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GENERAL STUDIES (TEST CODE : 845)

Name of Candidate	GARIMA AGRAWAL		
Medium Hindi/Eng.	ENGLISH	Registration Number	28264
Center	DRN	Date	

INDEX TABLE

Q. No.	Maximum Marks	Marks Obtained
1	12.5	
2	12.5	
3	12.5	
4	12.5	
5	12.5	
6	12.5	
7	12.5	
8	12.5	
9	12.5	
10	12.5	
11	12.5	
12	12.5	
13	12.5	
14	12.5	
15	12.5	
16	12.5	
17	12.5	
18	12.5	
19	12.5	
20	12.5	

Total Marks Obtained:

Remarks:

Signature of Examiner

INSTRUCTIONS

1. Do furnish the appropriate details in the answer sheet (viz. Name, Registration Number and Test Code).
2. There are TWENTY questions printed in ENGLISH.
3. All questions are compulsory.
4. The number of marks carried by a question/part is indicated against it.
5. 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. No marks will be given for answers written in medium other than the authorized one.
6. Word limit in questions, if specified, should be adhered to.
7. Any page or portion of the page left blank in the Question-Cum-Answer Booklet must be clearly struck off.

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EVALUATION INDICATORS

1. Alignment Competence
2. Context Competence
3. Content Competence
4. Language Competence
5. Introduction Competence
6. Structure - Presentation Competence
7. Conclusion Competence

Overall Macro Comments / feedback / suggestions on Answer Booklet:

1.

2.

3.

4.

5.

6.

All the Best

All the questions are compulsory and carry 12.5 marks each.

1. Soil management in Northeast India is critical for a viable agriculture economy. In this context, discuss the problems of soils in Northeast India. Suggest some steps that can be taken to counter this problem.

पूर्वोत्तर भारत में व्यावहारिक रूप से लाभप्रद कृषि अर्थव्यवस्था के लिए मृदा प्रबंधन महत्वपूर्ण है। इस संदर्भ में, पूर्वोत्तर भारत में मृदा संबंधी समस्याओं की चर्चा कीजिए। इस समस्या के हल हेतु उठाए जा सकने वाले कुछ कदम सुझाइये।

India in general and North East in particular is primarily dependent on Agricultural economy. Proper soil management is critical for viable agriculture in North East.

There are a number of problems of soil in North East -

- 1) SOIL EROSION : is the most major problem that degrades fertility of soil by removing its upper layer. It is very common in N.E due to -

- Hilly areas and steep slopes of hills are more prone.
- High rainfall - almost throughout the year
- Unconsolidated sedimentary rocks.
- Frequent land slides - both due to tectonic activities and anthropogenic reasons like mining & dams.

- 2) BAD DRAINAGE OF SOIL : some areas of Brahmaputra basin face the

1. Inm
soil / infection
soil erosion
salinity - water
logged area.
steep slopes
unconsolidated
rocks
heavy rainfall
land slides
soil leaching
eg meghalaya
Jhum culti.
steps
terrace farming
contour bunds
gully plucking
slope strip
soil mulching
organic farm
awareness

problem of water logging and saline water - making soil uncultivable.

3) LEACHING OF SOIL.

Due to high humidity, and rainfall - plateaus of Meghalaya face problems of leaching and desilication.

4) soil liquifaction : ~~frequency~~ occurrence of earth quake can cause this problem reducing strength of soil.

5) JHUM CULTIVATION : Prevailing practice of slash & burn cultivation leaves land fallow for over 5-10 years - which is prone to erosion.

~~of land erosion~~ However proper management of soil by adopting following practices and educating farmers about its consequences can help control ~~the~~ erosion & degradation.

1) Terrace farming and step like farming can check erosion along slopes.

2) Contour bunding

3) Gully plugging in case of gully erosion.

4) Wiring or pelting of slopes to check landslides & ~~see~~ soil runoff.

5) organic farming - can help practice

more sustainable agriculture.

- 6) Educating & spreading awareness among tribes regarding jhum cultivation and other practices.

Government has launched schemes like paramparagat kishi yojna and soil health card - it is to be ensured that they are fairly implemented in North Eastern region ~~considering~~ in a manner conducive to their traditions and customs. Crop insurance for plantation cropping will also help boost agriculture economy of North East.

2. How does the plate tectonics theory help explain the formation of Himalayas and Deccan Traps?

प्लेट विवर्तिनिकी सिद्धांत किस प्रकार हिमालय और दक्कन ट्रैप्स के निर्माण की व्याख्या करता है?

Plate tectonics is a theory developed by McKenzie and Parkes to explain formation of continents, oceans and several landforms on them. It is development from sea spreading theory and Paleomagnetism. The theory proposes that there are three type of plate-interactions -

1. Convergence 2. Divergence and 3) Transform

boundary movements between oceanic and continental (ocean-ocean, continental-continental, ocean-cont.) plates. As a result of these interactions several landform such as fold mountains - Himalayas, ocean ridges and Deccan Traps have ^{been} ~~also~~ formed.

Formation of Himalayas

Indian plate was initially part of Gondwana land. After its separation from that land it started its northward journey towards Eurasian plate. There was Tethys sea in between Indian plate and Eurasian plate at that type. At first the interaction between oceanic plate (Tethys sea) and

Continental plate convergence led to formation of Trans Himalayan volcanic ranges of Karakoram & Drass.

After the complete subduction of ocean plate; a continental (Indian) - continental (Eurasian) plate convergence led to formation of great fold mountains of Great Himalayas or Himadri, that are spread ~~far~~ across Suleiman-Kirthar ranges Hil Namcha Barwa.

Further compression of plate movement led to formation of recumbent folds in Himalayas - that ~~to~~ gave formation of Middle Himalayas - (Pir Panjal, Dhaulagiri, Kumaon etc).

The third phase of Himalayas - Shivalik ranges however is not explained by plate tectonics - but a result of fluvial deposits of antecedent rivers.

FORMATION OF ~~INDIAN~~ DECCAN

Deccan Traps are part of Indian peninsula which is one of the oldest geographical landform on earth.

After the separation from Gondwana land - during its northward journey

Indian plate moved over REUNION ISLANDS.
The volcanic or hot-spot activity of these islands over western part of peninsular led to spread of basaltic lava. Basaltic lava due to its fluidy nature spread across long distances and layers of such lava ~~for~~ took form of DECCAN TRAPS - that we find across states of Maharashtra, Karnataka and nearby. Such a volcanic formation is the reason - the region is rich in black regur soil which is a boon for cotton cultivation.

Though Deccan Traps are ~~also~~ stable but Himalayan region is still tectonically active and are still rising. It is prudent to same bio diversity of the region and establish effective disaster management system to effectively manage frequent Earth Quakes and land slides of the area.

