



India's Deep Ocean Mission

For Prelims: [Deep Ocean Mission](#), [Deep-Sea Mining](#), [Samudryaan](#), Matsya6000, Varaha, Decade of Ocean Science, Biomimicry .

For Mains: Key Pillars of Deep Ocean Mission, Major Challenges in Deep Ocean Exploration.

Source: [TH](#)

Why in News?

India is gearing up for a **historic [Deep Ocean Mission](#) to explore and harness the depths of the ocean**, a frontier that remains largely uncharted and holds immense potential for scientific and economic benefits.

- Countries such as the **U.S.A., Russia, China, France, and Japan** have already achieved successful deep-ocean crewed missions.

What is the Deep Ocean Mission?

- **About:**
 - **Deep Ocean Mission (DOM)** is an ambitious initiative of the **Ministry of Earth Sciences (MoES)** which aims to develop technologies and capabilities for **deep sea exploration**.
 - Also, DOM is one of nine missions under the [Prime Minister's Science, Technology, and Innovation Advisory Council \(PMSTIAC\)](#).
- **Key Pillars of the Mission:**
 - Technological Advancements for [Deep-Sea Mining](#) and **Crewed Submersibles**
 - Ocean Climate Change Advisory Services
 - Innovations for **Deep-Sea [Biodiversity](#) Exploration and Conservation**
 - **Survey and Exploration** of Deep-Ocean Minerals
 - **Harvesting Energy and Freshwater** from the Ocean
 - Establishment of an **Advanced Marine Station for Ocean Biology**
- **Major Advancement in DOM Objectives:**
 - [Samudryaan](#) and **Matsya6000**: As a part of DOM, India's flagship deep ocean mission, **Samudrayaan**, was initiated in 2021 by the Minister of Earth Sciences.
 - With Samudrayaan, India is embarking on a groundbreaking crewed expedition to reach a depth of **6,000 m to the ocean bed in the Central Indian Ocean**.
 - This historic journey will be accomplished by **Matsya6000, a deep-ocean submersible** designed to accommodate a crew of three members.
 - It is constructed from a titanium alloy, the sphere is engineered to withstand pressures of up to 6,000 bar.

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Note

The decision to target a depth of **6,000 meters** holds **strategic importance** due to the presence of valuable resources like **polymetallic nodules and sulphides**. These resources, containing essential metals, are found between depths of **3,000 to 5,500 meters**.

- **Varaha- India's Deep-Ocean Mining System:** The **National Institute of Ocean Technology**, an autonomous institute under MoES has conducted successful deep-sea locomotion trials

using '**Varaha,**' an **underwater mining system,** at a depth of 5,270 meters in the central Indian Ocean.

- These trials signified a pivotal moment in deep-sea resource exploration.

What are the Major Challenges in Deep Ocean Exploration?

- **Oceanic Pressure Challenges:** The high-pressure conditions in the deep ocean present a formidable challenge, exerting **immense pressure on objects comparable to carrying a weight of about 10,000kg per square meter.**
- **Equipment Design and Functionality:** The harsh conditions necessitate meticulously **designed equipment made from robust materials.** Electronics and instruments operate more efficiently in space or vacuum conditions, **while poorly designed objects tend to collapse or explode underwater.**
- **Challenges of Landing:** The **soft and muddy surface of the ocean bed** makes it exceptionally challenging for heavy vehicles to land or maneuver.
- **Material Extraction and Power Demands:** Extracting **materials from the ocean floor requires significant power and energy** to pump them to the surface.
 - Remotely operated vehicles are ineffective in the deep oceans due to the **absence of electromagnetic wave propagation.**
 - **Visibility is limited,** with natural light penetrating only a few tens of meters underwater, unlike space observations facilitated by telescopes.
- **Other Compounded Challenges:** Varied factors such as **temperature variations, corrosion, salinity,** and others further complicate deep-sea exploration, demanding comprehensive solutions.

Note

2021-2030 has been designated by the United Nations as the '[Decade of Ocean Science](#)'.

Way Forward

- **Biologically-Inspired Designs:** Draw inspiration from nature, such as **marine organisms, for innovative engineering solutions.**
 - **Biomimicry** could lead to the development of structures and materials that are naturally suited to deep-sea conditions, offering increased resilience and adaptability.
- **Energy Innovation:** Develop sustainable power sources to support long-duration missions.
 - This could include advancements in energy harvesting technologies like **ocean thermal energy conversion, utilizing temperature gradients in the ocean** for power, or exploring the potential of tidal and wave energy.
- **Multi-Sensor Integration:** Integrate diverse sensor technologies to compensate for limited visibility.
 - This could involve **combining sonar, lidar, and other imaging technologies to create a comprehensive picture** of the deep-sea environment, allowing for better navigation and exploration.
- **Environmental Impact Consideration:** Ensuring that **exploration initiatives are conducted with minimal impact on deep-sea ecosystems.**
 - Establishing **international regulations and policies that govern deep-sea exploration** to ensure responsible and ethical practices, **balancing scientific advancement with environmental conservation.**

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. With reference to the United Nations Convention on the Law of Sea, consider the following statements: (2022)

1. A coastal state has the right to establish the breadth of its territorial sea up to a limit not exceeding 12 nautical miles, measured from baseline determined in accordance with the convention.
2. Ships of all states, whether coastal or land-locked, enjoy the right of innocent passage through the territorial sea.
3. The Exclusive Economic Zone shall not extend beyond 200 nautical miles from the baseline from which the breadth of the territorial sea is measured.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (d)

Q. What is blue carbon? (2021)

- (a) Carbon captured by oceans and coastal ecosystems
- (b) Carbon sequestered in forest biomass and agricultural soils
- (c) Carbon contained in petroleum and natural gas
- (d) Carbon present in atmosphere

Ans: (a)

S-400 Missile and Project Kusha

For Prelims: [Indian Air Force \(IAF\)](#), [S-400 Triumf Missiles System](#), Project Kusha

For Mains: Indigenization of Technology, Significance of India's procurement of the S-400 missile system.

Source: [LM](#)

Why in News?

The [Indian Air Force \(IAF\)](#) to strengthen its defence capabilities has deployed three [S-400 Triumf air defence missile squadrons](#) along the **borders with China and Pakistan**.

