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ForumIAS
MGPQ45502**ForumIAS**

ACADEMY

GENERAL STUDIES

Name Of Candidate	Archita Goyal	Roll No.	1910059627
Email Id.		Date:	19 November
Mobile No.			

Time Allowed: Three Hours

Maximum Marks: 250

INDEX TABLE			INSTRUCTION	
Q. No.	Max. Marks	Marks Obtained		
1			1. Please do furnish Name, Email, Roll No and Mobile in the answer sheet. 2. There are TWENTY questions printed in ENGLISH, all questions are compulsory. 3. The number of marks carried by a question/part is indicated against it. 4. Answers must be written in the medium authorized in the admission Certificate, which must be stated clearly on the cover of this Question-Cum-Answer (QCA) Booklet in the space provided. 5. Word limit in questions, if specified, should be adhered to. Any page or portion of the page left blank in the Question-Cum Answer Booklet must be clearly Struck off.	
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13			Any specific messages for ForumIAS Mentors/Evaluators with respect to your copy? Write it here. ----- ----- ----- ----- -----	
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Total Marks:				
Remarks:			Start Time 	End Time
			Mode Of Examination :	Online ☒ Offline ☐
			ECN CODE:	Evaluation Date:

Parameters	Excellent	Very Good	Good	Average	Poor	Very Poor
Language						
Structure						
Presentation						
Handwriting						
Content						
Attempt						

ADDITIONAL COMMENTS

1. Ocean warming has caused coral reef depletion via bleaching as well as deadly outbreak of disease. Examine.

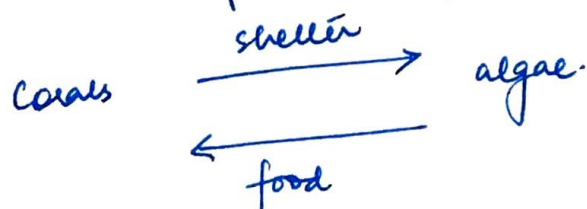
Oceans constitute 75% of the total Earth. Our oceans have been warming at a rate, far greater than that caused by natural forces. Since the 1970s, a mean rise of over $0.013 - 0.027^{\circ}\text{C}$ has already been observed.

Ocean warming in turn causes $\left\{ \begin{array}{l} \text{thermal expansion} \\ \text{of water} \\ \text{melting of ice} \end{array} \right.$
Hence, having wide ramifications. $\left\{ \begin{array}{l} \text{glaciers} \\ \text{bergs} \\ \text{sheets} \end{array} \right.$

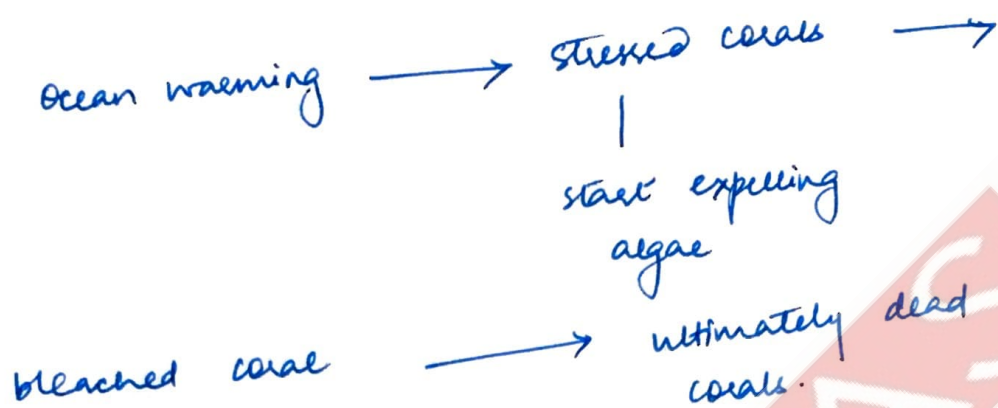
Coral Bleaching -

Corals are considered the tropical rainforests of the oceans. They are not only rich in species variety but also are of the most productive zones of the Earth.

Corals are basically sea anemone polyps in a symbiotic relationship with algae (zooxanthellae)



However, since corals need the temperature of oceans to be $25-27^{\circ}\text{C}$ for their existence,

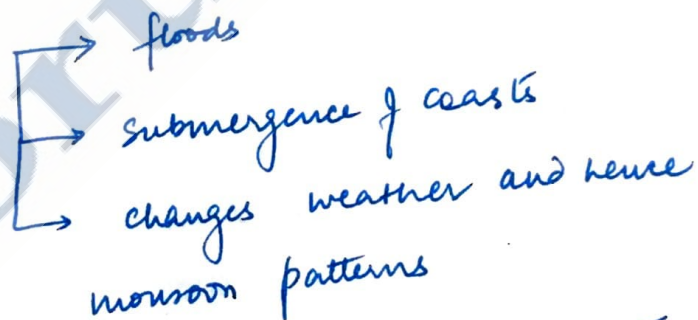


Since algae provide the color to corals,

if algae are absent, corals appear bleached

Diseases -

Sea level rise



This results in [contamination of water
proliferation of vectors
associated with communicable
diseases such as mosquitoes]

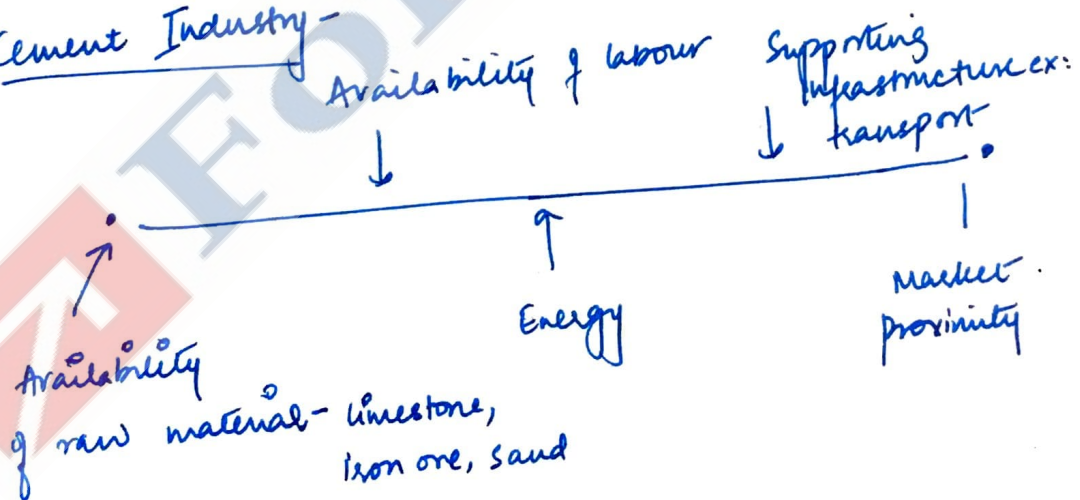
The above reasons lead to spread of diseases such as cholera, dengue, malaria, chikangunya etc.