3. In spite of being one of the largest producer of fish, there is still considerable scope of improvement in the fishery sector. In light of the above statement, discuss the problems and prospects of Fishery industry in India with respect to both inland and marine fisheries.

मत्स्य के सबसे बड़े उत्पादकों में से एक होने के बाद भी, मत्स्य-क्षेत्र में सुधार की अभी भी पर्याप्त संभावनाएँ हैं। उपरोक्त कथन के आलोक में भारत में अंतर्देशीय और समुद्री मत्स्यन दोनों क्षेत्रों में व्याप्त समस्याओं एवं संभावनाओं पर चर्चा करें।

Thanks to its peninsular (3 seas) shape and large inland water sources - India is one of the largest producers of fish, but still there is considerable scope of improvement in fishery sector. There are several problems, that our marine & inland fishing sector is suffering from - Marine fishing.

- Poverty of our coastal fishermen.
- lack of mechanization - Unavailability of mechanized ships, nets, trawlers etc.
- Deep sea fishing requires mech vessel, with inbuilt cold storage & GPS system - expensive for our farmers.
- Disputed water with neighbours - Pakistan and Sri Lanka
- lack of modern fish preservation techniques like canning, freezing etc.
- SW monsoon and tropical cyclones hinder fishing.
- Inland fishing

- Unavailability of modern trawlers and nets.
- Water contamination affecting fishing and health of marine life
- Most of the states except Kerala ^{have} are not evolved advanced processing and preservation units.
- Inadequate cold storage and hygiene standards.

Apart from these, both marine and inland fishing ~~can~~ ~~cause~~ pose these challenges -

1. By catch, use of dynamite & drifting are harmful for environment & health of marine system.
2. Inadequate level of bio-technology for preservation of indigenous species through geno-plasm conservation.

It is studies show that Indian Ocean is least explored ocean for fishery. It is ~~a~~ important for India to actualize its full potential by concentrating on 3 angles of fisheries -

- 1) finance to fishermen
- 2) modernization of catching/processing/trading
- 3) sustainability.

4. Vegetation in deserts and saline areas have highly specialized means of adapting themselves to the environment. Explain.

मरुस्थलों और लवणीय क्षेत्रों में पाई जाने वाली वनस्पति में स्वयं को पर्यावरण के प्रति अनुकूलित करने की अत्यधिक विशेषीकृत युक्तियाँ होती हैं। व्याख्या कीजिए।

Vegetation of a region adapts itself according to climate, topography and soil of the ecosystem. Such adaptation techniques are quite mature among vegetations of deserts & saline areas.

④ Xerophytic adaptations of desertic vegetations include the following.

1. No leaves or very short leaves -
2. long, fully developed and wellspread underground root system to absorb maximum ground water -
3. & leaves & ~~stem~~ trunks are succulent that is water storing - e.g. Cactus
4. The shrubs are thorny or picky to save themselves from plant eating animals - e.g. babool -
5. Wax coating, conceal stomata, large hair growth to conserve water from transpiration.

Some of these vegetations are -
1) Rain dependent - they often appear over ground after rainfall with perennial underground

growth -

- 4) Groundwater dependent - long, woody tap roots to absorb moisture & nutrients from soil.

Vegetation of Thar desert - ber, babool, Cactus and that cold deserts of J&K, HP like Rhododendrons, deodar etc are examples of such wonderful adaptations.

Vegetation in saline environment are also very adaptive.

- 1) Their root system is generally above ground e.g. proops, Parasitic roots etc; Pneumatophores, stilted roots.
- 2) The roots are made of soft tissues so that they can breathe within water.
- 3) VINIPARITY form of germination.
- 4) Vegetations are salt-tolerant so that they survive in saline water like mangroves.
- 5) They tend to release the salt content above surface of leaves in form of thin white layer.

Vegetations of mangroves of Sunderban, Gujarat and even that of saline areas of semi-arid regions of Rajasthan / Haryana are examples of the same.

Though the vegetations are quite adaptive; but however deserts &

saline areas of Arid / S. Arid regions are ~~most~~
least productive areas of world. Hence
it is imperative to control further ~~spread~~
spread of desertification and soil salination
in adjacent areas as per UNCCD -
United nations convention on combating
desertification.

5. Give an account of the distribution of cement industry in India and the factors that affect its location. Also trace the growth of cement industry in India.

भारत में सीमेंट उद्योग के वितरण और इसकी अवस्थिति को प्रभावित करने वाले कारकों का विवरण दें। साथ ही, भारत में सीमेंट उद्योग की वृद्धि की रूपरेखा भी प्रस्तुत कीजिए।

India's cement industry is one of the most advanced industries in country. While there are approximately 136 big cement industries and ≈ 850 smaller ones, the major industries are as follows-

STATE	LIMESTONE SOURCE	CITIES.
1. <u>Madhya Pradesh</u>	<u>Vidhyas</u> - highest limestone reserve	Satna, Katni, Kymore.
2. <u>Rajasthan</u>	<u>Aravali</u> - 2nd highest	Sawai Madhopur, Udaipur
3. <u>Andhra Pradesh</u>	<u>Telangana Plateau</u> - 3rd.	Kareemnagar
4. Maharashtra and Gujarat.		

Factors that affect its location are as follows -

1. Raw Material :
 - a. Lime stone (60-65%)
 - b. Coal
 - c. Silica and Alumina
 - d. Sea shell
 - e. slag from steel plant

f. Slag from fertilizers Industry

2. Energy : Cement Industry is a power intensive industry. It requires to burn the coal and mix its ash into lime stone. Hence nearby coal supply and or hydro electric power is envisaged

3. Labour : Being one of the large & core industries - it employs & requires huge pool of both technical as well as unskilled labour force.

4. Finance.

5. Market : sites where construction and infrastructure is on boom.

However since it is a weight losing industry - therefore nearby availability of raw material in general and lime stone in particular is the most crucial factor for its location.

India's growth in cement sector is much ~~too~~ commendable. India is second highest cement producer in world (after China). There are more than 450 small and big cement industries across India.

Recent decision of ministry of Transport to construct roads from cement instead of bitumin ~~is~~ will give a boost to cement

Industries. More investment (Approx 500cr per million), skilled labour RnD and boosting demand can insure its further growth. It

It is prudent that cement industry tap full potential & opportunities offered by upcoming projects like Housing for All.

6. Despite the enormous demand of electronics, the manufacturing of electronic goods has not been a feature of the Indian industry. Enumerate the reasons for the same. Suggest measures which are required to achieve the target of Net Zero Import by 2020.

