



# IAS MAINS 2019-GS1

## Q5- Answer

- By

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# Mangroves

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- **Discuss the causes of depletion of mangroves and explain their importance in maintaining coastal ecology.**

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# Introduction

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# Approaches

- **Extent of depletion of mangroves**
- **What are mangroves**
- **Coverage of mangroves**
- **Importance of mangroves**

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## Approach-1

- ▶ According to IUCN, 1/6<sup>th</sup> species of Mangroves are in danger of extinction.

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## Approach-2

- ▶ According to WWF, more than 35% of world's mangrove are already dead. This figure is >50% in countries such as India, Philippines, Vietnam.

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## Approaches-3

- **Mangroves can be found in over 118 countries and territories in the tropical and subtropical regions of the world. But are facing multiple threats.**

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## Approach-4

- ▶ According to UNEP, economic damage of Mangrove destruction is 6-42 billion \$ every year. Moreover it accounts for 1/5<sup>th</sup> of global emission from deforestation.

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## Approach 5

- **Mangrove forests are extremely productive ecosystems that provide numerous goods and services both to the marine environment and people.**

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## Approach 6

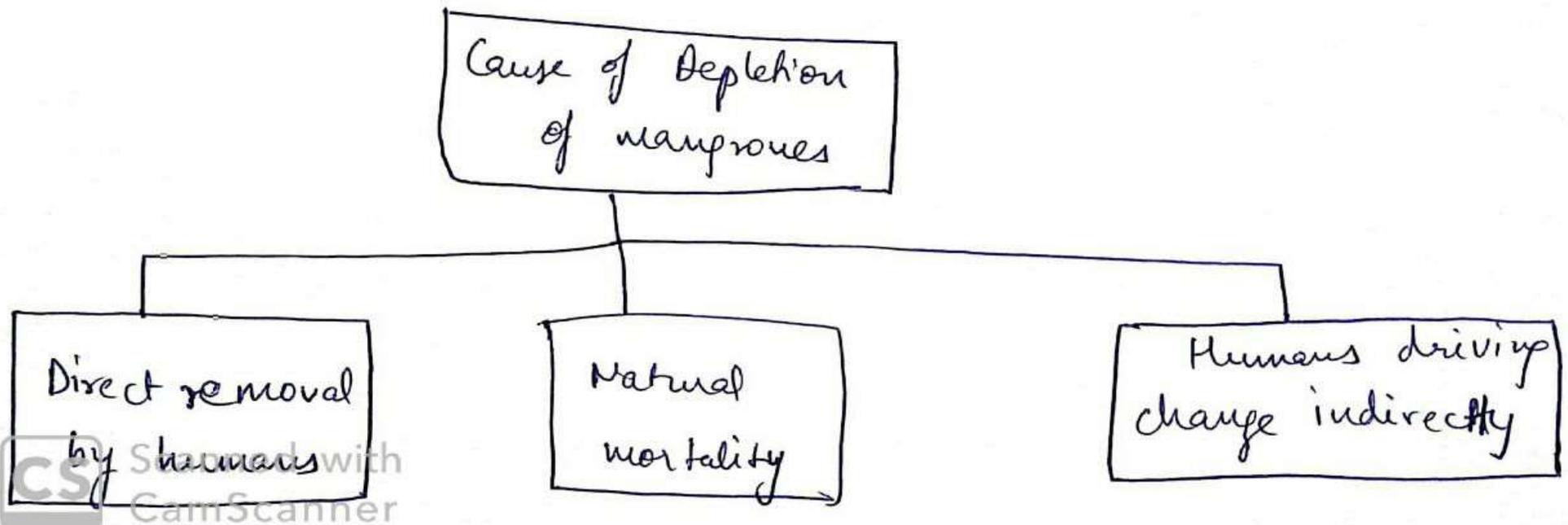
- **Mangroves are salt tolerant vegetation that grows in coastal inter-tidal region.**