As most of the ocean warming is attributed to anthropogenic factors, we must collectively address the same.

2. Enumerate the factors responsible for location of cement industry in India. Explain why mainly located along Vindhya range.

Industries are located in accordance with the availability, accessibility as well as affordability of its basic factors of production. Hence, the location of industries will be such that the cost of production is minimised (Weber's theory).

Cement Industry -



Along the Vindhya range -

1. Raw material - [Sand can be extracted from the rift valley, riverbeds of Narmada, Tapi presence of limestone]

ii) Labour — States like Maharashtra, MP have an influx of migrant as well as indigenous labour.

iii) Energy — easy availability of hydroelectricity from multipurpose dams

iv) Supporting/Infrastructure Enabling

- good road connectivity for transportation
- suitable government policies
- availability of credit

v) Market

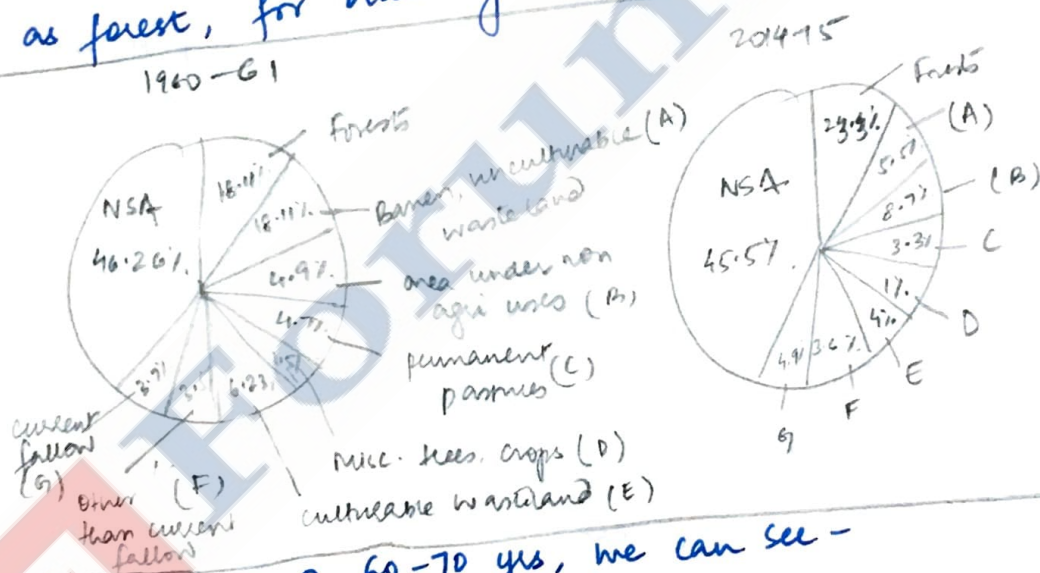
- proximity to big cities such as Ahmedabad, Bhopal, Indore etc.
- road connectivity for transportation

Hence, due to combination of above factors, the cement industry is largely concentrated near the Vindhya range.

4. The fast rate of urbanisation is leading to fundamental changes in land use patterns. Discuss.

Land occupies 25% of the Earth's surface. Around 95% of human needs are satisfied through it, hence considered as one of the most important natural resource.

Land use pattern refers to the account of usage of land - for example for cultivation, as forest, for buildings etc.



In a matter of 60-70 yrs, we can see -

- i) area of non-agricultural uses increased
- ii) area of wastelands decreased
- iii) area of pastures, grazing lands etc. decreased.

The change in pattern can be attributed to :-

- increase in population
- conversion of wastelands, forests, agriculture land to habitations
- expansion of urban cities in terms of peripheral area.

Hence, fast scale urbanisation which is a result of demographic, economic, social factors has led to a rapid change in land use pattern.

Despite the economic benefits of urbanisation, it is to be noted that diversion of land to non cultivable purposes has had a heavy impact on quality of land.

Hence, appropriate measures to restore degraded land as well as afforestation must be actively pursued. As highlighted

by NITI Aayog, sustainable urbanisation is the key to sustainable development. (India at 75 doc)

5. What do you understand by geoheritage? why neglected?

Nature has its own creative forces contributing to earth's heritage.

Geo-heritage refers to geographical features

caused by various natural forces, which have immense cultural, aesthetic, scientific, historical, biological or research value. for ex: Lonar lake, St Mary's Island in Karnataka etc.

Reasons for neglect in conservation landscape -

i) Lack of awareness of - [earlier generations
current generation

hence, many of the sites are in deplorable conditions as they weren't maintained earlier.

ii) Environmental reasons - [submergence of sites
natural degradation
climate change.

iii) Economic reasons - [illegal mining of minerals
pollution ex: recently
Lonar lake turned pink
due to over growth of
bacteria
destruction due to human
activities

iv) No laws/policies catering exclusively to geoheritage sites

v) State governments which are responsible for taking measures are lax.

As the geoheritage sites store the record of India's geographic evolution, necessary conservation steps must be taken.

i) A comprehensive inventory can be created by the GSI

ii) ASI has a list of monuments of national importance. The same can be maintained for geoheritage sites

iii) Create awareness among various stakeholders.

iv) Consider ~~creation~~ addition to Geopark Network (UNESCO). (Lonar lake, St Mary's Island are being considered by GSI)

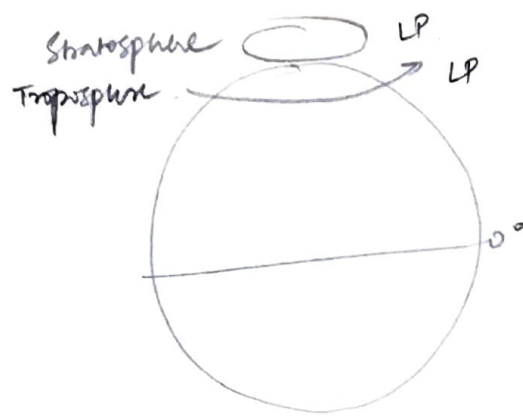
6. Discuss concept of polar vortex & explain impact on Indian climate.

