Date:

Question No.

KAVERI'S IAS | UPSC

1

Remarks

Dharani. R. K

[redacted]

63.2

Research based Questions. All the Questions are compulsory!

Word Limit in questions should be adhered to.

Section A

1. **Answer the following Questions in not more than 150 words. Each Question carries 10 Marks.**

A. **Agro Ecology & its Ecological principles for Productive and sustainable agriculture. Discuss.**

Agroecology is defined as application of ecological components in agriculture to increase productivity by ensuring sustainability.

Give structure of food (ecology) Diagram Representation Needed.

Agroecology
↓ ↓
Agriculture ⇌ Ecology
Interdependence

6.5

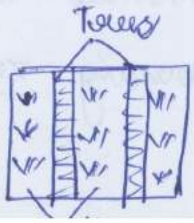
Principles to acheive productive & sustainable agriculture by :-

Other principles

- principle of Recycling ↳ Cycle of Nutrients & Biomass
- Input Reduction
- Soil Health.
- Animal Health
- Biodiversity
- Synergy
- Economic Diversification

A) Natural Farming - that practices agriculture in concurrence with nature

B) Agroforestry - Practice of using forest tree species / woody perennials along with agriculture crops



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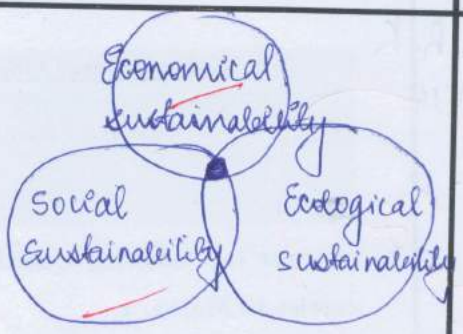
C) Sustainable in long run



- as it bypasses use of chemicals.

D) Organic Farming - that uses natural fertilizers like FYM, cattle manure, vermicompost

E) Reduced pest & disease incidence - because of strengthening local varieties

F) Maintain soil flora & fauna - Soil microorganisms are retained which enhances - Nutrient availability
- Nutrient efficiency
- Fixation of Atmospheric nitrogen thus by increasing yield

Therefore, as sustainability is need of hour promoting agroecology on large scale enhances achieving SDG goals by 2030 by addressing zero hunger (SDG-2).

B. What do you mean by carbon sequestration? Give the role of Afforestation in pollution control.

Carbon sequestration is process of using carbon sinks to capture atmospheric carbon dioxide by reducing ill effects of global warming

Why is it used Recently?

Carbon sinks
- Forest
- Oceans
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Carbon sequestration
- Terrestrial ~~ecosy~~ sequestration
  - by increasing vegetation that uptake CO_2 for photosynthesis
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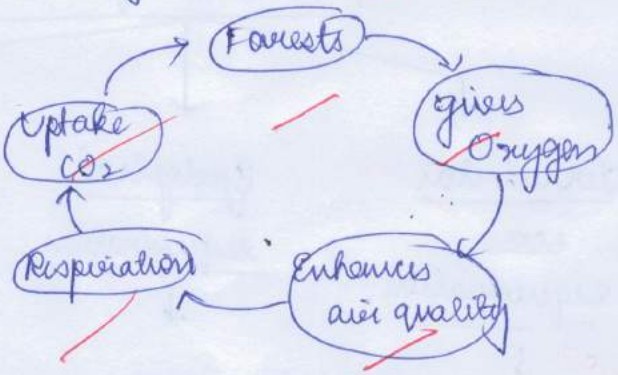
Afforestation plays key role in pollution control as it has multiplier effect on ecology by :-

A) Carbon sink - Forests acts as carbon sink by absorbing CO_2 & reducing CO_2 emissions

B) Reduces soil erosion - Plant roots bind soil particles & nutrients together by reducing surface runoff

C) Enhances water table - Forest increase ground water table without depleting water resource

D) Cyclical management - Wastes like dead trees, plants are recycled within forest ecosystem thus by promoting zero waste system



Challenges in ITY process ! way ahead

E) Serve as 3R ecosystem - Forests follow rule of Reduce, Reuse, Recycle and hence play good role in tackling pollution

