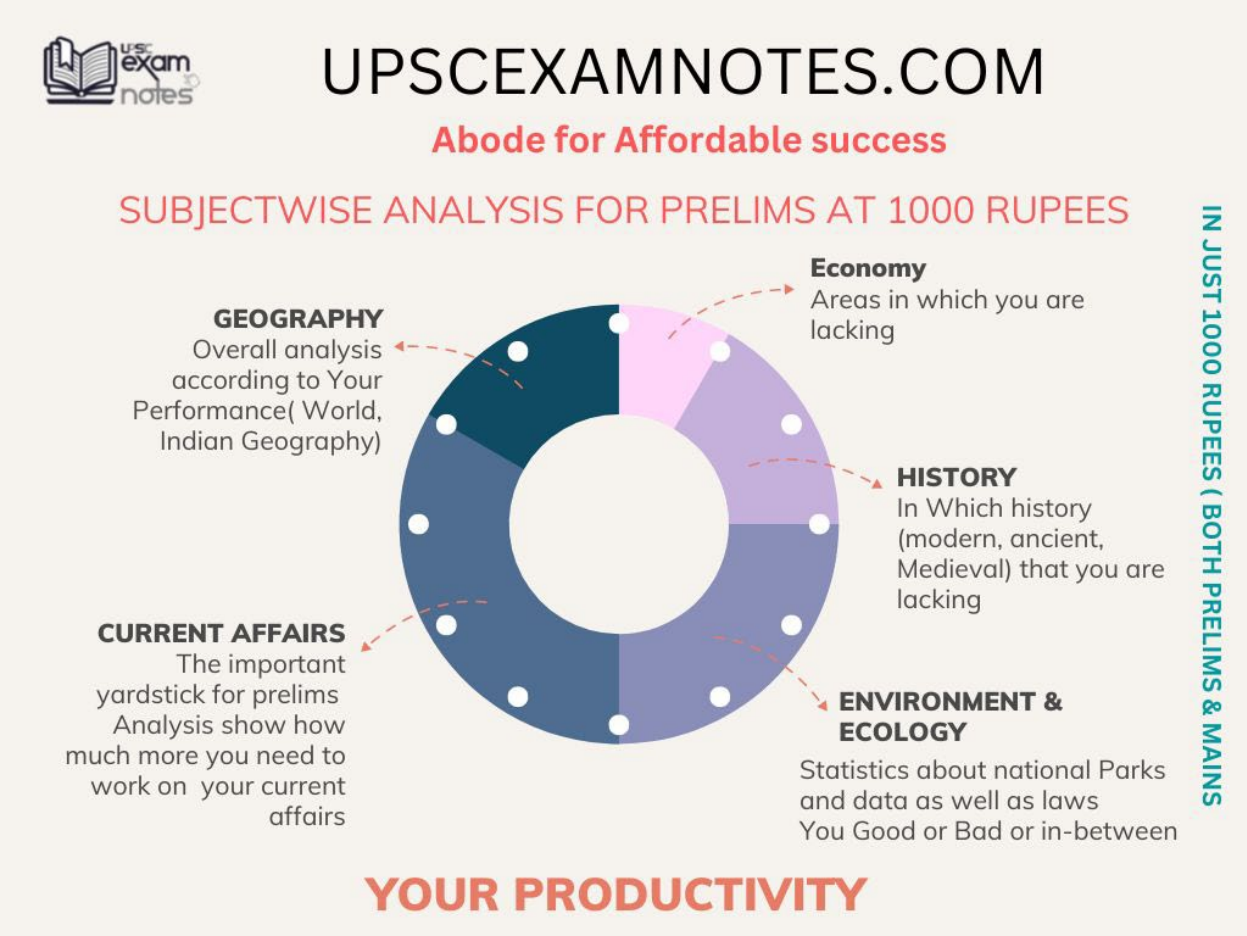
WEEKLY CURRENT AFFAIRS

SECOND WEEK OCTOBER 2022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Economy
Areas in which you are lacking
GEOGRAPHY
Overall analysis according to Your Performance(World, Indian Geography)
HISTORY
In Which history (modern, ancient, Medieval) that you are lacking
CURRENT AFFAIRS
The important yardstick for prelims Analysis show how much more you need to work on your current affairs
ENVIRONMENT & ECOLOGY
Statistics about national Parks and data as well as laws You Good or Bad or in-between
IN JUST 1000 RUPEES (BOTH PRELIMS & MAINS
YOUR PRODUCTIVITY

General studies I: World geography

CLIMATE CHANGE

1. Context

India takes over the G-20 presidency in 2023, Climate change should be our main agenda.

2. Climate change

The periodic modification of Earth's climate brought about due to the changes in the atmosphere as well as the interactions between the atmosphere and various other geological, chemical, biological, and geographical factors within the Earth's system is called Climate Change.

