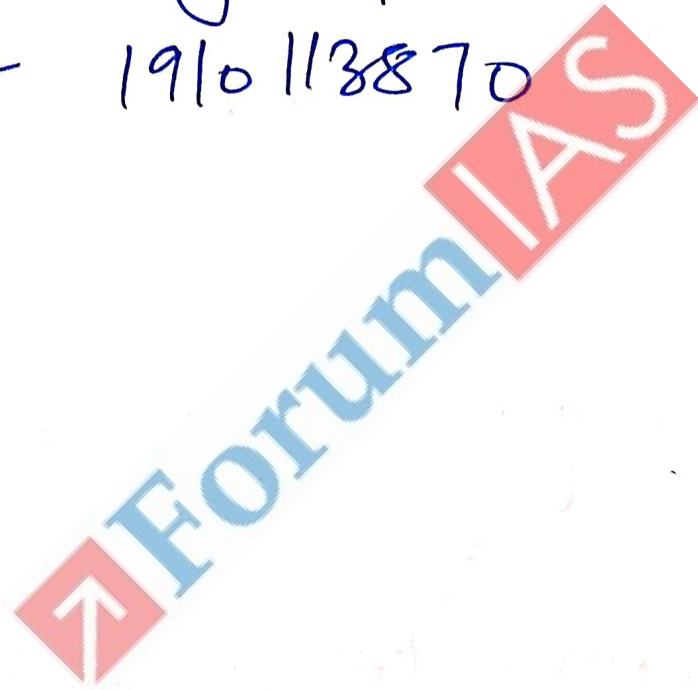


AWFG 2025

Name Ananya Rana

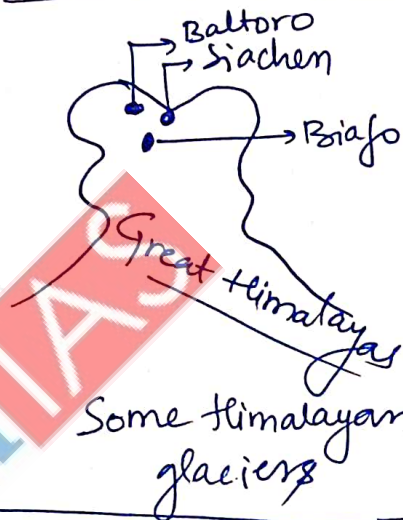
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1.

Himalayan glaciers are known as third pole of the world and has been witnessing changes in its composition due to climate change.

Changes in Himalayan glaciers reflecting climate change



① | Decrease in size due to melting

Caused by rise in atmospheric temperature. (eg) IPCC report on Himalayas

② | Loss in biodiversity due to change in temperatures of survivable place

(eg) Temperate vegetation is shifting towards poles.

③ | Frequent disasters like GLOF in Sikkim, Chorabari disaster in Uttarakhand.

Changes in Himalayas contributing to climate change

- ① Decrease in Earth's albedo due to melting of snow.
 - ② Absorption of black soot by snow increases melting.
 - ③ Melting rises sea levels which contribute to existential threats for some island nations @ Tuvalu.
 - ④ Disrupts cycle of cooling and heating that sustain Earth.
 - ⑤ Promotes warming of Asian Continent
- ⑨ According to WMO report, Asia is warming at twice the rate of world.

