded in hill districts of the country **(State of Forest Report, 2021).**
        - For instance, in Uttarakhand, forests around the **Nanda Devi Biosphere Reserve** have seen illegal logging rise, further destabilizing the region's fragile ecosystem.
- **Unsustainable Infrastructure Development and Environmental Stress:** While infrastructure development in the IHR, such as roads, dams, and hydropower plants, is necessary for economic growth, it is leading to significant environmental stress.
    - Large-scale construction projects, including the **Char Dham Highway and hydropower projects,** have weakened the region's geological stability, leading to massive land subsidence.
    - Recent incidents, such as the **Joshimath land subsidence in 2023**, highlight **the risks associated with overdevelopment in these seismic-prone area**s, where infrastructure projects destabilize the region's delicate balance
- **Strategic Border Vulnerabilities and Security Concerns:** The IHR holds significant geopolitical importance, particularly with India's borders with China and Pakistan.
    - With ongoing military standoffs, such as the **2020 Galwan Valley clash with China and recent terrorist attacks in Jammu and Kashmir like Pahalagam,** the region's strategic importance is heightened.
    - In the Ladakh region, the boundary dispute centers around the **Johnson Line proposed by the British in the 1860s**, which placed Aksai Chin within the then princely state of Jammu and Kashmir.
        - However, **China rejects the Johnson Line and bases its claim on the McDonald Line of the 1890s**, which places Aksai Chin as a point of contention between India and China.
    - Furthermore, **China's recent new map claims Arunachal Pradesh as part of its territory,** escalating tensions in the region.
- **Geopolitical Tensions Over Water Resources:** Water resources in the Himalayas have become a focal point for geopolitical tensions, particularly with neighboring countries like China and Pakistan.
    - China's recent decision to construct the world's largest dam across the **Yarlung Zangbo-Brahmaputra** raises serious concerns about India's water security.
    - Additionally, the **Indus Water Treaty**, which governs water-sharing between India and Pakistan, has faced challenges in recent years, with India halting the flow of certain waters to Pakistan in response to escalating tensions and security concerns.
- **Tourism Overload and Ecological Damage:** Tourism is a significant contributor to the economy in the IHR, but it is also causing considerable environmental degradation.
    - Over-tourism, especially in pilgrimage sites like **Kedarnath, Amarnath, and Vaishno**

Devi, has led to overcrowding and ecological stress.
    - For instance, the **Mandakini River in Uttarakhand, particularly near Kedarnath,** faces pollution from untreated sewage and garbage.
        - Despite directives from the **National Green Tribunal,** local establishments continue to discharge waste into the river, exacerbating water quality issues .
    - Also, in Himachal Pradesh, the 2023 floods caused significant damage. Studies indicate that **unregulated tourism and construction activities** have contributed to the region's vulnerability to such disasters.
- **Uncoordinated Policy Framework and Institutional Gaps:** There is a notable lack of cohesive, long-term policy frameworks addressing the unique challenges of the IHR.
    - Economic growth, particularly through infrastructure development like roads, dams, and tourism, is often prioritized at the expense of environmental protection and disaster management without adequate **Environmental Impact Assessments.**
    - For instance, **The Tehri Dam,** while providing hydroelectric power, disrupted local ecosystems, displaced thousands of people, and remains a source of concern due to the region’s seismic activity.

What Measures can India Adopt to Promote Sustainable Development in Himalayan Region?

- **Integrated Water Resource Management:** India must adopt a region-specific **Integrated Water Resource Management (IWRM)** approach for the Himalayan region.
    - This would include the **rejuvenation of springs, management of glaciers, and watershed conservation** through community-led initiatives.
    - IWRM would prioritize sustainable water use, ensure equitable distribution, and enhance water storage capacity.
        - This will help in **mitigating water scarcity, preserving traditional knowledge,** and balancing developmental needs with environmental protection.
- **Sustainable Infrastructure Development:** India should focus on sustainable infrastructure projects tailored to the unique ecological needs of the Himalayan region.
    - This includes using **environment-friendly construction materials, designing disaster-resistant structures,** and ensuring minimal ecological disruption.
    - Infrastructure projects must be **evaluated for their environmental as well as social impact before approval,** ensuring that long-term ecological consequences are addressed.
        - Furthermore, the **construction of eco-friendly roads and buildings should incorporate green technologies** such as solar energy, rainwater harvesting systems, and zero-waste management.
- **Community-Led Conservation Initiatives:** Local communities in the Himalayan region should be empowered to play a central role in conservation efforts, **creating a bottom-up approach to ecological sustainability.**
    - This would include training local populations in sustainable agriculture, forest conservation, and eco-tourism.
    - **Community-led initiatives** can manage **buffer zones around sensitive ecosystems,** such as wildlife sanctuaries and protected forest areas, allowing for better monitoring of illegal activities like poaching and deforestation.
        - Additionally, indigenous knowledge should be incorporated into conservation strategies, which **would also enhance the socio-cultural fabric of the region.**
- **Promotion of Green and Renewable Energy:** Encouraging the use of renewable energy sources such as **solar, wind, and small-scale hydropower** will be crucial for promoting sustainable development in the Himalayas.
    - Solar panels should be installed in remote villages, and micro-hydro projects can be promoted as decentralized, environmentally friendly alternatives to traditional energy sources.
    - Policies should also be **designed to promote clean energy solutions for industries, agriculture, and tourism**.
- **Climate-Resilient Agriculture Practices:** India must promote climate-resilient agricultural practices in the Himalayan region, such as **agroforestry, organic farming, and drought-**

