



DAILY CURRENT AFFAIRS 04-06-2024

GS-1

1. Vivekananda Rock Memorial
2. Honga Tonga volcano

GS-3

3. Preston curve
4. LignoSat
5. OPEC+

Vivekananda Rock Memorial

Syllabus: GS-1: Indian art n culture.

Context:

- *Vivekananda Rock Memorial is in news in the context of Prime Minister's Meditation saga.*

About Vivekananda Rock Memorial

- *Vivekananda Rock Memorial is a monument and **popular tourist attraction** in Kanyakumari, India's southernmost tip.*
- *The memorial stands on one of the two rocks located about **500 meters off mainland of Vavathurai, Tamil Nadu.***
- *It was **built in 1970 in honour of Swami Vivekananda**, who is said to have attained **enlightenment on the rock.***
- *According to legends, it was on **this rock that Goddess Kanyakumari (Parvathi)** performed tapas in devotion of lord Shiva.*
- *A meditation hall known as **Dhyana Mandapam** is also attached to the memorial for visitors to meditate.*
- *The design of the mandapa incorporates **different styles of temple architecture** from all over India.*
- *The rocks are **surrounded by the Laccadive Sea** where the three oceans Bay of Bengal, the Indian Ocean and the Arabian Sea meets.*
- *The memorial consists of two main structures, **the Vivekananda Mandapam and the Shripada Mandapam.***
- *It is **believed that Swami Vivekananda**, swam across the seashore in Kanyakumari, Tamil Nadu to reach the rock mid-sea and he meditated for three days and nights on the rock until he is said to have attained enlightenment there a basis for Kanyakumari resolve of 1892.*
- *There are several statements in many **books that Swami Vivekananda swam and got enlightenment at this place.***

Honga Tonga volcano

Syllabus: GS-1: World Physical Geography – Volcanoes.

Context:

- *Tonga volcano could cause unusual weather for rest of decade: study*

Background:

- **Hunga Tonga-Hunga Ha'apai** (Hunga Tonga) erupted on January 15, 2022, in Tonga.
- The eruption caused a tsunami, leading to **warnings across the Pacific.**
- **Sound waves** from the eruption traveled globally.
- A study in the **Journal of Climate** investigates the climate effects of the eruption.
- The study suggests the eruption may have **caused the unusually large ozone hole** in the previous year.
- It also links the eruption to the **wetter-than-expected summer of 2024.**
- The eruption's impacts **could influence winter** weather for several years.

A cooling smoke cloud:

- Normally, volcanic smoke, **especially sulfur dioxide**, leads to a temporary cooling of the Earth's surface **by transforming into sulfate aerosols** that reflect sunlight.
- Hunga Tonga's eruption, **being underwater**, produced little smoke but **a massive amount of water vapor**, around 100-150 million tonnes.
- The eruption's heat turned seawater into steam, which shot into the atmosphere.
- The **water vapor ended up in the stratosphere**, a dry layer of the atmosphere between 15 and 40 kilometers above the surface.
- Water vapor in the stratosphere **contributes to ozone layer destruction** and acts as a **potent greenhouse gas.**
- There's no historical precedent for **such a large amount of water vapor** in the stratosphere from volcanic eruptions, making it **difficult to predict its long-term climate effects.**
- **Satellite observations are the only way to measure water vapor** in the entire stratosphere, but satellites have only been around since 1979, and there hasn't been a similar eruption since then.

What did we find out?

- The **large ozone hole observed** from August to December 2023 was at least partially caused by the Hunga Tonga eruption.
- Climate simulations predicted this ozone hole almost two years before it occurred.