- Climate change is a global concern and requires a well-coordinated global approach to address it. In simple terms, what needs to be done is to assess and monitor the net stock of GHG (greenhouse gases) present in the atmosphere at any given time, and work out ways to reduce it. Unlike many pollutant gases that have a relatively shorter life span once emitted, GHG can remain in the atmosphere for a fairly long time. For instance, carbon dioxide, the major constituent of GHG, can remain in the atmosphere for as long as a thousand years.
- Another aspect of this is the distance GHG can travel from the emitting source in the atmosphere. As compared to pollutant gases like sulfur dioxide, which can at best travel up to a few hundred kilometers, carbon dioxide can travel up to thousands of kilometers.
- So, while excessive sulfur dioxide emissions could cause acid rain (rainwater containing sulphuric acid) in areas near the emitting source, GHG could potentially impact climate in places far away from the source.

3. Discussions about Climate change

- The Industrial Revolution in the 19th century and industrialization in the world added to great volumes of GHG in the atmosphere over time. Unfortunately, the realization of their adverse impact o climate came quite late.
- International Climate change negotiations among different countries under the United Nations Framework Convention on Climate Change (UNFCCC) framework started only in 1994.
- GHG targets discussed in the COP meeting under the UNFCCC framework largely focus on containing inflows of new emissions, which would add to the GHG stock already in the atmosphere.
- To address this, substantial financial resources and the latest technologies are required. Developed countries, which are responsible for creating this mess in the first place and have the better financial capacity and technological capability, have to bear the major burden for this. They need to provide funds for developing countries and facilitate technology transfers. This is the basic philosophy behind the "common but differentiated responsibilities and respective capabilities" principle.
- In the COP meeting in Copenhagen in 2009, developed countries pledged to channel $ 100 billion a year to developing countries by 2020 to help them adapt to and mitigate climate change. Unfortunately, despite all the talk, this is not happening.

UNFCCC

UNFCCC stands for United Nations Framework on Climate Change. The UNFCCC secretariat (UN Climate change) is the United Nations entity tasked with supporting the global response to the threat of climate change. The UNFCCC, signed in 1992 at the United Nations Conference on Environment and Development also known as the Earth Summit, the Rio Summit, or the Rio Conference. The UNFCCC entered into force on March 21, 1994.

4. Effects of climate change

- Excessive hot weather, untimely and excessive rains, flooding, and extreme climatic

conditions this year have affected people across the world.

- The poor and developing countries in Africa, South Asia, and Latin America suffer the most due to a lack of resources to deal with the problem. Even if these countries were to follow the emissions discipline strictly individually, they might still suffer the climate change consequences.
- When it comes to survival, there is little option for anyone but to take required precautionary or adaptive measures to the best of their capabilities.

5. India's Agenda

- India with 17.7 percent of the world's population, 30 percent of the world's cattle population, 2.4 percent of the world's surface area, 4 percent of the water resources, 55 percent of energy needs met by coal, and only $2,200 per capita per annum income, has its back against the wall while participating in international forums on climate change negotiations.
- India has shown leadership in declaring voluntary, ambitious NDCs in Paris, followed by bold commitments in COPs thereafter. This is likely to motivate others, especially developing countries, to follow.
- India should use its global stature, lobbying power, and leadership to take the bull by its horns- make developed countries do what they should rightly be doing, be it during the COP meetings on climate change or in other forms like G-20. As India takes over the G-20 presidency, this should be our main agenda.

G-20

The G20 was formed in 1999 against the backdrop of the financial crisis of the late 1990s that hit East Asia and Southeast Asia in particular. It aims to secure global financial stability by involving middle-income countries. Together, the G-20 countries include 60% of the world's population, 80% of the global GDP, and 75% of global trade.
Member countries
Argentina, Australia, Brasil, Canada, France, Germany, India, Indonesia, Italy, Japan, the Republic of Korea,

Mexico, Russia, Saudi Arabia, South Africa, Turkey, the United Kingdom, the United States, and the EU.

General studies III: Agriculture

COFFEE INDUSTRY

1. Context

The torrential rains in September thrashed the coffee plantation and left tender berries and leaves strewn everywhere.
The plants stood partially submerged in water for weeks in South Karnataka.

2. Key points

- The impact of the rains continues with diseases affecting plants and estate infrastructure suffering long-term damage in Karnataka, Plantations in Wayanad in Kerala and Palani in Tamil Nadu have also suffered similar losses.
- Drastic changes in climate patterns over the last few years have adversely impacted India's coffee production and the quality of the crop.
- There were dry spells between 2015 and 2017 and unseasonal heavy rains, floods and landslides between 2018 and 2022.
- According to the Coffee Board of India's post-blossom estimate, production for the 2022 crop year was estimated at 3, 93, 400 metric tonnes. But given the extreme climatic conditions, it is anticipated to be some 30 per cent lower.

3. Karnataka Planters Association

- Karnataka Planters Association (KPA) reported fruit rot, stalk rot, root rot and other irreparable damage due to heavy rainfall and landslides.
- Affected by stalk rot and root rot, berries turned black and dropped.
- Coffee growers are facing a severe financial crisis due to the vagaries of nature and the Coffee which is supposed to be harvested by December is largely damaged.
- Most growers fear that the frequently occurring pattern of droughts and floods could wipe out plantations.

- Sturdy and Weather-resistant varieties of coffee may help but sadly the government is not providing adequate funds to coffee research stations to develop these.