Therefore social awareness activities like plantation drive should be conducted on large scale to increase tree cover in urban areas to promote urban forestry

C. Ozone layer depletion & protection measures.

Ozone (O_3) is the layer above earth's atmosphere that acts as protective shield preventing earth from harmful radiations

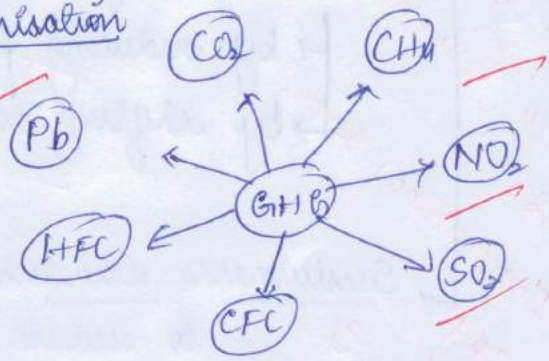
Ozone (O_3)
- Good ozone → In stratosphere
- Bad ozone → In Troposphere

Enlist Imp Ozone Depleting Substances

Ozone in troposphere & stratosphere is being depleted these days because of :- (GS)

A) Climate change
- Natural → Volcanic Eruptions
- Anthropogenic → CFC, HFC, HCFC, Other.

- by increasing green house gases [GHG] emitted by increasing industrialisation and urbanisation



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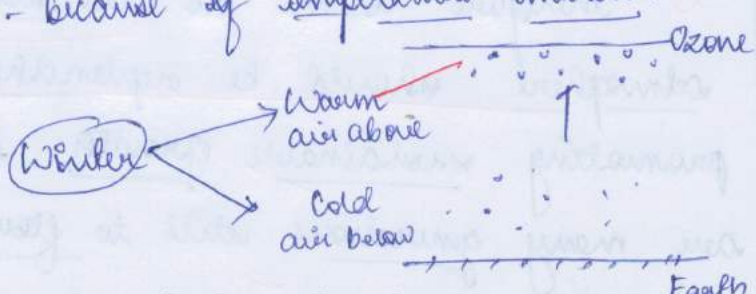


- Pollutants remain trapped at Ozone

Ozone hole at Antarctica was also because of temperature inversion

c) Increased consumption of white goods - AC's, refrigerators, coolers emit → CFC's, HFC's

Ozone can be protected by :-

- Montreal Protocol - to reduce ozone depleting substances
- Architectural engineering - promoting natural ventilation in buildings that decreases CFC & HFC
- Sustainable agriculture practices
  - by reducing fertilizers
  - by shifting to direct seeded aerobic rice to reduce CH_4
- Sustainable livestock management - to reduce CH_4