इलेक्ट्रॉनिक्स की भारी मांग के बावजूद इलेक्ट्रॉनिक वस्तुओं का विनिर्माण भारतीय उद्योग का वैशिष्ट्य नहीं है। इसके कारणों को उल्लिखित करें। ऐसे उपायों का सुझाव दीजिए जो 2020 तक शुद्ध रूप से शून्य आयात का लक्ष्य प्राप्त करने हेतु वांछित हैं।

India is one of the biggest consumers of electronics, but still manufacturing of electronics goods has not been a strength of our industry, because of several factors.

1. Raw material - raw materials like ~~car~~ silicon, P and rare earth like lithium is not explored in abundance.
2. LPG Reforms : Post LPG reforms, India was flooded by cheap imports of electronics that ruined our infant semiconductor industries & companies like OPTEL.
3. Biased govt policy towards service sector and software ignored electronics manufacturing.
4. IT Agreement of WTO allowed for tariff reduction on electronics goods & huge inflow came from China, Korea & US.
5. Outdated courses of Indian universities and inadequate R&D in electronics sector.

However, if some strong measures are taken, we can achieve revive the industry -

1. special focus on electronics under Make in India and Skill India
2. Ministry of electronics & IT has recently announced creation of "fund of funds" for of ≈ 5500 cr. for investment in electronics manufacturing.
3. Encourage rare earth matters of kerala, Rajasthan & also import crucial raw material required.
4. Encourage MNC's to manufacture in India & technology transfer instead of setting only assembly plants. Companies like Apple & Xiaomi are planning their expansion in India. Govt. should go use this opportunity for the same.
5. Promote research & development, electronics based startups & university courses on electronics.

Adequate ~~work~~ push for electronics manufacturing will not only help meet aim of zero import by 2020 but also reduce our foreign dependence, create

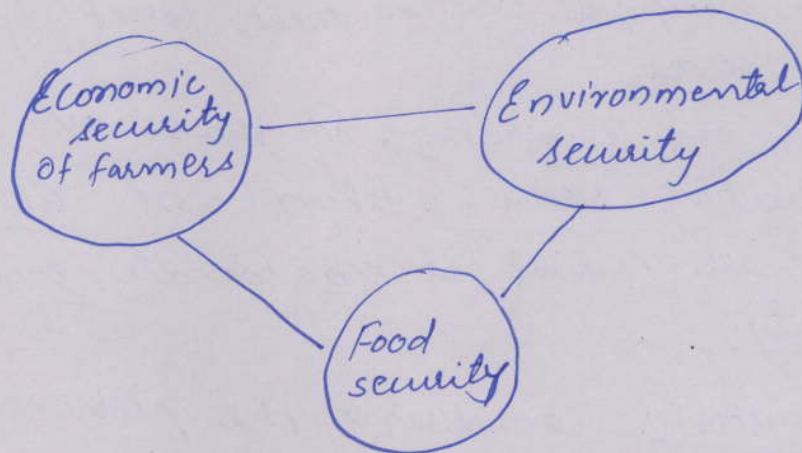
jobs and contain "brain drain" with
flourishing opportunities at home.

7. Agroforestry is seen as a solution to meet the challenges of food, nutrition, energy, employment and environment security. Elucidate.

कृषि-वानिकी को भोजन, पोषण, ऊर्जा, रोजगार और पर्यावरण सुरक्षा की चुनौतियों के समाधान के रूप में देखा जाता है। स्पष्ट कीजिए।

Agroforestry refers to growing trees on farms along with traditional crops and animal husbandry.

Objectives of Agro forestry



It is a practice pursued since centuries but now, government is actively promoting it through 'National Agro forestry policy, 2014' because it is seen as solution to-

1. **FOOD & NUTRITION :** Trees are great resources to fruits, fodder, fertilizers. These resources will not only feed farmers ~~at~~ *if* during crop failure but will ensure their nutritional requirements of vitamins. Extra production can be sold to markets - meeting food & nutrition requirement & ~~ENERGY~~ of local society as well.

ENERGY: Trees are the sources of TIMBER - which is still the most common fuel in rural areas. Given that 65% of timber requirement in India is met through farm grown trees - Agroforestry will help enhance its accessibility to women (who usually have to travel long distances to collect wood) as well as meet target of 33% forest cover.

The organic wastage of these can help in creating Biomass system and BIOGAS which are crucial for eco-friendly energy security.

EMPLOYMENT: Considering the problem of disguised unemployment in our agriculture - Agroforestry will act as cushion or buffer for our distressed farmers. If associated with complementary food processing industries like jam, sauce etc - it will create numerous job opportunities for Agricultural Youth & landless labourers.

ENVIRONMENT SECURITY: In short term - Agroforestry's benefits can be seen in form of checking soil erosion, water conservation and maintaining micro climate.

But in long term - these farm trees will

help in Carbon sequestration as well containing green house effect & ensuring environmental security.

Hence a coherent strategy under NAP - involving cooperation among central government, state governments, farmers, Agricultural scientists ~~can help~~ is envisaged. Proper land ~~for~~ & tenancy reforms, loans for seeds and research on Agro-climatic farming will help in successful implementation of the mission.

8. Explain the phenomenon of Tsunami formation and highlight reasons for India's vulnerability to Tsunamis. List some measures to mitigate the impact of Tsunamis.

सुनामी उत्पन्न होने की परिघटना की व्याख्या कीजिए और सुनामी के प्रति भारत की सुभेद्यता के कारणों पर प्रकाश डालिए। सुनामियों के प्रभाव का न्यूनीकरण करने हेतु कुछ उपायों को सूचीबद्ध कीजिए।

Tsunami means 'Tsu' + 'Nami' - that is 'Harbour Waves' in Japanese. These are waves that are formed as a result of an Earthquake inside the ocean at the sea floor. It can also be formed due to large upheavals in ocean like landslide or volcanic eruption.

The waves have great energy and speed - 700 km/hr in ocean. While moving in open ocean, their wavelength is around 700 km but height is as less as 1 km. This is why they are not observed too easily in open ocean. However as they reach coast - in shallow water waves' height reaches tremendously - upto 30 km and that ~~lead~~ leads to destruction of harbours and coasts. This is called "landfall" of Tsunami.

Tsunamis occur the most in Pacific Ocean. Indian Ocean too is vulnerable to Tsunamis as it has many subduction zones and tectonically active regions - that can generate ~~less~~ terrors waves.

Considering that India has a long coast line and especially Eastern Coast that is most vulnerable to Tsunami are the most densely populated areas of the world. At the landfall - Tsunami causes turbulent flow of water that completely ruins ports, cities, farms & settlements. This impact is very hard to be mitigated by a ~~single~~ country alone due to its sheer scale of destruction.

But still, Post 2004 Tsunami disaster, India has joined International Tsunami Warning System in 2004.