Earth's climate is a result of variety of factors like pressure, temperature, moisture etc. and the interplay among them.



low temperature at poles $\Rightarrow$ cold and dense air
at poles $\Rightarrow$ sinking air at poles and high
pressure $\Rightarrow$ low pressure at troposphere and
stratosphere.

A polar vortex is a low pressure wind at the
poles which develops during winters. Basically,
there are two polar vortices — [troposphere
stratosphere.



Owing to the increase in Arctic temperatures, the polar vortex becomes weaker, hence turning into a set of meandering waves called Rossby waves. This wind brings extremely cold weather in the temperate regions like North America, Scandinavian countries etc.



Impact on Indian climate -

- i) Extremely cold winters in North India
- ii) Snowfall, fog at hilly regions.
- iii) Occasional hailstorms if moisture in atmosphere but subfreezing temperatures near Earth's surface.

8. Upwelling. Illustrate causes & regions of upwelling & socio-eco impact.

Oceans undergo a variety of movements - horizontal like waves, tides; vertical like tides, upwelling.

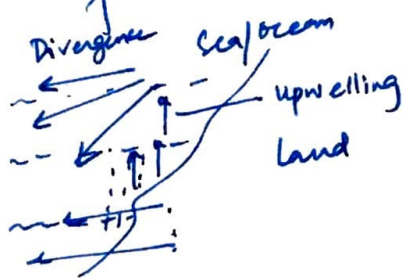
upwelling refers to the coming of deep, cold waters from greater depths of oceans to the surface of oceans. This water is not only colder, but also rich in nutrients.

Process of upwelling -

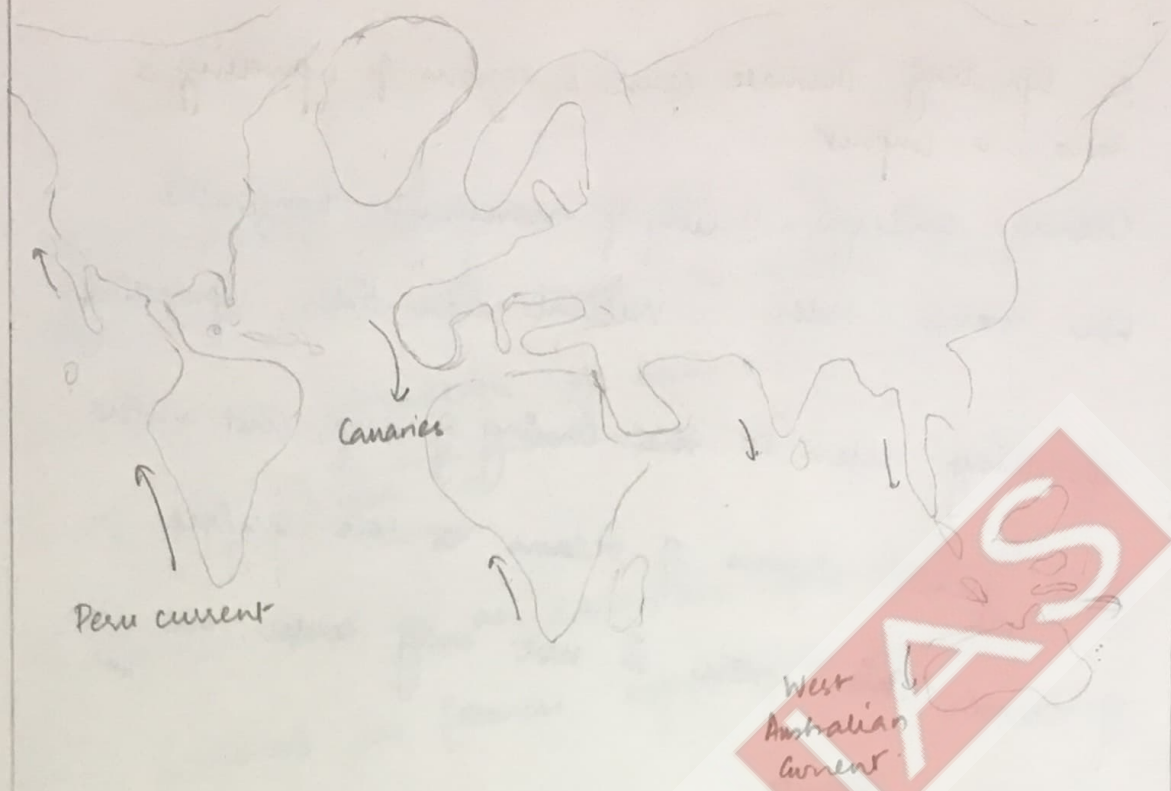


When wind blows near surface of water, the friction so created, creates stress on the water body proportional to its speed, in the same direction.

Due to the presence of Coriolis forces, the stress undergoes deflection towards the right, which is sustained till depth of 100 m (Ekman layer). This results into divergence of water from the coast. (Ekman transport)



The divergence pulls deeper waters to the surface hence resulting in upwelling.



upwelling generally occurs on the western margins of continents - ex: Peru (Peru current), East Iberian coast (Canaries current)

Socio-economic impact -

- i) upwelling brings nutrient rich waters to the surface
- ii) Nutrient rich waters lead to abundance of plankton
- iii) upwelling also results in ~~the~~ good fishing catch hence serving as factor for good fishing grounds
- iv) A healthy pisciculture industry provides livelihood to coastal communities as well as contributes to allied agricultural growth.

9. What is apiculture? Explain importance in agric & development.

Apiculture is one of the allied activities associated with agriculture. It deals with bee-keeping and production of bees wax, honey, bee venom, pollen etc.

Apiculture serves as an easy, low investment allied source of income for farmers especially in rural areas.

India's golden revolution -

currently, India produces over 90,000 tonnes of all kinds of honey combined, annually; which includes 30,000 bee colonies employing around 5 lakh persons.

