



# VISION IAS

www.visionias.in

VISION IAS

D L 10 JAN 2018 NO. 01

RECEIVED

## GENERAL STUDIES (TEST CODE : 1051)

|                   |                  |                     |            |
|-------------------|------------------|---------------------|------------|
| Name of Candidate | SHASHVAT SANGWAN |                     |            |
| Medium Eng./Hindi | English          | Registration Number | 154283     |
| Center            | Home             | Date                | 8 Jan 2018 |

### INDEX TABLE

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

Total Marks Obtained:

Remarks:

### INSTRUCTIONS

- Do furnish the appropriate details in the answer sheet (viz. Name, Registration Number and Test Code).  
उत्तर पुस्तिका में सूचनाएं भरना आवश्यक है (नाम, प्रश्न-पत्र कोड, विद्यार्थी क्रमांक आदि)।
- There are TWENTY questions printed in ENGLISH & HINDI इसमें बीस प्रश्न हैं अंग्रेजी और हिन्दी में छपे हैं।
- All questions are compulsory.  
सभी प्रश्न अनिवार्य हैं।
- The number of marks carried by a question/part is indicated against it.  
प्रत्येक प्रश्न/भाग के अंक उसके सामने दिए गए हैं।
- 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.  
प्रश्नों के उत्तर उसी माध्यम में लिखे जाने चाहिए जिसका उल्लेख आपके प्रवेश पत्र में किया गया है और उस माध्यम का स्पष्ट उल्लेख प्रश्न-सह-उत्तर (क्यूसीए) पुस्तिका के मुख्य पृष्ठ पर अंकित निर्दिष्ट स्थान पर किया जाना चाहिए। उल्लिखित माध्यम के अतिरिक्त अन्य किसी माध्यम में लिए गए उत्तर पर कोई अंक नहीं मिलेंगे।
- Word limit in questions, if specified, should be adhered to.  
प्रश्नों में शब्द सीमा, जहाँ विनिर्दिष्ट है, का अनुसरण किया जाना चाहिए।
- Any page or portion of the page left blank in the Question-Cum-Answer Booklet must be clearly struck off.  
उत्तर पुस्तिका में खाली छोड़ा हुआ पृष्ठ या उसके अंश को स्पष्ट रूप से काटा जाना चाहिए।

75, 3<sup>rd</sup> Floor, Old Rajinder Nagar Market, Near Axis Bank, New Delhi – 110060

103, 1<sup>st</sup> Floor, B/1-2, Ansal Building, Behind UCO Bank, Dr. Mukherjee Nagar, Delhi – 110009

## 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.

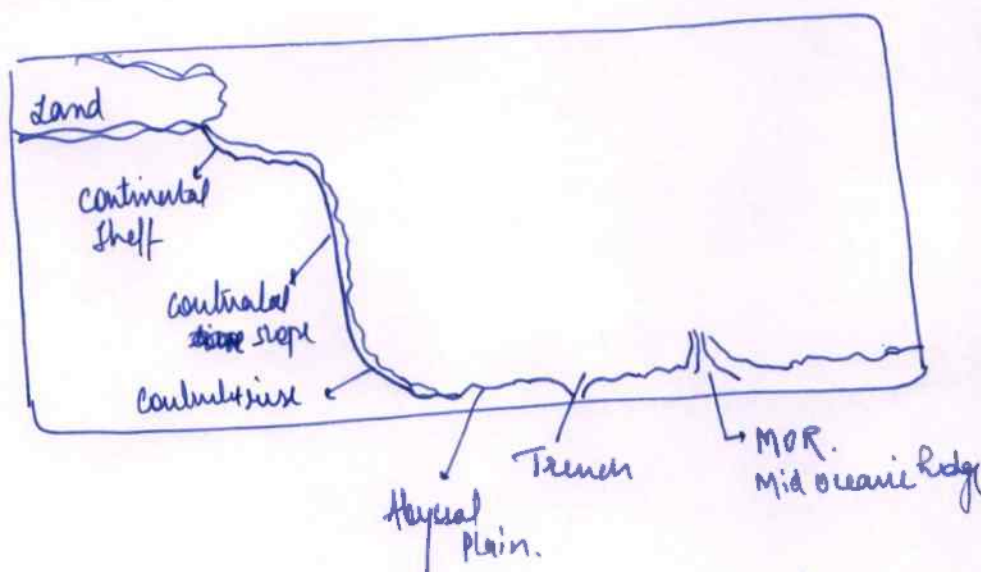
6.

All the Best

1. The mapping of ocean floor reveals complex and varied features, which rival the relief features on land. Discuss the reasons for the formation of main relief features of ocean along with their significance. **(150 words) 10**

महासागरीय अधस्तल के मानचित्रण से जटिल और विविध आकृतियों का पता चलता है, जो स्थलीय उच्चावचीय आकृतियों के तुल्य हैं। महासागरों की मुख्य उच्चावच आकृतियों के निर्माण के कारणों तथा उनके महत्व की चर्चा कीजिए।

The sea floor (ocean floor) has complex features on the lithosphere. e.g. The Mariana Trench depth > height of Everest.



- The lithospheric plates are formed of upper part of mantle, the continental crust and oceanic crust. They float on the asthenosphere.
- The MOR caused by diverging limbs of convective cells.

\* Trenches are formed where the sea floor is being consumed due to diverging limbs.

### ★ Economic Significance

1) The continental shelf provides the petroleum, natural gas reserves, apart from marine ecology that supports fishing and allied industry.

2) Sea floor has PMN (Poly Metallic nodules) rich in Manganese, Iron, aluminum etc.

3) Minerals such as sulphur (Mexican Gulf), salt etc are mined.

4) ~~Hydel~~ Hydel energy source.