Other Conventions

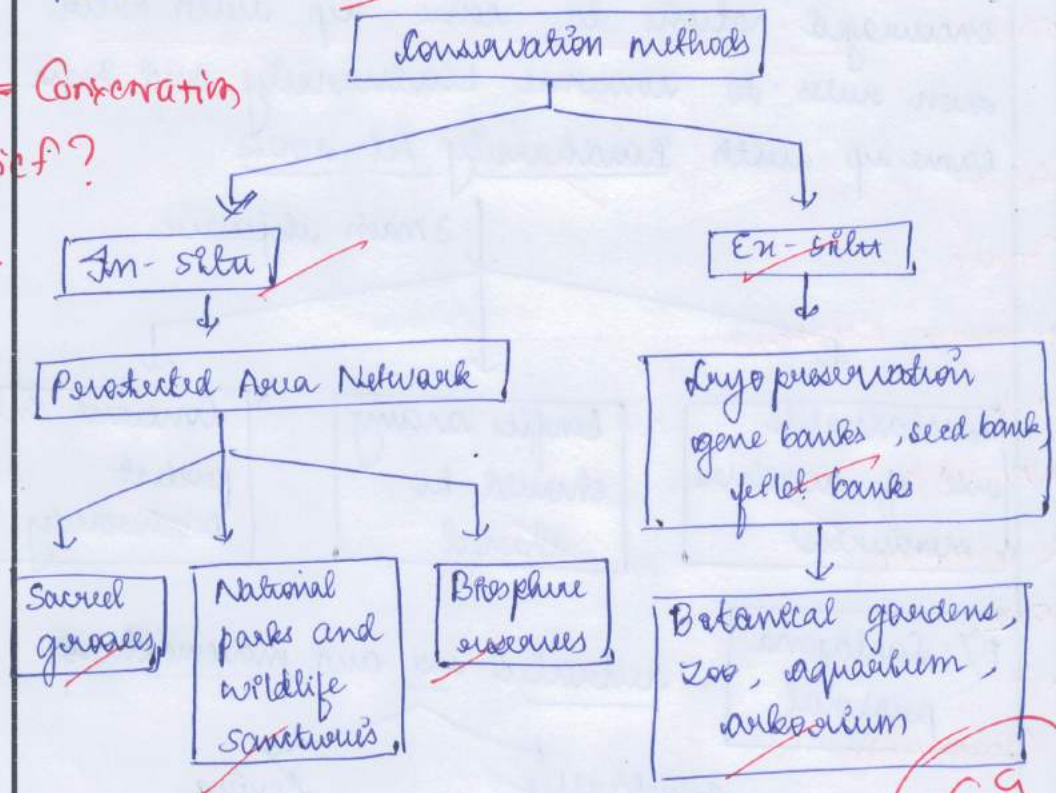
- Kigali Agreement to Reduce HFC Gas
- Vienna Convention 1985
- International Ozone Day
- SDG-13

Therefore ozone as the blanket of atmosphere should be replenished by promoting sustainable growth as there are many generations still to flourish on earth

D. Discuss Conservation strategy & legislative provisions for conservation and protection of biodiversity.

Conservation strategy is the process of protecting ecosystem from ill effects of climate vulnerability and variability through appropriate methods

Need of Conservation in Brief?



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Biodiversity protection & conservation in India is promoted through legal provisions like :-

Directive principle of state policy	- State shall promote wildlife, flora, fauna and their protection

B) Fundamental duty - It shall be duty of every citizen to protect and conserve nature and biodiversity

C) Convention of Biodiversity

- came under UNFCCC 1987 which encouraged nations to come up with their own rules to conserve biodiversity and India came up with Biodiversity Act 2002

3 main objective

- Sustainable use of available resources
- benefits arising should be shared
- Conserve and protect biodiversity

D) Cartagena protocol - restricted use and movement of

- genetically modified organisms
- Living modified organisms

E) Nagoya protocol - fair access and benefit sharing of use of genetic resources

Therefore comprehensive steps should be taken to conserve biodiversity as India alone accounts for four biodiversity hotspots with rich flora and fauna

Other provisions

- Article 48-A.
- Tiger Census
- Project Tiger, Elephant & Crocodile
- Cop Convention
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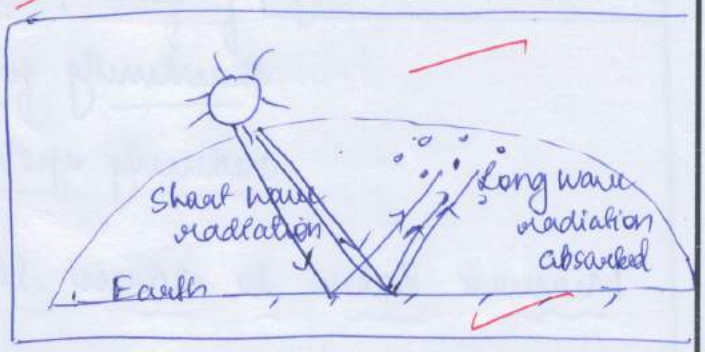
E. Greenhouse effects & its impact on agriculture.

