GSSCORE

An Institute for Civil Services

MAINS TEST SERIES 2023

GS MAINS Q&A

REVISION TEST - 06

(10 QUESTION)

GEOGRAPHY

Complete Syllabus

GEOGRAPHY REVISION TEST

Time Allowed: 90 Min. *Max. Marks: 125*

Section - A

1. Plate tectonics have played a critical role in sustaining life on the earth. Discuss.
2. Discuss the role of geological, geophysical and inherited tectonic factors in shaping the climate and geomorphology of the Indian peninsula.
3. Bring out the causes of desertification in India and explain how desertification leads to major environmental and socioeconomic problems.
4. Briefly explain the formation of marine resources. How can the economic benefits be increased from sustainable use of marine resources in India?
5. Retreating glaciers in the Himalayan region are posing the double whammy of droughts and floods. Illustrate with examples.

Section - B

6. How does geographical location affect international trade? Also, assess the impact of globalization on international trade.
7. What is the difference between delta and estuary? Discuss the factors responsible for the formation of both of them in the context of India.
8. What are the determining factors of cropping patterns in India? In what way have the cropping patterns changed after the introduction of the Green Revolution programme?
9. Explain the resource-base and other locational factors that led to the development of the Ukraine Industrial Region. Are Ukraine's vast natural resources one of the latent reasons behind Russia's recent invasion?
10. Montane forests have different characteristic vegetation in northern and southern parts of India. Examine the statement.

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GEOGRAPHY REVISION TEST

Section - A

1. *Plate tectonics have played a critical role in sustaining life on the earth. Discuss.*

Approach

1. ***The question focuses on the Plate tectonics and its role in sustaining the life on earth.***
2. ***The tone of the question is to explain in detail. It points out the importance of Plate tectonics.***
3. ***The introduction should include the basic information regarding plate tectonics and how it has led to life on Earth.***
4. ***Further elaborate your answer with a holistic explanation constituting why there is a need for Plate tectonic on Earth and what changes occur in its presence on the Planet Earth. Also analyze its role in sustaining life on Earth.***
5. ***Conclude on the lines that Plate tectonics is the grand, unifying theory of Earth sciences.***

Hints:

The Earth's outermost rigid shell is broken into a series of plates. These tectonic plates drift around—moving continents, causing earthquakes and volcanoes, and determining the composition of the air we breathe.

Plate tectonics is one of the key characteristics of Earth that is believed to have played a major role in the evolution of complex life. The influence of plate tectonics on the Earth's climate and carbon cycle, coupled with its role in generating a protective magnetosphere, helped various life-forms gain a foothold on the planet.

Role of Plate tectonics in sustaining life on Earth:

- **Role in Mountain Building:** Buoyant continental rocks only partly subduct back into the Earth. These colliding continental blocks lead to the formation of mountains. The Himalayas are a classic example of how plate tectonics can influence both the geographical and biological landscape of the Earth. The collision of the Indian and Eurasian plates resulted in the formation of the Himalayas, the highest mountain range on the planet.
- **Generating a Magnetic Field:** The magnetosphere, or magnetic bubble, in space is generated by the Earth's magnetic field. It protects our planet from the harmful effects of solar wind and ionizing particles from space. The magnetosphere deflects the continuous flow of plasma and charged particles released from the Sun and from space.
- **Influence on Oceans:** Plate tectonics can change sea levels of local regions. Shallow waters that occur due to these changes in sea level can be ideal grounds for life to evolve on Earth. Scientists are of the opinion that there is a relationship between plate tectonics and major evolutionary events in the fossil record.
- **Influence on Climatic Conditions:** A region's climatic system is largely dependent on ocean currents, which in turn are influenced by the movement of continental plates.

- **For example:** Ocean currents such as the Atlantic Meridional Overturning Circulation (AMOC) are the reason why places with the same latitudes in Europe and North America experience different temperatures.
    - The AMOC carries warm water from the equatorial regions in the Atlantic northward. As the warm water releases heat into the atmosphere, places with similar latitudes in Europe experience much warmer weather compared to their counterparts in North America.

- **The Earth's Carbon Cycle:** As the tectonic plates keep moving, carbon is cycled and recycled within the various layers of the Earth. Volcanism releases gases into the atmosphere, and then through weathering, carbon dioxide is pulled from the atmosphere and sequestered into surface rocks and sediment. Balancing those two processes keeps carbon dioxide at a certain level in the atmosphere

Conclusion:

Plate tectonics is the grand, unifying theory of Earth sciences, combining the concepts of continental drift and sea-floor spreading into one holistic theory that explains many of the major structural features of the Earth's surface. Thus we can say that the spheres, lithosphere, biosphere, atmosphere and are what make this planet unique. Remove one and the balance is destroyed and life would probably not exist.

2. Discuss the role of geological, geophysical and inherited tectonic factors in shaping the climate and geomorphology of the Indian peninsula.

Approach

1. ***Briefly discuss the formation of the Indian peninsula by underlining the major events which later shaped its climate and physiography.***
2. ***Discuss role of geological, geophysical and inherited tectonic factors in shaping of the climate and geomorphology of the Indian peninsula.***
3. ***Conclude with socio-economic impact of the geomorphology and climate of the Indian peninsula.***

Hints:

Indian Peninsula was a part of Gondwana land and migrated north-eastward after breaking from it, around 72 million years ago. In the path of its journey towards Eurasian Plate, the Indian plate encountered plum volcanoes or hotspot volcanoes near Seychelles and Madagascar. This led deposition of basaltic lava called Deccan Trap due to its staircase topography. When It collided with the Eurasian plate it shook hard leading to shedding of its western most flank which later submerged and its south-east ward tilt. These geological and tectonic factors aided in shaping up of its present day climate and physiography.