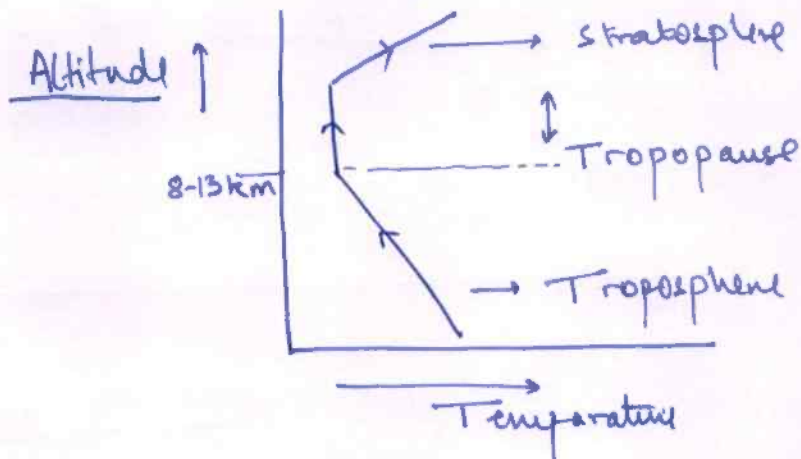
5) Calcium reserve from ocean.

therefore, we must conserve the marine ecology

2. What is inversion of temperature? Discuss the various mechanisms of occurrence of this phenomenon along with its climatic and economic significance. (150 words) 10

तापमान व्युत्क्रमण क्या है? इसके जलवायविक और आर्थिक महत्व के साथ इस परिघटना के घटित होने से संबंधित विभिन्न क्रियाविधियों पर चर्चा कीजिए।

The thermocline, as we rise up the atmosphere vertically, is as follows →



- we observe that usually, as we rise from earth, there is a drop in temperature.

- But as soon as we rise till tropopause, there is temperature increase with height.

- this phenomenon is known as temperature inversion.

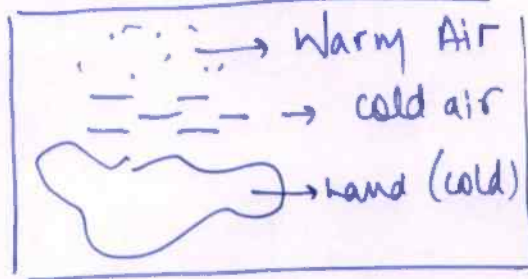
### MECHANISMS

1) ~~On plain land~~ On plain land

→ During night, the land cools quickly,

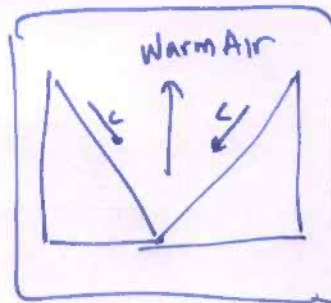
but air on top is still warm.

→ As we move up,  
there is inversion  
of temp.



### ② Valley and Mountain breeze.

⊛ During nights, the land on mountain is cold and therefore, the cold dense air descends to valley. There is inversion of temperature.



### ⊛ Significance

#### Climatic

1) Cloud formation  
in valleys

2) Frost and  
chill in valleys.

3) Mist in plain  
regions

#### Economic

1) Loss of crops due to  
frost in Mountain Breeze.

2) Hail and sleet  
cause damage to  
animals and  
ecology

3. With rapid industrialization, the threat of industrial disasters has increased. Explain the meaning of industrial disaster with adequate examples. Also, highlight the legal and institutional framework to reduce the risk during such events. (150 words) 10

तीव्र औद्योगीकरण के साथ, औद्योगिक आपदाओं का खतरा बढ़ गया है। यथोचित उदाहरण देते हुए औद्योगिक आपदा के अर्थ की व्याख्या कीजिए। साथ ही, ऐसी घटनाओं के दौरान जोखिम को कम करने के लिए कानूनी और संस्थागत ढांचे पर भी प्रकाश डालिए।

Industrial disaster refers to a calamity induced by a manufacturing, processing, or chemical industrial unit, causing widespread destruction of life and property.

#### EXAMPLES

- 1) Bhopal Gas Tragedy - Methyl Iso-Cyanide gas leaked, killing hundreds and poisoning many others.
- 2) Coal Reef Collapse - in Jharia, Jharkhand, trapping and killing coal miners due to asphyxiation.
- 3) Marine Ecology of Yamuna severely damaged primarily due to unchecked, untreated sewage and chemicals released.

The Government of India has timely identified this type of calamity, and

there were guidelines issued. This functions under the Ministry of Industries and Manufacturing.

• there was an elaborate legal and institutional framework,

① with the National Disaster Management Authority (NDMA) as the apex body, powered by the SDMAs and ADMA.

② There is a dedicated National Disaster response force (NDRF) comprising of CISF and CRPF battalions.

③ the responsibility on the industry in case of disaster

In addition, there was a focus and impetus to safe practices such as regular mock drills, awareness to nearby settlements, and clearly marked exit routes.

4. What are 'dead zones'? Mention the reasons for their formation. Explain, in brief, the impact of such dead zones. **(150 words) 10**

'मृत क्षेत्र' (डेड जोन) क्या हैं? इनके निर्माण के कारणों का उल्लेख कीजिए। ऐसे मृत क्षेत्रों के प्रभाव की संक्षेप में व्याख्या कीजिए।



5. Stating the differences between deltas and alluvial fans, highlight the factors responsible for their formation. Also, briefly bring out the economic importance of these two depositional landform types. (150 words) 10

डेल्टा और जलोढ़ पंख के मध्य अंतर बताते हुए, उनके निर्माण के लिए उत्तरदायी कारकों पर प्रकाश डालिए। साथ ही, इन दो निक्षेपात्मक भू-आकृतिक प्रकारों के आर्थिक महत्व को भी संक्षेप में बताइए।

Deltas are formed near mouth of rivers when its depositional activity supersedes over the erosional one.

Alluvial fans are formed when the river emerges from mountains to plains, and deposits suddenly, its alluvial load.

| Delta                                                                                                                        | Alluvial fan                                                                       |
|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 1) well <del>arranged</del> laid out <u>deposition pattern</u> with coarse grains first, medium next, and silt into the sea. | 1) Sudden emergence and steep slope cause the combined eroded material to deposit. |
| 2) <u>Usually slope</u> is very less, <del>less</del>                                                                        | 2) <del>less</del> slope is usually steep.                                         |

| Delta                                 | Alluvial fan                                |
|---------------------------------------|---------------------------------------------|
| 3) flow is very slow                  | 3) flow is fast.                            |
| 4) end stage of river                 | 4) Beginning - middle stage of river.       |
| 5) <u>Ganga - Brahmaputra delta</u> . | 5) <u>Bhabar region</u> in Himalayan region |

### Economic Significance

- 1) The alluvial fans deposit silt and sediments that contribute to soil fertility.
- 2) Deltas are wetlands that <sup>sustain and</sup> support ecology - ~~Patna Delta~~, Sunderbans Delta.
- 3) Deltas can be used as riverine ports. ~~Patna Port~~ Kolkata Port.