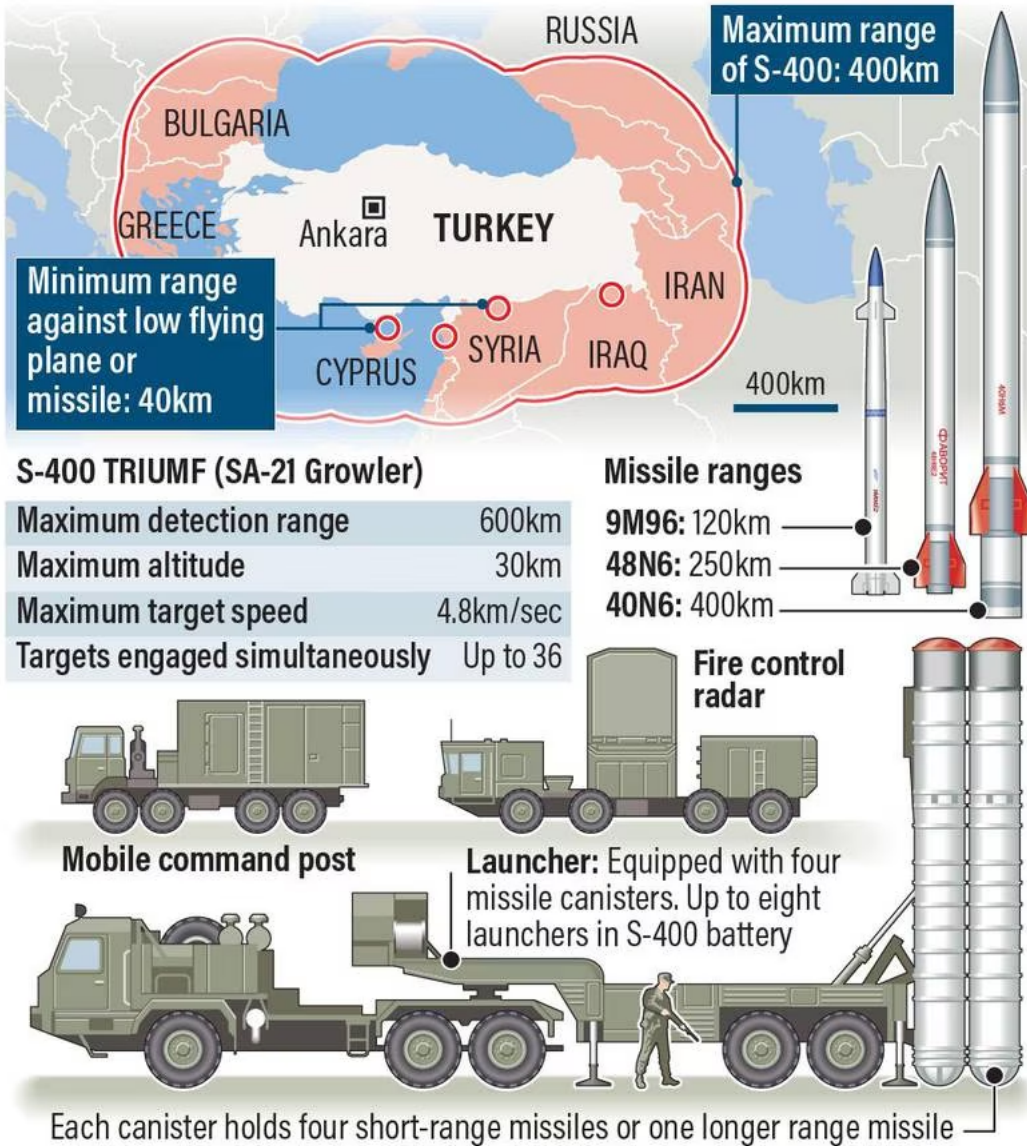
- India in 2018-19 signed a contract with **Russia for five S-400 missile squadrons**. Three have arrived, and the remaining two are delayed due to [Russia-Ukraine conflict](#).
- In another development, the [Indian Defence Acquisition Council](#) recently cleared the procurement of the **Indian Long Range Surface Air Missile(LRSAM) system** under **Project Kusha**.

What is the S-400 Triumf Missiles System?

▪ **About:**

- The S-400 Triumf is a mobile, **surface-to-air missile (SAM)** system developed by **Russia**, capable of intercepting and destroying various aerial targets, such as aircraft, drones, cruise missiles, and ballistic missiles.
- The S-400 has a range of up to **400 km**, at an altitude of up to 30 km and can engage up to **36 targets simultaneously**, with four different types of missiles.
 - It is the most dangerous operationally deployed **modern long-range SAM (MLR SAM)** in the world, considered much ahead of the **US-developed Terminal High Altitude Area Defense system (THAAD)**.

S-400 SURFACE-TO-AIR MISSILE SYSTEM



- Can shoot down up to 80 target simultaneously
- Cannot yet accurately target low-flying aircraft and missiles (altitude below 30,000 ft) at great distances

▪ **Importance for India:**

- India decided to procure the S-400 missiles to enhance its **air defence capabilities and deterrence posture** against **China and Pakistan**, which have been modernizing and expanding their air forces and missile arsenals.
 - India faces a **two-front threat from China and Pakistan**, which have been

- involved in several border disputes and conflicts with India over the years.
- India's acquisition is crucial to counter the growing presence and **influence of China in the [Indian Ocean Region](#)**, where China has been building ports, bases, and infrastructure projects.
 - India also wants to maintain its strategic autonomy and diversify its defence partners, amid the uncertainty and volatility of the global order.

What is Project Kusha?

- Project Kusha led by the **[Defence Research and Development Organisation \(DRDO\)](#)** is an ambitious defence initiative by India aimed at developing its **long-range air defence system by 2028-29**.
 - Long-range air defence systems will be capable of detecting and destroying enemy projectiles and armour, including cruise missiles, stealth fighter jets, and drones at long range.
 - It will consist of **three types of interceptor missiles**, with ranges of 150 km, 250 km, and 350 km, and advanced long-range surveillance and fire control radars.
- Project Kusha is expected to rival the effectiveness of the **renowned S-400 system of Russia and the [Iron Dome system of Israel](#)**.