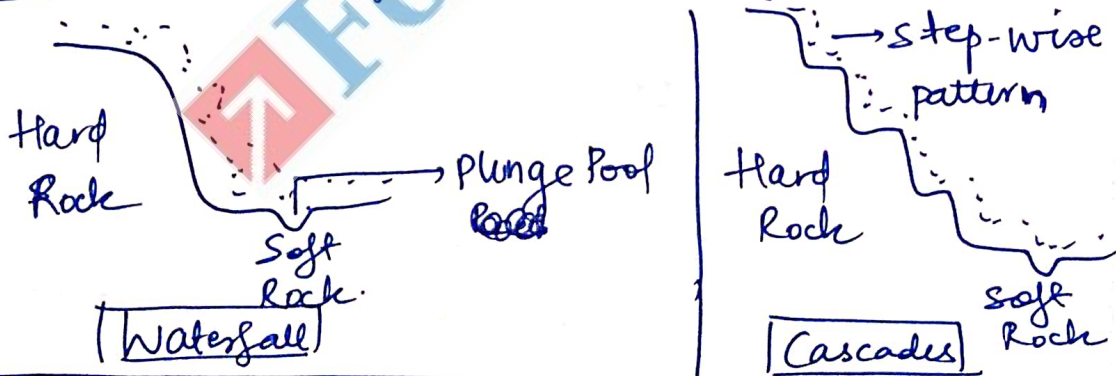
Declaration of 2025 as year of Glaciers is a step in right direction. Decreasing green house gas emissions and promoting Mission LIFE should be way forward.

2.

The landforms formed by running water are called fluvial landforms. They are formed due to abrasion, attrition and erosion-deposition of matter by running water.

Various erosional landforms formed by running water

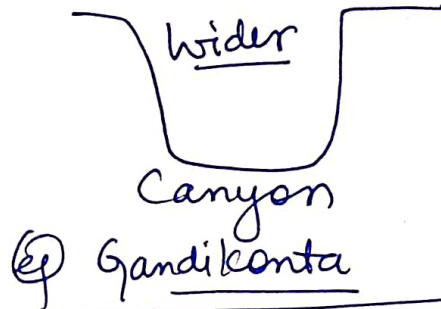
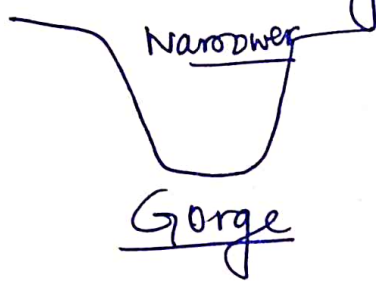
① Waterfalls and cascades - when hard rock remains steady while soft rock in the front is eroded.



② Rapids - Formed by erosion of all surface leaving only an isolated standing dykes structures.



2. Canyon / Gorge - By erosion of surface rocks creating deep structures.



Various depositional landforms

1. Delta: Formed by deposition of silt at mouth of river
(e) Sunderban Delta on Ganga



2. Ox-bow lakes: Formed due to cut off and deposition of silt while meandering
(e) Goga Beel



3. Step off ~~and~~ banks
When silt is accumulated inside convex bank of river

4. Floodplains
(e) Bangar - old
Khadar - new
alluvial soils



Fluvial landforms enrich the dynamism of earth and provide picturisque sites to witness.

3. The rate of cyclone formation in Arabian sea has nearly doubled in the last 15 years as compared to those in Bay of Bengal.

Bay of Bengal is more prone to cyclones

① Smaller in size than Arabian Sea

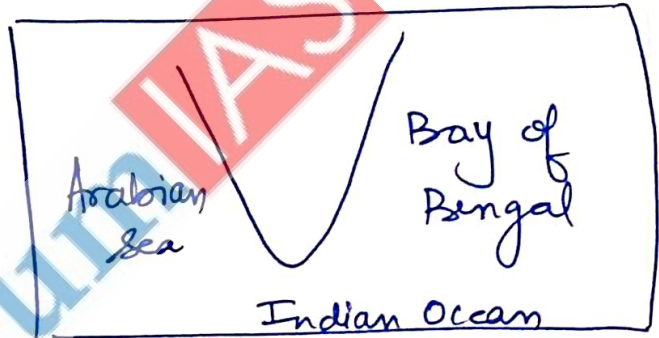
② More flux of fresh water
eg Ganga, Krishna

③ More enclosed body thus higher warming caused by contact with land.

④ Suitable conditions available especially during pre-monsoon times.

eg Cyclone Amphan, Taukate etc

However, over the years Arabian sea is witnessing changes in temperature giving rise to more cyclones.



Factors leading to higher number of cyclones in Arabian Sea.