6. What do you understand by Inter Tropical Convergence Zone (ITCZ)? Discuss the annual fluctuations and shifting of ITCZ belt and its significance for India. (150 words) 10

अंतः उष्ण कटिबंधीय अभिसरण क्षेत्र (ITCZ) से आप क्या समझते हैं? ITCZ पेटी के वार्षिक परिवर्तन और स्थानांतरण एवं भारत के लिए इसके महत्व पर चर्चा कीजिए।

The Inter Tropical Convergence Zone (ITCZ) is a belt of low pressure that shifts with the movement of the sun annually.

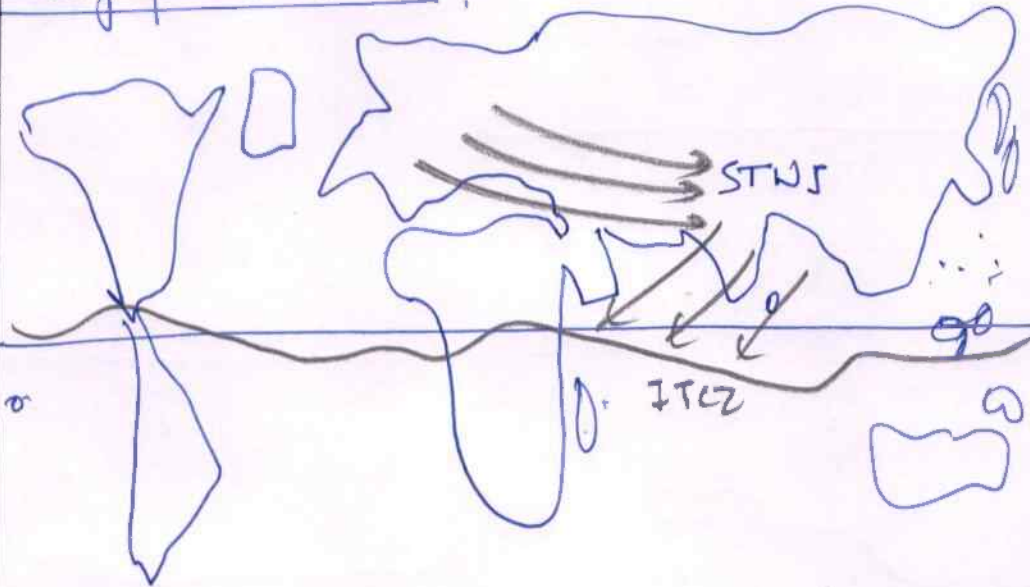
Significance for SW Monsoon (Summer)



- The ITCZ shifts to Tibetan Plateau causing intense HP there. This causes the moisture laden winds from the BoB and Arabian Sea to be drawn towards mainland.
- The region witnesses rainfall only when the moisture laden winds come to mainland.

\* In case the shifting fails to occur, there will be widespread harve due to loss of rain.

□ Significance in Winter



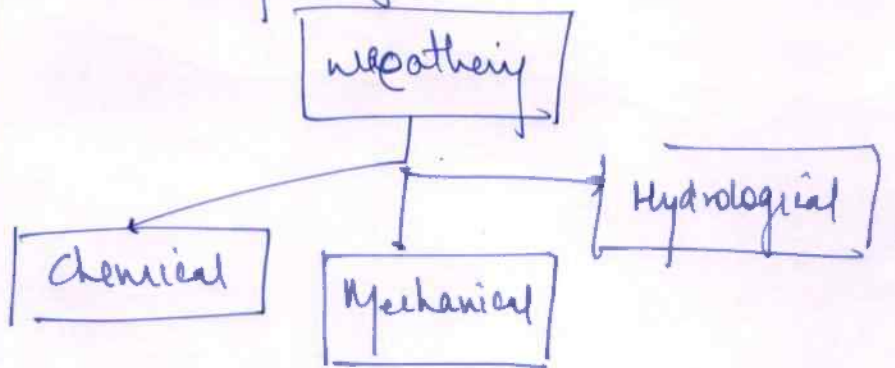
\* The Sub-Tropical Westerly Jetstreams himalayan branch carries disturbances from Mediterranean sea to Indian mainland, giving much needed winter rain.

\* This occurs because the ITCZ shifts trijely to the equator sides.

7. What is weathering? Discuss the ecological and economic significance of the process. (150 words) 10

अपक्षय क्या है? इस प्रक्रिया के पारिस्थितिकीय और आर्थिक महत्व पर चर्चा कीजिए।

The breaking down of rocks to form soil and minerals is called weathering. It depends vastly on the rock being eroded as well as the weathering agent.



- ① Chemical weathering occurs when limestone rocks are weathered by flowing water containing oxygen, and  $\text{CO}_2$  → stalactite, stalagmite etc.
- ① Mechanical weathering occurs when stones rumble against each other, etc.
- ① Hydrological happens by flowing water, sea cliff, stacks, sea-caves.

Ecological

- 1) Diverse landforms such as canyons, sea stack, sea cliff etc formed.
- 2) Soil is formed, coast is formed, and enrichment of land by minerals

Economical

- 1) Alluvial silt deposits of weathered material makes land fertile
- 2) Tourism - Grand Canyon, the beaches etc.
- 3) Sand bars, ~~lagoons~~ protect onset of cyclone, and tsunami by reducing impact.
- 4) Extraction of minerals of significant  
e.g. Monazite soil of Kerala coast is thorium reserve.

8. Explain the concept of Sun-spot cycle. In view of the approaching Solar minimum, highlight the changes that it brings on sun's surface and the effects that it has on earth. **(150 words) 10**

सौर कलंक चक्र की अवधारणा की व्याख्या कीजिए। आसन्न सोलर मिनिमम के परिप्रेक्ष्य में, सूर्य की सतह पर उत्पन्न होने वाले परिवर्तनों और इसके द्वारा पृथ्वी पर पड़ने वाले प्रभावों पर प्रकाश डालिए।



9. What is Pacific Ocean Garbage Patch? Provide an account for the factors responsible for its development and location. Also, discuss its impacts and suggest measures for mitigation. **(150 words) 10**

पैसिफिक ओशन गार्बेज पैच क्या है? इसके विकास एवं अवस्थिति के लिए उत्तरदायी कारकों का विवरण प्रस्तुत कीजिए। साथ ही, इसके प्रभावों पर चर्चा कीजिए और शमन के उपाय भी सुझाइए।