- *The influence of the eruption on the ozone hole was **expected only in 2023**, as the water vapor had sufficient time to reach the polar stratosphere over Antarctica.*

Impacts:

- *Subsequent years are unlikely to see a **significant impact on the ozone hole** due to insufficient remaining water vapor.*
- *The presence of the ozone hole led to a **positive phase of the Southern Annular Mode** during the summer of 2024, resulting in a **wetter summer in Australia** contrary to expectations of El Niño.*
- ***Global mean temperatures**, a measure of climate change, saw a very small impact from Hunga Tonga, estimated at about 0.015 degrees Celsius.*
- *The **high temperatures observed** in recent years cannot be attributed to the Hunga Tonga eruption.*

Disruption for the rest of the decade

- *The study predicts lasting impacts on **different regions of the planet**.*
- ***Northern Australia** is expected to **experience colder and wetter winters** until around 2029.*
- ***North America** is forecasted to **have warmer winters**, while **Scandinavia** is predicted to have colder winters.*
- *The eruption appears to **alter atmospheric wave patterns**, which directly influence weather patterns such as highs and lows.*
- *It's crucial to note that this study represents one approach to understanding the eruption's impact on weather and climate, and **it's not without limitations**.*
- *Other factors like the **El Niño-La Niña cycle** were not considered in this study.*
- *The study aims to **spark scientific interest** in further understanding the implications of such a **significant amount of water vapor in the stratosphere** on climate.*
- ***Confirmation or contradiction** of the findings will require additional research, and both outcomes are welcome.*

Practice Question

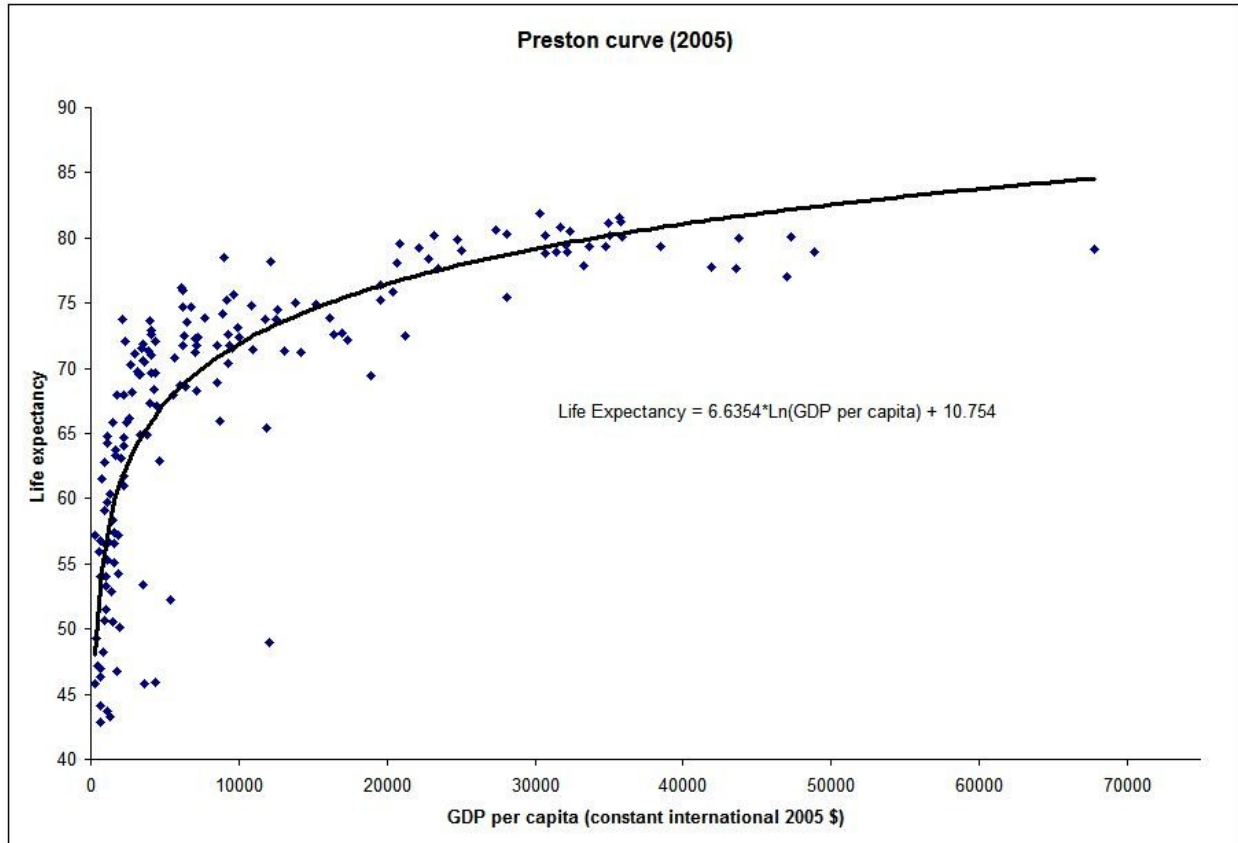
Q. Examine the implications of Hunga Tonga's stratospheric water vapor on global climate, elucidating regional effects and atmospheric wave dynamics, with implications for weather patterns. (10 marks, 150 words)