The greenhouse effect is process of heating of atmosphere that traps the green house gasses without allowing them to escape



Greenhouse effect which traps heat is having various impacts on agriculture by :-

A) High temperature retention
- Effects plant productivity and yeild
- Eg: Temperate crops - like Apple, peach, plum etc
- Increases Evapo transpiration
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  - Depletes soil moisture and cause water stress in plants

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B) Increased Incidence of pests
- Sucking pests - like mites, mealy bugs, aphids began to suck sap from plants
- Eg:- Mite infestation in coconut & arecanut

c) Changing pattern of diseases - Increasing diseases like leaf spots, blight etc

D) Climatic conditions show uncertainity - With wide spread occurence of floods, droughts are threatening food security and reducing yield by crop loss

Measures taken to address the effect:-

1. Kyoto protocol - to reduce green house gases
2. NICRA - National Innovation on climate Resilient agriculture for adopting climate resilient practices
3. National Mission for sustainable agriculture
4. Production Linked Incentive - for greenhouse cultivators.

Therefore inefficency in agriculture should be adressed as agriculture serves as backbone of Indian economy contributing 17% of GDP and 47% of population engaged

2. Answer the following Questions in not more than 250 words. Each Question carries

A. The Paris agreement has set targets for limiting temperature rise due to global warming which will be virtually impossible or very difficult to realize. Why is it argued that its either impossible or difficult to realize latest targets for limiting temperature? In the light of climate change science, Discuss. 15 marks.

2016

Paris Agreement was signed in 1992 with aim to stabilizing temperature and maintaining it at 2°C and later limiting to 1.5°C as of pre-industrial levels.

The rising temperature is unable to be curtailed within said limits because :-

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A) Ecological factors

- Large scale afforestation, urbanisation and industrialisation has already been witnessed which are irreversible
- Forest regeneration takes millions of years
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- With afforestation → soil lost its fertility and requires many years to regain lost fertility

B) Economic factors

- Developed nations are not reluctant to lend finances for developing nations in tackling climate change
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Despite of all these challenge countries were able to come together through :-

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- India - to achieve net zero by 2070
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- India - with huge tropical solar energy aspires to generate 40% of electricity by renewable energy sources by 2030.

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C) Technology transfer by Developed nations

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Therefore consensus and coming together of all 196 countries of world is required to address common global problem of climate change as it lacks territorial boundaries

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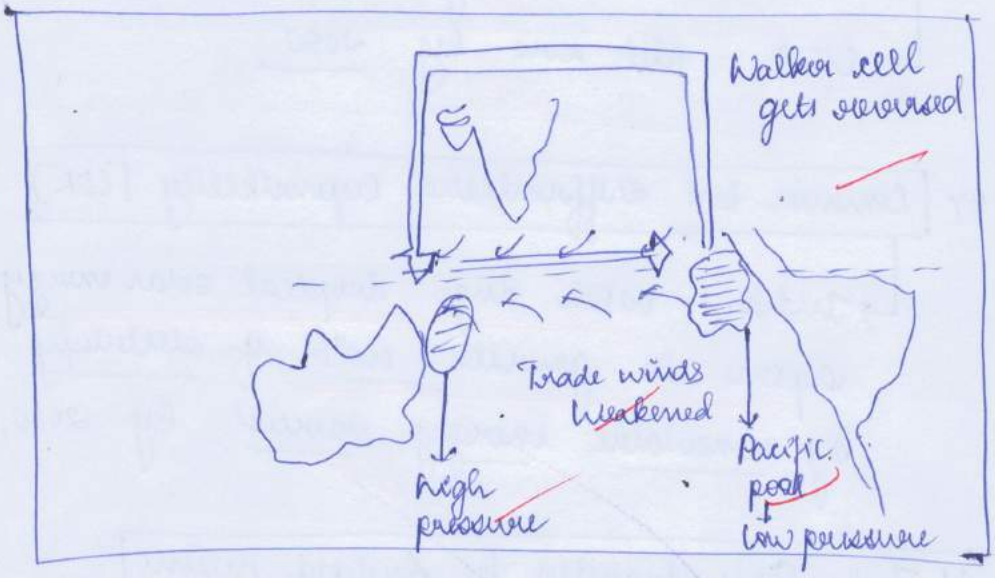

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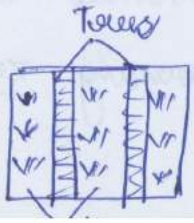