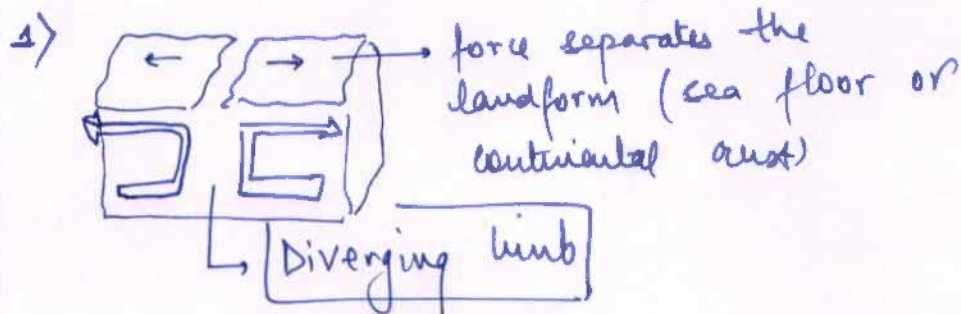


10. Explain the formation of mid-oceanic ridges in different oceanic basins of the world. (150 words) 10

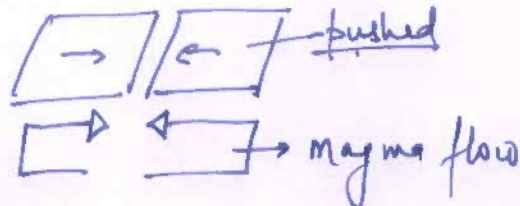
विश्व के विभिन्न महासागरीय नितलों में मध्य महासागरीय कटकों के निर्माण की व्याख्या कीजिए।

The sea-floor spreading theory justified how the force emanates which pushes the oceanic & continental crusts to move.

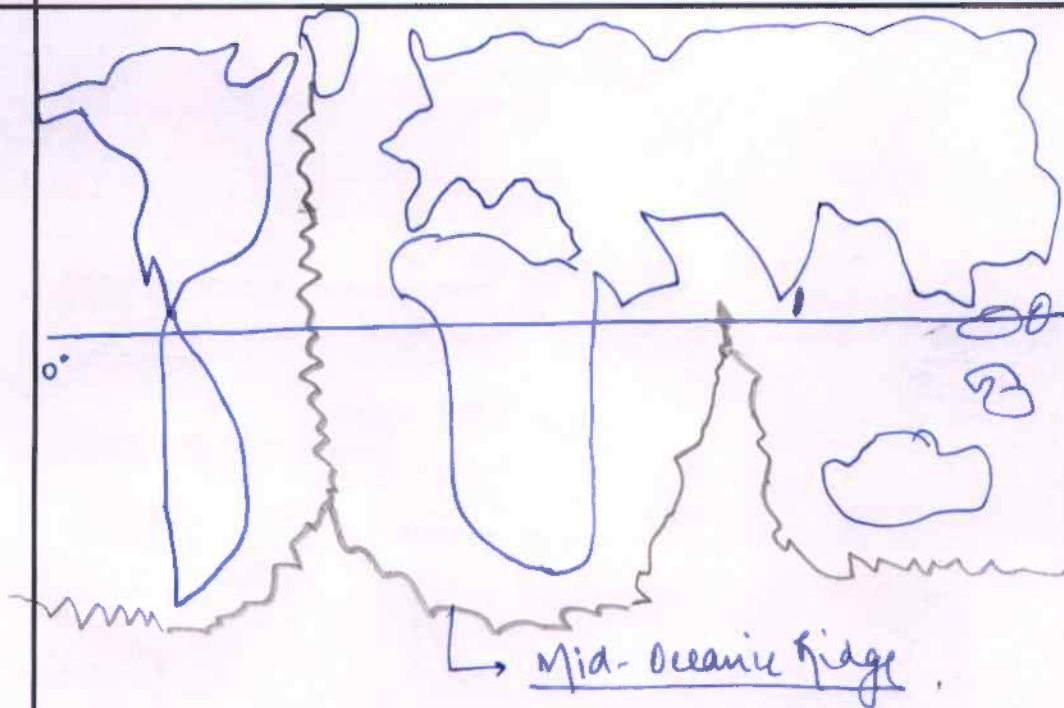
there exist convective cells in the mantle which have following mechanisms



2> converging limb  
causes trenches and consumption of sea floor.



Now, the Mid oceanic Ridge (MOR) is the region that has a series of diverging limbs which cause spreading of the sea floor →



\* These are places where sea floor spreads, as recognised by studying various ~~ex~~ examples,

→ such as identical rocks in chemical and magnetic properties when equal distance from MOR.

→ Sea floor consumed at Trenches.

→ Rocks of sea not older than the continental land mass. Therefore, new.

The MOR discovery was a landmark in the understanding of Earth's geography.

11. Discuss the spatial and temporal variation of rainfall in India. Has this pattern been changing in recent years? Examine. (250 words) 15

भारत में वर्षा की स्थानिक और कालिक भिन्नता पर चर्चा कीजिए। क्या हाल के वर्षों में यह पैटर्न परिवर्तित होता रहा है? परीक्षण कीजिए।

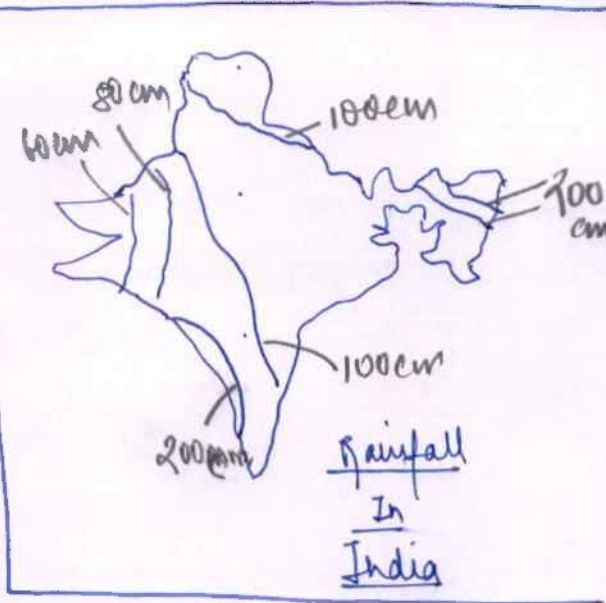
India is a predominantly agrarian economy where more than half its population derive a living from agriculture. Out of the total seven area, about 55% of the area is rain-fed, i.e. no irrigation and full dependence on rainfall.

Being a geographically diverse subcontinent, spanning a vast geographical margin, both length and breadth wise, and positioned in the subtropical ~~and temperate~~ regions, there is varied rainfall, with respect to space (regional) and time (seasonal).

