

## 1. What is ocean based blue economy? What potential does India have on this front? Analyse.

### Introduction

Oceans are the world's single largest ecosystem, covering nearly 3/4th of the earth's surface, where according to estimates by the Global Ocean Commission, ocean resources contribute five percent of the world's GDP, secure the jobs of three billion people, and sustain the livelihoods of 350 million. This clearly demonstrates the importance of ocean based economy for humanity.

### Body

- 'Blue Economy' (BE) conceptualises the oceans as "shared development spaces". It is defined by the World Bank as the "sustainable use of ocean resources for economic growth, improved livelihood and jobs, and ocean ecosystem health."
- Blue economy is a shift from the old, "brown" business-as-usual development model where oceans are perceived as a means of free resource extraction and waste dumping. This paradigm does not consider the costs of the negative externalities to resource accounting, failing to take into cognisance the costs of environmental damage and ecological imbalance by consumption.
- The United Nations has recognized the importance of the blue economy and its important role in a sustainable future for the world's oceans. Sustainable Development Goal 14, aims to "conserve and sustainably use the oceans, seas and marine resources."
- Recognizing the great potential of the blue economy, world leaders and scientists united for strategic talks about the future of our oceans at the first Sustainable Blue Economy Conference held in Nairobi, Kenya, in November 2018.
- The core of Blue economy is to realize socio-economic development and dynamic balance of resources and environment. In their second preparatory meeting summary, The United Nations Commission on Sustainable Development acting as the Preparatory Committee highlighted approaches to adopt "blue economy," and believes it is consistent with the core contents of RIO+20 Summit.
- There are two elements for the Blue Economy -
  - The first is the necessity of protecting and restoring where needed the existing ocean resource base that already supplies food and livelihoods to billions of people.
  - The other side of the Blue Economy is where opportunities may exist for enhanced or new sustainable economic activity derived from the ocean.

In context of India, Blue economy holds great potential as seen from the following points:

- The Indian Ocean Region is abundant with resources, particularly in the sectors of fisheries, aquaculture, ocean energy, sea-bed mining and minerals, and provides tremendous economic opportunities to develop marine tourism and shipping activities. Commercial and artisanal fisheries sustain the livelihoods of more than 38 million people worldwide.
- In the Indian Ocean, fish production increased drastically from 861,000 tons in 1950 to 11.5 million tons in 2010. The United Nations Food and Agriculture Organization (FAO) report states that while other world oceans are nearing their fisheries limit, in certain areas, the Indian Ocean's resources have the potential to sustain increased production.
- Polymetallic nodules and polymetallic massive sulphides are the two mineral resources of commercial interest to developers in the Indian Ocean. India had received exclusive rights for the exploration polymetallic nodules in 1987, in the Central Indian Ocean Basin. Since then, it has explored four million square miles and established two mine sites.
- The Indian Ocean Region is of strategic importance to India's economic growth as the most of the country's oil, and gas is imported through the sea. Further, this dependency is expected to rise by 2025 exponentially
- The Indian Ocean Region presents tremendous trade potential for the country. The countries in the Indian Ocean Rim Association (IORA) exhibited significant dynamism in the past few years as the trade in the region increased by over four times.
- Under the Make in India program of the Government, shipbuilding industry can benefit from a major thrust. This industry has a high multiplier effect on investment and can accelerate industrial growth along with its large number of associated industries.
- The India Maritime Security Strategy published by the Indian Navy articulates country's policy in the Indian Ocean region. It states that in the Indian Ocean region, India is committed to Building Indian Ocean Region as a frontier of sustainable economic development.
- The Sagarmala project, launched by the Ministry of Shipping, is the strategic initiative for port-led development through the extensive use of IT enabled services for modernisation of ports. It tackles the issue of underutilized ports by focussing on port modernization, efficient evacuation, and coastal economic development.

### Conclusion

The blue economy can provide a model for people to rethink how they preserve and sustain and improve the biodiverse ocean resources for future generations. It is necessary for India to tap the enormous potential of the Ocean based Blue Economy, which will propel the nation into a higher growth trajectory. The development of Blue Economy can serve as a growth catalyst in realizing the vision to become a \$10 trillion economy by 2032.