4. Cost of financing and existing debts

- Climate change has only compounded the financial issues of growers that have been in the making for a long.
- The volatility in market prices and the reduced influence of producers in the value chain render coffee cultivation an increasingly loss-making proposition.
- Producers are getting marginalised. This is rapidly turning out to be a buyer-driven commodity market.

More than 75 per cent of Indian coffee production is exported. This has an impact on the cost competitiveness of Indian coffee vis-a-vis the coffee that is exported from other producer regions, especially since those growers get their finances at very-low-interest rates.

- The cost of financing is one of the biggest challenges of the coffee sector.
- Most private banks insist that growers provide collateral for financing.
- Since small and medium-sized growers are invariably not in a position to provide collateral, the interest rates are high, at around 12 per cent.
- International interest rates, on the other hand, are negligible, mostly in single digits.
- This is an advantage for competing for coffee-producing regions.

5. The United Planter's Association of Southern India

Although the latest position of the industry's debt outstanding is not available, as per the information compiled by The United Planter's Association of Southern India (UPASI) at the end of 2019, there were around 1, 98, 000 short-term loan accounts and 5, 05, 000 long-term loan accounts outstanding, amounting to ₹ 395. 54 crores and ₹ 40.4 crores, respectively.

- UPASI and other producer associations have already

requested the Coffee Board to recommend the implementation of a special package in line with the Special Coffee Term Loan, expected to be announced later this year, to rescue coffee growers.

- Due to the rise in the cost of inputs year on year and the increase in the cost of labour and benefits, which constitute 60 to 70 per cent of total plantation expenditure, coffee growers are left with very little money in hand. This is not adequate to repay loans.

6. Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act

- Despite requests from coffee associations and circulars from the Reserve Bank of India and the State Level Banker's committee, banks have not restructured the loans.
- The accounts of many coffee growers have turned to non-performing assets (NPAs).
- These growers are now facing recovery proceedings under the SARFAESI Act (Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act) which gives banks the right to possess the security provided by the defaulting borrower against the loan and sell it to recover losses, without any intervention by any court of law.
- The KPA had also made a representation to the Union government requesting it to exclude plantations from the provision of the SARFAESI Act and the purview of CIBIL (Credit Information Bureau India Limited).

7. Low productivity

- In India, the production of coffee is low while the cost of production is on the rise compared to other coffee countries such as Vietnam and Brazil.
- In Brazil, labour charges account for 25 per cent of the entire production cost, but in India, planters say they account for about 65 per cent.
- It is possible to bring down the cost of production to some extent through mechanisation, but India's coffee terrains and topography limit this possibility.
- At the same time, Indian coffee has a unique positioning as it is

shade-grown and grown at elevations, while other major producing countries grow coffee in flat lands.

- There is a need to take advantage of this by aggressively promoting our shade-grown coffee in the global markets.

8. High cost of production

- There is no official price-setting mechanism even in the domestic market. So, traders and curers are calling the shots and fixing prices and growers are at their mercy.
- The cost of production per acre has gone up substantially to ₹ 80, 000- 85, 000 from ₹ 50, 000 five years ago.
- The cost of inputs around coffee such as fertilizers and agrochemicals has increased by almost 20 per cent in a year.
- Plantations face power cuts during the summer months. This makes irrigation expensive as the cost of diesel is high.
- The high cost of inputs leads to the high cost of production which is the main problem for coffee growers. It makes coffee cultivation unviable.
- Earlier, the cost of production would go up by 4 to 5 per cent annually, but now it goes up at least 20 per cent annually.

9. Shortage of labour

- There is increasingly a shortage of labour while the cost of labour is on the rise in the coffee sector.
- The children of workers in all three coffee-growing states Karnataka, Tamil Nadu and Kerala prefer to move to urban areas.
- This means plantations are forced to depend heavily on migrant labours who are unskilled. A lot of effort, time and energy has to be invested in training migrant labours.
- As wage costs are not linked to productivity, growers are mandated to pay the usual wage along with other social costs such as housing and medicines, which adds up some 30 per cent more to the wages.
- Most plantations simply do not find skilled labour, especially for tasks such as shade-lopping pruning and borer tracing.

10. Identity crisis in global markets

- On the brand front, Indian coffee is still facing an identity crisis in global markets, although the country started exporting coffee actively before the 19th century.
- Indian coffee is highly rated and commands premium prices in the global coffee markets.
- But a global buyer of Indian coffee may not know about the brew's India connection as they would have bought it from a coffee roaster.

11. Coffee Exports

- The fact that India sells Robusta and Arabic at a price higher than the hugely advertised Colombia is an indication of the brand building done by the Indian exporter and the quality of Indian coffee.
- Yet, Indian coffee does not have an individual brand identity in the international markets, say, growers and exporters.
- Indian coffee was never considered a separate-origin coffee. It was always used as filler.
- This is despite Indian coffee offering innumerable flavours, aromas and blends.
- The commodity for several decades enjoyed a special position in India's export lists.
- Coffee was an important export item for the Union Government, when the Commodity's exports were in the range of ₹4, 000- ₹ 5, 000 crores annually.
- But around 20 years ago, with the IT and services sector dominating the export industry, coffee lost its prominence in the power corridors, especially in the Ministry of Commerce.