### SPACIAL VARIATION

The map of rainfall clearly indicates the variation. There is Cherrapunji which is the world's wettest place, and the great Sahara Desert too.

• The western ghats; leeward side is dry, but the windward side acts as a barrier to SW monsoon winds, and the region gets rainfall



• The N.E. Region of India, has one of the wettest parts of the world → The Himalayan slopes act as natural barriers

• The West Rajasthan and Gujarat (Kachch) are dry because the moisture laden winds from West to East and dry by the time they reach the western margins of the subcontinent

• Other parts are mostly in 100-125 cm/year range.

TEMPORAL VARIATION

- in summer, the SW monsoon winds give plenty of rain

Summer:

- in winter, the Sub-Tropical westerly Jetstream (STWJ) brings ~~water~~ disturbances from Mediterranean Sea, and give winter rain

winter• CHANGING PATTERN

- ▣ India receives about 80% rain in a matter of 100 days, causing loss to agriculture. This severity is increasing to a latest
- ▣ Global warming, according to a latest UNEP Report, is the prime culprit to blame for cycles of excessive rain and drought
- ▣ Periodically aggravated El Nino (ENSO) and La Nina are intensified as anthropogenic factors come into play

12. Technology has provided important tools for making disaster management more effective. Elaborate with special focus on the role of technology in reducing disaster risk. Also highlight the challenges in application of technological solutions in disaster affected areas. (250 words) 15

आपदा प्रबंधन को अधिक प्रभावी बनाने हेतु प्रौद्योगिकी ने महत्वपूर्ण साधन प्रदान किए हैं। आपदा जोखिम न्यूनीकरण में प्रौद्योगिकी की भूमिका पर विशेष ध्यान केंद्रित करते हुए सविस्तार वर्णन कीजिए। साथ ही, आपदा प्रभावित क्षेत्रों में तकनीकी समाधानों के अनुप्रयोग में आने वाली चुनौतियों पर भी प्रकाश डालिए।

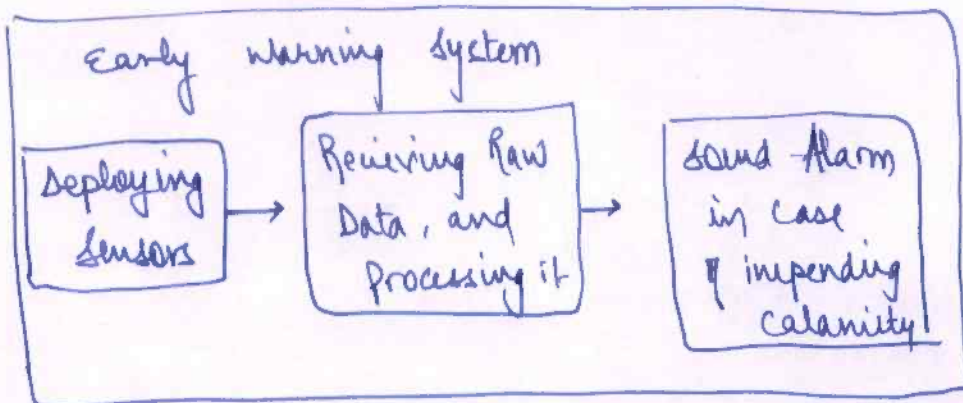
• Disaster management is the mitigation strategy that is deployed during a natural or man-induced calamity. It has three stages.



• Technology is a resource that comes in handy at all 3 stages. for example, during the Chennai Floods recently, the PWD's WhatsApp group coordinated all rescue and search operations including identification, resource deployment, manpower management, etc. there were no official meetings held at district level saving valuable time and resources.

## Role of Technology in Reducing Risk

- 1> During natural calamities such as earthquakes, cyclones, Tsunami etc. early warning systems can be deployed, for timely preparedness. E.g. INCOIS, Hyderabad



- 2> for events like water-release from Dam, drought prevention practices, channels on Radio and TV (Kisan TV etc), can be used. Since 2014, the Indian Meteorological department gives out SMS-based alerts to coastal district population.

- 3> Agrarian practices - Scientific cultivation, irrigation etc. preserves aquifer, stops land degradation.

- 4) During fires etc, smoke detectors play a vital role in sensing and activating hoses
- 5) Poisonous gas sensors and heat sensors identify gas-leaks and prevent disasters.

### CHALLENGES

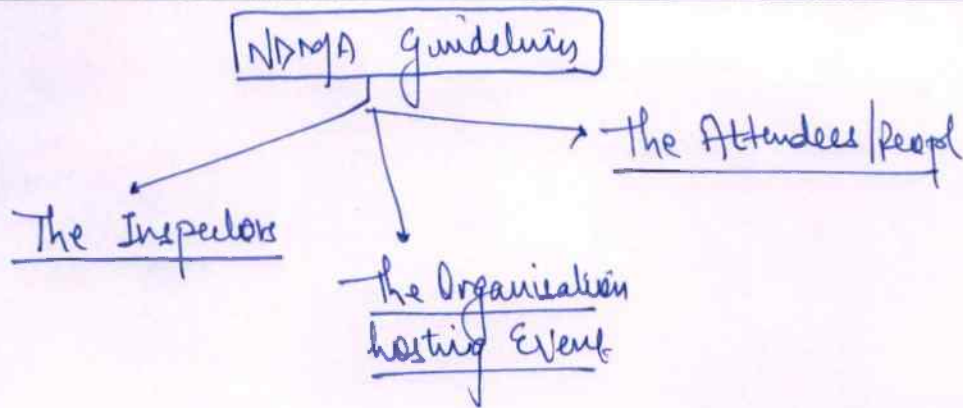
- 1) Privacy, security: Channels like social media, WhatsApp may be prone to leaking of vital information
- 2) Dependence on systems: During floods, earthquakes, the lines of electricity and internet are disrupted. Now, fall back on traditional means.
- 3) Lack of resources - to deploy latest warning and prevention measures.
- 4) Lack of skilled manpower - to effectively use the available resources for preparedness.
- 5) Common Man - is unaware of how to use ~~and~~ technology effectively
- Therefore, there is ample scope for utilising technology in disaster management.