These advanced warning system & simulation of their spread prepared by Institute of Ocean Information Sciences (Hyderabad) can allow administration to evacuate risky areas in time.

Training and involving local community is of utmost importance as declared in SENIPET FRAMEWORK for DISASTER MANAGEMENT.

Simple observations & vigilance like retreating coast line in case of Tsunami can go a long way in mitigating impact during ^{and before} "golden hours."

And lastly enough emphasis must be given on 3R's of Disaster - Response, rescue and relief / rehabilitate because even UN says "It's not enough to save life alone, it is important to give back life of dignity."

9. Explain the role of Himalayas in influencing the climate of South Asia. Enumerate the changes observed recently in the Himalayan region with respect to climate and geomorphology. What are the possible anthropogenic causes behind them?

दक्षिण एशिया की जलवायु को प्रभावित करने में हिमालय की भूमिका की व्याख्या कीजिए। हिमालयी क्षेत्र में जलवायु और भू-आकृतिविज्ञान के संबंध में हाल ही में चिन्हित किए गए परिवर्तनों की गणना कीजिए। इनके पीछे संभावित मानवजनित कारण क्या हैं?

Himalayas are the most unique geographical feature of South Asian region which acts as a physical, ecological and cultural divide from the world. There ~~are~~ is crucial role of Himalayas in shaping South Asian climate -

1. It acts as a shield between cold siberian winds and India - maintaining its temperature to moderate level.
2. It acts as a barrier to monsoon winds and brings rain to most of South Asia.
3. Its glaciers are a great source of water to rivers like Indus, Ganga & Brahmaputra giving them perennial nature of flow.
4. Himalayas are home to huge diversity of flora & fauna - Starting from tr deciduous forests to Temperate & alpine forests at the top. Such diverse biota impacts climate of S. Asia as well as gives several forest resources.

5. Heating of Tibetan plateau defines strength of Tropical Easterly jet stream and in turn strength of SW monsoon & rainfall.

Therefore it's said that had there not been Himalayas - northern part of India & S. Asia would perhaps been a cold desert.

However, these strong shield like mountains are most fragile areas of world. Several Himalayan studies including IPCC has noted following changes in its climate & geomorphology -

1. Shrinking and melting of glaciers.
Acc. to IPCC - gangotri is shrinking at the rate of 28 m/yr.
2. More frequent land slides.
3. More ~~intense~~ Earth quakes.
4. Forest fires.
5. Avalanches are more common now.

Though it is a tectonically active region - that is bound to face diastrophic activities but, some of these changes can be attributed to anthropogenic reasons.

They are -

1. Indiscriminate mining activities.
2. Unscientific dam construction.
3. Migration of aboriginal tribal communities to plain areas leaving area devoid of their tradition knowledge.

4. Rampant deforestation & overgrazing.
5. Global warming.

Rising sea level, melting of snow at Antarctica & Himalayas are alarming signals of impact of global warming. Effective climate change control strategies by global ~~and~~ & local communities is need of the hour.

10. Explain the different types of earthquake waves and the concept of shadow zone. What inferences can we draw from shadow zones regarding the interior of the Earth?

विभिन्न प्रकार की भूकम्पीय तरंगों और छाया क्षेत्र की अवधारणा की व्याख्या कीजिए। पृथ्वी के आंतरिक भाग के संबंध में छाया क्षेत्रों से हम क्या निष्कर्ष निकाल सकते हैं?

Earthquake is a tectonic phenomenon that is caused by release of energy across of a fault in earth's crust. Occurrence and intensity of earthquakes is detected by detecting seismic waves that are called Earthquake waves.

There are two types of E.Q waves -
1) Body waves 2) Surface waves.

Body waves are of two types -

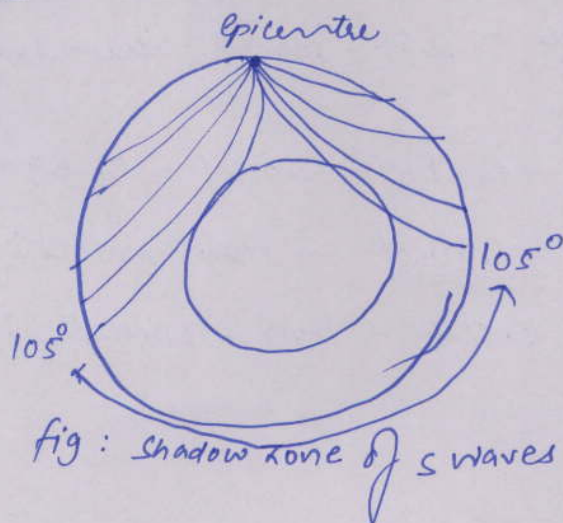
1. P waves - These are primary waves. They start from the hypocentre and spread in all directions and then reach surface first. They are longitudinal waves that propagate in direction of propagation of wave vibrating material of earth forming crests & troughs. They travel in all mediums.

2. S waves - These are body waves that appear 2nd on the surface after P waves. These waves move ^{vibrate} perpendicular to direction of propagation of wave. They are unique as they only travel in solid medium.

Apart from these - there are R-waves and love-waves that are surface waves - they are the most destructive in nature.

Seismic waves - S and P form Shadow zone on earth surface - that is the zone where they can not be detected on a seismograph.

This is due to phenomena of reflection and refraction. Because S waves can not travel through liquid medium and P waves refract - changing their direction in different mediums; this gives emergence of shadow zones. Shadow zone of P waves is from $105^\circ - 145^\circ$ East & West of epicentre; while that of S waves is longer from $\approx 105^\circ E$ to $105^\circ W$ from epi-centre.



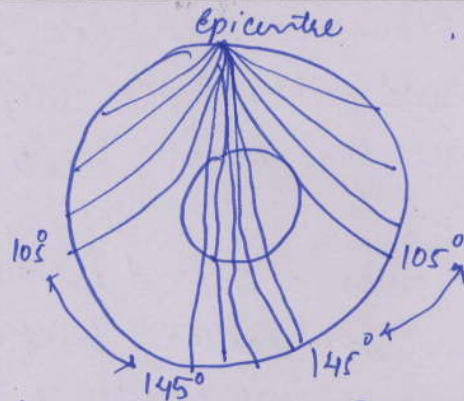


Fig: shadow zone of P waves.

formation of shadow zones, and properties of reflection & refraction of S & P waves give us much crucial information about Earth's interior. It tells us that

- Earth's interior is not uniformly solid (S waves)
- There are density variations in different layers of its interior (P waves).
- There are following layers of Earth:
 1. CRUST - outermost - density $\approx 3 \text{ gm/cm}^3$ - $\approx 70 \text{ km}$
 2. Outer Moho's discontinuity & Outer Mantle.
 3. Aesthenosphere - soft - plastic like radio active layer
 4. Mantle (Inner Mantle) - solid - $\approx 5 \text{ gm/cm}^3$ density
 5. Outer core - liquid - very convection-prone
 6. Inner core - solid - Iron & Nickel - thick layer - most dense.