Iron Dome System of Israel

- It is a **ground-to-air defence system** that comprises radar and interceptor missiles that are capable of tracking and neutralising any rockets or missiles fired towards targets in Israel.
- It was developed by the state-run **Rafael Advanced Defense Systems and Israel Aerospace Industries** and was deployed in 2011.
- It is particularly useful in defending against rockets, artillery and mortars, as well as aircraft, helicopters and **[unmanned aerial vehicles \(UAVs\)](#)**.
- The Dome has a range of close to 70 km and has three crucial components, Detection and Tracking radar, Battle Management and Weapons Control and the Missile Launcher.

UPSC Civil Services Examination Previous Year Question (PYQ)

Q1. What is "Terminal High Altitude Area Defense (THAAD)", sometimes seen in the news? (2018)

- (a) An Israeli radar system
- (b) India's indigenous anti-missile programme
- (c) An American anti-missile system
- (d) A defence collaboration between Japan and South Korea.

Ans: (c)

Q2. With reference to Agni-IV Missile, which of the following statements is/are correct? (2014)

1. It is a surface-to-surface missile.
2. It is fuelled by liquid propellant only.
3. It can deliver one-tonne nuclear warheads about 7500 km away.

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only

(d) 1, 2 and 3

Ans: (a)

- Agni-IV is a nuclear-capable long-range ballistic missile of India, with a strike range of 4,000 km.
- The indigenously developed Agni-IV is a two-stage surface-to-surface missile. It is 20 metres long with a weight of 17 tonnes. Hence, statement 1 is correct.
- It is a two stage solid fuelled system that can carry a one-tonne nuclear warhead over a distance of 4,000 kilometres. Hence, statements 2 and 3 are not correct.
- Therefore, option (a) is the correct answer.

Mains

Q. What is the significance of Indo-US defence deals over Indo-Russian defence deals? Discuss with reference to stability in the Indo-Pacific region. (2020)

Adaptation Gap Report, 2023

For Prelims: [United Nations \(UN\)](#), [Adaptation Gap Report](#), [UN Environment Programme \(UNEP\)](#), [Nationally Determined Contributions \(NDCs\)](#), [World Bank \(WB\)](#), [International Monetary Fund \(IMF\)](#)

For Mains: Urgent Need for Revamping Climate Financing to Promote Adaptability to Climate Changes.

[Source: IE](#)

Why in News?

As per the latest edition of [Adaptation Gap Report, 2023](#) released by [UN Environment Programme](#), developing countries, together, **need at least USD 215 billion every year** this decade to carry out meaningful adaptation work. In 2021, **just about USD 21 billion** went to developing countries for adaptation projects, which was down about 15% from the previous years.

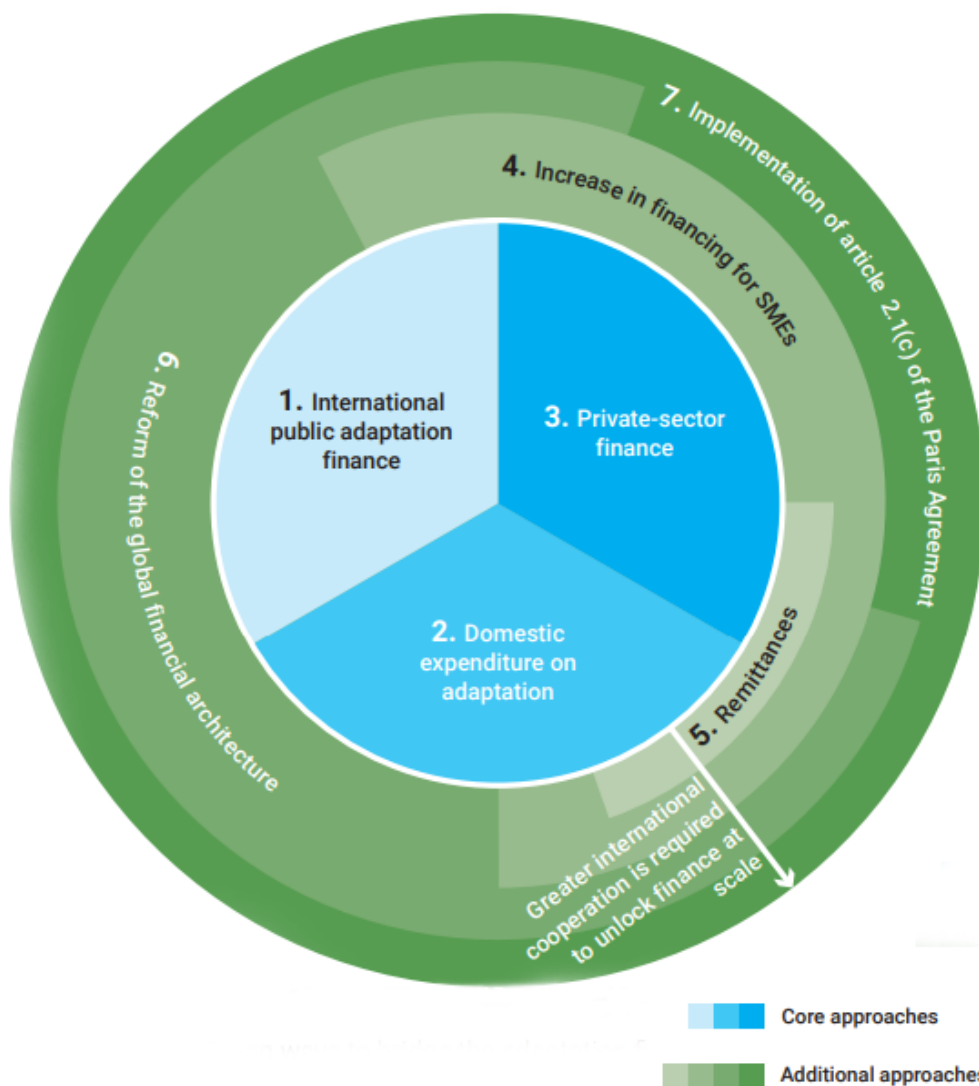
- This year's report focuses on [adaptation finance](#), or the availability of money to carry out the adaptation projects.