Realising the importance of apiculture in supplementing farmer's income, India included apiculture in its horticulture mission in 2005.

apiculture boosting as well as considering landless beekeepers as farmers (Bikeesh Debroy Committee) can help us realise our vision of doubling farmer's income by 2022.

10. What do you understand by temp. inversion. Discuss various types

Temperature shares an inverse relationship with ~~pressure~~ altitude. As the altitude rises, corresponding temperature decreases.

However, in the presence of certain conditions, the temperature in place of decreasing, increases with an increase in altitude. This phenomenon is called temperature inversion.

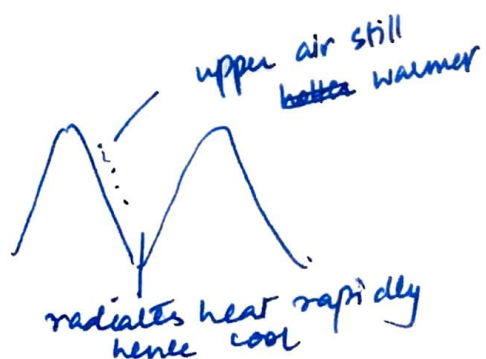
We can see temperature inversion beyond the tropopause in the stratosphere layer. With increase in altitude, temperature increases in stratosphere due to presence of ozone.

At earth, this occurs if —

- cold winter nights,
- absence of moisture
- dry wind
- clear atmosphere, no presence of clouds.

Types of inversion-

i) Mountain slope-valley -



(i) At the ground - in absence of clouds, on cold winter night. If temperature drops dew point, we can also see fog.

(ii) Frontal inversion - cold and warm fronts result in conditions of temperature inversion as warm front is above the cold front.

Implications of temperature inversion -

- Trees along lower slope/valley - bitten by frost but upper slope trees aren't
- hill stations, habitations on upper slopes
- coffee plantations, apple orchards are also along upper slopes
- temperature inversion causes fog
- stable conditions $\Rightarrow$ no rain.

Discuss the conditions required for formation of a tropical cyclone. How is a bomb cyclone different from normal cyclone?

Tropical cyclones are one of the most destructive natural phenomena that occur on the earth. A tropical cyclone is so called because they occur in the tropical regions, during late summers.

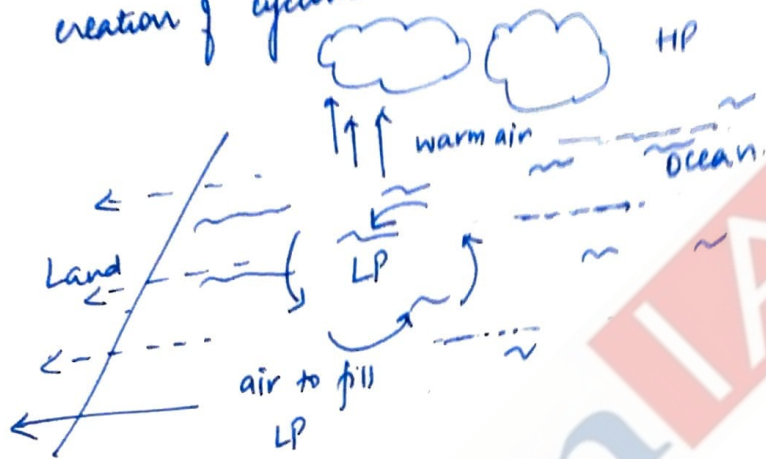
Conditions necessary for formation -

- i) Temperature of around $25-27^{\circ}\text{C}$ over ocean surface
- ii) presence of Coriolis force for deflection
- iii) high pressure situation above the ocean, in the atmosphere

Formation of tropical cyclones -

During late summers, ocean surface temperature reaches $25-27^{\circ}\text{C}$ $\rightarrow$ air over the surface gets heated $\rightarrow$ air starts to rise above hence creating a low pressure on the sea surface.

As the air rises, it cools, the low pressure created starts to get filled by neighbouring air → In the presence of coriolis forces, air gets deflected in anti clockwise direction → creation of cyclone.



This cyclone starts moving towards the land, landfall occurs when the cyclone hits the coast.

Since the direction of coriolis force is anticlockwise in the northern hemisphere, the cyclone always moves from east to west. This explains why most of tropical cyclones occur in Bay of Bengal and not Arabian Sea.

A bomb cyclone refers to an intense and violent temperate or extra tropical cyclone.

Difference between bomb cyclone and tropical cyclone-

Bomb cyclone	Tropical cyclone
occurs in temperate regions	occurs in tropical regions
move west to east as are supported by westerlies, jet stream	move east to west due to direction of Coriolis forces
predictable	unpredictable
last longer	last for relatively shorter period of time
result of occluded front	formed due to temperature-pressure differences
occurs in winters	occurs in late summers

Explain how local winds are different from planetary winds, giving examples highlight role of local winds in influencing climate, agriculture and livelihood.

Wind refers to horizontal movement of air.

Winds can be of various types - planetary whose direction remains same throughout the year; periodic - whose direction depends on certain factors and varies periodically; or local which are limited to a small geographic region and depends on local climatic conditions.

Difference between planetary and local winds -

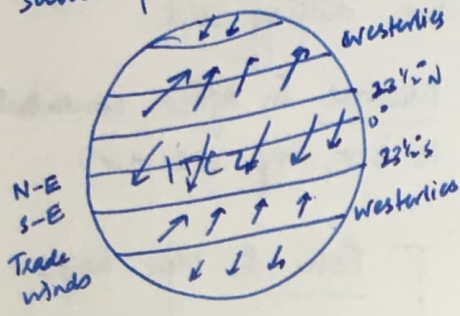
planetary winds	local winds
blow throughout the year	blow for a small range of time - depending on seasons
known as trade winds	known by local names, ex: loo in India, Föhn in Europe.

depends on pressure belts due to heating of earth

depend on local climatic conditions

Direction remains the same for entire belt -

localised to particular area, hence no effect of pressure belts.