## 2. How is India placed globally in terms of renewables? What initiatives have been taken recently to tap the potential on this front? Examine.

### Introduction

India is one of the countries with the largest production of energy from renewable sources. As of 2019, 35% of India's installed electricity generation capacity is from renewable sources, generating 17% of total electricity in the country.

### Body

**Renewable Energy in India Potential:** Estimated renewable energy potential: 900 GW from commercially exploitable sources Sources:

Wind: 102 GW (at 80 metre mast height); Small Hydro – 20 GW

Bio energy – 25 GW; Solar-750 GW solar powers

India ranked second in renewable energy attractiveness index in 2017.

- India was ranked 76th on a global energy transition index 2019. Sweden remains on the top on this annual list compiled by Geneva-based World Economic Forum (WEF) and is followed by Switzerland and Norway in the top three.
- India ranks 4th in overall installed capacity of 35 GW of wind energy. While, China tops the chart with 221 GW of installed wind capacity followed by the United States and Germany.

### Policy Initiatives in the Renewable Energy Sector

|   | Initiative  | Details  |
|---|---|--|
| 1 | <b>National Green Corridor Programme- Green Energy Corridor Project</b> | <ul style="list-style-type: none"> <li>Objective: synchronise electricity produced from renewable sources, such as solar and wind, with conventional power stations in the grid.</li> </ul>  |
| 2 | <b>National Clean Energy Fund</b>                                       | <ul style="list-style-type: none"> <li>For funding research and innovative projects in clean energy technologies.</li> </ul>   |
| 3 | <b>National Biogas and Manure Management Programme</b>                  | <ul style="list-style-type: none"> <li>Objective: To set up family type biogas plants in rural and semi-urban areas of the country.</li> </ul>   |
| 4 | <b>Biomass Power and Bagasse Co-generation Programme</b>                | <ul style="list-style-type: none"> <li>Aim: efficient utilization of biomass such as agro residue and agro-industrial residues for power generation</li> </ul>   |
| 5 | <b>Draft National Wind Solar Hybrid Policy</b>                          | <ul style="list-style-type: none"> <li>Aim: promotion of large grid connected wind - solar PV hybrid system</li> <li>Significance: This would help in optimal and efficient utilization of transmission infrastructure and land, reducing the variability in renewable power generation and achieving better grid stability.</li> <li>Wind-solar hybrid systems to be formed: Wind Turbine Generators (WTGs) and Solar PV systems will be configured to operate at the same point of grid connection.</li> </ul> |
| 6 | <b>Off-Grid and Decentralised Solar PV Applications Programme</b>       | <ul style="list-style-type: none"> <li>Aim: promote off-grid applications of Solar photovoltaic (SPV) systems for meeting lighting, electricity requirements</li> </ul>  |
| 7 | <b>National Offshore Wind Energy policy</b>                             | <ul style="list-style-type: none"> <li>Objective: To set up of Offshore Wind Farms in the Exclusive Economic Zone (EEZ) of the nation; (PPP) Public Private Partnership in ideal coastal regions.</li> </ul>   |