What are the Key Highlights of the Adaptation Gap Report, 2023?

- **Adaptation Finance Gap:**
 - The adaptation finance gap - the difference between estimated adaptation financing needs and costs and finance flows - has grown over the past.
 - The adaptation gap is likely **10-18 times as great as current international adaptation finance flows — at least 50% higher than previous range** estimates.
 - The current adaptation finance gap is now estimated at **USD 194-366 billion per year**.
- **Gender Equality in Financing:**
 - Of the international public finance for adaptation that is also tagged with gender equality as a principal objective, **only 2% is assessed as gender-responsive**, with a further 24% considered gender-specific or integrative.
- **Seven Ways to Increase Financing:**
 - **Private Financing:**

- **Domestic expenditure and private finance** are potentially important sources of adaptation finance where domestic budgets are likely to be a large source of funding for adaptation in many developing countries, **ranging from 0.2 % to over 5 % of government budgets.**
 - There is also fragmented evidence of increasing private-sector adaptation interventions all over the world and in most sectors such as water, food and agriculture; transport and infrastructure; tourism.
- **Internal Investments:**
 - **'Internal Investments'** by large companies, financial institutions' provision of finance for activities that contribute to **adaptation, and companies 'provision of adaptation goods and services** are much needed.
 - Also the options of [Corporate Social Responsibility](#) can be explored in India for achieving climate financing and adaptation goals.
- **Reform of Global Financial Architecture:**
 - Report calls for a reform of **global financial architecture, to ensure greater and easier access to finance for climate-related purposes** from multilateral agencies the [World Bank](#) or the [International Monetary Fund \(IMF\)](#) after it has become evident that current levels of international financial flows for fighting climate change are highly inadequate.

Seven ways to bridge the adaptation finance gap



What are Climate Financing Concerns for Developing Countries?

- **Limited Capacity of Developing Countries:**

- **Adaptation is vital for saving lives, livelihoods, and ecosystems**, particularly in developing and vulnerable countries with limited resilience, as there is no immediate solution to halt the ongoing effects of climate change. **These adaptation measures require adequate climate financing.**
- **Feasibility of Adaptation Measures by Developing Countries:**
 - Countries take various adaptation measures based on their specific needs **which include reinforcing coastlines, constructing seawalls in island nations, experimenting with heat-resistant crops**, building climate-resilient infrastructure, securing water sources, and similar efforts to help local populations better cope with rising temperatures and their consequences.
 - But these **adaptive measures impose financial obligations beyond the budgetary reach of governments.**
- **Lack of Proactiveness on Part of Developed Countries:**
 - Developed countries, as per international climate agreements, are **obligated to offer financial support and technology to assist developing countries in adapting to climate change.**
 - Developed countries have **failed to channelise requisite funds despite various conventions and treaties.**
- **Requirement of Funds Far Outweighs the Availability of Funds:**
 - Most of the developing countries have listed their adaptation requirements in their climate action plans, called [Nationally Determined Contributions \(NDCs\)](#) **which seek to document every country's contribution to the global fight against climate change.**

What are the Efforts Being Made by the Developed Countries?

- **Target of USD 100 billion:**
 - Developed countries had promised, **way back in 2009**, to mobilize at least **USD 100 billion** in climate finance every year from 2020 but even three years after the deadline, **that amount has not been realized.**
- **UNFCCC Platform:**
 - Efforts are being made to increase the finance flows, not just for adaptation, but for all other kinds of climate needs, together called climate finance through [United Nations Framework Convention on Climate Change \(UNFCCC\)](#).
 - But the need for climate finance has skyrocketed and is now assessed to be in **trillions of dollars every year.**
- **Glasgow Climate Conference:**
 - **At the [Glasgow climate conference in 2021](#)**, the developed countries had committed themselves to double the money for adaptation.
 - Separately, there is also an agreement that a new climate financing goal, **over and above USD 100 billion every year**, would be set by 2025.
- **New Collective Quantified Goal:**
 - The **doubling of adaptation finance by 2025** and the **new collective quantified goal for 2030** that is under deliberation will be instrumental in helping to close the **climate finance gap** with the help of developing countries.

What is Climate Financing?

- **About:**
 - It refers to **local, national, or transnational financing—drawn from public, private and alternative sources** of financing—that seeks to support mitigation and adaptation actions that will address climate change.
 - It seeks to support mitigation and adaptation actions that will address climate change.
- **Common but Differentiated Responsibility and Respective Capabilities (CBDR):**
 - The UNFCCC, [Kyoto Protocol](#), and the [Paris Agreement](#) call for financial assistance from Parties with more financial resources (Developed Countries) to those that are less endowed and more vulnerable (Developing Countries).
 - This is in accordance with the principle of [CBDR](#).

- **Conference of Parties-26 (COP 26):**
 - In UNFCCC [COP26](#), new financial pledges to support developing countries in achieving the global goal for adapting to the effects of climate change were made.
 - New rules for the **international carbon trading mechanisms** agreed at COP26 will support adaptation funding.
- **Intergovernmental Panel on Climate Change (IPCC), 2018:**
 - Climate finance is critical to tackle the issues posed by climate change and **achieve the goal of limiting the rise in the earth's average temperature** to below 2 degrees Celsius over pre-industrial levels, something the [IPCC report 2018](#) has predicted.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. With reference to the Agreement at the UNFCCC Meeting in Paris in 2015, which of the following statements is/are correct? (2016)

1. The Agreement was signed by all the member countries of the UN, and it will go into effect in 2017.
2. The Agreement aims to limit the greenhouse gas emissions so that the rise in average global temperature by the end of this century does not exceed 2°C or even 1.5°C above pre-industrial levels.
3. Developed countries acknowledged their historical responsibility in global warming and committed to donate \$ 1000 billion a year from 2020 to help developing countries to cope with climate change.

Select the correct answer using the code given below:

- (a) 1 and 3 only
- (b) 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

Ans: (b)

Q. "Momentum for Change: Climate Neutral Now" is an initiative launched by (2018)

- (a) The Intergovernmental Panel on Climate Change
- (b) The UNEP Secretariat
- (c) The UNFCCC Secretariat
- (d) The World Meteorological Organisation

Ans: (c)

Mains

Q. Describe the major outcomes of the 26th session of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC). What are the commitments made by India in this conference? (2021)

For Prelims: [Food Security](#), [Agricultural Marketing](#), Seed Capital Assistance, Food Street, Food Basket of the World, [International Year of Millets](#), [Ease of Doing Business](#), [Self Help Groups](#).