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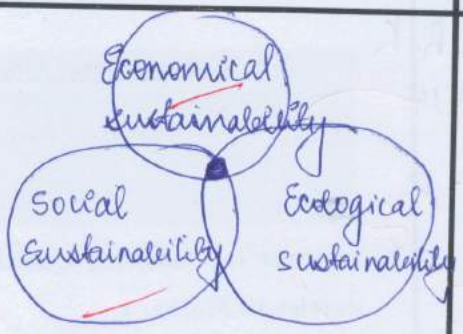

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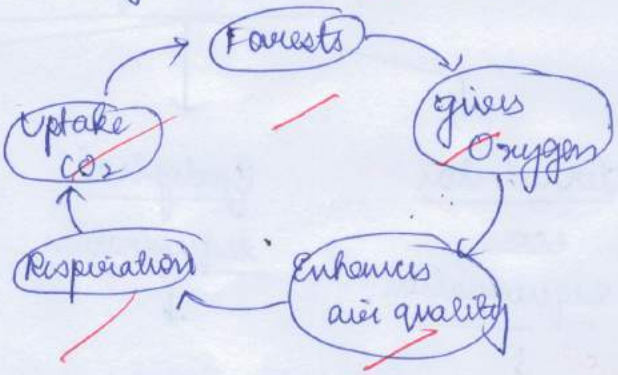

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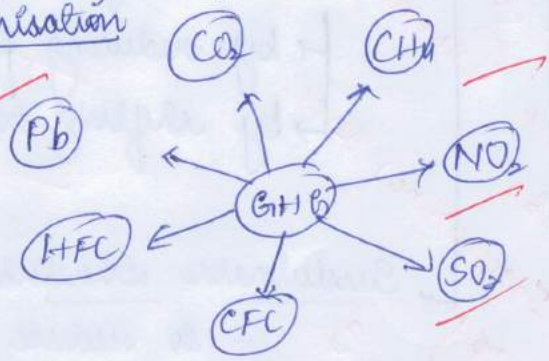

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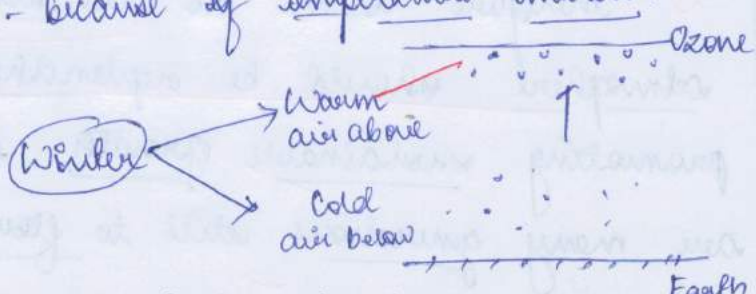

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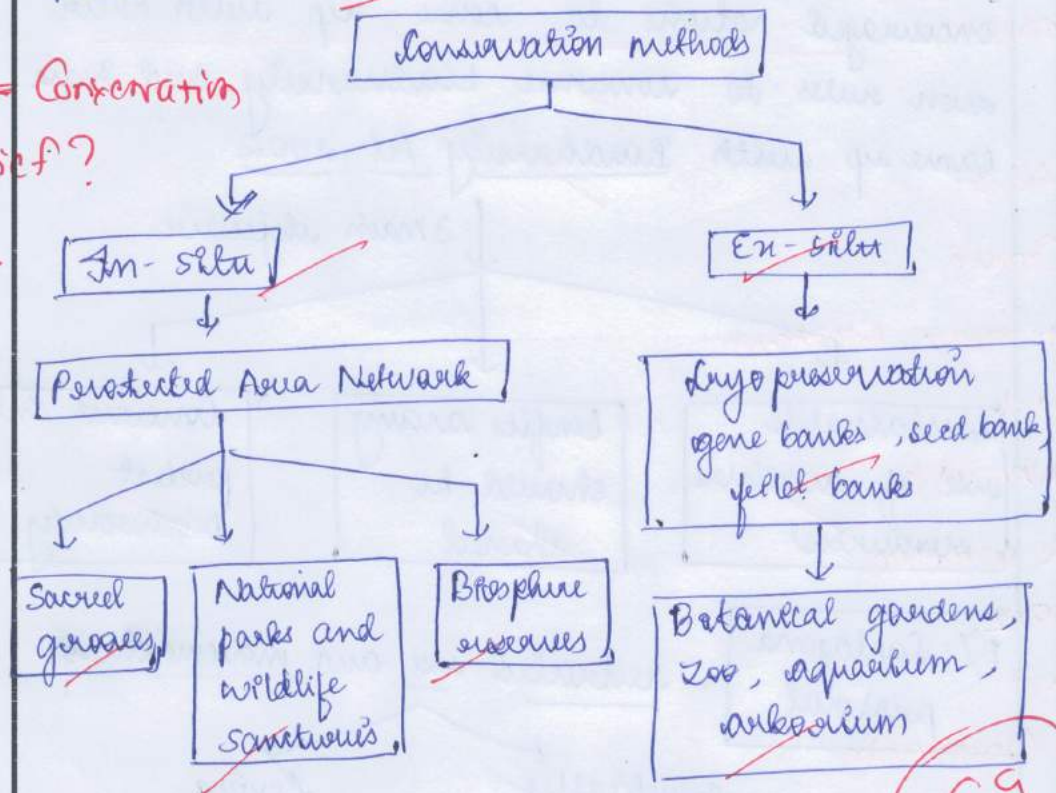