13. While overcrowding in public places cannot be wished away in India, what we need are better infrastructure and more effective crowd-control measures. Comment. Also, briefly enumerate NDMA guidelines for crowd management. (250 words) 15

यद्यपि भारत में सार्वजनिक स्थलों पर अत्यधिक भीड़भाड़ को कम नहीं किया जा सकता है, तथापि हमें बेहतर अवसंरचना और अधिक प्रभावी भीड़-नियंत्रण उपायों की आवश्यकता है। टिप्पणी कीजिए। साथ ही, भीड़ प्रबंधन के लिए NDMA के दिशानिर्देशों को संक्षेप में सूचीबद्ध कीजिए।

The Elphinstone Bridge Station overbridge witnessed a stampede recently, where tens of hapless commuters lost their lives. Being one of the most population dense country, and a culture of 'mel', meaning 'gathering' being prominent, crowd control remains one of the prime areas where we need to focus, and make conditions safer.

Recently, NDMA (National Disaster Management Authority), the Apex body responsible for disaster management policy, implementation, and preparedness, established under the Disaster Management Act, 2001, released guidelines for crowd management -



### 1) Organiser

- Must deploy CCTV cameras at strategic locations
- Must familiarise the crowd about exit routes compulsarily
- Well laid out exit routes and fluorescent markings, and assembly points.

### 2) Inspectors

- The SDMA, DDMA working under the CM and DM (DMA act 2005) must regularly supervise, check, and suggest measures and policy adherence for prevention of a disaster.

### \* People

- 1) Must be familiar with exit routes
- 2) Help oneself first before moving to help others.

\* More over, better infrastructure, such as

- 1) Open and spacious seating arrangement.
- 2) Use of scientifically approved fire-resistant material during construction.
- 3) Upgradation of over-bridges, stadiums etc.

### \* Better Measures

- The NDMA guidelines are a 'bullet on the mark', if implemented in spirit.
- It is vital to ensure accountability, responsibility, transparency in administration of these activities
- Ensuring volunteers to handle crowds and
- Medical help near crowded locations.

14. State the conditions that are conducive for the formation of coral reefs. Mention the anthropogenic factors that have resulted in their decline. Also highlight its consequences. (250 words) 15

प्रवाल भित्तियों के विकास के लिए अनुकूल दशाएँ बताइए। उन मानवीय क्रियाकलापों का उल्लेख कीजिए जिनके परिणामस्वरूप प्रवाल भित्तियों का ह्रास हुआ है। साथ ही, इसके परिणामों पर भी प्रकाश डालिए।

Corals are marine organisms found near tropical regions, and are often indicative about the health of marine ecological conditions.

#### Conditions for Coral reef formation

- 1) Temperature more than  $16.5^{\circ}\text{C}$ .
- 2) Low salinity.
- 3) Stable water
- 4) Availability of zooplankton (marine organism, which has a symbiotic relationship with corals).
- 5) Sunlight for zooplankton to prosper, which is food for corals.

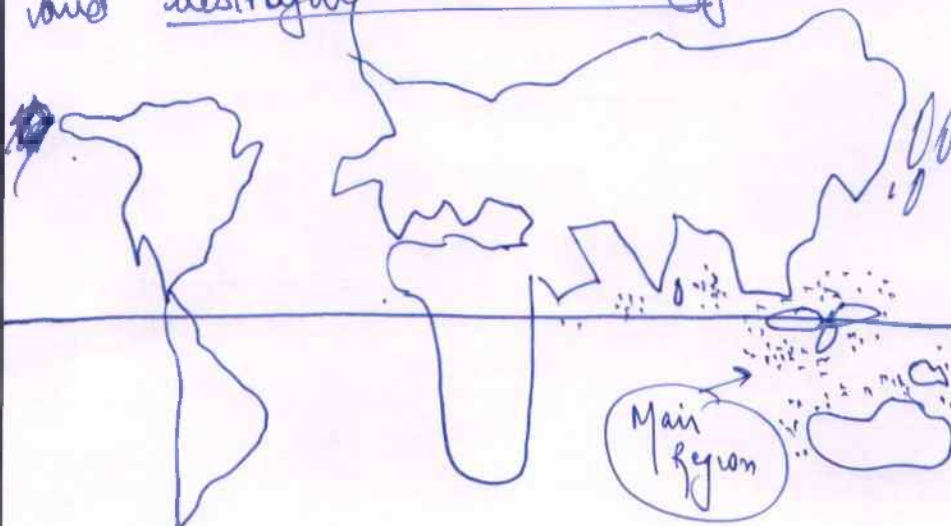
### ▣ Anthropogenic factors causing decline

Corals start expelling zoo-planktons when under stress, and start turning white. This happens because of.

1) Pollutants :- Untreated chemicals, when released cause poisonous elements such as acids, that kill corals

2) Algal Bloom :- Algae blocks sunlight, and corals die. This is a consequence of pollutants released in sea.

3) Oil Spill - Oil layer covers vast expanse on the ocean surface, blocking sunlight, and destroying water ecology.



Coral pollution (in :: India)

Consequences

- 1) Destruction of marine ecology, and the food cycle, symbiotic relationships existing
- 2) Loss of fishing and allied industry with increasing marine pollution.
- 3) Loss of tourism - Coral landforms such as atolls, barrier reefs (great barrier reef) etc. are famous tourist hotspots. Death of corals means loss of revenue.

Therefore, this issue is an international one, and a collaborative initiative of all stakeholders is necessary to combat this impending calamity.

15. In combining the sea floor spreading theory with continental drift and information on global seismicity, the theory of Plate Tectonics provides a coherent explanation for crustal movements. Discuss. (250 words) 15

महाद्वीपीय विस्थापन सिद्धांत और वैश्विक भूकंपीयता के बारे में सूचना के साथ सागर अधस्तल विस्तार सिद्धांत को संयोजित करने से, प्लेट विवर्तनिकी सिद्धांत भूपर्पटी संचलन की एक सुसंगत व्याख्या प्रदान करता है। चर्चा कीजिए।

The Theory of Plate Tectonics indicates that the Earth is composed of massive, irregular blocks of large areas, usually containing oceanic and lithospheric regions. They float on a layer of asthenosphere, that lies in the Mantle region of Earth.

But the drawback of Wegener's theory was - didn't explain force that moves these plates.

#### □ The Sea Floor Spreading

There were evidences suggesting that the sea floor was spreading at the Mid-oceanic Ridge, as marked on map.

1) Age of sea floor similar when similar distances traversed from MOR. chemicals, paleomagnetism property etc. This, *inter alia* gave definite proof that sea floor spreads.



There exist convective cells, that may either converge or diverge magma, and cause the movement of plates.

The MOR is place where there are active diverging cells, that create sea-floor (spread).