For Mains: Significance and potential of India's [food processing](#) on economic growth and development.

Source: [PIB](#)

Why in News?

The second edition of 'World Food India 2023' was inaugurated recently in New Delhi, where the Prime Minister of India provided **Seed Capital Assistance** to over **one lakh** [Self Help Group \(SHG\)](#) members.

- The Ministry of Food Processing Industries launched the first edition of World Food India in 2017.

What is World Food India 2023?

▪ About:

- World Food India 2023 is a gateway to the [Indian food economy](#), facilitating partnerships between Indian and foreign investors.
- It will be a one-of-a-kind gathering of manufacturers, producers, food processors, investors, policymakers, and organisations **from across the global food ecosystem**.

▪ Mascot:

- MillInd (a probot) is the Mascot for World Food India 2023.




▪ Focus Pillars:

- **Shree Anna (Millets): Leveraging India's Super Food for the World**
 - Millets can enhance **food security**, [nutrition security](#), and **sustainability in the face of global challenges** such as climate change, population growth, and malnutrition.
 - The [United Nations](#) has declared **2023 as the International Year of Millets (IYM 2023)**.
- **Exponential Food Processing: Positioning India as the Global Hub**
 - To achieve this vision, India intends to boost its enablers that can **support and accelerate its food processing industry**.
 - One of the key enablers is Financing Agri Food Value Chains and also Providing

adequate and affordable credit to the food processing sector, especially to the [micro, small and medium enterprises \(MSMEs\)](#).

What is the Current Status of the Food Processing Sector?

▪ Sunrise Sector:

- The Food Processing Sector received recognition, owing to the outcomes of World Food India, often referred to as the '[sunrise sector](#)'.
- In the past nine years, the sector has attracted foreign direct investments exceeding **Rs 50,000 crores**, thanks to the government's industry-friendly and farmer-centric policies. 

▪ Production Linked Incentive:

- The progress made under the [Production-Linked Incentive \(PLI\)](#) scheme in the food processing sector, has opened other dimensions.
 - Different ongoing projects under the **Agri-Infra Fund**, focusing on post-harvest infrastructure, with an investment exceeding **Rs 50,000 crores**, also hold massive potential for the sector.
 - Investments in **processing infrastructure in the fisheries and animal husbandry sector**, amounting to thousands of crores, are encouraged.

▪ Other Government Initiatives:

- Creation of the [Agri-Export Policy](#)
- Development of **nationwide logistics and infrastructure**
- Establishment of **district-level hubs**
- Expansion of [Mega Food Parks](#)
- [Pradhan Mantri Kisan Sampada Yojana](#)
- [Pradhan Mantri Formalisation of Micro Food Processing Enterprises Scheme](#)

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q.1 An objective of the National Food Security Mission is to increase the production of certain crops through area expansion and productivity enhancement in a sustainable manner in the identified districts of the country. What are those crops? (2010)

- (a) Rice and wheat only
- (b) Rice, wheat and pulses only
- (c) Rice, wheat, pulses and oil seeds only
- (d) Rice, wheat, pulses, oil seeds and vegetables

Ans: (b)

Q.2 Among the following, which one is the largest exporter of rice in the world in the last five years? (2019)

- (a) China
- (b) India
- (c) Myanmar
- (d) Vietnam

Ans: (b)

Mains

Q.1 In what way could replacement of price subsidy with Direct Benefit Transfer (DBT) change the scenario of subsidies in India? Discuss. (2015)

Population Survey in China

For Prelims: Population Survey in China, Population Policies of China, [United Nations](#), [National Family Health Survey \(NFHS\)](#).

For Mains: Population Survey in china, Population and associated issues, Poverty and developmental issues.

Why in news?

Recently, China has started polling 1.4 million people in a survey on population changes, as authorities struggle to **incentivise people to have more children** amid a declining birth rate and the first population drop in more than six decades.

- China is experiencing a declining birth rate and a population drop for the first time in over 60 years, with a **decrease of approximately 850,000 people in 2022**.
- The 2022 population decline is the first since 1961, which was the last year of China's [Great Famine](#).

What Have Been China's Policies for Population So Far?

- **One Child Policy:**
 - China embarked upon **its one-child policy in 1980**, when its government was concerned that the country's growing population, which at the time was approaching one billion, would impede economic progress.
 - Chinese authorities have **long hailed the policy as a success**, claiming that it helped the country avert severe food and water shortages by preventing up to 40 crore people from being born.
 - It was a source of discontent, as the state used brutal tactics such as forced abortions and sterilisations.
 - It also met criticism and remained controversial for violating [human rights](#), and for being unfair to the poor.
- **Two Child Policy:**
 - From 2016, the Government of China finally allowed **two children per couple**- a policy change that did little to arrest the rapid fall in population growth.
- **Three Child Policy:**
 - It was announced after **China's 2020 census** data showed that the country's rate of population growth is falling rapidly despite the 2016 relaxation.
 - The country's [fertility rate](#) has **dropped to 1.3, far below the replacement level of 2.1 required for a generation to have enough children to replace it.**
 - The [United Nations](#) expects China's population to begin declining after 2030, but some experts say this could happen as early as in the next one or two years.

What are the Concerns over the Falling Population in China?

- **Decreased Labour:**
 - When the young population in a country declines, **it creates labour shortages**, which have a major detrimental impact on the economy.
- **Increased Social Spending:**
 - More older people also **means that demands for healthcare and pensions** can soar,

burdening the country's social spending system further when fewer people are working and contributing to it.