Role of geological, geophysical and inherited tectonic factors in shaping of the climate and geomorphology of the Indian peninsula

- Tilt of the Indian peninsula to the south-west has caused the flow of most of the major rivers towards south-west except Narmada and Tapi which flows in a trough towards west coast.
- Steep slope of western ghat leads to formation of estuaries on the western coast of the peninsula lacking alluvial deposits on coastal plain. Similarly, windward side of the western ghat gets maximum rainfall making it biodiversity hot spot while leeward side remains drought prone area.
- Due to deposition of basaltic rocks on the Peninsular plateau, black soil or Regur is found which most suitable soil for the production of cotton.
- Rainfall and slope of the middle Sahyadris make it suitable for the production of plantation crops such as Coffee.

- The eastern ghat and the coastal plains on the other hand are most productive due to deposition of loads of alluvium by the Indian rivers. This makes it suitable for cultivation of paddy, jute e.t.c.
- Dharwar rocks which are one of the oldest rock system of the world has deposits of high grade ores of iron, copper, cobalt, nickel and quality of coal.
- Further, presence of mineral rich rocks which were formed during Gondwana period makes the north-east part of peninsula suitable for heavy industries.

Conclusion:

The climate and physiography of the peninsular plateau has been influenced by its geological history to a greater extent. This has also influenced the economic activities of the region such as concentration of cotton mills in the regions of Deccan trap. This has led to economic prosperity of the region aided by large ports located in nearby areas. Similarly, regions located in leeward side of the Western Ghats receive less rainfall due to its steep slopes. This has made the regions such as Marathawada of Maharashtra drought-prone and created regional disparity. Overall, the geological and geophysical factors imprints in shaping of the climate and geomorphology of the Indian peninsula.

3. Bring out the causes of desertification in India and explain how desertification leads to major environmental and socioeconomic problems.

Approach

1. ***The question focuses on the impact of Desertification in India and the need to attempt to attain the measures to combat desertification in India.***
2. ***The tone of the question is critical as it analyzes the causes of desertification in India and its impacts on environment and social life's of people.***
3. ***The introduction should clearly sum up basic information and facts about desertification.***
4. ***Further elaborate your answer with a holistic explanation of Causes associated with desertification in India and major socioeconomic and environmental problems. Also suggest some reforms that are required.***
5. ***Conclude the answer by explaining the role played by India in combating Desertification. India is committed to reducing its land degradation and desertification.***

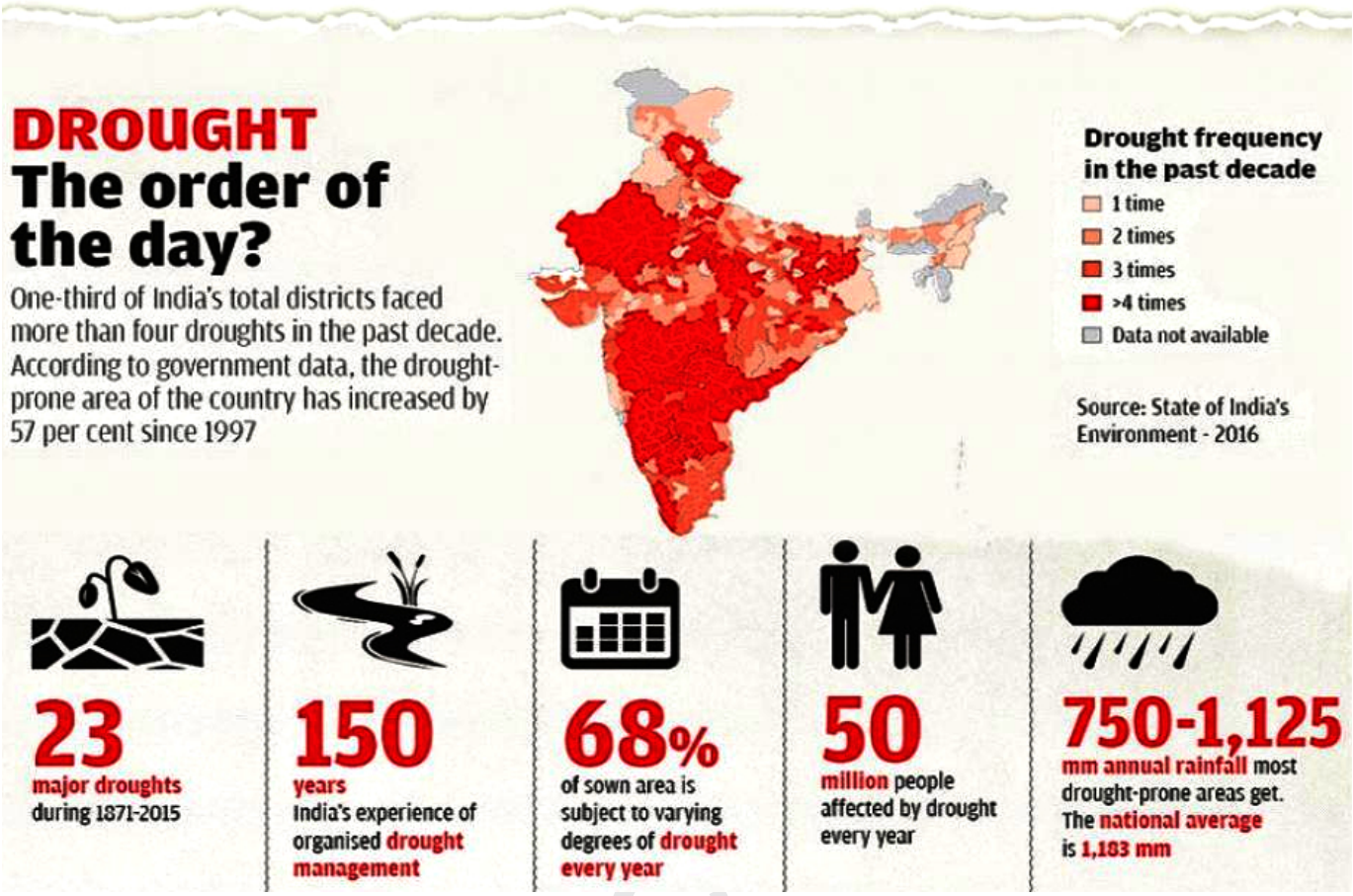
Hints:

According to the **Drought in Numbers, 2022** report released at the **15th Conference of Parties (CoP15)** to the **United Nations Convention to Combat Desertification (UNCCD),** the frequency and duration of drought is increasing at an alarming rate across the world since the onset of the 21st century.

- UNCCD defines desertification as "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities".

Scale and extent of desertification in India

- According to Desertification and Land Degradation Atlas of India, released by the Space Applications Centre of the Indian Space Research Organisation, some 97.85 million hectares (mha) — nearly 30 per cent of India's total geographical area (TGA) — underwent land degradation during 2018-19.
- In 2003-05, 94.53 mha (28.76% of the TGA) underwent land degradation. This number increased to 96.40 mha (29.32% of the TGA) in 2011-13.
- In eight states—Rajasthan, Delhi, Goa, Maharashtra, Jharkhand, Nagaland, Tripura, and Himachal Pradesh—around 40 to 70 per cent of land has undergone desertification.
- Around 23.79% of the area undergoing desertification/land degradation in the country was contributed by Rajasthan, Maharashtra, Gujarat, Karnataka, Ladakh, Jharkhand, Odisha, Madhya Pradesh and Telangana.



Causes of desertification in India:

- Factors like deforestation, wetland drainage, overgrazing, unsustainable land-use practices, and the expansion of agricultural, industrial, and urban areas are the other significant causes of land degradation.
- **Unsustainable agricultural practices:** About 141 million hectares of land is used by agriculture in India. Faulty land and water management practices in agriculture have significantly contributed to land degradation. Intensive irrigation and high chemical use (fertilisers, pesticides, etc.) adds to degradation.
- **Increasing population:** With rise in population, stress on natural resources is increasing. People are looking to move into new areas and are invading new land in order to make houses. This is contributing to the rise in desertification and land degradation.

How desertification leads to major environmental and socioeconomic problems?

- **Biodiversity Loss:** In general, the destruction of habitats and desertification may also contribute to a loss of biodiversity. While some species may be able to adjust to the altered environmental conditions properly, many species will not be able to do so and may suffer from serious declines in population.
- **Endangerment and Extinction of Species:** The desertification results in a decline in population for which species may become endangered or even extinct. This problem is especially severe for species that are already endangered as the small number of animals or plants that remains may also die off over time, which may even lead to the extinction of species.
- **Reduction in agricultural productivity:** Land degradation exacerbates climate change and threatens agricultural productivity. It reduces soil health, water quality and damages Thus in turn impact the livelihood of rural people.

- **Water crisis:** Land degradation has resulted in a deterioration in the quantity and quality of both surface and groundwater resources. Less vegetative cover leads to soil erosion. Runoff increases and flooding becomes more frequent and extensive. Groundwater recharge decreases, and the water table also drops.
- **Endanger food resources:** With land degradation, the food production is endangered and reduced. With reduced agricultural activities and productivity, land degradation endanger future nutrition.
- **Decrease in population:** Land degradation adversely impacts the population as it leads to increased health risk due to lack of nutrition and water. It reduces human settlement as land becomes non productive for livelihood. This would lead to internal and external migration.

Steps Taken by Government of India to combat desertification

- **Integrated Watershed Management Programme:** It aims to restore ecological balance by harnessing, conserving, and developing degraded natural resources with the creation of Rural Employment. It is subsumed under **Pradhan Mantri Krishi SinchaiY yojana.**
- **UNCCD**: India became a signatory to the United Nations Convention to Combat Desertification (UNCCD) in 1994 and ratified in 1996.
- **National Afforestation Programme:** Implemented since 2000for the afforestation of degraded forest lands.
- **National Action Programme to Combat Desertification:** It was prepared in 2001to address issues of increasing desertification and to take appropriate actions.
- **Fodder and Feed Development Scheme:** Launched in 2010 to improve degraded grassland and also the vegetation cover of problematic soils like saline, acidic and heavy soil.