#### • Continental Drift

suggests that whole earth was a single landmass - PANGAEA and a single water body - PANTHALASIA, which eventually broke down into plates of lithosphere, and over millions of years, re-arranged to form several continent structures.

Proof (only few)

- 1) ~~some~~ Jug-Saw fit of continents
- 2) fossil dating - Lemurs only in Asia, Africa, Madagascar.
- 3) placer deposits - gold veins in Ghana and Brazil plateau

• Seismicity Pattern

The places where the tectonic plates form converging, diverging, or transform boundaries are high seismic zones, and hence prove that there exist tectonic plates.

Therefore, all these combined theories throw light on the geography of Earth in a coherent manner.

16. Provide an appraisal of the vulnerability of the agriculture sector to natural disasters. What can be done to strengthen the resilience of the sector in order to reduce the impact of such disasters? (250 words) 15

प्राकृतिक आपदाओं के प्रति कृषि क्षेत्र की सुभेद्यता का आकलन कीजिए। ऐसी आपदाओं के प्रभाव को कम करने के लिए इस क्षेत्र की अनुकूलन क्षमता को सुदृढ़ करने हेतु क्या किया जा सकता है?

Agriculture is the source of livelihood for over 55% of India's population.

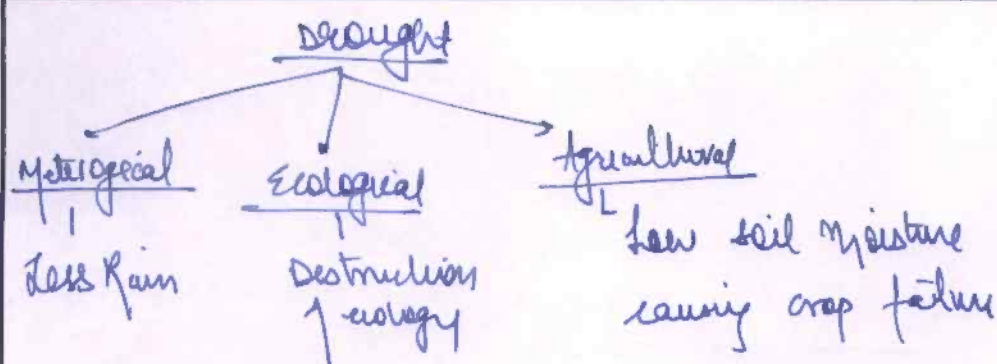
Any hinderance in the functioning can cause calamities of unspculated nature and scale.

According to Ministry of agriculture data, over 1.5 Lakh farmers committed suicide in 2016 due to distress. Many of these owe their occurrence to natural disasters, such as

### 1) DROUGHT

A 'slow-onset' disaster, intensified because over half of India's fields are rain-fed with no irrigation.

can be of the following types—



- Government has classified droughts as  
'onset of drought', 'drought', and 'severe' drought.
- PM Fasal Bima Yojana insures against loss.

### ② Floods

- Cause widespread loss to life and property
- Cause death of cattle.
- Tsunami, cyclone causes salinisation of land.

### ③ Earthquakes, landslides

- Cause upheaval with collapsed structures, and damaged crops

### ④ Locust Attack

- Destroy whole crop causing losses to farmers.

Measures Suggested1) Drought Management

- A) A series of measures such as inclusive policy on classification and remedial measures.
- B) Structural (irrigation, scientific ploughing) and non-structural (capacity building) measures.

2) floods

- A) Build embankments.
- B) Settlements should be away from flood plain. e.g. Amravati should not be built in Krishna flood plain.

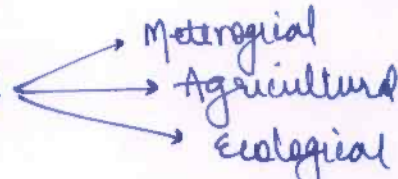
3) Policy

- There must be full insurance, and prompt claim settlements too.
- Detailed study of regions and identify drought prone - hazard mapping.

17. Explain what a drought is and describe its different types. Discussing the environmental and societal impacts of droughts, enumerate the factors that aggravate these. (250 words) 15

व्याख्या कीजिए कि सूखा क्या है तथा इसके विभिन्न प्रकारों का वर्णन कीजिए। सूखे के पर्यावरणीय और सामाजिक प्रभावों पर चर्चा करते हुए, इनकी गंभीरता को बढ़ाने वाले कारकों को सूचीबद्ध कीजिए।

A drought is a prolonged period of deficiency of water resources, that severely affects life of people by disrupting agriculture, and livelihoods.

TYPES OF DROUGHTS 

1) Meteorological

- When a region gets less than normal rainfall, there is a condition of drought, though it varies in intensity and intensifies slowly.

2) Agricultural

- When soil moisture is lessened, there is a chance of crop failure, causing widespread damage to crops.

3) Ecological

- When there is water shortage due to damaged ecology - such as lowered water table of groundwater, polluted lakes etc.

Droughts cause a widespread environmental and societal impact.

\* Environmental

- 1) Land degradation, salination due to mismanagement of resources, faulty policies (free electricity to tubewells).
- 2) Desertification of land.
- 3) Death of cattle and animals due to lack of water to drink.

\* Social

- 1) farmer suicide out of distress, more than 1.5L in 2016.
- 2) Large scale migration in search of employment.
- 3) lack of proper growth i.e. 4) Poverty

FACTORS AGGRAVATING DROUGHT

\* These are mostly anthropogenic factors.

1) De-forestation - more run-offs, and less seepage through roots, causes failure of replenishing groundwater table.

2) Faulty Policy - free electricity for pumps and tubewells - more water drawn, more salinisation, causing land to become barren.

3) Infrastructure lapse - no alternate irrigation mechanism, even when there is predicted low rain fall. i.e. some area is only rain-fed.

4) Concentration of 80% rainfall over a span of just 100 days (summer)

5) Lack of scientific ecologically-sustainable sowing - e.g. Pulses, millets in arid region.