12. Varieties in Indian Coffee

- Coffee has high value and high imagery potential at home and overseas markets.
- Over the years the humble berry has been able to value-add. From being handled and sold as a berry, a green bean, a processed bean, a roasted bean and now a roasted and ground offering, coffee has climbed the hierarchy of value-addition.
- India has several speciality coffees and over three dozen estate brands for the global markets.
- Many more are in the making. The cuppers, graders and tasters are trying to tell a unique story

about the origin of a particular coffee.
    - India's green coffee on its own is capable of fetching premium prices in the global markets.

13. Pooling system

- Even after getting out of the shackles of the pooling system in 1996, in which the Coffee Board and the Government controlled the trade of coffee and the bean maintained a special status as a valuable export commodity for a long time.
- It earned recognition across the agriculture, commerce, finance and environment ministries as a serious forex earner for the exchequer.

14. Coffee Act and the new Coffee (Promotion and Development Bill) 2022

- India's share in the global coffee market may be less than 5 per cent but the coffee sector is hopeful that the Coffee Act and the new Coffee (Promotion and Development Bill) 2022, will do away with the 80-year-old coffee regulation and usher in change.
- As a precursor, the Coffee Board has embarked on a series of initiatives to unleash the full potential of the cuppa in the domestic and global markets.
- It is working on a separate India brand and certification system for coffee growers.
- The coffee community in India, comprising close to 4 lakh coffee growers, hundreds of large planters, associations that represent growers, planters, curers and exporters and over a dozen Fair Trade Organisations, hope to boost coffee in the domestic and international markets and counter the problems the industry faces.

15. The Way Forward

- Many feels are finding alternative sources of revenue and increasing domestic consumption on the one hand and branding and promoting Indian coffee better in the global market on the other.
- Growers should create additional revenue streams through inter-cropping or innovative measures.
- In addition to traditional inter-cropping of pepper and

cardamom, coffee growers could try planting exotic fruit-bearing trees and food crops or get into fish farming, dairy farming, apiary or green tourism to increase incomes from their coffee gardens.

- Farmers started growing avocados, mangosteens, oranges, guavas and other fruit-bearing trees amid their coffee plants.
- In some seasons they say they have even earned more money from these than from coffee and pepper.

Considering the change in land use, the government could permit growers to plant alternate crops on land not suitable for coffee cultivation. Timely conversion will prevent growers from going financially sick.

General studies III: Environment & Ecology

VULTURES

1. Introduction:

The Tamil Nadu Government formed a committee to set up an institutional framework for the effective conservation of vultures. Tamil Nadu is home to four species of vultures-

1. The white-rumped vulture- Gyps bengalensis
2. The long-billed vultures- Gyps indicus
3. The Asian king vulture- Sarcogyps calvus
4. The Egyptian vulture- Neophron percnopterus

2. Locations of Vulture Populations:

- The Nilgiris, Erode, and Coimbatore districts form one of the largest contagious expanses where vultures are spotted.
- The Mudumalai Tiger Reserve, parts of the Nilgiris forest division, and the Sathyamangalam Tiger Reserve are crucial strongholds for the vultures.
- Occasional migrants like the Himalayan griffon vultures and the Cinereous vulture are spotted each year.
- In the Nilgiris, researchers & forest department officials estimate that there are 100-120 white-rumped vultures, 10-15

long-billed vultures & less than 10 Asian king vultures.

- Though Egyptian vultures are spotted in the Sigur plateau, researchers are still unsuccessful in tracing the breeding sites of the critically endangered Asian king vultures.

3. Numbers:

- The population of the vultures in the Nilgiris, Erode & Coimbatore districts has remained largely stable.
- Experts state that the numbers are still extremely low & even a single poisoning event could lead to several of the species going locally extinct especially the long-billed & Asian King vultures.
- Over the last few years, breeding seasons have also seen fewer hatchings than is the norm, because of lesser availability of prey and erratic weather.
- Use of some Non-Steroidal Anti-Inflammatory Drugs(NSAIDs), ketoprofen has led to the crash in vulture populations across India.

3.1Role of Vultures:

As scavengers, vultures prevent the spread of many diseases & can remove toxins from entering the environment by consuming carcasses of dead cattle/wildlife before they decompose. Unfortunately, their tolerance for harmful substances does not extend to man-made drugs.

4. Challenges:

- Temple tourism in the Sigur plateau is centred primarily around vulture habitats, like Siriyur, Anaikatty, and Bokkapuram.
- There have been recorded instances of vultures abandoning nesting sites located too close to temples inside these reserves, with activists calling for strict controls on the number of people allowed to attend these festivals.
- The spread of invasive weeds such as Lantana Camara in

vulture landscapes, which hinder the birds from scavenging as their large wing spans require plenty of open areas to safely land.

- Due to illegal tapping of water along the streams running through these areas, possible climate change, forest fires, and Terminalia arjuna trees, which many vultures use as nesting sites are disappearing.
- Through a multipronged approach of increasing the amount of food available to the birds & managing invasive species can rebound vulture numbers.