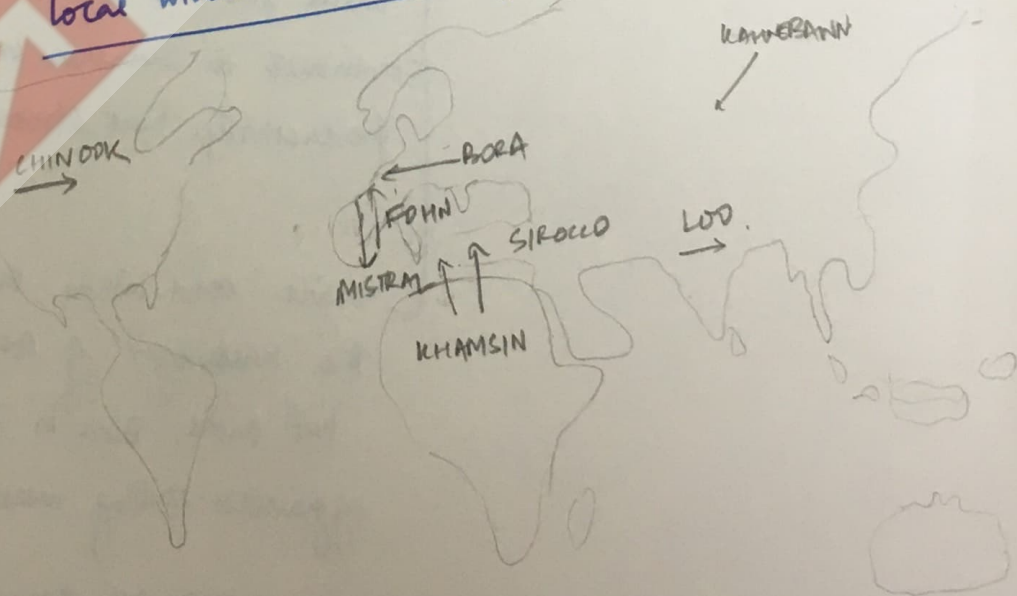
No such temperature based classification

may be hot or cold
Chinook, Bora
loo

localised
No such utility

may be beneficial or harmful depending on region [hot/cold]

local winds across the globe -



i) Role in climate

Chinook in USA melts snow
hot winds such as loo
in India make the summer
hotter, drier

hot winds such as Föhn
in Alps bring respite from
the chilling cold.

Mistral in Africa contributes
to hot, dry weather

ii) Role in agriculture

Föhn in Alps helps
viticulture farmers

loo in India
disturbs the
agricultural setting

iii) Role in livelihood

while hot winds in
cool regions bring respite
for population; in hotter
areas such as Africa, India
contribute to decrease in
productivity, heat strokes etc.

while cold winds can be
the harbinger of cool in
hot areas, Bora in Europe
aggravates chilling weather.

Hence the local winds can be beneficial or harmful depending
on time and area they blow through.

What are the factors affecting location of industries?
Discuss in context of location of pharmaceutical industry.

Location of industries is affected by the availability, affordability and accessibility of various factors of production. Since the primary aim of an industry is to maximise its profits and minimise its production costs, the following factors influence the setup of an industry -

- i) Accessibility of raw materials ex: agro processing in Punjab
- ii) Availability of cheap, productive labour ex: in UP due to migrants
- iii) Availability of easy capital, finance ex: Mumbai for Cotton industries
- iv) Transport Infrastructure - roads, highways etc.
- v) Government policies - ex: automobile industry in Gujarat, iron industry in Thailand
- vi) Accessibility or presence of market - ex: beef industry in Chicago

location of pharmaceutical industry -

i) Since most of the APIs (active pharmaceutical ingredients) are imported, industries are generally located near port areas ex: Mumbai

ii) Availability of labour - available near port areas, big cities

iii) Transport, road connectivity - as pharma industry is a footloose industry, connectivity is important since raw material can be fetched easily from anywhere.

iv) government schemes & policies - for example, government launched production linked incentive scheme, drug parks etc.

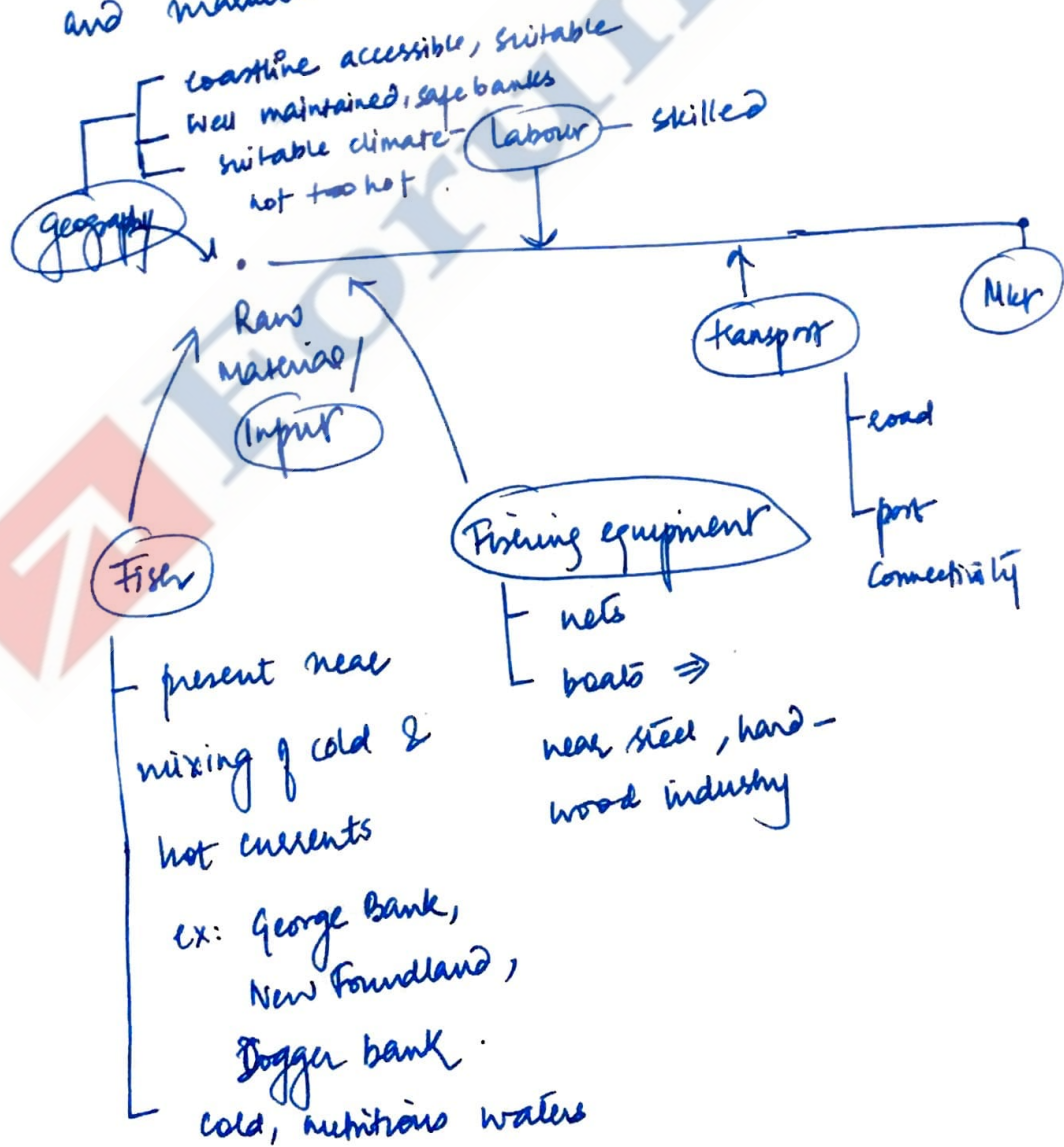
v) Availability of capital for machinery - through drug parks, common infra can be shared hence saving costs