|     |  |   |
|-----|--|---|
| 8   | Development of Solar Parks and Ultra Mega Solar Power Projects                         | <ul style="list-style-type: none"> <li>Aim: to set up at least 25 Solar Parks and Ultra Mega Solar Power Projects targeting over 20,000 MW of solar power installed capacity within a span of 5 years starting from 2014-15</li> </ul>  |
| 9   | Grid Connected Solar Rooftop Programme   | <ul style="list-style-type: none"> <li>Promote installation of solar panels on rooftops across India</li> </ul>   |
| 10  | Sustainable Rooftop Implementation for Solar Transfiguration of India (SRISTI) Scheme: | <ul style="list-style-type: none"> <li>Financial incentives to be provided to the beneficiary for installing solar power plant rooftop projects in India</li> <li>mobile app <b>ARUN (Atal Rooftop Solar User Navigator)</b> launched</li> <li><b>Suryamitra programme</b>- creation of a qualified technical workforce</li> </ul>  |
| 11  | Repowering of Wind Power Projects  | <ul style="list-style-type: none"> <li>Objective: To promote optimum utilization of wind energy resources by creating a facilitative framework</li> <li>Repowering refers to replacing ageing wind turbines with more powerful and modern units in order to raise electricity generation levels</li> </ul>  |
| 12  | National Solar Mission   | <ul style="list-style-type: none"> <li>Aim: To achieve 100GW capacity by 2022</li> <li><u>Renewable purchase obligation (RPO)</u>: The RPOs make it compulsory for all large consumers of energy to ensure that a certain percentage of that energy mix is from renewable sources such as wind and solar.</li> <li>In 2017 there has been Enhancement in Solar RPO to 8% by March 2022</li> <li><u>Accelerated Depreciation</u>: Indirect financial support mechanism- Tax relief due to availing higher rate of depreciation. A tax break is given in the first year of operation</li> </ul> |
| 13  | Small Hydropower Programme   | <ul style="list-style-type: none"> <li>Aim: To set up installed capacity of 7000 MW by the end of 12th Plan</li> <li>The Draft National Hydropower scheme- promote public-private partnership in developing small hydro power projects in hilly terrains in India</li> </ul>  |
| 14  | Generation Based Incentive (GBI) Scheme  | <ul style="list-style-type: none"> <li>A GBI @ Rs. 0.50 per unit of electricity fed into the grid is provided for a period not less than 4 years and a maximum period of 10 years with a cap of Rs. 62 lakh per MW.</li> </ul>  |
| 15. | Wind Energy Bidding  | <ul style="list-style-type: none"> <li>Auctions in wind power. Has led to transparency in wind tariffs</li> </ul>   |

**Intended Nationally Determined Contribution:** The GoI in its submission to the UNFCCC on Intended Nationally Determined Contribution (INDC) has stated that India will achieve 40% cumulative Electric power capacity from non-fossil fuel based energy resources GoI has set a target of achieving 175GW of renewable energy capacity by 2022. This includes:

- 60 GW from wind power,
- 100 GW from solar power,
- 10 GW from biomass power

- 5 GW from small hydro power

**Conclusion**

India is all set to cross the 100GW renewable energy capacity mark in 2020 and can make rapid strides towards the ambitious 175GW clean energy target by 2022 provided the government keeps a close eye on key issues and deals with those well in time.

**3. What is water stress? Which parts of India are water stressed? How can proper water management help in addressing this challenge? Discuss.**

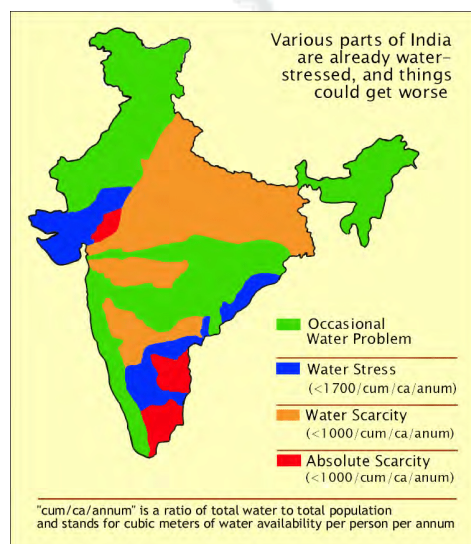
**Introduction**

Water stress is a situation where in the demand for water exceeds the available amount during a certain period or when poor quality restricts its use. Water stress causes deterioration of fresh water resources in terms of quantity and quality.

**Body**

**Parts of India facing water stress:**

According to the data released by the World Resources Institute (global research non-profit organization), India is ranked 13th among the 17 most water stressed countries of the world.



(The diagram is for your reference. Draw simple diagram in exam)

- The states of Rajasthan and some parts of Madhya Pradesh, Gujarat face water stress due to inadequate rainfall, desert like conditions, excessive evaporation.