5. Protective Measures:

- The state government has banned the use of Diclofenac, a drug to treat cattle.
- There are strict restrictions for the sale of other NSAIDs in the Nilgiris, Erode, and Coimbatore districts.
- The vultures in the Sigur plateau utilise landscapes in Karnataka & Kerala, experts called for a synchronous vulture census to accurately identify vulture populations & nesting sites.

General studies II: Governance

OFFICIAL LANGUAGE COMMITTEE

1. Context

The 11th volume of the Report of the official Language Committee submitted to the President of India on September 9, 2022, did not seem to evoke much interest in the media, Except for the Chief ministers of Tamilnadu and Kerela, no other political leader reacted to the recommendations made.

2. Official Language Committee

- The Committee of parliament on Official Languages was set up in 1976 under section 4 of the Official Languages Act, of 1963.
- Section 4 of the Act says "there shall be constituted a committee on Official language, on a resolution to that effect being moved in either House of Parliament with the previous sanction of the

president and passed by the both Houses."

- Under the provision of the 1963 Act, the panel submits its report to the president, who "shall (then) cause the report to be laid before each House of Parliament, and sent to all the state Governments."
- The Committee is chaired by the Union Home Minister, and has, by the provisions of the 1963 Act, 30 members- 20 MPs from Lok sabha and 10 MPs from Rajya sabha. The mandate of the committee is to review the progress made in the use of Hindi for official purposes and to make recommendations to increase the use of Hindi in official communications. The first Report of the committee was submitted in 1987.

3. Committee Recommendations

- The committee has recommended replacing English as a medium of instruction in all technical and non-technical institutions with Hindi.
- While IITs, IIMs, and the All India Institute of Medical Sciences are considered technical institutions, Kendriya Vidyalayas and Navodaya Vidyalaya fall under the other category.
- Also, the committee has recommended the removal of English as one of the languages in examinations held for recruitment to the central services.
- It has been stated that the requisite knowledge of Hindi among candidates should also be ensured.
- These recommendations have made many states claim that it is an attempt to impose Hindi on non-Hindi-speaking people.

4. Fall out in Non-Hindi states

- India has two major groups of languages-the Indo-European language group and the Dravidian language group. Hindi belongs to the former and Tamil (More ancient than Sanskrit) belongs to the latter. All the prominent languages in the Dravidian group, i.e., Tamil, Telugu, Malayalam, and Kannada, have rich literature. However, it was English that brought the northern and southern regions together.
- The idea of the official language for the Union is a

product of the freedom struggle which promoted Hindustani, a mixture of Hindi and Urdu. Later, when the constitution was framed, the idea of Hindustani was given up and Hindi in the Devanagari script was adopted as the sole official language.

- Candidates from the non-Hindi states, the south, in particular, will face a great disadvantage when compared to those whose mother tongue is Hindi. The result would be a gradual elimination of candidates from the all-India services. The Constitution makers anticipated this problem, which is why the Constitution provides in Article 344(3) that the commission on official language shall have "due regard to the just claims and interests of persons belonging to the non-Hindi speaking areas in regard to public services".

5. A changing world requires English

- The overwhelming public opinion in the south is that English should continue as one of the official languages.
- Today, the union has Hindi and English as two official languages and Canada has English and French as its official languages.
- The policymakers should seriously think of making the provision constitutionally that Hindi and English should be the official languages of the Union.
- Therefore, all efforts should be made to ensure their natural development so as to be able to meet the requirements of modern science and technology. At the same time, we need English to better understand science and the world around us and beyond.

6. The alternative suggested to the proposal

The essence of the Official Languages Act, of 1963 is to provide something to each of the different groups to meet its objections and safeguard its position. Also, there is a call for equal treatment to all the languages specified under the Eighth Schedule of the constitution.

General studies I: World Geography

OCTOBER STORM

1. Context

The first tropical cyclone of the Post Monsoon season of 2022 is likely to form in the Bay of Bengal on October 24, the Indian Metrological Department (IMD) has said.
If realised, this will be the first cyclone to develop in the Bay of Bengal in October 2018 and will be called Sitrang, as named by Thailand. The last October cyclone in the Bay of Bengal was Titil in 2018.

2. Why Storms in October

- October-November and May-June see storms in the North Indian Ocean comprising the Bay of Bengal and the Arabian Sea with an average of five deploying in a year.
- In the past 131 years, October saw 61 storms in the Bay of Bengal, as per the Regional Specialised Metrological Centre (RSMC).
- The east coast notably Odisha has faced many of its severest storms in October including the Super Cyclone of 1999.

3. Ocean-atmospheric factors

- After the withdrawal of the Southwest monsoon, there is a rise in ocean heating, which leads to a rise in sea surface temperatures over the Bay of Bengal. The atmospheric moisture availability over the ocean is higher.
- So, when remnant systems from the south china sea reach the Bay of Bengal, they get conducive conditions aiding the formation and intensification of Cyclones in October.
- In recent years ocean-atmospheric factors hinder this phenomenon.
- For instance, in 2020, weak La Nina along the equatorial Pacific ocean prevented a cyclonic formation near India's coast.