vi) Research and development

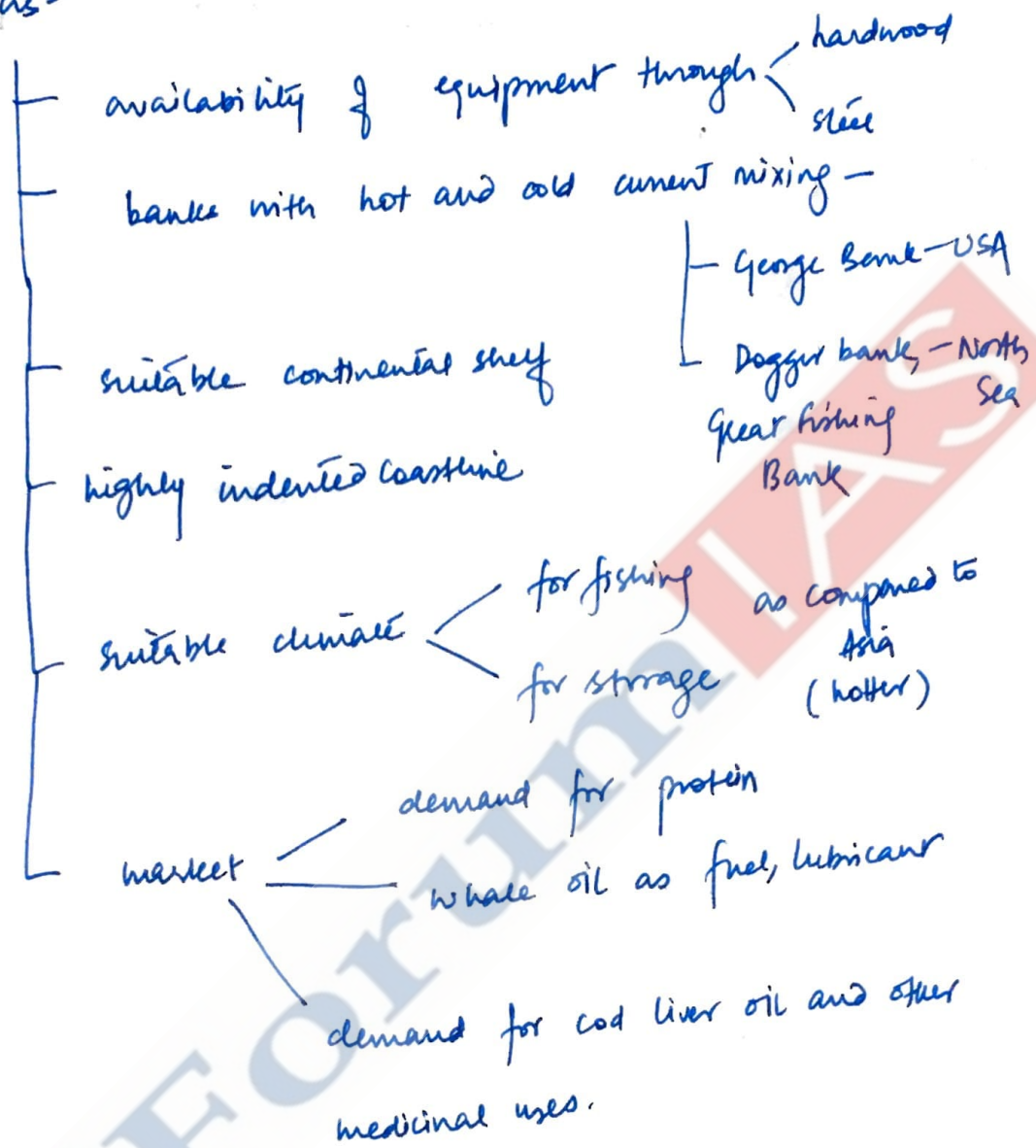
vii) Market reachability, easy export facilitation

Explain factors responsible for commercial fishing being developed in North Europe & America as compared to Asia. Also, discuss why fishing is more developed along western coast than on Eastern.

Location of fishing industry is determined by variety of factors such as availability of good catch, fishing equipments, skilled labour, cold storage infrastructure as well as demand and markets.