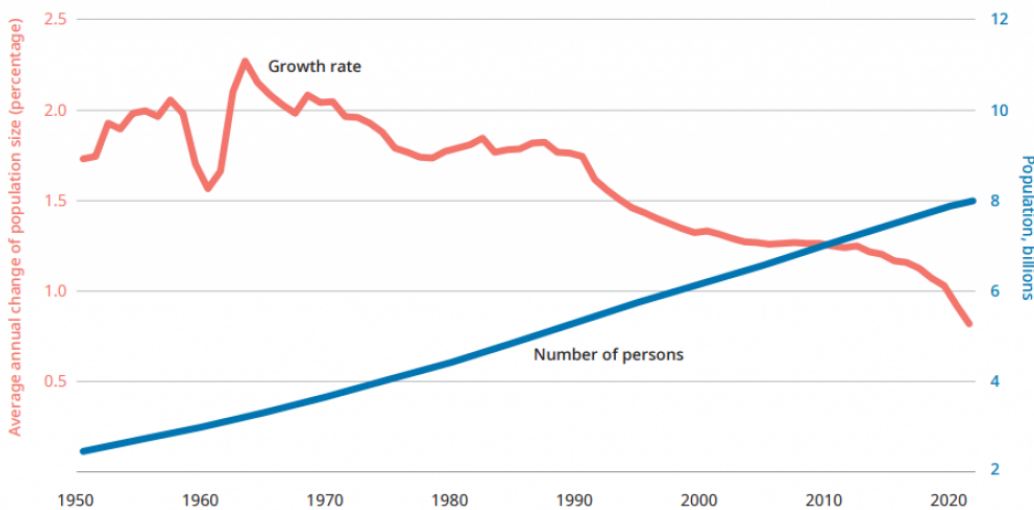
▪ **Critical for Developing Nations:**

- China faces a unique challenge of population decline as a **middle-income country that relies on labor-intensive sectors**, unlike rich countries (like Japan and Germany) that can invest in capital and technology. This could **reduce its economic growth and affect other developing countries like India.**
- The population decline could have various impacts on the world, such as **slowing down the global economic growth** and disrupting **the supply chains that depend on China's manufacturing and exports.**
- It could also create opportunities and challenges for other countries to fill the gap in the global labor market and consumer demand.

What are the World's Population Trends?

▪ **World's Population:**

- The world's population reached 8 billion people in mid-November 2022 from an estimated 2.5 billion people in 1950, a milestone in human development. While it took the global population 12 years to grow from 7 to 8 billion.



▪ **India's Population:**

- According to the United Nations data, India **has surpassed China to become world's most populous nation** with 142.86 crore people in 2023.
 - 25% of India's population is in the age group of 0-14 years, 18% in the 10-19 age group, 26% in the age bracket of 10-24 years, 68% in the 15-64 years age group, and 7% above 65 years.

DEMOGRAPHIC INDICATORS

	Population	15-64 years	65+	TFR	Life expectancy
India	1,428.6 mn	68%	7%	2.0	72.5 yrs
China	1,425.7 mn	69%	14%	1.2	79 yrs
World	8,045 mn	65%	10%	2.3	73.5 yrs

UNFPA's State of World Population Report 2023

- **Regions with Highest Population Growth:**
 - More than half of global population growth between now and 2050 is expected to occur in Africa.
 - Africa has the **highest rate of population growth among major areas**. The population of sub-Saharan Africa is projected to double by 2050.
 - In Syria, the population grew by about 6.39% **compared to the previous year**, making it the country with the highest population growth rate in 2023.
- **Countries with Populations Declining:**
 - Several countries are expected to see their populations decline by more than 15% by 2050, including Bosnia and Herzegovina, Bulgaria, **Croatia, Hungary, Japan, Latvia, Lithuania, Republic of Moldova**, Romania, Serbia, and Ukraine.
 - Cook Islands has the highest population decline rate of 2.31 % in 2023.

What Lessons can India Learn from Such A Demographic Shift in China?

- **Avoid Stringent Measures:**
 - Stringent population control measures have landed China in a human crisis that was inevitable. If coercive measures like a two-child limit are enforced, India's situation could be worse.
- **Women Empowerment:**
 - The proven ways to lower the fertility rate are to **give women the control over their fertility** and ensure their greater empowerment through increased access to education, economic opportunities and healthcare.
 - As a matter of fact, China's fertility reduction is only partly attributable to coercive policies, and is largely because of the sustained investments the country had made in education, health and job opportunities for women.
- **Need to Stabilize Population:**
 - India has done very well with its family planning measures and now **it is at replacement level fertility of 2.1**, which is desirable.
 - It needs to sustain population stabilization because in some States like Sikkim, Andhra Pradesh, Delhi, Kerala and Karnataka, the total fertility rate is way below replacement level, which means it can experience in 30-40 years what China is experiencing now.

What are the Steps taken by India to Control Population ?

- India became one of the **first developing countries to come up** with a state-sponsored family planning programme in the 1950s.
 - A population policy committee was established in 1952.
 - In 1956, a Central Family Planning Board was set up and its focus was on sterilisation.
 - In 1976, GOI announced the first National Population Policy.
- **National Population Policy, 2000** envisaged achieving a stable population for India.
 - The Policy aims to achieve a stable population by 2045.
 - One of its immediate objectives is to address the unmet needs for contraception, health care infrastructure, and personnel and provide integrated service delivery for basic reproductive and child health care.
- **National Family Health Survey (NFHS)**
- Realising the potential of education in tackling the problems of growing rate of population, the Ministry of Education launched a Population Education Programme with effect from 1980.
 - The Population Education programme is a central sector scheme designed to introduce Population Education in the formal education system.
 - It has been developed in collaboration with the United Nations Funds for Population Activities (UNFPA) and with the active involvement of the Ministry of Health and Family Welfare.

Conclusion

- India has a chance to benefit from its young population (demographic dividend) until the 2040s, similar to how China did until 2015.
- But this opportunity depends on providing good job opportunities for the youth. Without those opportunities, India's demographic advantage could become a problem instead of a benefit.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q1. In the context of any country, which one of the following would be considered as part of its social capital? (2019)

- (a) The proportion of literates in the population
- (b) The stock of its buildings, other infrastructure and machines
- (c) The size of population in the working age group
- (d) The level of mutual trust and harmony in the society

Ans: (d)

Q2. India is regarded as a country with “Demographic Dividend”. This is due to (2011)

- (a) Its high population in the age group below 15 years
- (b) Its high population in the age group of 15-64 year
- (c) Its high population in the age group above 65 years
- (d) Its high total population

Ans: (b)

Mains

Q1. Discuss the main objectives of Population Education and point out the measures to achieve them in India in detail. (2021)

Q2. “Empowering women is the key to control the population growth.” Discuss. (2019)

Q3. Critically examine whether growing population is the cause of poverty or poverty is the main cause of population increase in India. (2015)

Global Declaration for River Dolphins

[Source: WWF](#)

Why in News?