4. Cyclone Sitrang

- On Thursday IMD officials said the cyclonic storm will reach close to the coasts of the West Bengal-Bangladesh by October 25.
- The name Sitrang will be given by Thailand and feature in the list of Tropical cyclone names prepared by the RSMC been followed since April 2020.

The IMD is one of the world's six RMSCs mandated to provide cyclone advisories and alerts to 13 member countries Bangladesh, India, Iran,

Maldives, Myanmar, Oman, Pakistan, Qatar, Saudi Arabia, Sri Lanka, Thailand, United Arab Emirates and Yemen.

5. States like to be affected

- The IMD is yet to release the probable cyclone track, but as per the latest updates, the Prevailing low-pressure system will strengthen and move towards India's east coast in the coming four days.
- Gale winds and enhanced rainfall are expected mainly over Andaman and Nicobar islands, Odisha, West Bengal and Bangladesh, particularly the Coastal Districts.

6. Weather models

- Weather models on Thursday suggested that the low-pressure system (Wind speed of 31 km/hr) will strengthen into a depression (Wind speed of 31 to 50km/hr) by October 22 and further into a deep depression (Wind speed of 51-61km/hr) by October 23.
- Thereafter, it will most likely re-curve northeastwards, thus skirting past the Odisha coast.
- As it progresses, it will intensify into a cyclonic storm (windspeed of 62-87 km/hr) by October 25.
- The storm is expected to reach close to the West Bengal and Bangladesh coasts in the north Bay of Bengal on October 25.
- Winds with speeds ranging between 40-45km/hr gusting to 55 km/hr are likely over the Andaman Sea and Andaman and Nicobar islands on Friday.
- Here, light to moderate rainfall (15.6 to 64.4 mm in 24 hours) will continue till Saturday.
- As the storm is expected to come close to Odisha shores, heavy to very heavy rains (64.5 to 204.4 mm in 24 hours) Would lash over Puri, Jagatsinghpur and Kendraparha districts during October 22-25.
- The IMD has issued a "yellow" for these coastal districts. Districts along the Gangetic West Bengal, too, will experience moderate rainfall accompanied by lightning on October 24 and 25.

7. Cyclones in the Arabian Sea

- In comparison with the Bay of Bengal, only 32 storms have

developed in the Arabian Sea in October since 1891.

- Climatologically too, the IMD states that of the five storms formed in the North Indian Ocean in a calendar year, four are in the Bay of Bengal and one in the Arabian Sea.

General studies I: Indian heritage & Culture

LOTHAL

1. Context:

Prime Minister Narendra Modi on Tuesday evening reviewed the construction of the National Maritime Heritage Complex (NMHC) site at Gujarat's Lothal via video conferencing

2.About Lothal:

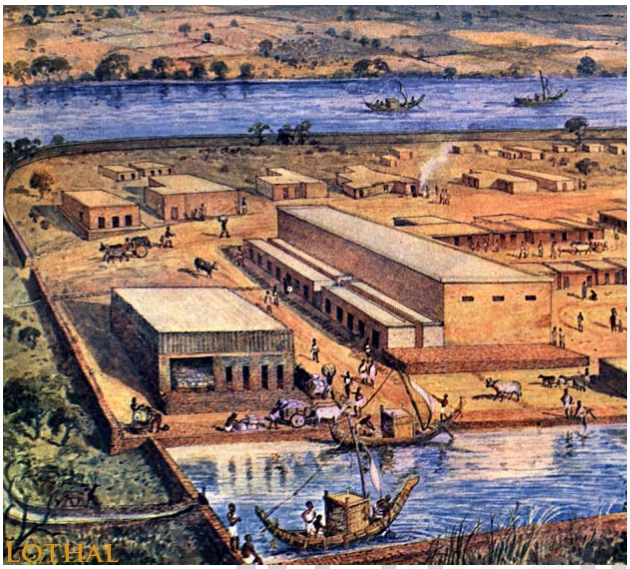
- Lothal was one of the southernmost sites of the Indus Valley civilization, located in the Bhāl region of what is now the state of Gujarat.
- The port city is believed to have been built in 2,200 BC. Lothal was a thriving trade centre in ancient times, with its trade of beads, gems and ornaments reaching West Asia and Africa.
- The meaning of Lothal (a combination of Loth and (s) thal) in Gujarati is "the mound of the dead".
- Incidentally, the name of the city of Mohenjo-daro (also part of the Indus Valley Civilisation, now in Pakistan) means the same in Sindhi
- Indian archaeologists started the search for cities of the Harappan Civilisation post-1947 in Gujarat's Saurashtra.
- Archaeologist SR Rao led the team which discovered a number of Harappan sites at the time, including the port city of Lothal.
- Excavation work was carried out in Lothal between February 1955 and May 1960.
- According to the Archaeological Survey of India (ASI), Lothal had the world's earliest known dock,

connecting the city to an ancient course of the Sabarmati river.