11. Explain the difference between chemical weathering and physical weathering. What is the ecological and economic significance of weathering?

रासायनिक अपक्षय और भौतिक अपक्षय के बीच अन्तर की व्याख्या कीजिए। अपक्षय का पारिस्थितिक और आर्थिक महत्व क्या है?

Weathering refers to effects of elements of weather and climate on rocks and breaking down upper layers of rock.

Weathering can be of either chemical weathering or physical weathering.

Differences between them are -

Chemical

→ It is due to reaction of water, acid, carbon dioxide on parent rock material and breaking them down by chemical reactions

→ It changes chemical property and structure of rock. For eg formation of gypsum from lime stone.

→ Chemical weathering involves Carbonation, Solution, Hydration etc.

→ eg. formation of feldspar, salt, NaHCO_3 .

Physical

→ It is due to
a. Gravitational force or shear stress
b. Thermal expansion or contraction
c. Frequent freezing and thawing.

→ It may not ~~change~~ change chemical nature but only changes physical structure.

→ physical weathering involves exfoliation, expansion, contraction etc.

→ eg. Exfoliated dome in Bhangir (A.P.).

Weathering is not simply just another geological process but has great economic significance.

Economic Significance :

Weathering process like chemical leaching helps in ~~the~~ making plateaus ~~to~~ enriched in valuable minerals like Iron, Manganese, Bauxite etc which are crucial for national economy. For eg. all lateritic plateaus in Odisha, Jharkhand, TN are rich in iron and other minerals. Even physical weathering aids in exploiting minerals ~~as~~ easily by bringing them closer to surface and by breaking them down - which are otherwise economically unviable to explore. For eg. ~~say~~ & despite having huge rare earth material ~~to~~ reserve in India - we could not explore them much because of difficulty in ~~their~~ exploitation of unweathered material -

Ecological significance :

Weathering is ~~the~~ very crucial for SOIL FORMATION. And since flora and fauna of any region deeply depends upon its soil profile and depth of its weathered mantle - it has a huge impact on

defining bio-system of a region.

For eg Tropical rainforests of Amazon basin possess highest bio-diversity because of long depth of weathered mantle.

Weathering also aids in mass movement and erosion

which in turn shape relief of our landscape and create different landforms.

Hence process of weathering has influence on ~~as~~ each - resource mobilization, biological activities and ecology.

12. Tropical regions are not only the most resource rich but also one of the most underdeveloped regions of the world. What are the factors responsible for this? How have some of the tropical countries turned their natural limitations to their advantage? Illustrate.

उष्णकटिबंधीय क्षेत्र न केवल सर्वाधिक संसाधन संपन्न हैं वरन् विश्व के सर्वाधिक अविकसित क्षेत्रों में से भी एक हैं। इसके लिए कौन-से कारक उत्तरदायी हैं? कुछ उष्णकटिबंधीय देशों ने अपनी प्राकृतिक रूकावटों (बाधाओं) को स्वयं हेतु लाभप्रद स्थितियों में किस प्रकार परिवर्तित किया है? व्याख्या कीजिए।

Tropical regions are the most resource rich in terms of - solar energy, adequate rainfall, minerals and fertile agricultural lands. But, however are most underdeveloped regions of world - for eg Tropical desert - SAHARA region of Africa. There are numerous factors responsible for this -

- 1) Climate - is extremely hot and humid at most of the places that affect efficiency & productivity of people.
- 2) Natural disasters - like tropical cyclones, and Tsunamis have huge destructive impact on economies as well as society. Eg - Bangladesh.
- 3) Erratic Monsoon - South & S.E Asian region is primarily dependent on monsoon for their agriculture. Its erratic nature and phenomena like EL-NINO make adverse impact on their agriculture.

for eg India, Indonesia, Australia.

- 4) Most prone to communicable diseases like Malaria, dengue, Chickengunia, Ebola etc - put heavy pressure on social infrastructure of these countries - eg. Most S. African countries like Nigeria, Congo, Chad.
- 5) Colonial past - Colonization by western countries ~~imped~~ deferred their development stories. eg- India, Africa, Indo China, SE Asia etc.

However, determination and ~~can~~ ~~can~~ attitude of society can turn natural limitations into strengths as in case of some tropical countries like -

1. Singapore - once a trading post - has now become ~~now~~ strongest economy of ASEAN - using its strategic marine location & strait of Malacca.
2. Indonesia & Sri Lanka have ~~improved~~ taken advantage of plantation - agriculture to support economy - Sri Lanka also ~~see~~ declared itself Malaria-free recently.
3. Islands like Mauritius, ~~Tanzania~~ Maldives and Australia boosted their TOURISM taking advantage of their scenic

beauty.

4) Brazil used its minerals reserves & MINAS GERAIS as growth pole of nation.

5) ~~countries~~ Mediterranean countries have advanced their horticulture.

6) Even India has used its vulnerable long coastline for its port led development.

7) Taking advantage of our intensive agriculture & minerals like iron and human capital (IT) we are exporting all-goods & services to the world - turning our limitations into advantages.

13. Coral reefs are the most biologically diverse and economically valuable ecosystems on earth. Elaborate. Discuss the factors responsible for the decline of coral reefs across the world. Also, list some measures that have been taken for their preservation.

प्रवाल भित्तियाँ पृथ्वी पर जैविक रूप से सर्वाधिक विविधतापूर्ण और आर्थिक रूप से मूल्यवान पारिस्थितिक तंत्र हैं। सविस्तार व्याख्या कीजिए। विश्व में प्रवाल भित्तियों की कमी के लिए उत्तरदायी कारकों की चर्चा कीजिए। साथ ही, उनके संरक्षण हेतु किए गए कुछ उपायों को सूचीबद्ध कीजिए।

Coral reefs are formed as result of symbiotic relationship between hard polyps and algae-zooxanthellae.

They are the most biologically diverse & economically valuable ecosystems on earth that they are called Tropical rainforests of the oceans.

Reasons for their high value are -

- 1) Great grounds for catching Planktons hence - good for fishes and other marine ~~eco~~ organisms.
- 2) They ~~have~~ trap the sediments and act as first defence against sea-storms & Tsunamis ⇒ much valuable for economy & society.
- 3) Their beautiful colours ~~in~~ in water form the coral islands to be most sought after tourist locations eg. Maldives, Lakshadweep.
- 4) They are highly efficient in

nutrient recycling - and hence they keep water nutrient rich to maintain high biological diversity as well as ~~too~~ ecological stability.