Conclusion:

As a signatory to the United Nations Convention to Combat Desertification (UNCCD), India is committed to reducing its land degradation and desertification. India's goal is to achieve land degradation neutral status by 2030 whereby increases in land degradation would be offset by gains in land reclamation. The Green India Mission (GIM) under the National Action Plan on Climate Change is important that focuses on sustainable land management and restoration of degraded areas.

4. Briefly explain the formation of marine resources. How can the economic benefits be increased from sustainable use of marine resources in India?

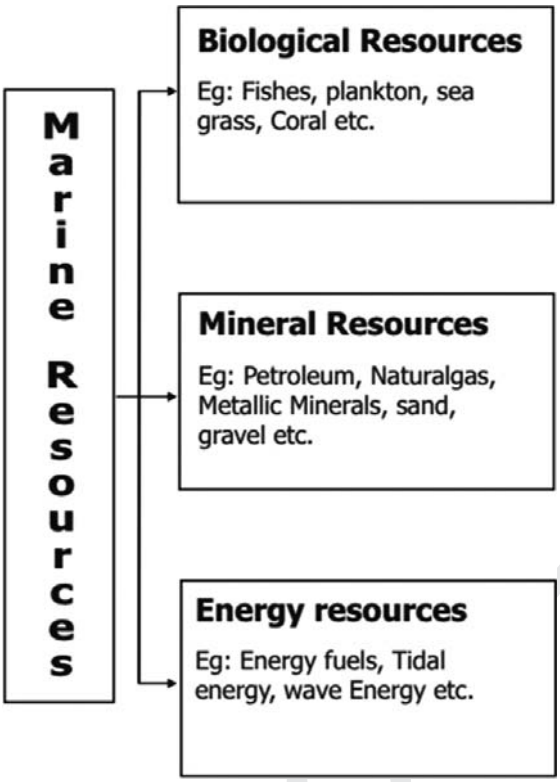
Approach

1. ***Introduction: Briefly define marine resources and contextualise with some fact, report, current development***
2. ***Explain the formation of the marine resources***
3. ***Describe the economic benefits of marine resources***
4. ***Discuss how sustainable use of the marine resources can help increase the economic benefits in India***
5. ***Conclude with importance of the marine resources***

Hints:

Marine resources are materials and attributes of the ocean that can be harnessed for value. India has over 7500 km of coastline and targets over 100 Billion $ Blue Economy through marine resources.

Types of Resources:



Formation of Marine Resources:

1. Oil and gas form as dead marine plants and animals get buried on the ocean bed under sediments for millions of years. They are exposed to high pressure and temperature for all the years which creates oil and with greater pressure and temperature form natural gas
2. Minerals generally form when lava from oceanic volcanoes or oceanic ridges solidifies on the oceanic bed. Example: metallic sulphides
3. Polymetallic Nodules are formed by concretion of lumps of minerals that are precipitated by seawater, accumulating over millions of years on the seafloor
4. Terrestrial mineral resources from rocks weathered on land and carried to oceans by rivers. Example: Gold, Iron, tin, barium, Zirconium and non-metals like lime, silica and even diamonds
5. Fishes, plankton, seagrass, corals form over billions of years of evolution
6. Energy resources like Tidal and wave energy are generated due to the action of gravity of the sun, moon and earth system and the wind

Economic Benefits of Marine Resources include:

1. Food security
2. Energy security
3. Livelihoods

Yet it is vital that marine resources be used in a sustainable manner to increase the economic benefits

Sustainable use of Marine Resources in India to increase economic benefits:

- Monitoring fish stock and preventing over-exploitation: According to Central Marine Fisheries Resources Institute: over 36% of fish stocks are overfished in India. Preventing fishing of juvenile fish and also fishing during breeding season.
- Preventing harmful methods of fishing like bottom trawling, Cyanide fishing and Dynamite fishing

- Promoting clean energy to reduce dependence on fossil fuels like petroleum and natural gas. India targets 500 GW of renewable installed energy capacity by 2030. Additionally, India's tidal energy potential is 12 GW
- Eco-tourism can help improve economic benefits of marine resources while protecting the natural marine resources. For example, training in eco-tourism around corals can also help report on coral bleaching and destruction by tourism operators whose livelihoods depend on them.
- Increased research and development in Clean Energy to harness Tidal and wave energy, including development of battery and storage systems
- Leveraging backwaters and brackish water areas in India's coastal states to grow marine resources like Cage Aquaculture under **Blue Economy Policy**
- Integrated multi-trophic aquaculture in which byproducts of one species is recycled as inputs for another. Example: Aquaculture is combined with inorganic extractive (ex: seaweed) and organic extractive(ex:shell fish) aquaculture to create balanced systems for more sustainable use
- Developing best practices for sustainable mining of Polymetallic nodules in India so that the natural marine resources, biodiversity is not threatened

Conclusion:

Thus, measures taken by India like Blue Economy Policy, Pradhan Mantri Matsya Sampada Yojna, Guidelines by CMFRI to prevent juvenile fishing, notifying the minimum landing size for commercially important fishes, are a positive step in the direction of sustainable use of marine resources. Further, training local communities and ensuring participation will also contribute towards sustainable increase of economic benefits of marine resources in India and achieving SDG 14 Life Below Water.

5. Retreating glaciers in the Himalayan region are posing the double whammy of droughts and floods. Illustrate with examples.