- National Institute of Oceanography in Goa discovered marine microfossils and salt, gypsum crystals at the site, indicating that seawater once filled the structure and it was definitely a dockyard.
- ASI unearthed a mound, a township, a marketplace, and the dock. Adjacent to the excavated areas stands the archaeological site museum, where some of the most prominent collections of Indus-era antiquities in India are displayed.

3.Prominence of Lothal

- Lothal was nominated in April 2014 as a UNESCO World Heritage Site, and its application is pending on the tentative list of UNESCO.
- As per the nomination dossier submitted to UNESCO, "The excavated site of Lothal is the only port-town of the Indus Valley Civilisation.
- A metropolis with an upper and a lower town had in on its northern side a basin with vertical wall, inlet and outlet channels which has been identified as a tidal dockyard
- Satellite images show that the river channel, now dried, would have brought in considerable volume of water during high tide, which would have filled the basin and facilitated sailing of boats upstream
- The remains of stone anchors, marine shells, sealings which trace its source in the Persian Gulf, together with the structure identified as a warehouse further aid the comprehension of the functioning of the port.
- Its heritage value is comparable to other ancient port-towns around the world – including Xel Ha (Peru), Ostia (Port of Rome) and Carthage (Port of Tunis) in Italy, Hepu in China, Canopus in Egypt, Gabel (Byblos of the Phoenicians), Jaffa in Israel, Ur in Mesopotamia, Hoi An in Vietnam, as per the dossier
- In the region, it can be compared with other Indus port towns of Balakot (Pakistan), Khirasa (in Gujarat's Kutch) and Kuntasi (in Rajkot).



4. The Project

The project began in March 2022 and is being developed at a cost of Rs 3,500 crore. It will have several innovative features such as Lothal mini-recreation, which will recreate Harappan architecture and lifestyle through immersive technology; besides four theme parks – Memorial theme park, Maritime and Navy theme park, Climate theme park, and Adventure and Amusement theme park

It will also house the world's tallest lighthouse museum, 14 galleries highlighting India's maritime heritage starting from the Harappan time till today, as well as a coastal states pavilion displaying the diverse maritime heritage of Indian states and UTs

General studiesIV: Science & Technology

LASER INTERFEROMETER GRAVITATIONAL-WAVE

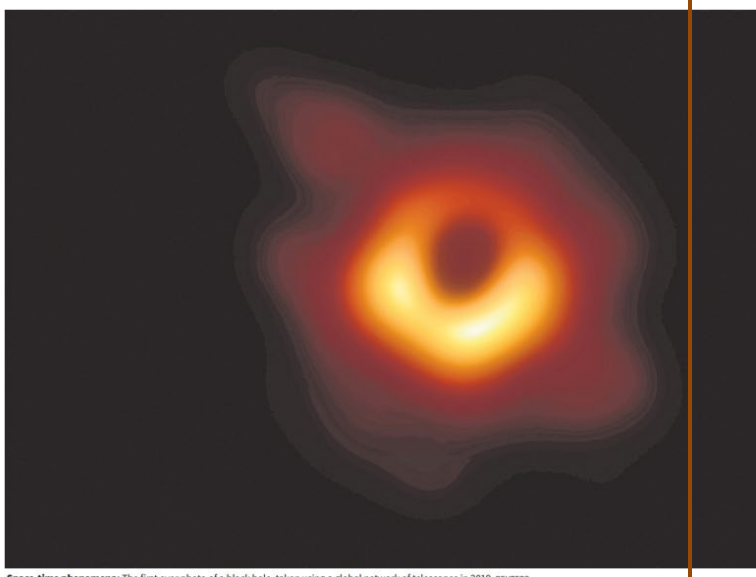
1. Background

- In 2017, astrophysicists observed an unusual feat among the stars.
- The Laser Interferometer Gravitational-Wave (LIGO) observatories recorded a signal which indicated that two massive and dense stellar bodies had merged to form a third body, likely a black hole.
- In the process, they gave off vibrations that quite literally shook the universe and its very fabric of space-time.

- For the very first time, scientists noted that this observation of the LIGO observatories coincided with the measurements made by other telescopes that measured visual and electromagnetic signals.

2. Was this light given off by the merging bodies?

- The evidence seemed to suggest that it was.
- From this scientists piecing together evidence from complementary measurements surmised that the event they had observed was of two neutron stars merging and forming a black hole and in the process, giving off light.
- An unusual jet of the matter was observed that gave an illusion of travelling faster than light.
- These were all exciting phenomena observed for the very first time by telescopes and observatories.



Space-time phenomena: The first ever photo of a black hole, taken using a global network of telescopes in 2019. REUTERS

3. Crossing the speed of light

- Now, using data that had been recorded by the Global Astrometric Interferometer for Astrophysics (GAIA) spacecraft and Hubble Space Telescope instruments, scientists have confirmed that the above picture is correct. They have made it more precise and descriptive.

In a paper published in Nature, they describe measuring the "apparent speed" of the jet to be about seven times the speed of light.

- They have also measured more accurately a factor called the

Lorenz factor which scales with the actual speed of the particles in the jet.