- (1) Indian Ocean Dipole - Positive IOD increases temperature in West Indian Ocean and hence Arabian Sea:
- (2) ENSO - Frequent and prolonged spells of El-Nino in Pacific Ocean have indirect bearing on Arabian sea temperature
- (3) Slowing down of AMOC - leading to disruption in heat distribution.
- (4) Decrease in influx of already scarce freshwater @ Narmada & Tapi
- (5) Green house gas emissions caused by vehicles used for trade via sea

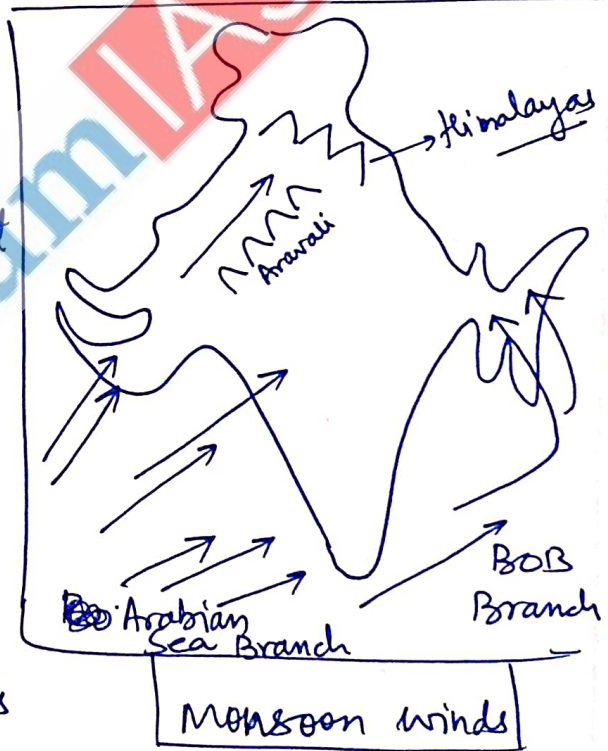
This rising and changing trend of cyclones is a wake up call to take efficient steps to prevent reaching tipping point and fulfill mandate of Paris agreement.

4. Monsoon system is a pan-India phenomenon [also present in some other pockets of the world] which is a result of presence of favourable conditions over the continent in summers.

Mechanism of monsoon system

① Warming of Indian continent in summer leading to development of low pressure region.

② This cause air to move from high pressure region in Indian Ocean towards land.



③ While moving, winds carry huge amount of moisture with it

④ 2 Branches - Arabian Sea and Bay of Bengal to cause rain

in different parts of region

This monsoon is called South West Monsoon, responsible for rainfall in majority of India. Other retreating part is North East Monsoon for T.N. coast.

Difficulty in accurately predicting monsoon patterns

- ① Rise in climate change making all natural phenomenon getting abrupt.
- ② Connections with other global phenomenon like ENSO, IOD, AMOC etc.
- ③ Changed nature of heat distribution due to differential heating of some parts of Earth @ Asia is warming at twice the rate of World (WMO).

The unpredictability can be reduced by investing in R&D eg. Project Mausam by IMD to prevent farmers from losses

5. Corals are the cnidarian species of polyps living in symbiotic relationship with an algae called zooxanthellae. They are called the 'Rainforests of the Ocean'.

Coral Bleaching

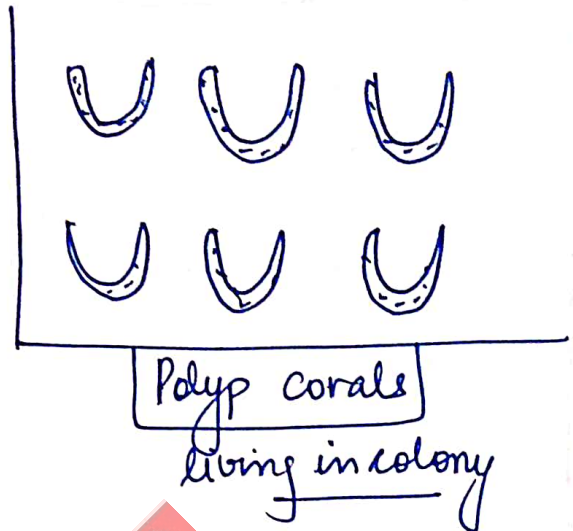
It is a phenomenon of loosing of colour by corals due to expulsion of zooxanthellae.