Approach

1. ***The key demand of the question is to investigate the environmental impact of retreating glaciers in the Himalayan region, particularly the role they play in generating droughts and floods.***
2. ***The perspective of the question is both analytical and consequential, also the tone of the question is critical.***
3. ***The intro part should consist of brief information about retreat of glaciers in the Himalayan region, with explaining their reasons for occurrence.***
4. ***Discuss the various environmental impacts of glacier retreat, specially their role in drought and floods.***
5. ***Give a brief conclusion with way forward.***

Hints:

Glaciers may retreat when their ice melts or ablates more quickly than snowfall can accumulate and form new glacial ice. Higher temperatures and less snowfall have been causing many glaciers around the world to retreat recently. A recent study conducted by the ORF shows that significant areas of glaciers in the Himalayan Hindu Kush region are retreating at an alarming rate. According to this assessment of climate change, the country's glaciers and water resources will be at further risk without local actions. However, their outcomes for the region's water regime, especially the groundwater, is yet to become clear.

Retreating Glaciers: Threats of Flood and Drought

- Retreating glaciers threaten regional water security.
- Retreating glaciers contribute to the formation of glacial lakes when glacial melt water and debris such as dirt and rock accumulate in mountain depressions.

- Recent study mentioned that approximately 25,614 glacial lakes exist in the region.
- More lakes would result in more frequent glacial lake outburst floods.
- Such events wreak destruction on small settlements and other infrastructure such as dams and hydropower plants downstream.
- With changing socioeconomic conditions and rapidly rising demand for water, water security in Himalayan Hindu Kush region is also threatened.
- Approximately 2 billion people depend on glaciers in the Himalayan Hindu Kush, to fulfill their water needs, like drinking, irrigation, and energy.

Reasons for Retreating Monsoon:

- In a recent study on the state of more than 250 glaciers in the Suru River basin in northern India, scientists found an increase in debris cover of almost 62% from 1971 to 2017.
- Carbon blankets on ice caps absorb more solar radiation rather than reflecting, which intensifies retreat further.
- Also, atmospheric warming and an increase in the anthropogenic footprint in glacier and periglacial regions results in rapid retreating.
- Besides these, many topographic and geological aspects also affect glacier health.
- Infrastructure development in the Pangong region by India and China will be another contributing factor for the melting of glaciers.

Conclusion:

Study says that unless a coherent nationwide policy is developed for springs and Himalayan groundwater, villages and towns in the region will face a severe water crisis in coming decades. Hence, a regional approach is necessary for the protection of the Himalayan Hindu Kush regions' interconnected systems. Countries that share the hydrological boundaries must come together to understand the nature of the resource, share data with one another, and contribute to comprehensive planning.

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Section - B

6. *How does geographical location affect international trade? Also, assess the impact of globalization on international trade.*

Approach

1. ***Introduction: Briefly mention the volume and significance of international trade and key geographical points which enjoy greater trade volumes due to their location***
2. ***Explain in detail how geographical location affects international trade.***
3. ***Provide examples to substantiate each factor***
4. ***Discuss how globalisation impacted international trade***
5. ***Conclude with measures that India can take to leverage its location as well as globalisation for international trade***

Hints:

Geographical location has a significant bearing on international trade which is demonstrated historically by the Silk route and in modern trade by larger trade volumes across Suez Canal, Strait of Malacca and Panama. In 2021, the Ship Ever Given blocked the Suez canal for over a week costing the global economy $ 54 billions.

Thus, Geographical location has significant effect on International trade as follows:

- **Availability of Natural harbours** which supports maritime trade for example Mumbai, and Kochi in India
- **Near the poles, Ice-free ports** provide an important trade free advantage. Geographically, such ports are located along the route of warm ocean currents which keeps them ice-free. For example: Port of Murmansk in Northwestern Russia remains ice-free due to the warm North Atlantic Drift or Ports of Alaska remain ice-free due to warm Kuroshio current
- **Canals and waterways** help increase connectivity and reduce the transportation time for international trade. For example, about 12% of the global trade pass through Suez Canal that connects Mediterranean sea to Red sea and 5% through Panama canal which connects the Pacific with Atlantic Ocean
- **Natural resources available** in a country are also affected by Geographical location, which in-turn influence the trade potential of the country. For example, middle east countries dominate oil production and trade.
- **Culture and climate** affected by geographical locations which influenced the consumption preferences of people and by extension the trade: for example, Europe has historically demanded spices where they were as valuable as gold because spices were used to keep the food especially meat fresh
- Britain pioneered industrial revolution also due to its geographical location: as an Island country it was relatively more protected from the wars ongoing in Europe and could divert resources towards industrialisation

Impact of Globalisation on International Trade:

Globalization is a process of interaction and integration among the people, companies, and governments of different nations and has a significant inter-dependence with international trade.

- Globalisation creates an exchange of cultures including food and clothes which creates demand for international trade to fulfill cultural preferences. For example, international cuisines and franchises are now found in India
- Ease of global connectivity driven by information and communication technologies also made trade in services possible. For example Business Process Outsourcing (BPO) centres in India serving International clients
- Facilitate foreign investments like through Multinational Corporations which further encourage international trade
- Globalisation compelled international rules and legal regimes to be created to safeguard stakeholders and make international trade smoother
- As costs of manufacturing can be made more efficient by sourcing raw materials and labour from cheaper countries: Globalisation has made supply chains more interconnected
- Globalisation facilitated human travel and exchanges which further boosted international trade
- Negative impacts of globalisation on international trade include exploitation of labour in developing countries, environmental destruction (waste and pollution), piracy, supply chain bottlenecks and large scale domino effect of one market on another

Conclusion:

As globalisation and geographical factors play a significant role in International trade measures by India to leverage these factors like SAGAR initiative, Asia-Africa growth corridor, Global branches of Public Sector Units like ONGC Videsh, and India's interest in building the Kra Canal are all positive steps to leverage geographical factors and globalisation for international trade. Measures like diplomatic

engagements with Central Asian region, Indian Ocean Region, African region is a way forward to leverage geographical factors and globalisation for boosting India's international trade.