Recently, **11 Asian and South American** countries signed a landmark deal in Bogota, Colombia to save the world's **six surviving species of [river dolphins](#)** from extinction.

- This landmark deal signifies a ray of hope in combating the severe decline of river dolphin populations, which have dwindled by a staggering **73% since the 1980s**.

What is the Global Declaration for River Dolphins?

▪ About:

- The **Global Declaration for River Dolphins** aims to halt the **decline of all river dolphin species** and bolster the most vulnerable populations through concerted efforts.
 - It outlines measures such as **eradicating gillnets, reducing pollution, expanding research initiatives**, and creating protected areas to safeguard the remaining river dolphin species.
- Countries that adopted the declaration include: Bangladesh, Bolivia, Brazil, Cambodia, Colombia, Ecuador, **India**, Nepal, Pakistan, Peru, and Venezuela.
 - There was also a representative from the regional government in Indonesia that has responsibility for the **Mahakam river**.

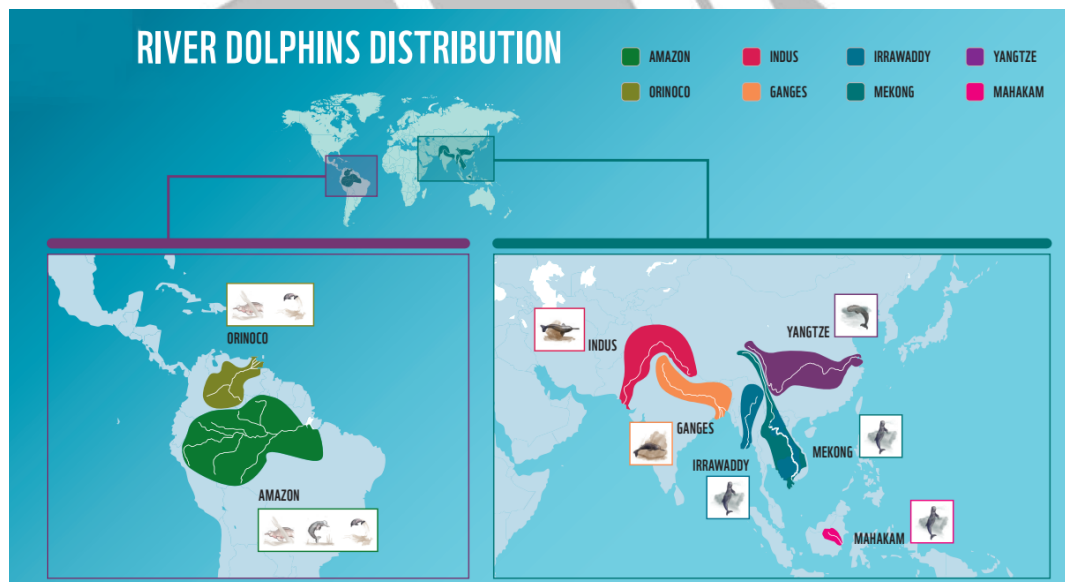
▪ Foundational Pillars:

- The **eight foundational pillars** of the Global Declaration for River Dolphins comprise initiatives like **establishing a network of protected areas, improving river dolphin site management, expanding research and monitoring efforts**, engaging local communities and Indigenous Peoples, eradicating unsustainable fishing practices, enhancing water quality and quantity, promoting **World River Dolphin Day (24th October)** to raise awareness, and augment resource allocation and partnerships.

What are the Key Facts Associated with River Dolphins?

▪ About:

- River dolphins are a group of **freshwater cetaceans** that inhabit various river systems across Asia and South America.
- The **Six Surviving River Dolphin Species** include: **Amazon, Ganges, Indus, Irrawaddy, Tucuxi, and the Yangtze finless porpoise**.
 - The Chinese river dolphin was deemed '**probably extinct**' in 2007.
- As per the [IUCN Red list](#), **Yangtze finless porpoise** are classified as **Critically Endangered**.
 - **Amazon, Ganges, Indus, Irrawaddy and Tucuxi** are labeled as Endangered.



Note

The Yangtze finless porpoise is the **world's only freshwater porpoise** but it is included with the **other freshwater cetaceans** under the umbrella name '**river dolphins**'.

- The [Amazon river dolphin](#), also known as the **pink river dolphin or boto** is the largest river dolphin.

▪ Challenges Faced by River Dolphins:

- River dolphins are threatened by diverse factors, including **unsustainable fishing practices**, **hydropower dam construction**, **pollution from various industries**, agriculture, and mining, as well as habitat loss.
- Also, the recent tragic deaths of **over 150 river dolphins in the drought-stricken Lake Tefe in the Amazon** illustrate how climate change poses an increasingly severe threat to their survival.

▪ Successful Conservation Efforts:

- Conservation efforts in populated river basins like the **Indus and Yangtze have seen success**.
 - For instance, the **Indus river dolphin population in Pakistan** doubled due to joint stakeholder action.
 - Additionally, the **Yangtze finless porpoises** witnessed a **23% increase in numbers owing to protective measures**.
- Moreover, the World Wildlife Fund's **electronic pinger project** saved **80 dolphins in Indonesia's Mahakam river** from gill net entanglement.

GANGES RIVER DOLPHIN

(*Platanista gangetica gangetica*)

National aquatic animal of India

Facts

- Can only live in freshwater; prefer deep water
- Essentially blind; hunts by emitting ultrasonic sound
- Can't breathe in water; must surface every 30-120 seconds for air
- Also called 'susu' because of sound they make while breathing

Habitat & Distribution

- Distributed in Ganges and Brahmaputra River basins of India, Nepal and Bangladesh.
- Distribution range in India covers 7 states namely, Assam, Uttar Pradesh, Madhya Pradesh, Rajasthan, Bihar, Jharkhand and West Bengal.