The corals becomes dull and white after coral bleaching.

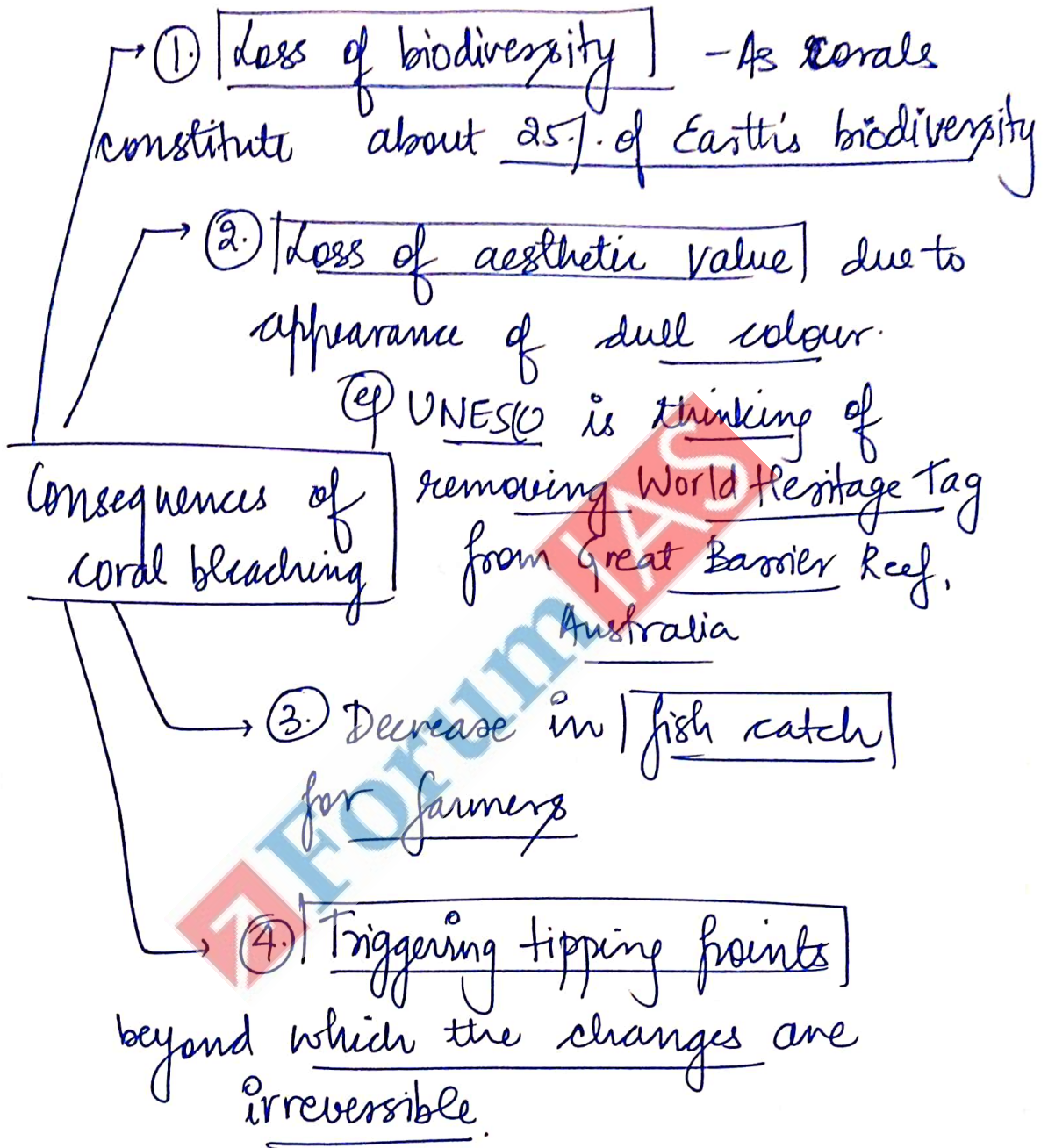
④ Coral Bleaching observed in Great Barrier Reef, Australia.