7. *What is the difference between delta and estuary? Discuss the factors responsible for the formation of both of them in the context of India.*

Approach

1. ***The key demand of the question is to analyze the formation of delta and estuary along with key differences.***
2. ***The perspective of the question is analytical, and the tone of the question is positive.***
3. ***Intro part should consist of a brief summary with defining delta and estuary.***
4. ***Examine the various factors associated with the formation of delta and estuary.***
5. ***Conclude briefly.***

Hints:

Deltas and estuaries are fluvial landforms with many similarities. Deltas form at the mouths of rivers that carry enough sediment to grow outward, while estuaries form in areas where the sea waters flood up into the river valley.

The main differences between Delta and Estuary are as follows:

Delta

- Delta is a landform created due to the deposition of sediments carried by water in the river. These landforms form at the point where a river connects to the ocean.
- The shape and the size of the deposition depend on the watershed process and the receiving mechanism. On the basis of shape, Arcuate, Bird's foot and Cuspate are the main types of delta.
- Deltas are formed in the regions of low tides and coastal plains.
- Deltas are fertile lands.
- In India, Ganga and Brahmaputra, Krishna, Kaveri and Mahanadi form delta.

Estuary

- The sharp edged mouth of rivers, devoid of any deposits is known as Estuary. An estuary is a partially enclosed coastal water body where freshwater from rivers mixes with the saltwater from the ocean.
- Here, the mix of seawater and freshwater results in brackish water, which is somewhat salty but not salty as seawater.
- Regions of high tides and rift valleys witness Estuaries.
- Estuary does not have fertile lands.
- In India, Narmada and Tapi rivers form Estuaries.

Factors responsible for the formation of Delta and Estuary in the context of India:

As a river continues its course towards the sea, It deposits the materials carried in suspension. The deposit accumulates in a low fan shaped slope in which the river splits or distributes itself in channels which diverge. This portion marks the beginning of the Delta, a name taken from the Nile outlet to the sea where its shape resembles the Greek letter delta.

For the formation of delta the following conditions must hold good:

- The coast at the mouth of the river must be sheltered.

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- There must be an absence of currents and tidal movements in the water of the sea into which the river empties itself.
- The velocity with which the river flows into the sea must not be sufficiently great to carry the suspended material far away from the coast.

In the context of India, most of the east-flowing rivers like Ganga, Mahanadi, Godavari, Krishna, Kaveri fulfill the above mentioned conditions and thus make fertile deltas. On the other hand west-flowing rivers like Narmada and Tapi do not fulfill these required conditions and they flow in rift valleys. The initial historical deposits brought by these rivers were filled in several cracks and crevices of the rift valleys and a very small amount of deposits could reach the mouth of the river which was not sufficient to make the shape of a delta. Another reason for absence of delta in the west-flowing rivers Narmada and Tapi is that their mouth regions experience high tides which do not allow sand and silt to deposit and make a delta shape but the deposits are readily mixed in the sea water by the high tides and only estuaries are formed.

Delta and estuaries have important civilizational, agricultural, economic and ecological significance. They are important biodiversity hotspots and act as buffer zones in the event of cyclones and tsunami like disasters.

8. *What are the determining factors of cropping patterns in India? In what way have the cropping patterns changed after the introduction of the Green Revolution programme?*

Approach

1. ***The key demand of the question is to analyse the impact of the Green Revolution programme on the cropping patterns in India.***
2. ***The perspective of the question is evolutionary and informative, also the tone of the question is positive.***
3. ***The intro part should include the cropping pattern in India and associated factors.***
4. ***Trace the impact of the Green Revolution programme on the changing cropping pattern in India.***
5. ***Conclude briefly with the way forward.***

Hints:

The type and arrangement of crops in time and space is called a cropping pattern. It can also be defined as the proportion of area under different crops in a unit area at a time. It includes the annual order and spatial arrangement of crops and fallows on a given area. The cropping pattern is determined by rainfall, climate, temperature, soil type and technology, thus varies with location and time.

Factors Associated with Cropping Pattern in India:

Physical Factors:

- The cropping pattern of a particular region of the country depends upon its soil quantity, weather, climate, rainfall etc.
- For example, in a humid region where there is a possibility of heavy rainfall and water-logging, people would prefer to cultivate rice whereas in a dry region, farmers can cultivate coarse cereals like bajra, jowar etc.

Technical Factors:

- The cropping pattern also depends upon the technical factors such as nature and capacity of irrigation facilities available in a region, availability of improved seeds, chemical fertilizers etc.
- With the development of irrigation facilities, the entire method of cultivation being followed from the traditional period is bound to change.