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**BODY**

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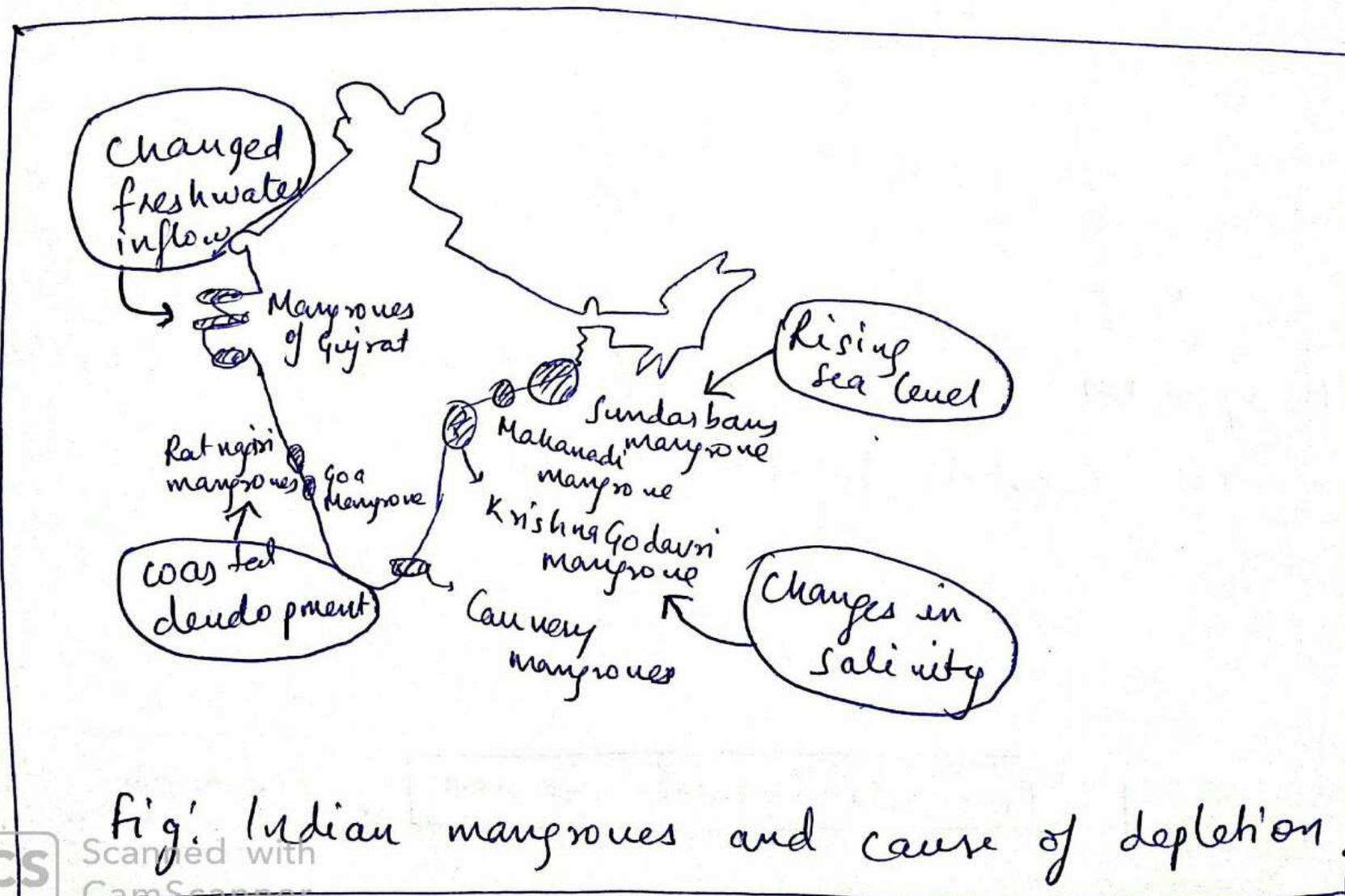


Fig: Indian mangroves and cause of depletion



## Causes of depletion

- Direct removal by humans
- Natural mortality
- Humans driving change indirectly