The coral bleaching is a 'biosignature' that natural conditions are undergoing changes and actions are required.

Causes of coral bleaching

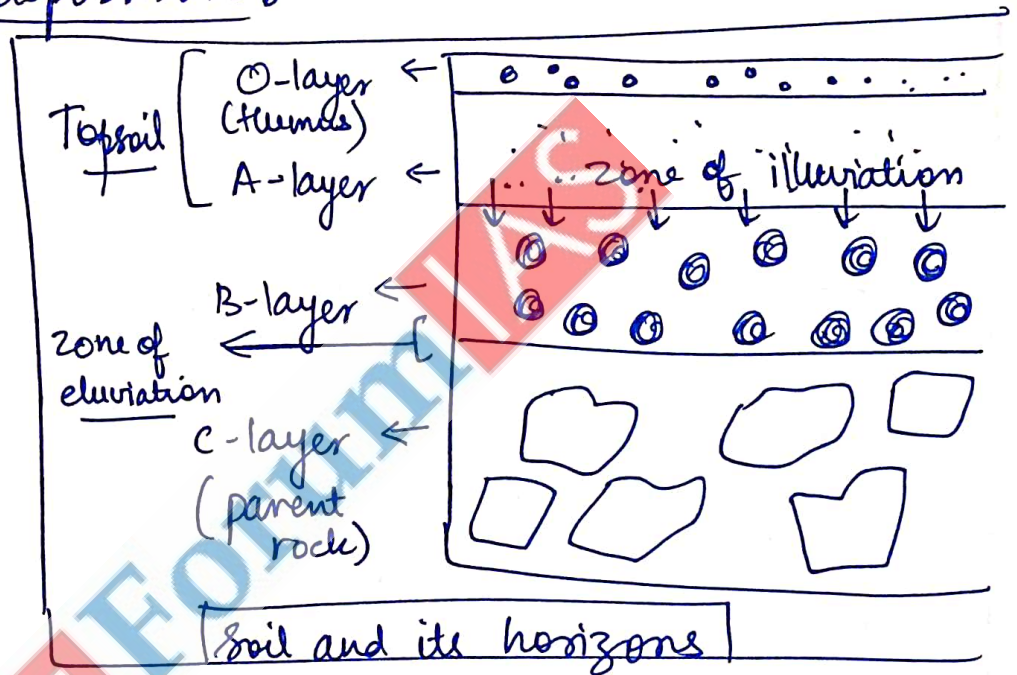


- ① Rising pollution levels of water due to chemical intake caused by erosion into sea/ocean
- ② Change in temperatures beyond 18°C increases changes of coral bleaching.
- ③ Acidification of ocean due to rising levels of CO₂ in atmosphere and their consequent absorption by oceans causing corals CaCO₃ content to dissolve
- ④ Instability in water disturbs the calm nature preferred by corals & thus disrupting their habitat.



Coral bleaching is a nature's way of indicating human excesses on it. Time is to work on war footing to reduce GHG emissions and preserve this heritage.

6. Soil formation and its study is known as pedology. Soil formation takes millions of years via process of erosion and deposition.