- With this, new and better crop rotation system can be followed and new and superior crops also can be grown.
- In India, due to extended irrigation facilities, the cultivation of sugarcane, tobacco, oilseeds etc. have increased substantially.
- Moreover, with the availability of irrigation water, even double or triple cropping is also successfully done.
- Again, in recent years due to the absence of irrigation facilities in some other parts of the country, the concept of "dry land farming" is also gaining its importance.

Economic Factors:

Economic factors are playing the major role in determining the cropping pattern in a country like India. Some of them are as follow:

- **Price and income aspect:** Cropping pattern is directly related to the price and income aspect.
- **Farm Size:** Farm size influences the volume of production, like for small farms, farmers are very much interested in producing food grains for household consumption.
- **Tenure:** Land tenure system prevailing in the country also influences the cropping pattern.
- **Availability affirms inputs:** Farm inputs such as - seeds, fertiliser, controlled and assured water supply through irrigation etc. are the most influential factors in cropping.

Government Action:

Government policies play a very significant role in deciding the Cropping pattern. Supply of inputs by the government, intensive schemes for various crops, various government campaigns like growing more food or any legislative provision by the government, transportation and marketing provision also help to finalize the cropping pattern in the country.

Cropping Pattern in the Post-Green Revolution Period:

In the Post-Green Revolution Period, cropping pattern in India saw two significant changes.

- First - Cropping pattern changed in favour of nonfood grains at the cost of food grain crops. The average share of non-food grains has been continuously increasing, from about 19 per cent of gross cropped area (GCA) during the 1960s to about 28 per cent during 2012–13.
- Second - The dominant crop in India - rice produced at constant acreage share at around 22 per cent of GCA.
- But, high-value non-food grain crops like oil seeds, spices and fruits showed increasing acreage shares, particularly in the period after 1990–91.
- The increase in area shares of non-food grains came mainly from the decline in area shares of coarse cereals and total pulses.
- Also, the per capita consumption of fruits and vegetables increased from 51 kg/year to 62 kg/year.
- The consumption of edible oils also increased significantly during this time.
- Both domestic and export demand contributed to the increase in area under fruits.
- The northern region, which includes Punjab and Haryana, the major beneficiaries of Green Revolution, showed a sharp increase in concentration in their cropping pattern towards cereals.
- The eastern zone diversified its cropping pattern until 1990 and thereafter has concentrated towards cereals.

- Finally, we can say that, all other regions in India as a whole have diversified their cropping pattern away from cereals toward high-value crops.

Conclusion:

The green revolution led to high productivity of crops through adapted measures, such as - increased area under farming, double-cropping, which includes planting two crops rather than one, annually, adoption of HYV of seeds, higher use of inorganic fertilizers and pesticides, improved irrigation facilities, and improved farm implements and crop protection measures and modifications in farm equipment. The green revolution, which was beneficial in ensuring food security, has unintended but harmful consequences on agriculture and human health. This requires new interventions to be tested and piloted before implementation, and continuous evaluation of the harms and benefits should guide the implementation.

9. Explain the resource-base and other locational factors that led to the development of the Ukraine Industrial Region. Are Ukraine's vast natural resources one of the latent reasons behind Russia's recent invasion?

Approach

1. ***Introduction: Briefly describe Ukrain's industrial region and what it comprises of***
2. ***Explain the resource base and other locational factors that led to the development of Ukraine's industrial region***
3. ***Include a map diagram***
4. ***Discuss whether Ukraine's natural resources are one of the latent reasons for Russia's invasion***
5. ***Conclude with the need for restoration of global order and respecting a country's sovereignty from a political-geography perspective***

Hints:

Industry in Ukraine amounts to around 28% of its GDP and industrial development was driven on the resource base of oil and gas, metals and rare earths including Iron, Lithium, Titanium Gallium, manganese and, food commodities like wheat and corn. It is said that a driving factor of Russia's invasion of Ukraine.

Resource-base and other locational factors that led to the development of the Ukraine Industrial Region:

1. Gas Reserves: Ukraine has the second largest gas reserves in Europe
2. Metals: Ukraine has vast reserves of metals that are in high demand across the world
    a. Lithium: concentrated in Zaporizhzhia oblast (Kruta Balka area), Donetsk (Shevchenkivske field), and Kirovohrad (Polokhivske field, Dobra area)
    b. Titanium: up to 20% of the proven world reserves of titanium ores are situated in Ukraine. Additionally, Ukraine is one of the few countries with closed-loop production of Titanium from mining, processing of ores and producing finished products
    c. Other metals include: Iron, Manganese, Gallium, Germany and rare earth elements
3. Food: wheat corn oil seeds: Ukraine is one of the largest distributors of wheat, corn and oil seeds and exports of grains drive Ukraine's economy
4. Locational factors:
    a. Sevastopol port on the Crimean peninsula plays a strategic role in connectivity of Ukraine with Black Sea and by extension the Mediterranean sea
    b. Port of Odessa is the largest and only deep water port of Ukraine with access to railways which thus allows transfer from sea to ground

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5. Ukraine is also home to key rivers that make it a significant bridge between the Black Sea, Europe and Russia:

   a. Danube connects Ukraine to the European mainland

   b. Dniester travels through Moldova to the Ukrainian border with Poland

   c. Dnieper provides a link with Belarus and Russia

6. However, a significant portion of Ukraine's resource-base and locational factors are in the Donbass region which enjoys the heavy industry base including coal and metallurgy. This region is made up of Donestk and Luhansk which are home to pro-Russia separatists and this has caused a breakoff of Ukraine's industrial resource based and locational advantages too. It is said that Russia is leveraging this separatist tendency to acquire the industrial resources