- Parts of North East face water stress due to heavy rainfall and inadequate storage and distribution of water.
- The leeward side of western ghats which include several regions of Maharashtra like Marathwada, Saurashtra of Gujarat, Bayalseema regions of Karnataka and Andhra Pradesh face water stress due to inadequate monsoon rainfall.
- Groundwater depletion faces high groundwater depletion with states like Punjab, Haryana, Rajasthan facing severe water stress. Punjab, Haryana also faces water stress due to overuse of water in agriculture.
- Almost all metropolitan cities like Bengaluru, Chennai, New Delhi and so on faces drinking water crisis.

Proper management of water would help address the issue as

- Watershed management programmes like PM Krishi Sinchai Yojana restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover.
- Agriculture: Proper crop selection as per the climatic conditions would reduce the water requirement and also prevent groundwater depletion. E.g. Paddy grown in Punjab, Haryana; sugarcane grow in several parts Maharashtra is the major reason for water stress in those regions. Further, precision farming, micro irrigation techniques would reduce the use of water.
- Water use techniques: Israel supply around 70% of its domestic water requirement through desalination of sea water. This would help increase the supply to meet the growing demand. Similarly,
- Managing the urban water bodies provides additional storage for the rainwater and urban domestic supply.
- Ideas like Inter-river linking reduce persistent floods in some parts and water shortages in other parts of India.
- Decentralised water management like rainwater harvesting, local area water bunds creation under MGNREGA would help provide additional storage for water collection and reduce the dependency on long distance water supply.
- Proper drainage and sewerage management in cities would help not only in avoiding disasters like that happened in Chennai, but also help in recycling of water which could be used in non-domestic use.

Also, all these would help maintain adequate water supply during the summer season during which the water stress is more.

ZBNF in agriculture, desalination plants in Tamilnadu, projects like Mission Kakatiya, traditional water management like Bamboo drip irrigation of Meghalaya are some examples where proper water management is able to address water stress.

### Conclusion

As per the report of Niti Aayog, India is currently suffering from the worst water crisis in its history with the country ranked at 120 among 122 countries in the quality

of water. Around 70% of the water is not even drinkable as per the report. In these scenarios, the proper management of water is the need of the hour.

**4. Why is land such an important resource? Discuss. Do you think India's land resources require better planning and management? Substantiate your views.**

**Introduction**

Land is an essential natural resource, both for the survival and prosperity of humanity, and for the maintenance of all terrestrial ecosystems.

Land and Land Resources refer to a delineable area of the earth's terrestrial surface, encompassing all attributes of the biosphere immediately above or below this surface, including those of the near-surface climate, the soil and terrain forms, the surface hydrology (including shallow lakes, rivers, marshes and swamps), the near-surface sedimentary layers and associated groundwater and geohydrological reserve, the plant and animal populations, the human settlement pattern and physical results of past and present human activity (terracing, water storage or drainage structures, roads, buildings, etc.).

Or

Land is not regarded simply in terms of soils and surface topography, but encompasses such features as underlying superficial deposits, climate and water resources, and also the plant and animal communities which have developed as a result of the interaction of these physical conditions.

**Body**

**Land is such an important resource because of following reasons –**

- a store of wealth for individuals, groups, or a community
- production of food, fibre, fuel or other biotic materials for human use
- provision of biological habitats for plants, animals and micro-organisms
- co-determinant in the global energy balance and the global hydrological cycle, which provides both a source and a sink for greenhouse gases
- regulation of the storage and flow of surface water and groundwater
- storehouse of minerals and raw materials for human use
- a buffer, filter or modifier for chemical pollutants
- provision of physical space for settlements, industry and recreation
- Storage and protection of evidence from the historical or pre-historical record (fossils, evidence of past climates, archaeological remains, etc.)
- enabling or hampering movement of animals, plants and people between one area and another