Factors influencing formation of soil

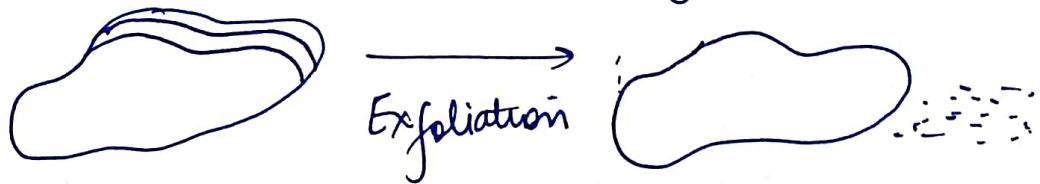
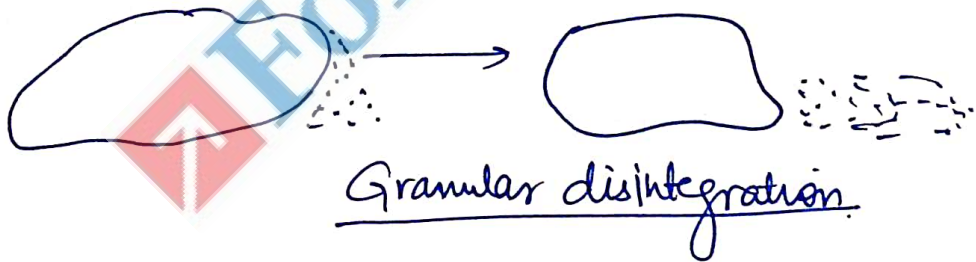
- ① Geographical factors - Temperature and pressure conditions. Warm and humid climate enhance rate of rock weathering.
- ② Type of rock structure - Highly erodible rocks give rise to faster soil formation

③ Physical agents like running water, wind and sunlight aid in soil formation.

④ Physical processes (a) hydration, oxidation, carbonation, hydrolysis etc

⑤ Biological processes (a) by animals and plants - burrow making by rabbit.

⑥ Granular or block disintegration determines soil particle size



India has 8 major types of soil systems distributed in accordance with geographical factors.

Distribution of major soil types in India

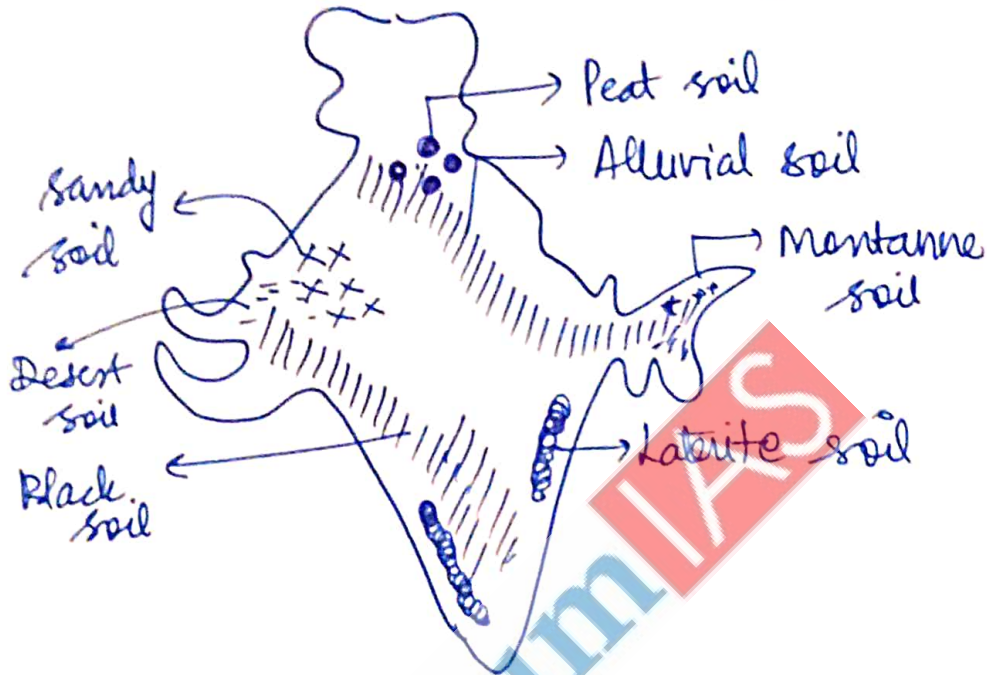


Fig: Major soil types in India

These soils are formed in accordance with temperature and rainfall pattern of the region, and support various activities.