resistant crop varieties.
    - The government can **incentivize farmers to adopt practices that improve soil health, enhance water retention, and reduce chemical inputs.**
    - Additionally, there should be a **focus on developing local markets for organic and eco-friendly produce**, ensuring that sustainable farming becomes economically viable.
        - Investment in research and extension services to introduce climate-smart farming technologies and diversify agricultural incomes will improve the region's resilience to changing climatic conditions.
- **Eco-Tourism and Sustainable Tourism Development:** To reduce environmental degradation and generate local income, India should promote eco-tourism as a key strategy for sustainable development in the Himalayas.
    - This would involve **developing infrastructure and policies that limit overcrowding in sensitive areas** while offering tourists eco-friendly experiences.
    - Tourism activities should be regulated to ensure that **they do not disturb local wildlife or contribute to excessive waste and pollution**. Establishing community-based eco-tourism ventures will allow local people to directly benefit from tourism while maintaining ecological integrity.
- **Strengthening Disaster Preparedness and Risk Reduction:** Given the region's susceptibility to natural disasters such as landslides, avalanches, and flash floods, India must invest in strengthening disaster preparedness and risk reduction mechanisms.
    - This includes **early-warning systems, disaster-resilient infrastructure, and community-based disaster management strategies.**
    - Training local communities to respond effectively to natural disasters, alongside the integration of climate change projections into disaster management planning, will significantly reduce vulnerability.
- **Biodiversity Protection through Eco-Corridors:** Creating ecological corridors in the Himalayan region to connect isolated wildlife habitats is essential for preserving biodiversity.
    - These corridors would **allow for genetic exchange and safe movement of wildlife, reducing human-wildlife conflicts** and improving ecosystem health.
    - Governments and NGOs should collaborate with local communities to ensure that development activities, such as roads or urban expansion, do not fragment these vital corridors.
- **Institutional Framework for Himalayan Sustainable Development:** India should establish a dedicated institutional body for the Himalayan region, tasked with overseeing sustainable development initiatives across sectors such as **water, energy, agriculture, and biodiversity.**
    - This body would coordinate efforts among central and state governments, local communities, NGOs, and private sector players to ensure that development is ecologically sustainable.
    - A dedicated body would help in aligning national policies with local realities and ensure long-term sustainability.
- **Education and Awareness Campaigns for Sustainability:** There is a critical need to increase awareness of sustainable development practices within local communities and stakeholders across the Himalayan region.
    - **Education campaigns focusing on climate change, biodiversity conservation, sustainable agriculture,** and eco-friendly practices should be integrated into school curriculums, community programs, and media outreach.
    - By raising awareness at the grassroots level, people can make informed decisions that prioritize environmental sustainability over short-term gains.

Conclusion:

Himalayas are vital for India's **3H's: Heritage, Hydrology, and Health.** They sustain culture, water resources, and ecological balance. To protect these invaluable assets amid rising challenges, sustainable policies are crucial. As **John Muir** once said, **"*In every walk with nature one receives far more than he seeks.*"** By protecting the Himalayas, we safeguard not just the environment, but the future of humanity itself.

Drishti Mains Question:

Examine the strategic, ecological, and economic importance of the Indian Himalayan Region. In light of environmental challenges and development pressures, suggest sustainable policy measures for its preservation.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims:

Q. Consider the following pairs: (2020)

Peak Mountains

1. Namcha Barwa Garhwal Himalaya
2. Nanda Devi Kumaon Himalaya
3. Nokrek Sikkim Himalaya

Which of the pairs given above is/are correctly matched?

(a) 1 and 2

(b) 2 only

(c) 1 and 3

(d) 3 only

Ans: (b)

Q. If you travel through the Himalayas, you are likely to see which of the following plants are naturally growing there? (2014)

1. Oak
2. Rhododendron
3. Sandalwood

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Ans: (a)

Q. When you travel in Himalayas, you will see the following: (2012)

1. Deep gorges
2. U-turn river courses
3. Parallel mountain ranges
4. Steep gradients causing landsliding

Which of the above can be said to be the evidence for Himalayas being young fold mountains?

(a) 1 and 2 only

(b) 1, 2 and 4 only

(c) 3 and 4 only

(d) 1, 2, 3 and 4

Ans: (d)

Mains:

Q1. Differentiate the causes of landslides in the Himalayan region and Western Ghats. (2021)

Q2. How will the melting of Himalayan glaciers have a far-reaching impact on the water resources of India? (2020)

Q3. "The Himalayas are highly prone to landslides." Discuss the causes and suggest suitable measures of mitigation. (2016)
