Geography · GS - I

What are the forces that influence ocean currents?

Describe their role in fishing industry of the world.

EXAM YEAR	PAPER	SUBJECT
2022	GS - I	Geography

MARKS	WORD LIMIT
15	~250 words

Answer Hint

Ocean currents are influenced by planetary winds, the Coriolis force, temperature and salinity differences, pressure gradients, tides and coastal configurations. They regulate marine productivity by transporting nutrients, influencing upwelling and determining fish distribution, thereby shaping major fishing grounds and global fisheries.

Model Answer

Introduction

Ocean currents are continuous movements of seawater that redistribute heat, nutrients and marine organisms. They are broadly classified as surface currents and deep-ocean currents.

Body

Forces Influencing Ocean Currents

1. Planetary Winds: Trade winds and westerlies drive major surface currents. For example, the Gulf Stream is influenced by prevailing winds and basin circulation.

2. Coriolis Force: Earth’s rotation deflects currents to the right in the Northern Hemisphere and to the left in the Southern Hemisphere.

3. Temperature and Salinity: Differences in water density caused by temperature and salinity generate thermohaline circulation, particularly in deeper ocean layers.

4. Pressure Gradients and Gravity: Differences in sea-surface height and pressure help drive water movement.

5. Tides and Coastal Configuration: Tidal forces, continental boundaries and the shape of ocean basins influence current direction and intensity.

Role in the Fishing Industry

1. Nutrient-Rich Upwelling: Cold currents bring nutrient-rich deep water to the surface, supporting plankton growth and abundant fish populations. The Peru and Benguela currents sustain major fisheries.

2. Convergence of Currents: Mixing between warm and cold waters often creates productive fishing grounds, as seen near Newfoundland's Grand Banks.

3. Fish Migration and Distribution: Currents influence the movement, breeding and feeding patterns of commercially valuable species.

4. Economic Importance: Productive currents support fishing employment, seafood exports and coastal livelihoods. However, changing currents and marine warming can disrupt fish stocks.

Conclusion

Ocean currents strongly influence global fisheries through nutrient circulation, temperature regulation and fish distribution. Sustainable fishing and climate-informed management are essential to protect these valuable marine resources.

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