Soil is an important component of natural resources. UNCCD has been taking steps like REDD+, 30x30 target to prevent degradation of land & soil.

7.

Recently, an 8.8 magnitude earthquake has hit Kamachatkan plateau of Russia's far east region triggering floods as well as volcanic eruptions.

Global pattern of earthquake occurrences

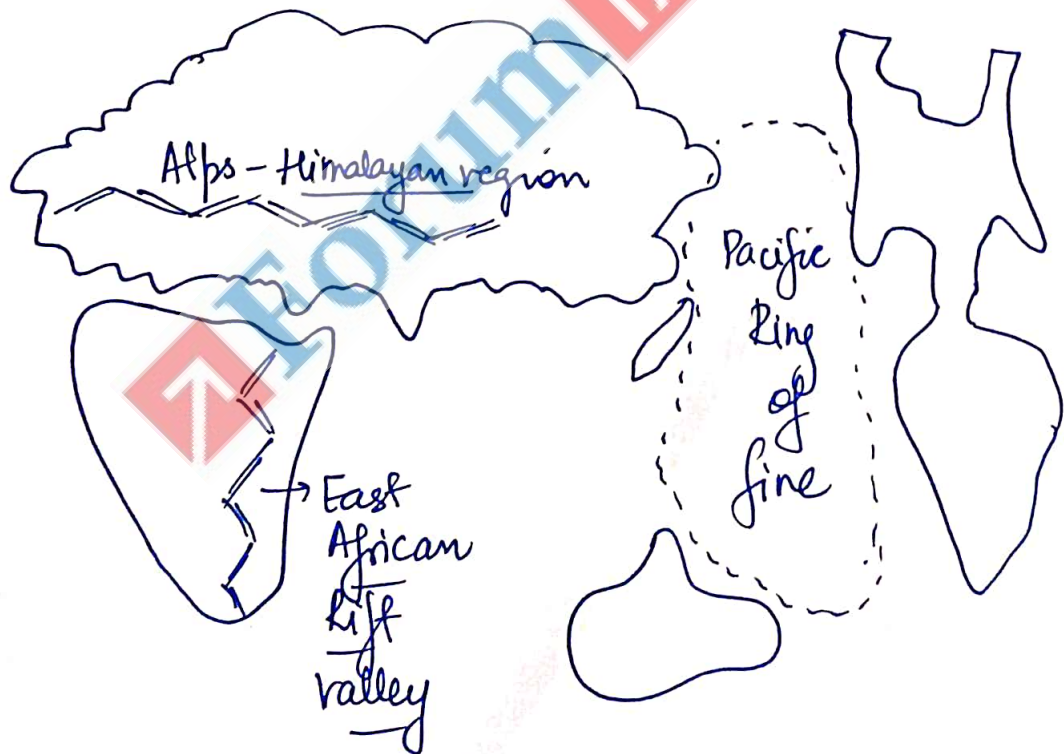


Fig: Major earthquake prone regions of the world

① Pacific ring of fire - It accounts for about 68% of total earthquakes. It is due to ~~be~~ boundary line between different tectonic plates.

② Pacific, North American, South American, Eurasian and Indo-Australian plates

② Alps-Himalayan region - It accounts for about 21% of the earthquakes. It is earthquake prone due to region of collision plates of Eurasian & Indo-Australian plates.

③ East African Rift valley - accounts for about 11% of total earthquakes. It is due to presence of fault line in the Eastern Region of African continent.

Multidimensional impact of such distribution of earthquakes

- ① Adaptation by communities (e.g.) Japanese have adapted to earthquake resistant building architecture.
- ② Frequent volcanic eruptions and presence of major active volcanoes in these regions
- ③ Soil is mineral rich due to volcanic eruptions (e.g.) Iron, coal etc.
- ④ International efforts taken by global community to save against impacts of earthquakes (e.g.) Inclusion in Sendai Disaster Risk Framework

Earthquakes can't be predicted. Thus, need is to invest in earthquake-prone infrastructure & community resilience to decrease damage