



## Mains Practice Question

**Q.** How do Himalayan rivers maintain their flow throughout the year while peninsular rivers show significant seasonal variations?(**150 words**)

13 Jan, 2025 GS Paper 1 Geography

### Approach

- Introduce the answer by differentiating Himalayan rivers and Peninsular rivers
- Give Geographical Factors responsible for Year-Round Flow of Himalayan Rivers vs Seasonal Variations of Peninsular Rivers
- Conclude suitably.

### Introduction

**Himalayan rivers**, such as the **Ganga, Yamuna, and Brahmaputra**, maintain perennial flow, whereas **Peninsular rivers** like the **Godavari, Krishna, and Mahanadi** exhibit seasonal variations in their discharge. These differences arise due to distinct geographical, climatic, and hydrological factors that influence their regimes.

### Body

#### Geographical Factors: Himalayan vs Peninsular Rivers' Flow:

- **Source of Origin and Water Supply**
  - **Himalayan Rivers:** These rivers originate from **glaciers and snow-fed regions** in the Himalayas, ensuring a continuous water supply throughout the year.
    - **Examples:** The **Ganga** originates from the **Gangotri Glacier**, and the **Brahmaputra** from the **Chemayungdung Glacier** in Tibet.
    - During summer, melting glaciers significantly contribute to their flow, compensating for reduced rainfall.
  - **Peninsular Rivers:** Most peninsular rivers are **rain-fed**, relying heavily on the **southwest monsoon** for their water supply.
    - **Examples:** The **Godavari** originate from **Trimbakeshwar in the Western Ghats**, and the **Krishna** from **Mahabaleshwar** in Maharashtra.
    - In non-monsoon months, these rivers often dry up or experience reduced flow due to the absence of alternative water sources.
- **Climatic Influence**
  - **Himalayan Rivers:** The **humid and subtropical climate** in the Himalayan region ensures a steady supply of precipitation, including **snowfall in winter** and **rainfall during the monsoon**.
    - **Examples:** Tributaries of the Ganga, such as the **Kosi** receive rainfall from the high-rainfall areas of the **Terai** region.
  - **Peninsular Rivers:** The **semi-arid to tropical climate** in peninsular India results in pronounced seasonality.
    - **Examples:** Rivers like the **Cauvery** and **Tungabhadra** experience high discharge

during the **southwest monsoon** but show significant reductions in the dry seasons.

▪ **Catchment and Geology**

- **Himalayan Rivers:** The **large catchment areas** of these rivers and their extensive **tributary networks** allow for efficient water collection.
  - **Examples:** The **Brahmaputra** has large tributaries like the **Dibang** and **Lohit**, ensuring a vast catchment area.
  - The young and **tectonically active Himalayas** are prone to erosion, contributing to high sediment loads that sustain flow.
- **Peninsular Rivers:** These rivers have **smaller catchments** and originate from ancient, stable geological formations with **hard crystalline rocks**, limiting groundwater recharge.
  - Seasonal rainfall drains quickly due to the hard terrain and limited permeability.

▪ **Human Interventions**

- **Himalayan Rivers:** The perennial nature of Himalayan rivers makes them suitable for **irrigation and hydroelectric projects**, helping to regulate flow.
  - **Examples:** The **Tehri Dam** on the Bhagirathi and the **Farakka Barrage** on the Ganga manage flow for irrigation and navigation.
- **Peninsular Rivers:** Over-reliance on monsoon-fed rivers for **irrigation and drinking water** exacerbates their seasonal nature.
  - **Examples:** The **Hirakud Dam on the Mahanadi** often faces low storage levels during dry seasons.

**Conclusion**

Himalayan rivers maintain their **perennial nature due to glacial melt, large catchments, and favorable climatic conditions**, while peninsular rivers face seasonal variations due to monsoon dependence, geological constraints, and smaller catchments. These differences underline the **need for effective water resource management, such as river interlinking, to mitigate disparities and ensure sustainable water availability.**

Alternatively, the body section can be presented in tabular format:

Aspect	Himalayan Rivers	Peninsular Rivers
<b>Source of Origin and Water Supply</b>	Originate from glaciers and snow-fed regions in the Himalayas, ensuring perennial flow.	Rain-fed, relying heavily on the southwest monsoon, resulting in seasonal water supply.
	<b>Examples:</b> Ganga from Gangotri Glacier; Brahmaputra from Chemayungdung Glacier.	<b>Examples:</b> Godavari from Trimbakeshwar; Krishna from Mahabaleshwar.
	Melting glaciers during summer sustain flow, even with reduced rainfall.	Dry up or experience reduced flow in non-monsoon months due to lack of alternative water sources.
<b>Climatic Influence</b>	Humid and subtropical climate ensures steady precipitation, including winter snowfall and monsoon rains.	Semi-arid to tropical climate leads to pronounced seasonality with high monsoon discharge and dry-season flow.
	<b>Examples:</b> Ganga tributaries (e.g., Kosi) receive rainfall from the Terai region.	<b>Examples:</b> Cauvery and Tungabhadra show significant flow reductions in dry seasons.
<b>Catchment and Geology</b>	Large catchments with extensive tributary	Smaller catchments, originating from ancient, stable geological

	networks, supported by young, tectonically active Himalayas.	formations with hard crystalline rocks.
	<b>Examples:</b> Brahmaputra has vast tributaries like Dibang and Lohit, sustaining flow.	Seasonal rainfall drains quickly due to hard terrain and limited permeability.
<b>Human Interventions</b>	Perennial flow supports irrigation and hydroelectric projects, enabling flow regulation.	Seasonal flow limits utility for irrigation and drinking water during dry seasons.
	<b>Examples:</b> Tehri Dam on Bhagirathi; Farakka Barrage on Ganga for irrigation and navigation.	<b>Examples:</b> Hirakund Dam on Mahanadi often faces storage issues during dry seasons.

PDF Reference URL: <https://www.drishtias.com/mains-practice-question/question-8627/pnt>