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## Direct removal by humans

- Coastal development-
  - Salt farming
  - Tourist development
  - Agriculture land expansion
  - Human settlement
  - Infrastructure- Industrial area

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- Construction of aquaculture facilities
- Overharvesting-Mangroves removed for wood unstainably-
  - Houses
  - Charcoal
  - Animal fodder

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## Natural mortality

- Coastal erosion and accretion
- Salinity change
- Sea level change
- Leaf loss due to cyclones

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## **Humans driving change indirectly**

- **Altering pattern of fresh water inflow-  
Dams and irrigation**
- **Increased sedimentation in rivers-  
erosion due to deforestation**

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- Introduction of invasive species
- Overfishing- Ecological balance of food chain and mangrove fish community disrupted

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- **Coral reef destruction- first barrier against current and stormy waves which destroys the fine sediments**
- **Pollution- kills animals**
- **Climate change**

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- **Total mangroves has declined from 18.8 mha in 1980 to 15.2 mha in 2005**

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# Importance in coastal ecology

- **Biodiversity**
  - Nursery for fish and other species
  - Ecotone of terrestrial and aquatic ecosystem
  - Breeding and nesting habitat- fish, migratory birds sea turtles

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- **Coastal erosion**
  - **Protects from Tsunami, cyclones, waves**
  - **Binds coastal sand**

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- **Soil nutrient replenishment**
  - **Source and repository for nutrient for sea grass bed and coral reef**
  - **80% of global fish catch relies directly or indirectly on mangrove forest**

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- **Carbon sequestration**
  - **4 times the capacity of mature tropical forest**
  - **1000 tonne CO<sub>2</sub> eq per hectare**
  - **NASA- planet's best carbon scrubber**

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# Conclusion

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- **Solution/ Way forward- Can quote UN report- Importance of Mangroves : call to action**
- **Steps taken by Indian Government**

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## ➤ According to UN report- Steps required are-

- Economic valuation and restoration
- Global mangrove fund
- Mangrove conservation through carbon credit markets
- Community involvement
- Economic incentive for sustainable use
- Alternate livelihood for dependent community

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- **Mangrove for future in an Indian initiative in collaboration with IUCN aimed at mangrove conservation. Such steps are vital in safeguarding this vital resource.**

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Q.5 Discuss the causes of depletion of mangroves and explain their importance in maintaining coastal ecology.

According to WWF, more than 35% of world's mangroves are already dead.

Various Causes of depletion of mangroves are -

(i) Direct Removal by humans -

a) Coastal development → agricultural land expansion  
→ human settlement  
→ Infrastructure-Industrial area  
→ Aquaculture facilities

b) Overharvesting & Overfishing → disrupt the ecological balance of food chain and mangrove fish community

(ii) Natural Mortality -

- Natural coastal erosion and accretion
- Changes in sea level
- Change in Salinity.

(iii) Humans driving change indirectly

a) Alteration of pattern of freshwaters - due to dam construction, irrigation facilities and increased sedimentation in river waters.

b) Climate Change - increased ~~st~~ Sea level Change.

c) Pollution - kills animals that live in mangrove forest.

These factors declined Mangrove areas from 18.8 mha (1980) to 15.2 mha (2005)

### Importance of Mangroves to maintain coastal Ecology

#### (i) Biodiversity

- Ecotone of terrestrial & aquatic ecosystem
- Breeding and nesting sites for fishes, migratory birds

#### (ii) Prevents Coastal erosion

- Binds coastal sand
- Protects from cyclones, Tsunamis

#### (iii) Replenish Soil Nutrients

- Serve as source and repository for nutrients for sea grass beds and coral reefs
- 80% of global fish catch relies on mangrove forest directly or indirectly.

#### (iv) Carbon Sequestration

- More than 4 times the capacity of mature tropical forest.

Way forward - According to UN Report, steps required

are →

- 1) Economic valuation and restoration
- 2) Global mangrove fund & Carbon Credit mechanism
- 3) Community involvement in conservation

4) Alternative livelihood to mangrove-ecosystem dependent community.



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