**India's land resources require better planning and management**



- India today is facing a critical situation in relation to land - use planning. Even though the foodgrain production recorded almost a fourfold increase in the post-independence decades, shortage of rice, pulses and oilseeds is growing. Shortages of pasturelands, firewood and fast depletion of the forest wealth are assuming serious proportions.
- As a consequence of various development endeavors ecological imbalances e.g. soil erosion, rapid siltation of dams, shortage of ground water, land and water pollution, water logging etc. are growing adversely affecting the agricultural productivity.
- The non-sustainable nature of the green revolution, white revolution technology and the fast depletion of natural resource base needs serious cognizance of the problems of planning and management of country's natural resources.
- Relaxation of restrictions on conversion of agricultural lands to non-agricultural uses, and ceiling on agricultural land holdings. This is resulting in a large-scale transfer of lands for speculative purpose, distorting the land market and viability of agriculture.
- Promotion of export-oriented agriculture and concessions to agro-processing companies. This is leading to diversion of land peasant farming and exhaustion of soils, mining of water resources due to chemical-input intensive cultivation.
- Invasion of Coastal Lands through measures like Coastal Regulation Zone 2018 to promote tourism and affordable housing.
- Aarey forest protest against Mumbai metro project; opposition from certain state against declaring Western Ghat as Ecologically Sensitive Area requires careful planning.
- For the success of smart city projects, to provide congestion-free and pollution-free urban space, to promote city forestry, planning and management of land resource is crucial.

### Conclusion

Unless special efforts are made towards preservation of the land, water and vegetative resources of the country and its long term sustainable use is planned, the food grains and other basic needs of the country's population cannot be met, food security and self-reliance cannot be assured and enhanced livelihood security to the oiling millions in India cannot be ensured.

**5. What are non-ferrous minerals? How are they distributed in India? Discuss their significance for an economy like India.**

### Introduction

A non-ferrous mineral is a mineral that does not contain iron in appreciable amounts. Important non-ferrous metals include aluminium, copper, lead, nickel, tin, titanium and zinc, and alloys such as brass. Precious metals such as gold, silver and are also non-ferrous. They are usually obtained through minerals such as sulfides, carbonates, and silicates.

## Body

### Distribution of non-ferrous minerals in India

India's reserves and production of non-ferrous minerals is not very satisfactory –

- Copper - India is critically deficient in the reserve and production of copper. However the Balaghat mines in Madhya Pradesh, Khetri mines in Rajasthan and Singhbhum district of Jharkhand are leading producers of copper.
- Bauxite - Though, several ores contain aluminium, it is from bauxite, a clay-like substance that alumina and later aluminium is obtained. India's bauxite deposits are mainly found in the Amarkantak plateau, Maikal hills and the plateau region of Bilaspur-Katni.
- Gold - There are three important gold fields in the country, namely, Kolar Gold Field, Kolar district and Hatti Gold Field in Raichur district (both in Karnataka) and Ramgiri Gold Field in Anantpur district (Andhra Pradesh).
- Lead-Zinc - Lead-Zinc resources are located in Rajasthan, Bihar, Maharashtra, Madhya Pradesh, Andhra Pradesh, Gujarat, Uttarakhand, West Bengal, Odisha, Sikkim, Tamil Nadu and Meghalaya

### Significance of non-ferrous minerals for an economy like India

Non-ferrous metals, due to their inherent characteristics like excellent thermal and electrical conductivity, high recyclability, high strength-to-weight ratios, form the backbone of a growing economy like that of India.

- Metals like aluminium, copper, zinc and lead are key inputs to a wide range of critical industries, including infrastructure, power, automobile, defence, transport, telecom and manufacturing in general.
- India is critically deficient in the reserve and production of copper. Being malleable, ductile and a good conductor, copper is mainly used in electrical cables, electronics and chemical industries.
- Aluminium is an important metal because it combines the strength of metals such as iron, with extreme lightness and also with good conductivity and great malleability.
- Key Government reforms like Make in India, focus on urbanization, including initiatives like Smart Cities, place strong emphasis on expansion of our

manufacturing sector. Growth of the manufacturing sector will be directly proportional to the growth of the non-ferrous metals industry.

- Aided by strong demand in sectors like automobile, construction, electrical and consumer durables, the non-ferrous metals industry in India has historically witnessed good progress.
- The NFM industry generates large-scale employment both directly and indirectly. For example, aluminium industry alone accounts for employment generation of about 800,000 people.

### **Conclusion**

However, there are many critical challenges which are affecting robust growth of the sector in India, especially the China factor, the underdeveloped scrap recycling sector and the problem of inverted duty structure. Addressing each of these challenges is imperative for India to realize the true potential of its vast natural reserves and for boosting sustainable economic development.