Whether Ukraine's natural resources are one of the latent reasons for Russia's invasion

- Russia's advance into Donbass region has helped it gain control of the industrial base in coal and metallurgy
- Russia supplies around 50 % of Europe's gas consumption via the Nord Stream 1 pipeline as well as the Ukrainian network. As the bulk of the supply goes through Ukraine, Russia has to pay a transit fee to Ukraine. Thus, avoiding this transit fee could also be a motivating factor for Russia's invasion of Ukraine
- Russias previous invasion of Crimea in 2014, brought an estimated 80 percent of Ukraine's offshore hydrocarbon deposits under Russia's control
- One-third of Ukraine's corn crop, for example, is grown in Russian-occupied areas
- 30 percent of Ukraine's wheat production is concentrated in the Donbas, Zaporizhzhia, Kherson, and Odesa oblasts all of which Russia has been trying to control

Conclusion:

Natural resources, geographical location of any country play a significant role in its comparative and strategic advantage. These factors demonstrate that Ukraine's vast resources could be one of the latent reasons behind Russia's invasion of Ukraine. However, Ukraine's vast natural resources are not the sole reasons for the conflict, there are many other geopolitical factors responsible for Russian invasion of Ukraine. The taproot of the crisis is the American-led effort to make Ukraine a Western bulwark on Russia's borders. That strategy has three prongs: integrating Ukraine into the EU, turning Ukraine into a pro-Western liberal democracy, and most importantly, incorporating Ukraine into NATO.

10. Montane forests have different characteristic vegetation in northern and southern parts of India. Examine the statement.

Approach

1. ***The central demand of the question is to analyze the different features of the Montane Forest found in northern and southern India.***
2. ***The perspective of the question is consequential and viewpoint based, and the tone of the question is critical.***
3. ***The intro part should contain various aspects of the Montane Forest of India.***
4. ***Discuss the various characteristics of Montane Forest found in northern and southern India.***
5. ***Give a brief conclusion.***

Hints:

Montane forests are the natural vegetation found in the mountains. As the temperature decreases with increase in altitude, the natural vegetation covers at altitude changes. It is affected by the cold

climate at moderate altitudes. Dense forests are common in such areas. Rainfall and temperate climate change the natural vegetation in mountainous forests. In India, montane forests can be divided into two types – northern montane forests and southern montane forests.

Northern Montane Forests

These forests include the Himalayan moist temperate forests, Himalayan dry temperate forests, and Alpine forests.

Himalayan Moist Temperate Forests:

- Climatic Conditions: Found mainly in regions having rainfall between 100 cm and 300 cm and temperature ranges between 12°C and 13°C.
- Distribution: Himalayan zone from Kashmir to Sikkim and Arunachal Pradesh.

Characteristic Features:

- Mixed species of broad-leaved evergreen trees and conifers. These forests also contain scrubs, ferns and creepers.
- Important Species of Trees: Oak, fir, spruce, maple, yew, deodar, birch and cedar. The timber is used for commercial purposes.

Himalayan Dry Temperate Forests

- Climatic Conditions: Found in areas receiving less than 100 cm of rainfall and are found at a height above 1500 m.
- Distribution: Ladakh, Chamba, Sikkim, and in the inner Garhwal regions.
- Important Species of trees are ash, junipers, maple, and oak.
- The timber can be used for construction work and for making light furniture.

Alpine Forests

- Climatic Conditions: Available at an altitude of 2800–4000 m.
- Distribution: Found in high altitudes of the Himalayas running from the northwest to the northeast frontiers.

Characteristic Features:

- Deciduous forests are found at the foothills of the Himalayas.
- Wet temperate types of forests are found between 1000 to 2000 m height. Trees are broadleaf such as oak and chestnut.
- At a height of 1500– 3000 m, Temperate forests are found. Coniferous trees predominate in this region. eg. Pine, cedar, fir, deodar, and spruce. These forests are found primarily on the southern slopes of the Himalayan Mountains.
- Temperate grasslands are found at higher altitudes.
- Alpine vegetation can be found at much higher altitudes, such as above 3600 m height. eg. Silver fir, pines, junipers, and birches.
- At higher altitudes, mosses and lichens found which form part of the Tundra vegetation. Important vegetation at this height are silver chestnut, oak, fir, juniper, pine, and birch. The trees can be used for making furniture, wood pulp, and plywood.

Southern Montane Forests

Characteristic Features of Southern Montane Forests:

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- These are found in high rainfall regions having annual rainfall of more than 150 cm. Temperature of these regions varies between 18°C and 24°C. These forests are found mainly in the Nilgiris, and the Western Ghats.
- These forests include both tropical and temperate vegetation like Shola forests around Nilgiri hills.
- Hilly regions have temperate vegetation, while lower regions of the Western Ghats have sub tropical forests.
- Important species of trees are Rhododendron, laurel, wattle, plum, and magnolia.

Conclusion:

Thus we can see that mountain forests contribute significantly to the environment and produce a large number of vegetation. They provide both fuel and timber to local and non-local consumers. These forests are an important feature of complex land-use patterns in many highland locations. Mountain forests must therefore be managed as part of larger land-use systems, watersheds and mountain ecosystems. These forests, with their many roles, should be included in all activities aimed at hill area development.

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