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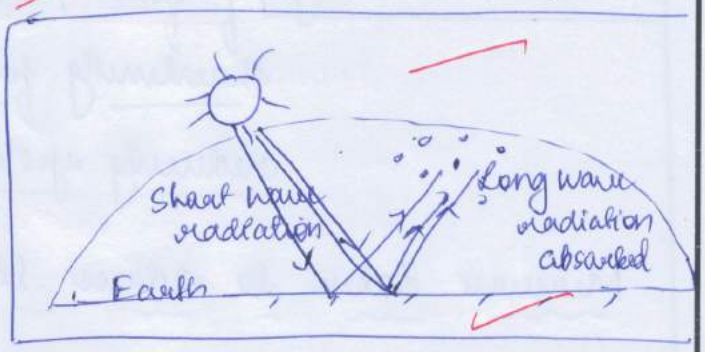

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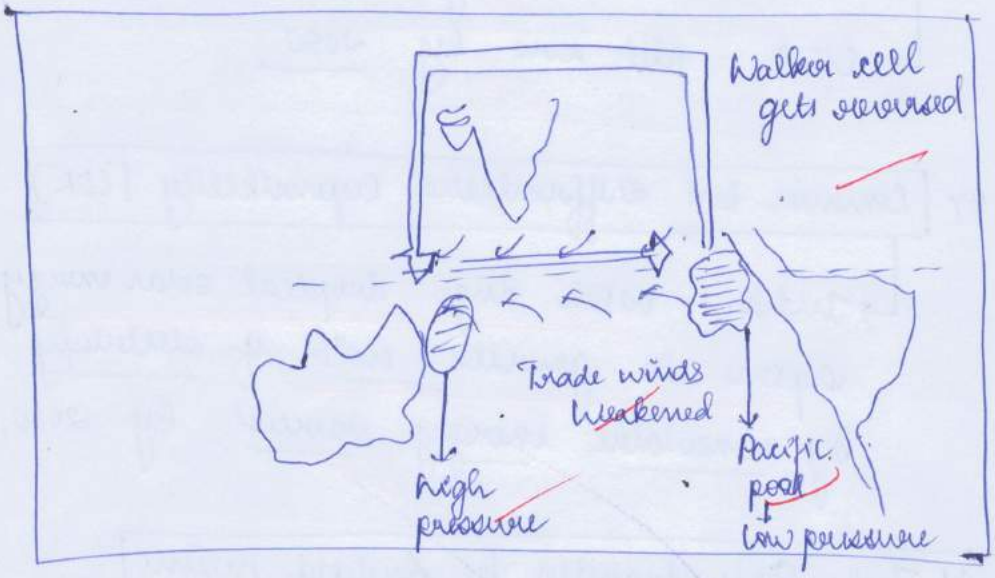

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