Preston curve

Syllabus: GS-3; Economy; GS-1; Human Geography

Context

- The article discusses about Preston curve and its significance



About

- The Preston curve refers to a certain empirical relationship that is witnessed between **life expectancy and per capita income in a country**.
- It was first proposed by American sociologist **Samuel H. Preston** in his 1975 paper "The changing relation between mortality and level of economic development".

Richer Countries and their Life Span

- Preston found that people living in **richer countries** generally had **longer life spans** when compared with people living in poorer countries.
- This is likely because people in wealthier countries have better access to healthcare, are better educated, live in cleaner surroundings, enjoy better nutrition etc.

Poor Countries begin to grow and their Life Span

- *When a poor country begins to grow, its per capita income rises and causes a significant increase in life expectancy initially as people are able to consume more than just subsistence calories, enjoy better healthcare etc.*
- *The average per capita income of Indians rose from around ₹9,000 per year in 1947 to around ₹55,000 per year in 2011.*
- *During the same period, the average life expectancy of Indians rose from a mere 32 years to over 66 years.*
- *However, the positive relationship between per capita income and life expectancy begins to flatten out after a certain point.*
- *In other words, an increase in the per capita income of a country does not cause much of a rise in the life expectancy of its population beyond a point, perhaps because human life span cannot be increased indefinitely.*

Problems in the curve

- *The positive relationship highlighted by the Preston curve holds true not just when it comes to life expectancy and per capita income.*
- *Other development indicators such as **infant and maternal mortality, education, healthcare**, etc. also improve when the per capita income of a country rises.*
- *Experts, however, have disagreed over the causal relationship between income levels and human development indicators.*
- *Many economists have used this positive relationship to argue that the way to improve development outcomes in a country is to encourage economic growth.*
- *The rapid economic growth of India and China over the last few decades, which has helped improve life expectancy and other development indicators, has been cited as an example of faster economic growth leading to better development outcomes.*
- *Other experts, meanwhile, have argued that most improvements in life expectancy have come from a shift in the Preston curve rather than due to a movement along the curve.*
- *That is, **higher life expectancy has been achieved by countries even at low per capita income levels.***
- *Such improvement in life expectancy at low income levels, according to these experts, could be due to improvements in medical technology, such as the development of life-saving vaccines.*
- *So, in this view of the Preston curve, improvement in life expectancy and other development outcomes is seen as the result of public investment in human development.*
- *Critics of this view however, argue that technological advancement itself is linked to income levels; richer countries tend to possess better technologies.*
- *It should also be noted that poor countries can benefit from technologies that have already been developed by richer countries.*

- *They may thus be able to achieve higher life expectancy even at very low levels of income, thus providing a boost to their development indicators despite their low income levels.*
- *Richer countries, on the other hand, may not have possessed the same **life-saving technologies** when they were very poor.*
- *Hence, their life expectancy may have been far lower when they were poor than poor countries today which have the benefit of technology transfers from countries that are already rich.*

LignoSat

Syllabus: GS-3: Science and Technology - Space

Context:

- *LignoSat: Japan Launches **World's First Wooden Satellite** In Fight Against Space Debris.*

About LingoSat:

- *In a world-first, Japanese researchers have **built a tiny wooden satellite** named **LignoSat** that will be launched into space in September.*
- *This innovative project **aims to reduce space debris by burning up completely** upon re-entry into Earth's atmosphere.*
- *LignoSat is a collaborative effort between **Kyoto University** and the logging company **Sumitomo Forestry**.*
- *The **satellite is a mere 10 centimetres** on each side and is **crafted from magnolia wood**.*
- *The wood is **selected for its strength and workability** after space exposure tests were conducted on **cherry, birch, and magnolia wood chips**.*
- *The wood was sourced from **Sumitomo Forestry's company forest**.*
- *Traditionally, **satellites are constructed from metal**, which creates harmful debris when they burn up in the atmosphere.*
- *This debris can pose a **significant threat to operational satellites** and spacecraft, and researchers believe wooden satellites could offer a more sustainable solution.*
- *LignoSat is **scheduled to launch on a SpaceX rocket** from the **Kennedy Space Centre** in September.*

- It will be **delivered to the International Space Station (ISS)**, where it will be deployed for a **series of tests to assess its strength and ability to withstand extreme temperature fluctuations**.
- This pioneering project represents a significant step forward in the **fight against space debris**.
- If successful, LignoSat could pave the way for a **new generation of environmentally friendly satellites**.

OPEC+

Syllabus: GS-3: International Economic Organisations.

Context:

- *U.S. crude oil falls more than 3% as OPEC+ plans to phase out voluntary production cuts.*

More about news:

- *A coalition of eight OPEC+ members led by Saudi Arabia and Russia announced Sunday that they would begin phasing out those cuts over the course of 12 months starting in October.*
- *The planned phase out, however, will be subject to market conditions and could be reversed, the producers said.*
- *OPEC+ is keeping separate tranches of production cuts totaling 3.6 million bpd in place until the end of 2025.*

OPEC (Organization of the Petroleum Exporting Countries):

- *Founded in 1960 by Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela (currently 13 members).*
- *Headquarters: Vienna, Austria*
- *Objective: Coordinate oil production policies and influence global oil prices.*

OPEC+:

- *Formed in 2016 through an alliance between OPEC and non-OPEC oil producers (10 additional countries).*
- *Key Members (besides OPEC): Russia, Kazakhstan, Mexico, Azerbaijan.*
- *Significance: OPEC+ collectively controls a significant share of global oil reserves, granting them dominance over the oil market.*

Functions of OPEC+:

- **Production Quotas:** OPEC+ agrees on production quotas for member countries to regulate oil supply and influence prices.
- **Market Stability:** Aims to prevent extreme price fluctuations that harm both producers and consumers.
- **Member Benefits:** Ensures a steady flow of revenue for producer nations.

Relevance for India:

- India is a **major oil importer**, heavily reliant on OPEC+ for crude oil.
- OPEC+ decisions directly impact global oil prices, **affecting India's energy security and inflation**.
- A production cut by OPEC+ **can lead to a spike in oil prices**, impacting India's trade deficit and economic growth.

Related concepts:

Benchmark	Description	Source	Typical Sulfur Content
WTI (West Texas Intermediate)	Light sweet crude oil produced in the United States, specifically from Cushing, Oklahoma. It is a high-quality oil with low sulfur content, making it easier and less expensive to refine.	Texas	Low (around 0.42%)
Brent Crude	Blend of several North Sea crude oils. It is another high-quality, light sweet crude oil and is a major global benchmark alongside WTI.	North Sea Brent oilfields	Low (around 0.35%)
Dubai Mercantile Crude (DME)	Medium sour crude oil originating in the Middle East. It is a key benchmark for crude oil sales in Asia.	Dubai, United Arab Emirates	Medium (around 2.0%)
OPEC Reference Basket	Basket of crudes oil from various OPEC member countries. It is not directly traded but provides an average price point for OPEC crudes. The specific crudes and their weightings in the basket can change.	OPEC	Varies depending on the crudes included (generally around 1.3% to 1.7%)
Urals	Blend of several Russian export crudes. It is a medium sour crude oil, similar to	Russia	Medium (around

	<i>Dubai Mercantile Crude.</i>		<i>1.3% to 1.6%) pen_spark</i>
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