North America, Europe have a flourishing fishing industry as-

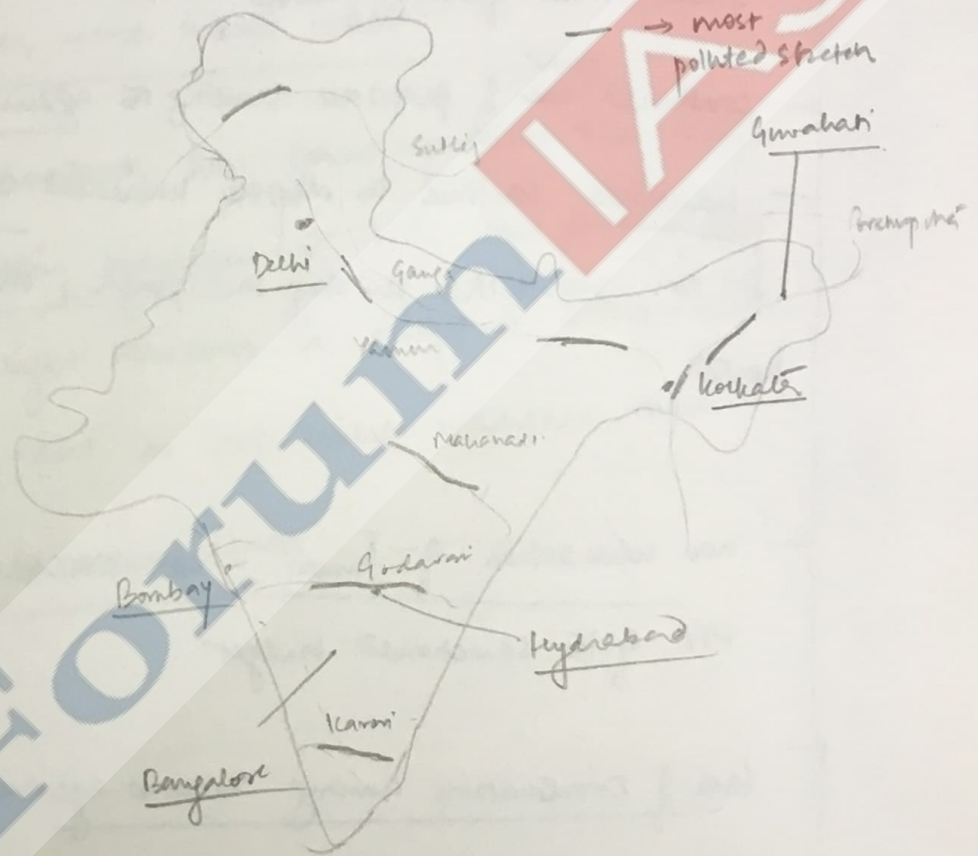


In India, fishing is more prevalent in Western coasts rather than eastern as-

- western coast is narrower
- presence of ports/harbours.
- submerged $\Rightarrow$ fishing is easier

Despite the implementation of various programmes for cleaning our major rivers, riverine pollution continues unabated in India. Explain.

According to the Central Pollution Control Board (CPCB), there are 351 polluted river stretches in 2018.



The government has taken various steps to address-

- National river conservation plan
- National water management plan.
- NGT - Central Monitoring Committee; programme on river indexing
- Special programmes such as Namami Gange.

However, despite the efforts, rivers continue to remain polluted as -

- lack of awareness among non traditional actors -
 - major population indulges in
 - pollution of rivers through tourist activities
 - disposal of plastic waste
 - idol immersion
 - lack of regular dissemination of data about quality of rivers
- continued ^{over} use of pesticides leading to agricultural runoff .
- industries continue to dispose untreated sewage -
for ex: 3500 ML per day in Ganga, only 1000 ML treated
- non utilisation of funds - ex: NMCG used only 27% of its sanctioned budget
- lack of coordination among various agencies
- decreased ecological flow thereby decreasing velocity of water and increasing siltation .
- inadequate sewage treatment plants - only 46 out of 152 STPs have been completed as of January 2020 .

To cater to the river, it is important that we take the following measures -

- awareness generation
- maintenance of c-flow
- integrated watershed development
- explore bioremediation
- recycle, reuse waste water

The government has come up with the draft river basin management bill. This is one step in the right direction to adopt a basin-unit approach, and let our rivers maintain their 'nirmal and aviral dhara'.

Explain with evidence how continental drift theory explained shifting of world continents over earth's surface. Highlight limitations.

There are many theories explaining the current geographical setting of continents on the globe, the earliest being the continental drift theory.

The continental ^{drift} theory was proposed by Alfred Wegener. According to the theory,

Initially, there existed one huge mega continent called Pangaea and one mega ocean called Panthalassa.

The Pangaea continent was divided into Gondwana and Laurasia, separated by the Tethys Sea.

Due to a combination of forces, the continents started to separate resulting into the current configuration. Drift started in mesozoic age.

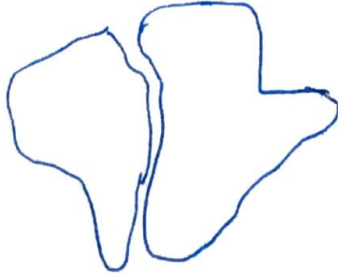
The forces responsible for this drift are -

The process of drift is still continuing

- gravitational forces
- buoyancy
- tidal currents
- pole fleeing

The following observations substantiate the theory -

- i) physical affinity of continents - South America and Africa seem to fit like a jig-saw puzzle -



- ii) Identical coastlines of all continents signify that they could have drifted after initially belonging to one continent

- iii) presence of fossils in different continents - for ex:-
Lemurs fossils were discovered in India, South America as well as Africa

- iv) placer deposits - both South America and Africa have deposits of gold; tillite deposits

- v) Botanical - presence of glossopteris vegetation in Carboniferous rocks of India, Australia, Antarctica etc.

- vi) Rocks of same age have been dated across oceans.

However, the theory was criticised as it suffered from the following drawbacks -

- i) The coastlines could have been a temporary change
- ii) Similar vegetation is also present in unrelated parts of the world
- iii) The forces responsible for the drift do not seem to be so strong to have caused the drift.
- iv) India's position is assumed to be too south.
- v) it is not clear as to why the drift began in mesozoic era.

Hence, the continental drift theory was discarded for the wide range of assumptions it had made to justify the drift.

Insensitivity towards ecology of Western ghats is making Southern states vulnerable to floods & landslides. What measures are required to arrest the widespread ecological devastation that we are facing?

The Western ghats are one of the richest biodiversity hotspots in the Indian subcontinent. They are a host to wide variety of exotic plants, animals as well as serve a habitat to ^{one of the} most critical ecosystems. However, the ghats ^{have} ~~have~~ been subjected to great destruction and degradation due to the following reasons -

i) Rapid urbanisation and expansion due to increase in population

ii) Industrialisation leading to encroachment of lands in and around ghats and related deforestation.

iii) Developmental activities such as construction of highways, railways etc.

iv) Widespread tourism leading to

v) Mining activities, over exploitation of forest resources.

— { pollution by tourists
construction of resorts, hotels etc.
disturbance of ecological balance.

creation of mass infrastructure on the fragile western ghats have led to -

- destruction of habitat of biodiversity
- increased vulnerability to disasters such as ~~earthquake~~ landslides, floods, avalanches - Kerala
floods, landslide in Udupi, Idduki etc.
- ultimately disturbing the ecological balance.