However recent reports of heavy coral bleaching in Great barrier reef of Australia point to their decline. The reasons are -

1) Temperature (Major cause)

Coral reefs are extreme sensitive to their narrow temp range. Excess Temperature beyond 30°C or too cold temperature disrupts enzymes of zooxanthalae & starts bleaching.

2) Solar radiation :

Direct solar radiation in summer months can sometimes cause impairments to photosynthetic cells of zooxanthalae.

3) Sedimentation - & pollution.

4) Nutrient inflow : Nitrate, Ammonia etc.

5) Epizootics : Pathogenic diseases -

6) Fresh water dilution.

7) Eutrophication (minor cause) may decrease their resistance.

8) Natural - storms, floods, El-nino.

However there are attempts being made at both national & international level to conserve them.

1. NASA has launched dedicated satellite to study Great barrier reef.
2. In India coral reefs are part Schedule I of Wildlife Protection Act 1972.
- 3) In India, they are part of Coastal regulation zone (CRZ-I) where development activities are regulated & restricted.
- 4) SICOM : society of Integrated coastal management.
- 5) National & state level Coastal zone regulation authorities to abate pollution & conserve coastal areas along with coral reefs.

14. Despite EIA being a useful policy tool for sustainable development, deficiencies in its design and implementation have prevented it from realising its potential. Discuss.

संघारणीय विकास के लिए एक उपयोगी नीतिगत उपकरण होने के बावजूद, पर्यावरणीय प्रभाव आकलन (ई.आई.ए.) की अभिकल्पना (डिजाइन) और कार्यान्वयन संबंधी कमियों ने इसकी सम्पूर्ण क्षमता को साकारित होने से बाधित किया है। चर्चा कीजिए।

Environmental Impact Assessment (EIA) is a planning tool to harmonize developmental process with environmental concerns.

Through its steps like screening, scoping, public hearing and appraisal - it not only calculates possible environmental impacts of projects but also suggests effective mitigation efforts, alternative and management plan (EMP) to help decision makers take effective decisions that ensure sustainable development.

However certain deficiencies in its design & implementation have prevented it from realising its potential -

Applicability

→ There are a number of projects with severe environmental impact being exempted from EIA either because not being part of schedule (I) of EPA or due to ~~less~~ investment less than prescribed limit.

Design

→ Composition of EIA Authority lack adequate experts from environmentalists

and social scientists

- The very process that the project proponent hires EIA Agency to assess his project reduces possibility of a fair & sincere assessment. Because the aim of agency is to "utilize / exploit natural resources and not to conserve it."

Public Hearing

- ~~For~~. Since public consultations are not involved at initial stages of project planning - it leads to conflicts at later stages. eg. vedanta case in Orissa.
- A number of projects are exempted from public hearing exp of EIA.

Reliable data

- In Rapid EIA, baseline data is collected only for one season which is not comprehensive.

Implementation

- Evidences have shown use of fraud data for assessment. asking indicating need for centralized baseline data.
- Consultancy agencies are paid in huge amounts by project proponents raising questions about their integrity.

- Certain EIA reports of projects of Atomic energy are not accessible to public.
- Butky & technical nature of EIA reports ~~are~~ are not understandable to public impeding transparency & accountability

Recommendations like an Independent EIA authority & establishment of a central fund to fund these agencies will help their effective implementation.

However EIA has time & again given due voice to affected population - especially tribals - as in case of Dongra Kondh tribe who rejected bauxite mining in Niyangiri hills. Hence some good governance principles in EIA process will continue to ensure sustainable development in the country.

15. According to the Indian Fertiliser Scenario 2014, the use of urea in India has increased by more than 50 per cent since 2000. How does human intervention turn nitrogen from a nutrient to a pollutant? Discuss the impacts of nitrogen pollution on environment and human health. Also, explain how nitrogen pollution can be managed.

भारतीय उर्वरक परिदृश्य 2014 के अनुसार, भारत में यूरिया का उपयोग सन् 2000 के बाद 50 प्रतिशत से अधिक बढ़ गया है। मानवीय हस्तक्षेप किस प्रकार नाइट्रोजन को एक पोषक तत्व से प्रदूषक के रूप में परिवर्तित कर देता है? पर्यावरण और मानव स्वास्थ्य पर नाइट्रोजन प्रदूषण के प्रभावों की चर्चा कीजिए। साथ ही, व्याख्या कीजिए कि नाइट्रोजन प्रदूषण का प्रबंधन किस प्रकार किया जा सकता है?

Nitrogen forms a biogeochemical cycle on earth. ~~It~~ It is an important nutrient for the growth of crops & plants. However as the ~~use of~~ excessive use of N_2 increases due to human intervention - the natural cycle gets altered and disturbs the N_2 balance in environment turning it into a pollutant.

a. As highlighted by Indian fertilizer scenario 2014, use of nitrogenous urea in India has increased by more than 50% since 2000.

Such indiscriminate use of fertilizer due to large subsidies on fertilizers

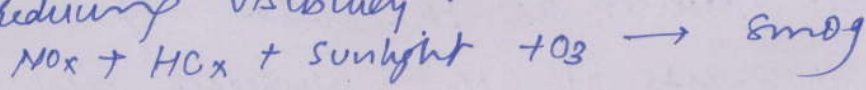
& lack of agricultural education to ~~to~~ among farmers.

Such excess nitrogen flows through agricultural runoff and

mixes with ~~aq~~ aquatic systems like lake & oceans leading to Eutrophication. The same leaches into ground water, contaminating our source of drinking water.

Nitrogen^{pollution} has ~~been~~ severe adverse impact on Environment.

1. Emissions of NO_x in atmosphere leads to formation of photochemical smog - worsening air quality, ~~also~~ pulmonary diseases & reducing visibility.



2. NO_x ~~ed~~ in atmosphere can also cause ACID RAIN - which ~~not~~ not only harms biodiversity, oceans & human health but also corrodes precious metals & other ~~metals like~~ materials like rubbers & textile.

3. Nitrogen as surface runoff increases nutrient level in lakes & marine systems (cultural eutrophication) - may culminate into harmful algal blooms - disturbing entire marine ecosystem.

It has severe impacts on human health as well

1. Respiratory diseases

2. Bronchitis
3. Blue baby Syndrome • (Nitrogenated haemoglobin)

4. Biomagnification from consumption of contaminated water or fishes etc.

Considering the impacts - it is imperative to check nitrogen pollution.

1. Soil health card scheme - to rationalize use of fertilizers.
2. Agricultural research & development.
"Lab to field" programs to demonstrate farmers diff technologies & educate them.
3. Rationalize fertilizer subsidies.
4. Waste water treatment of Industrial effluents before dumping into a water body.
5. Control vehicular emissions through improved public transport system, adoption of Bharat VI norms effectively.

