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Q14

Give a geographical explanation of the distribution of off-shore oil reserves of the world. How are they different from the on-shore occurrences of oil reserves?

UPSC Civil Services Mains 2025 · GS I · 15 marks · Natural Resources and Industries

Distribution of key natural resources across the world (including South Asia and the Indian sub-continent); factors responsible for the location of primary, secondary, and tertiary sector industries in various parts of the world (including India).

Core demand of the question

- **Map world offshore oil:** Gulf, North Sea, Gulf of Mexico, West Africa, Brazil pre-salt, South China Sea, Arctic margins
- **Explain why offshore exists:** continental shelves, source rock, traps under sediment
- **Contrast with onshore:** cost, technology, environment, geopolitics

Revision summary

Offshore oil lies in sedimentary traps on continental shelves and slopes.

Major provinces include the Persian Gulf, North Sea, Gulf of Mexico, West Africa, Brazil's pre-salt, and India's **Mumbai High** and **KG basin**.

The geology is kin to onshore basins; the difference is water depth, platforms and spill behaviour.

Onshore fields are usually cheaper to develop and easier for a state to hold physically.

Disputed seas turn offshore oil into a geopolitical resource, not only a geological one.

Introduction

Oil is a **geological accident** of ancient seas and buried organic mud. Some of those accidents now lie under **dry land**. Others lie under **shallow or deep water** on the continental shelf and slope. Offshore oil is not a different chemical. It is a different **address**, and the address changes cost, risk and politics.

Body

Where offshore oil sits

The world's great **offshore** provinces follow drowned continental margins. The **Persian Gulf** is a flooded foreland with huge reserves under shallow water (Saudi, Iran, UAE, Qatar). The **North Sea** (UK, Norway) is a rift basin that became a late-twentieth-century province. The **Gulf of Mexico** holds US and Mexican fields, including deep water. **West Africa** (Nigeria, Angola, Ghana) and **Brazil's pre-salt** under thick ocean are Atlantic margin stories. The **South China Sea** mixes geology with a sovereignty dispute. **Arctic** shelves (Russia, Norway, US) are ice-limited frontiers. India's **Mumbai High**, the **Krishna-Godavari** offshore, and **Cauvery** waters are the domestic map.

These waters sit on **continental shelves** where Mesozoic or Cenozoic source rocks cooked, and where **anticlines, faults or salt** trapped the oil. Deep water is simply that geology **further down the slope**, needing floating rigs.

How onshore differs

Onshore giants - Ghawar in Saudi Arabia, the Texas Permian, West Siberian fields, Iraq's land provinces, India's **Assam and Barmer** - are cheaper to drill when the desert or plain is stable. A truck can reach the well. **Offshore** needs platforms, subsea pipes, helicopters and a navy's worth of safety. A spill at sea (Deepwater Horizon) travels with the current; a land spill is ugly but more containable. **National control** of land fields is simpler than of fields under disputed water.

- **Onshore can still be brutal:** Niger Delta pollution, Amazon drilling, and war on land. Offshore is not cleaner by nature. It is **technically heavier and capital heavier**. When oil prices fall, deep water is the first to freeze.

Geographically, offshore oil is the **drowned twin** of onshore basins. Politically, it is a **floating fortress**. That is the difference the question wants.

Flow diagram

Offshore provinces
Persian Gulf
North Sea
Gulf of Mexico
West Africa
Brazil pre-salt
Mumbai High KG
Onshore contrast
Ghawar Permian Siberia
Continental shelf traps -> Offshore provinces
Easier access lower cost -> Onshore contrast

Conclusion

Offshore oil clusters on continental shelves in the Gulf, North Sea, Mexico, West Africa, Brazil and Asian seas, including India's **Mumbai High**. It is the same rock story as onshore oil, moved under water, which raises cost, spill risk and the need for ships and law of the sea.

Facts & figures

Mumbai High

India's main historic offshore field in the Arabian Sea, discovered in the 1970s.

Pre-salt Brazil

Deep Atlantic fields beneath a thick salt layer, a symbol of high-cost, high-tech offshore oil.

Deepwater Horizon, 2010

A Gulf of Mexico blowout that showed how an offshore spill becomes an ocean-wide event.

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