In this light, protection of western ghats becomes of utmost importance.

Measures to be taken -

- i) Regulate tourist activities such that no over burdening happens
- ii) Appropriate land use planning.
- iii) declaration of eco sensitive areas within the ghats as suggested by the Machan Gadgil and Kasturirangan committee.
- iv) Hope in tribal communities and use of indigenous knowledge in conservation efforts

It is important to strike a balance between development and environment; for it is not only important to

cater to the needs of present generation but also remember
that we've borrowed ~~the~~ ^{earth} from the future (and not
inherited from our ancestors).



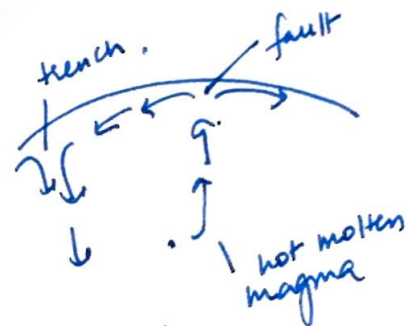
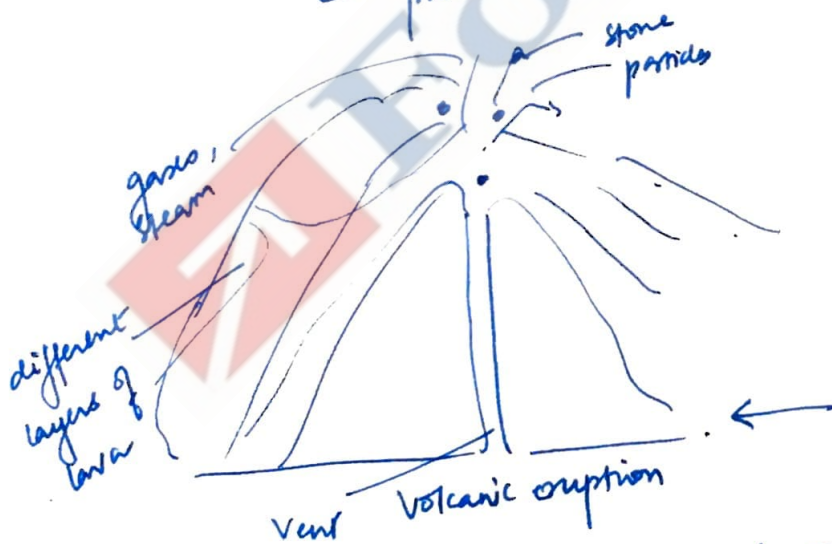
Explain the origin and types of volcanoes. Also, explain various landforms associated.

A volcano is a vent in the earth's crust which releases magma from beneath the earth, along with ashes, dust, steam and gases such as hydrogen and sulphur dioxide.

Origin of volcano -

i) Heat under earth's surface due to → rocks metamorphose → magma melts → rise of convectional currents

chemical reactions
radioactive forces
primordial heat



magma reaches the surface, through the vent explodes / exhalates fumes.

ii) Earthquake - leads to release of stress & magma.

The type of volcano depends on the nature of explosion as well as the nature of lava.

On basis of Type of lava

Acidic / Composite -

- contains silica
- lava is very viscous, $\therefore$ doesn't flow far
- layered structure
- ex: Mt. Stromboli

Basic / Basaltic -

- consists of basaltic lava
- is liquid, flowy due to absence of silica
- formation of sheets
- ex: Hawaiian basaltic islands.

On nature of explosion

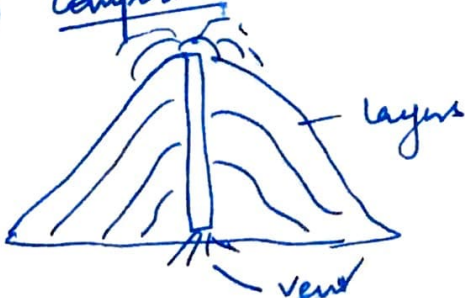
- Explosive - with heavy outpour of lava
- Exhalative - gaseous outpour
- Fissure vent - through fissures.
- Subaqueous - under ocean

There are various landforms associated with volcanoes -

Extensive volcanoes

on surface

i) Composite - ex: Mt. Vesuvius



Intrusive volcanoes

inside earth

ii) Batholiths -



dome shaped magma, huge in size

- ii) Shield - flows to long distances; wide base due to basalt



- iii) Fissure type / flood basalt - layered, undulating flat surface
ex: Ocean traps

- iv) Caldra - crater turned into lake - most explosive so much so that collapsed on itself rather than building a structure
ex: Lonar lake



- v) Cinder cone - steep conical hills of pyroclastic fragments around vent



- ii) Stocks -

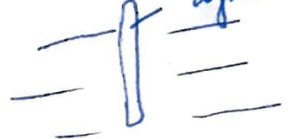
Batholiths of smaller size

- iii) Laccoliths - misshapen volcano - volcano inside surface.

- iv) Sill - lava parallel to layers of rocks - near horizontal



- v) Dykes - vertical solidification of lava



Hence, despite the negative effects of volcanoes, volcanoes result into formation of various kinds of landforms seeing as a tourist attraction as well as contribute to geoheritage.

How does sand mining affect hydraulic structure.
What measures can be taken to mitigate.

Sand is considered as a minor mineral. It can be mined from through open pits.

- riverbeds
- beaches, coastal belts
- agricultural fields
- floodplains
- reservoirs, lakes etc.

Since it is extracted from water based regions, extraction of sand affects hydraulic structure -

- i) changes in water flows, marine currents
- ii) affects flood regulation
- iii) lowers water table, pollution of water table
- iv) coastal erosion
- v) Damages to coastal / river infrastructure —
 - bridges
 - embankments
 - levees.

This results into decline of protection against extreme events such as floods, storm surges etc.

To mitigate this, -

- illegal mining must be curbed
- state governments should actively monitor mining activities (sand - minor mineral hence states' jurisdiction)
- Sustainable mining practices .

In this regard, the government has come up with guidelines for sand mining, which state -

- preparation of district survey reports, identification of mining, no mining zones
- preference to abandoned river channels .
- no operation during monsoons
- use of technology to monitor mining activities

Hence, to ensure maintenance of river equilibrium and its natural environment, mining must be

Sustainable .