16. Temperate grasslands are called 'Granaries of the world'. Elucidate. How have the farming practices adopted in these regions impacted the environment?

शीतोष्ण घास के मैदानों को 'विश्व के अन्न भंडार' कहा जाता है। स्पष्ट कीजिए। इन क्षेत्रों में अपनायी गई कृषि प्रथाओं ने पर्यावरण को किस प्रकार प्रभावित किया है?

Temperate grasslands are plains regions of the mid latitudes characterised by relatively ~~low~~ trees less, grasslands with nutritious grasses and fertile soil. Such soil ~~is~~, moderate rain and Temperate-temperatures are beneficial for number of grains especially WHEAT, CORN and ~~barley~~ BARLEY.

This is evident in world distribution of temperate grasslands & crops.

1. PRAIRIES - of USA & CANADA - grow wheat, corn, ~~oats~~ & cotton. USA is largest producer of wheat in world.
2. STEPPES - of central Asia & Russia is called as 'wheat bowl of Asia'.
3. PAMPAS - of S.America also grow a variety of grains & fodder crops. Their nutritious Alfa-Alfa grass is good for Sheeps & goats.
4. VELDTS of South Africa also grow wheat, rice, cotton and have developed animal ~~breeding~~ as well.

5. DOWNS of Australia though are part of temperate grasslands - they have focussed more on animal ranching, dairy and meat as compared to grain production.

The reason, that climate is favourable and most of these regions come under developed countries of world - they have adopted extensive farming - which is though beneficial economically but has quite impacted the environment -

1. Extensive truck farming focusses on MONOCULTURE - where soil is deprived of its natural fertility in absence of diverse cropping.
2. Extensive use of fertilizers and pesticides adversely impacts soil fertility & may lead to its salinity.
3. Excessive use of nitrogen-fertilizers disturb nitrogen cycle and causes ~~eco~~ atmospheric pollution & imbalance.
4. Such farming though gives high yield per person - but employs less number of farmers - That is excess mechanization replaces human employment opportunities.

5. Use of high level of chemicals change the organic nature of crop and adversely impact health. This is why there is new trend towards organic food among western communities.

6. Such farming also disturbs bio-diversity - as ~~now~~ more emphasis is given on those crops that have higher cash incentives compared to their ecological & nutritional significance.

There is that why international community is now focussing on more sustainable agriculture. Even India has adopted National actional plan for sustainable Agriculture as part of its National action plan for climate change. Which is a step in right direction.

17. Enumerate the global targets and priorities for action of the Sendai Framework for Disaster Risk Reduction. Discuss the positive features and limitations of the framework.

आपदा जोखिम न्यूनीकरण हेतु सेनडाई फ्रेमवर्क के अनुरूप कार्रवाई के लिए वैश्विक लक्ष्यों और प्राथमिकताओं की गणना कीजिए। इस फ्रेमवर्क की सकारात्मक विशेषताओं और सीमाओं की चर्चा कीजिए।

Sendai framework for disaster risk reduction is a successor of HYOGO FRAMEWORK and is going to be a guiding lamp for international communities to design their disaster management frameworks for 2015-2030.

There are four principles envisaged under Sendai Framework -

1. Understand the risks and analysis
2. Investing in risk reduction
3. Improving governance system to better manage risks.
4. Capacity building for better preparedness, early warning system, response and recovery.

Framework has also formulated Global targets to be achieved by 2030.

1. Reduce the numbers of disasters.
2. Reduce the numbers of people affected by disasters.
3. Reduce the economic loss due to disasters.
4. Reduce the Infrastructure loss due to disasters.

5. Improve international cooperation to achieve the targets -
6. Increase number of countries having legal/institutional mechanisms for disaster risk reduction.

The framework has a paradigm shift from conventional post disaster management to risk reduction. Hence it is more proactive than reactive. It has ~~an~~ an integrated approach incorporating all four stages of DM - prevention, mitigation, risk reduction, preparedness and response. Also, a clear target seeking international cooperation is recommendable considering global ~~valuse~~ regional nature of disasters as compared to national specific nature. It also appreciates contribution of community and local people in DM which is must to ~~make~~ involve first responders in DM & utilizing their traditional wisdom.

However, there is clear mechanism established for technology transfer and finance mobilization - which are the two key hindrances on path of risk reduction in developing and least developed countries.

it is a significant guideline.

Don't write
anything this
margin
(इस भाग में
कुछ ना लिखें)

But nevertheless - ~~the~~ India being
signatory of framework must align
its national disaster management plans
& policies with Sendai framework along
with guiding philosophies of PARIS SUMMIT
and SUSTAINABLE DEVELOPMENT GOALS.

18. What is a heat wave? Discuss the health impacts of heat wave in India. Analyse the reasons behind high incidence of mortality rates due to heat wave in India. Suggest measures to tackle the above problem.

हीट वेव (ऊष्ण लहर) क्या है? भारत में ऊष्ण लहर के स्वास्थ्य संबंधी प्रभावों की चर्चा कीजिए। भारत में इस घटना के कारण उच्च मृत्यु दरों की घटना के पीछे विद्यमान कारणों का विश्लेषण कीजिए। उपर्युक्त समस्या का समाधान करने के उपाय सुझाइए।

Heat waves refer to atmospheric conditions in a months of summer when temperature is extremely high. It is usually referred to as "loo" in Northern India.

However in some parts of India - extreme heating in pre monsoon months sometimes lead to conventional ~~rain~~ - light showers which are referred to as kal baisakin - (WB), Blossom showers (Kerala) etc -

But usually they are being referred to 'loo' that are common in UP, Bihar, Orissa, East Maharashtra, & Rajasthan. Health impacts of heatwave are quite severe in India: -

- 1) Fever, extreme body temperature
- 2) Food poisoning - due to ~~low~~ food contamination in high temperature
- 3) Diarrhoea.
- 4) Tanning, and extreme form of skin - burn can sometime expose body to UV radiations and cause dangerous consequences.
- 5) Incidents of sunstroke are also more frequent during summer days
- 6) Dehydration, and in general low reproductivity.

In severe cases - direct exposure to heatwaves can even lead to a loss of life.

-as we hear numbers of death cases ~~every~~ due to heat wave every year in month of April-May. Reasons behind ~~for~~ high incidence of mortality rates are -

1. Geographical - India is a TROPICAL country - so naturally more exposed to sun ~~or~~ but during summers due to apparent movement of sun - sun comes overhead on our latitudes giving intense insolation. low diurnal range.
2. Poor Infrastructure : There are many homeless beggars or travelers who do not have proper shelter to save themselves.
3. Poor health infrastructure to control the ~~the~~ sickness before it reaches to level of mortality.
4. many farmers ~~are~~ & Agricultural labourers work in afternoon w/o shade - exposing them to sun.
5. lack of transport facilities force people in general & students in particular to travel/walk long distance to schools.
6. lack of refrigeration facilities of food lead to more incidences of food poisoning.