- Unlike earlier estimates which placed this factor at about 4, the present paper estimates this factor to be over 40.
- This is because they measure the speed of the relativistic jet to be close to 0.9997c, where "c" is the speed of light.
- This resolves the earlier fuzziness about what the source was and puts the source clearly as massive neutron stars merging to give a black hole and throwing off relativistic jets of particles in the process.

4. Merging neutron stars

- Neutron stars are stellar corpses, left behind after a star has undergone a supernova explosion and reached the end of its lifetime.
- They are extremely dense, containing more mass than the sun in a sphere that is a few tens of kilometres wide.

The observation of particles moving at seven times the speed of light is an illusion.
This happens in cases where a source moves with a velocity that is very close to light's velocity. This phenomenon is known to astrophysicists earlier.

- This has been seen in many active galactic nuclei galaxy centres that harbour black holes and binary star systems within our galaxy, where one of the stars is a black hole. Mostly, black holes are responsible for producing such fast-moving material.
- The present measurements and observations made with GAIA data are extremely challenging.
- They amount to measuring the position of an object in sky coordinates.
- These authors measured a change in sky position one millionth the span of the full moon.

5. Very Long Baseline Interferometry

- Normally, if one were making these measurements from earth-based telescopes, it would require data from radio telescopes spaced apart by intercontinental distances. This technique is called Very Long Baseline Interferometry (VLBI) and was used in earlier papers.

- Here, the authors could beat VLBI in precision because they calibrated Hubble Space Telescope data with GAIA, which is a precision astrometry mission.

The researchers used both their Hubble Space Telescope and GAIA optical position measurement along with the earlier VLBI position measurement to get a better estimate of the speed of the source and angle (viewing angle) with which it is travelling concerning us on earth.

- This estimate requires plugging in equations of the special theory of relativity. So, it is an estimate as opposed to a measurement.

6. Impact of the study

- The significance of the paper is that now, we have learnt that neutron star mergers can result in material moving with speeds as high as 0.9997c.
- Earlier results using Very Long Baseline Interferometry had pegged this value at about 0.938c. With the new results, this lower limit has been improved.
- Even earlier, with VLBI, it was understood that it was a neutron-star merger that produced such ultra-relativistic material.
- Before the VLBI results, several models could replicate the observations.
- The observations could be explained both by ultra-relativistic material and non-relativistic material, with some differences in assumptions.
- That study indicated that the observed gamma-ray bursts were produced along with the ultra-relativistic material.

7. Gamma-ray bursts

- This paper, in turn, strengthens the hypothesis that such neutron star mergers are responsible for a class of gamma-ray bursts.
- Gamma-ray bursts are flashes of extreme gamma-ray photons that release a huge amount of energy nearly ten-raised to 47 joules.
- They come from different galaxies in the universe and are observed here quite frequently.

Prelims Corner:

1.Which of the pairs are correctly matched?

1. Undernourishment: reflects inadequate food availability

2. Child Wasting: reflects acute undernutrition

3. Child Stunting: reflects chronic undernutrition

4. Child Mortality: reflects both inadequate nutrition and unhealthy environment

A) 1, 2 and 3 B) 1 and 4 C) 2, 3 and 4 D) 1, 2, 3 and 4

2. Which of the following statements is not true with respect to Living Planet Report 2022?

A) Monitored wildlife populations have seen a 69-per cent drop between 1970 and 2018.

B) While overall mangrove loss is declining, the study finds that there remains hotspots of mangrove loss, particularly in Myanmar.

C) The Bramble Cay melomys, a small Australian rodent, was declared extinct after sea-level rise.

D) The Living Planet Report has found that hunting is the most prevalent threat to amphibians.

3. Which of the following statements are true with respect to telecom sector in India?

1. India the second-largest telecom market in the world.

2. Government of India has allowed 100% FDI in the sector

A) Only 1 B) Only 2

C) Both 1 and 2 D) Neither 1 nor 2

4. Which of the following statements is not true with respect to monsoons?

A) During monsoon season a shallow trough of low pressure is observed along west coast of India which is known as off-shore trough.

B) Periodicity of monsoon is largely controlled by the global ocean atmospheric phenomena like El nino Southern oscillation (ENSO).

C) Extended range forecast of monsoon is defined as the forecast from 30 days' up to one season's

description of averaged weather parameters.

D) Statistical Ensemble Forecasting system is a statistical model used by IMD for the long range forecasting of South west monsoon season rainfall over the country as a whole.

5. Which of the following statements with respect to *stagflation* is/are correct?

1) Growth rate of the economy slows down

2) The level of unemployment remains steadily high

3) The inflation or price level remains high.

A) 1 and 2 only

B) 2 and 3

C) 1 and 3 only

D) 1, 2, 3

Mains Corner:

1.What is the oldest dock in the world.Discuss it's prominence (250 Words)

2. What is October Storm? Discuss its impact on India. (250 Words)

3. Discuss the challenges posed by climate change in recent times and explain why India is going to choose the G-20 platform to address climate change(250 Words)

4. What is the role of vultures as scavengers. Discuss the measures to be taken to protect them (250 Words)

5. What is Coffee Act? Discuss the significance of the new coffee promotion and development bill 2022 (250 Words)

Prelims Key:

1	2	3	4	5
D	D	C	C	D