Threats

- Habitat destruction
- Pollution
- Bycatch
- Climate Change
- Hunting

Conservation Efforts

- **Project Dolphin (2021):** On lines of project Tiger
- **National Dolphin Research Centre (2021):** India's and Asia's First; in Patna University (Bihar)
- **Dedicated Dolphin Sanctuary:**
 - Vikramshila sanctuary (Bihar) – 1991
 - Hastinapur sanctuary (UP) – Proposed

Protection Status

- **IUCN Red List:** Endangered
- **CITES:** Appendix I
- **Wildlife Protection Act 1972:** Schedule I

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UPSC Civil Services Examination, Previous Year Question

Q. Which one of the following is the national aquatic animal of India? (2015)

- (a) Saltwater crocodile
- (b) Olive ridley turtle
- (c) Gangetic dolphin
- (d) Gharial

Ans: (c)

CO₂ to CO Conversion Technology

[Source: PIB](#)

Why in News?

The **National Centre of Excellence in Carbon Capture and Utilisation (NCoE-CCU)** at IIT Bombay has developed a new technology for converting [carbon dioxide \(CO₂\)](#) to [carbon monoxide \(CO\)](#).

- The technology is energy-efficient and can be used in the steel sector. It aligns with India's goal for [net-zero emissions by 2070](#).

How Does the CO₂ to CO Conversion Technology Work?

- **Working Process:**
 - The CO₂ to CO conversion technology operates through an **electrocatalytic process**.
 - Unlike traditional methods that **require high temperatures (400-750 °C)**, and the presence of the equivalent amount of hydrogen, this process can operate at **ambient temperatures (25-40 °C)** in the presence of water, **eliminating the need for high-temperature conditions**.
 - The energy for this electrocatalysis reaction can be sourced directly from [renewable energy, such as solar panels or windmills](#), ensuring a carbon-neutral operation. Making it highly energy-efficient process and environmentally friendly and sustainable.
- **Significance for the Steel Industry:**
 - CO is a crucial chemical in the steel industry, used in the **conversion of iron ores to metallic iron in blast furnaces**.
 - CO is a widely used chemical in the industry especially in the form of syn gas.
 - Traditionally, CO is produced through the partial **oxidation of coke/coal, resulting in significant CO₂ emissions**.
 - The new CO₂ to CO conversion technology presents an opportunity to establish a [circular economy](#), reducing **carbon footprint and associated costs in steel production**.

Electrocatalytic Process

- It is a catalytic process that involves the **direct transfer of electrons between an electrode and reactants**.
- This process is environmentally friendly, efficient, and inexpensive. It can be used in many sustainable energy technologies.

Carbon monoxide (CO)

- It is a **colorless, odorless, and tasteless** gas that is slightly less dense than air.
- **Sources of CO:** CO is a byproduct of the **incomplete combustion of hydrocarbons**. Common sources include burning fossil fuels like natural gas, petrol, coal and oil, wood smoke, car and truck exhausts etc.
- It is toxic to humans insofar as it forms a complex thereby displacing oxygen from the hemoglobin of the blood.
- In the atmosphere CO is short lived because of the role it plays in the formation of [ground-level ozone](#).

UPSC Civil Services Examination Previous Year Question (PYQ)

Q. Consider the following: (2019)

1. Carbon monoxide
2. Methane
3. Ozone
4. Sulphur dioxide

Which of the above are released into atmosphere due to the burning of crop/biomass residue?

- (a) 1 and 2 only
(b) 2, 3 and 4 only
(c) 1 and 4 only
(d) 1, 2, 3 and 4

Ans: (d)

Rapid Fire Current Affairs

India Flags Off First International Cruise Liner

Recently, the Union Minister of Ports, Shipping & Waterways flagged off the maiden voyage of the vessel **Costa Serena**, the first International Cruise Liner in India from Mumbai.

- The initiative aligns with the ["Dekho Apna Desh" campaign](#), reflecting the government's emphasis on promoting tourism.
- The development of **cruise and lighthouse tourism** is part of the [Sagarmala Programme](#), which aims to establish India as the premier cruise hub in the **Asia Pacific region by 2030**.
 - The goal is to increase the **annual number of cruise passengers in India to 18 lakhs by 2030**, up from the current figure of 4.72 lakhs.
- India plans to have **25 operational cruise terminals by 2047**, with an estimated annual passenger count of 5 million.

Read more: [Ganga Vilas Cruise](#)

ATL Marathon 2023-24

Atal Innovation Mission (AIM), a flagship initiative set up by the [NITI Aayog](#), opened applications for the '**Atal Tinkering Lab(ATL) Marathon 2023-24**,' a **national-level innovation challenge** in collaboration with the Ministry of Education, [YuWaah](#) and [UNICEF](#).

- The 2023-24 ATL Marathon is themed around **"India's 75th Republic Day(26th January 2024)"**, with several problem statements on which student teams can build projects like Space, Agriculture, Inclusivity, [Disaster management](#), Mobility, Health, Education & Skill Development.
 - Students across India can participate and develop innovative solutions for community problems.
- Aims to create an ecosystem of innovation in schools and expose students to innovation.

Read more: [Atal New India Challenge 2.0](#)

Inaugural AIESC Meeting

The inaugural **Australia India Education and Skill Council (AIESC) meeting**, hosted at IIT

Gandhinagar, represents a pivotal moment in the bilateral education and skill development collaboration between **Australia and India**.

- Established in **2011** as the **Australian India Education Council (AIEC)**, this bi-national body strategically guides the educational, training, and research partnerships between the two countries.
- By focusing on themes like **shaping future workforces, bolstering institutional partnerships, and driving research impact through internationalization**, the council seeks to pave the way for the future of education and skilling in both nations.

Read more: [India-Australia Relations](#)

Neeraj Chopra Nominated for 2023 World Athlete of the Year Award

[Neeraj Chopra](#), the Olympic and World Champion Javelin Thrower, stands among the **11 nominees for the 2023 Men's World Athlete of the Year award given by the World Athletics**.

- The selection process involves a **three-way voting system**, incorporating votes from the **World Athletics Council, the [World Athletics Family](#)**, and the public.
 - While the **council's vote carries 50% weight, the remaining 50% is divided equally between the World Athletics Family** and public votes.

Read more: [World Athletics](#)

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