Heat waves are climatological ~~disse~~ hazards that can be well estimated before their arrival and be prepared for. Some measures to tackle the problem -

1. IMD @ should forecast heatwaves in advance. ~~and~~
 2. Information dissemination through multiple means of communication - Radio, TV, Papers so that the weather forecast reaches the ~~fastest~~ remotest person and is able to stay home.
 3. Construct travel shelters across highways and at public places -
 4. Establish drinking water facilities at ~~major~~ alongside roads.
 5. Primary health care system should be trained and prepared to handle ~~over~~ patient overflow during summers -
 6. District administration can declare orders to close the schools in peak heat waves days.
- Any hazard turns a disaster only when vulnerable community is exposed to it. It's imperative to apply ~~the~~ visionary preparedness & mitigation techniques along with effective emergency response as envisaged in Sendai framework for disaster risk reduction.

19. "Rising accidents involving merchant ships leading to oil spills in Indian waters is a growing concern that needs to be addressed." Discuss the impact of oil spills on marine environment. Also, suggest measures to prevent such disasters.

"व्यावसायिक जहाज संबंधी दुर्घटनाएँ निरंतर बढ़ने के कारण भारतीय जलीय क्षेत्र में तेल रिसाव की चिंता उत्पन्न हो रही है, जिसका समाधान करने की तत्काल आवश्यकता है।" समुद्री पर्यावरण पर तेल रिसाव के प्रभावों की चर्चा कीजिए। साथ ही इस प्रकार की आपदाओं का निवारण करने हेतु उपायों का सुझाव दीजिए।

Recent accident of oil spill near Karaiyar port (Chennai) due to collision of two oil ships brings light to prevailing problem of OIL SPILL and its disastrous impact on our marine life - that are as follows -

1. Though $\frac{2}{3}$ of oil evaporates within 21 days but during this time - it spreads across long distances over sea.
2. Sea surface covered with oil & is unable to receive sunlight and oxygen - that leads to killing of planktons and in turn mass killing of fishes.
3. oil sometimes spread till ~~beaches~~ continental shelf & beaches leading to killing of turtles, birds and disrupts entire marine ecosystem.
4. when oil sinks seabed and in other directions - even coral reefs are adversely impacted.
5. In some cases it can lead to eutrophication of water & hence lead to Algal bloom.
6. since oil is non bio degradable - bioaccumulation of toxic can even enter human food chain disrupting human health.

7. The oil slick near beaches not only destroys much important sea weeds but makes the beaches dirty & aesthetically unattractive leading to loss of TOURISM as well. And also creates unhygienic conditions for coastal community & migratory birds & species.

However - oil spill - as an industrial disaster is quite preventable →

- 1) Quality of equipments & maintenance - It is to be ensured that all ~~technical~~ parts of oil vessels & ships are of high quality and are regularly maintained against any possible leakage.
- 2) Technology - precise use of GPS & IRNSS (satellite) and GIS technologies can minimise incidents of collisions.
- 3) International ~~collisions~~ Cooperation : considering - that these disasters are not peculiar to specific national boundary - international cooperation on risk reduction through knowledge & information sharing, technology transfers and training activities can be effective. Already IMO convention is in place.
- 4) Government and responsible authority - Coast Guards should have a 24/7 emergency response team ready for quick response & recovery.
- 5) standard safety operations must be followed.

Along with preventive measures - it is crucial to use technically sound cleansing methods ~~to~~ like bioremediation, chemical absorbants, pressure water / foam are used to contain its spread and minimise the loss of marine life.

Its Periodic review, monitoring and evaluation of National oil spill disaster contingency plan and its implementation would ensure that such accidents ~~as~~ don't ~~recur~~ recur in our seas.

20. Forest fire pose a threat not only to the forest wealth but also to the entire regime of flora and fauna. What are the causes of forest fire? Discuss the ecological, economic and social impacts of forest fires.

दावानल (जंगल में लगने वाली आग) न केवल वन सम्पत्ति बल्कि क्षेत्र की संपूर्ण वनस्पतियों और जीवों के लिए भी खतरा प्रस्तुत करती है। वनों में आग लगने के कारण क्या हैं? दावानलों के पारिस्थितिक, आर्थिक और सामाजिक प्रभावों पर चर्चा कीजिए।

Forest fire of Uttarakhand - Himalayas in 2015 and many cases of forest fire in dense forests of Orissa & M.P. alarm us about a threat - not only to forest wealth but the entire regime of flora & fauna. There are many causes attributed to them -

- 1) Prevalent high temperatures - especially during dry summer days.
- 2) Erratic climate conditions for eg. EL-NINO in 2015-16.
- 3) Migration of local tribal communities from forest uplands to plain areas - so there is no community to act as first responders & contain the fire.
- 4) Mismanagement of funds for forest & disaster management also makes the disaster prevention inefficient.
- 5) Resin of certain trees especially pine trees is highly inflammable - while dry leaves of Saal - Sargam in dry deciduous forests are also highly inflammable.

The forest forest not only pose threat to forest wealth but also has deep ecological, economic & social impacts -

Ecological Impacts - Destruction of forests at large scale not only leads to felling down of trees which are crucial for carbon sequestration but also leaves dependent fauna - homeless posing threat to entire ecosystem. Such invaded land is also more prone to soil erosion.

However in case of limited fire - it can sometime help in sitting and flowering as well as help clear invasive grass species.

Economic Impacts -

Acc. to world bank data India lost 2.2% of GDP to disasters in 1990's-2000's. Hence most impact of any disaster is its high cost of emergency-response.

Apart from this, Forests are huge source of valuable timber, fuel, food & medicinal sources. loss of that impacts economy as well.

long spread innovation can be more prone to floods as well. So one disaster's spill over effects can lead to another one with deep ecological/ economic & social impacts.

SOCIAL IMPACTS :-

Forest lands are home to many aboriginal tribal communities like Gaddis, Bakawals, Bhotiyas, Bhils etc. Such accidents lead to loss of life & property & causes their displacement - which is difficult to be rehabilitated / reconstructed back.

It also disrupts the supply of essential services & infrastructure leading the benefits of hitherto development. And considering the fact that poor, women, children - already under-privileged sections of society are more ~~more~~ vulnerable to such accidents - the impacts lead to more disturbed & disparate society.

Effective, transparent and accountable forest administration in collaboration with local communities & environmental organizations can limit the accidents of forest fire to great extent so that there are no hindrances in our vision of achieving 33% forest cover under GREEN INDIA.