18. Assess the vulnerability of Indian coastal regions to cyclones. Also, mention the objectives and approach adopted by the National Cyclone Risk Mitigation Program (NCRMP) in this regard. (250 words) 15

चक्रवातों के प्रति भारतीय तटीय क्षेत्रों की सुभेद्यता का आकलन कीजिए। साथ ही, इस संबंध में राष्ट्रीय चक्रवात जोखिम शमन कार्यक्रम (NCRMP) द्वारा अपनाए गए उद्देश्यों और दृष्टिकोण का भी उल्लेख कीजिए।

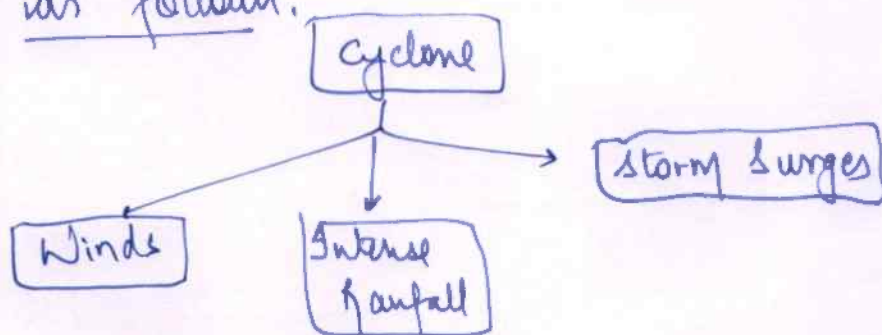
\* A Tropical Cyclone is an intense low pressure system that forms over warm oceans and seas due to intense heating. According to Indian Meteorological Department, about 8% of India's land is cyclone-prone.



During late October, and early November months, the LP system over the Tibet plateau shifts to the Bay of Bengal, and the waters are

already warm (necessary condition) due to the late summer season.

This is an ideal condition for cyclones to develop, and they cause widespread loss of life and property, as follow.



• Wind causes uprooting of structures, and causes loss of property, destroy crops.

• Rainfall causes flooding in agricultural areas, kills people and cattle, disrupts communication.

• Storm Surges - are abnormally high tidal waves that cause the most damage. crops, salination, ports, roads, houses, all are destroyed.

The National Cyclone Risk Mitigation Program  
has taken the following steps:-

- 1) INCOIS, Indian National cyclone observation Information, ~~Observation~~ <sup>Studies</sup> at Hyderabad, to process data from sensors, and notify in case of abnormality.
- 2) Indian Meteorological Department (IMD) sends SMS-based warnings to fisherman and coastal population in case of impending cyclone.
- 3) The Navy and Coast Guard vessels are perpetually stocked with safety equipment, food, blanket, and rescue apparatus, and is the first responded.
- 4) Indraprastha mangrove conservation program to reduce the severity of cyclone once it reaches shore.
- 5) A designated portion of NDRP for cyclone-affected victims.

19. What role have volcanoes played in formation of earth's atmosphere in the past? Elaborate on the impact of volcanic activity on climate change in contemporary times. (250 words) 15

अतीत में पृथ्वी के वायुमंडल के निर्माण में ज्वालामुखियों ने क्या भूमिका निभायी है? समकालीन समय में जलवायु परिवर्तन पर ज्वालामुखीय गतिविधियों के प्रभाव का सविस्तार वर्णन कीजिए।

The Atmosphere of Earth evolved in three stages.

1) Primordial Atmosphere of Hydrogen and Helium gases being driven away by sun's heat and radiation

2) Gases from Earth's interior escaping through breaks in crust such as earthquakes, volcanism etc.

3) Biotic beings influencing and modifying the atmosphere. e.g. Plants, animals, green house gases by humans etc.

- Volcanism led to the release of trapped gases and heat which enabled life to begin.

- The overall earth is most abundant in Iron, followed by Oxygen.
- The earth's crust is most abundant with oxygen.

Therefore, it was volcanism, that caused the oozing out of life-giving gases to sustain life.

However, in recent times, it is playing havoc with frequent eruptions, gas clouds, ash and cinder rain etc.

- Bali, Indonesia recently witnessed nature's fury when a volcano erupted, and thousands of tourists were stranded.

- Effective forecasting and mitigation strategy can greatly reduce the impact.

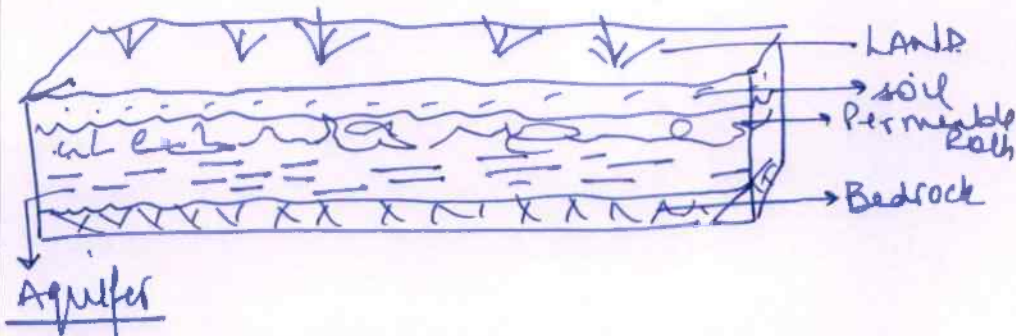


20. A need has been felt to demarcate aquifer systems in the country so as to provide critical information to plan for their sustainability. Analyse. Also, mention the steps taken by the Government of India in this regard.

(250 words) 15

देश में जलभृत (एक्विफर) प्रणालियों को सीमांकित करने की आवश्यकता का अनुभव किया जा रहा है, ताकि उनकी संधारणीयता संबंधी योजना बनाने हेतु महत्वपूर्ण सूचना प्रदान की जा सके। विश्लेषण कीजिए। साथ ही, इस संबंध में भारत सरकार द्वारा उठाए गए कदमों का भी उल्लेख कीजिए।

- Aquifer system refers to the ecology surrounding groundwater reserves, especially the level of groundwater table.



- In a predominantly agrarian economy, such as ours, where rained regions (only rainwater as irrigation source) comprise over 56% of all down area, the groundwater table is an extremely valuable resource to prevent conditions

of agricultural drought, salination of land,  
and desertification of land.

#### □ IMPACT

- Regions such as Punjab and western UP have over-utilised their ground water reserves (80% developed), and there is an impending ecological crisis.

- There is salination of land because more than necessary water is drawn. More salts are left behind when this water evaporates. This causes salination and loss of productivity.

□ Keeping in view of this, the government has demarcated aquifer systems, and taken following steps.

\* soil health Card scheme (SHC)

in order to suggest the amount of water to be used, so that best sustainable output is achieved.

• Replenishing triples - artificially through  
rain-water harvesting

• Watershed Management - to preserve the  
aquifer, among ~~other~~ other measures.

Therefore, the government has timely  
identified how crucial aquifer ecology  
is to India, and right steps need  
to be taken without delay.