

Indigenization of Technology & Developing New Technology (SPACE)

❖ **A ground view of the Indian Space Policy 2023**

➤ **CONTEXT:** On April 20 this year, the Indian Space Research Organisation (ISRO) released the Indian Space Policy 2023 that had been in the works for some years. The document has been received positively by industry.

➤ **Developments so far**

- Until the early 1990s, India's space industry and space economy were defined by ISRO. Private sector involvement was limited to building to ISRO designs and specifications.
- The Second Space Age began with the licensing of private TV channels, the explosive growth of the Internet, mobile telephony, and the emergence of the smartphone.
- ✓ Today, while ISRO's budget is approximately \$1.6 billion, India's space economy is over \$9.6 billion. Broadband, OTT and 5G promise a double-digit annual growth in satellite-based services. It is estimated that with an enabling environment, the Indian space industry could grow to \$60 billion by 2030, directly creating more than two lakh jobs.
- Yet, it is the enabling policy environment that has proved elusive. The first satellite communication policy was introduced in 1997, with guidelines for foreign direct investment (FDI) in the satellite industry that were further liberalised but never generated much enthusiasm.
- Today, more than half the transponders beaming TV signals into Indian homes are hosted on foreign satellites, resulting in an annual outflow of over half a billion dollars.
- A remote sensing data policy was introduced in 2001, which was amended in 2011; in 2016, it was replaced by a National Geospatial Policy that has been further liberalised in 2022.
- Yet, Indian users including the security and defence agencies spend nearly a billion dollars annually to procure earth observation data and imagery from foreign sources.
- To streamline matters, a draft Space Activities Bill was brought out in 2017, which went through a long consultative process. It lapsed in 2019 with the outgoing Lok Sabha. The government was expected to introduce a new Bill by 2021, but it appears to have contented itself with the new policy statement.

➤ **What is different**

- The Indian Space Policy 2023 is qualitatively different from previous efforts. The 'Vision' is to "enable, encourage and develop a flourishing commercial presence in space" that suggests an acceptance that the private sector is a critical stakeholder in the entire value chain of the space economy.
- It makes five key points. It defines its role in India's "socio-economic development and security, protection of environment and lives, pursuing peaceful exploration of outer space, stimulation of public awareness and scientific quest".
- **First**, this is the only reference to 'security' in the document, making it clear that the focus is on civilian and peaceful applications.
- ✓ Considering that space-based intelligence, reconnaissance, surveillance, communication, positioning and navigation capabilities are increasingly seen as mission critical by the defence services, that India conducted a successful A-SAT (anti-satellite) direct ascent test in March 2019, and, in the same year, set up the Defence Space Agency and the Defence Space Research Organisation, it is reasonable to infer that a defence-oriented space security policy document will be a separate document.
- ✓ The United States puts out a space policy under the aegis of the White House Office of Science and Technology Policy, National Aeronautics and Space Administration (NASA) and the Departments of Commerce and Transportation, while the Department of Defence and the Director of National Intelligence are responsible for the space security strategy.
- **Second**, the policy lays out a strategy and then spells out the roles of the Department of Space, ISRO, the Indian National Space Promotion and Authorisation Centre (IN-SPACe) set up in 2020, and the NewSpace India Limited (NSIL), a public sector unit set up in 2019 under the Department of Space as the commercial arm of ISRO to replace the now defunct Antrix.
- **Third**, it states that ISRO will "transition out of the existing practice of being present in the manufacturing of operational space systems. Hereafter, mature systems shall be transferred to industries for commercial exploitation. ISRO shall focus on R&D in advanced technology, proving newer systems and realisation of space objects for meeting national prerogatives".
- Another of ISRO's tasks in the new policy is to "share technologies, products, processes and best practices with NGEs (non-government entities) and/or Government companies". This implies that ISRO will now use its biggest asset, its qualified and talented manpower, to concentrate on cutting edge research and development and long-term projects such as Chandrayaan and Gaganyaan.
- As ISRO's commercial arm, NSIL will become the interface for interacting with the industry, undertake commercial negotiations and provide hand-holding support to ensure smooth and efficient transfer of technologies.

➤ **Private sector role**

- The NGEs (this includes the private sector) are “allowed to undertake end-to-end activities in the space sector through establishment and operation of space objects,
- ✓ Ground-based assets and related services, such as communication, remote sensing, navigation, etc.
- ✓ Satellites could be self-owned, procured or leased;
- ✓ Communication services could be over India or outside
- ✓ Remote sensing data could be disseminated in India or abroad.
- NGEs can design and operate launch vehicles for space transportation and establish their own infrastructure. NGEs can now make filings with the International Telecommunication Union (ITU) and engage in commercial recovery of asteroid resources. In short, the entire gamut of space activities is now open to the private sector.
- Security agencies can task NGEs for procuring tailor-made solutions to address specific requirements.
- The activities of the NGEs will be in keeping with guidelines and regulation to be issued by IN-SPACe. It is expected to act as the single window agency for authorising space activities “by government entities and NGEs”, in keeping with safety, security, international obligations and overall national interests.
- IN-SPACe is expected to create a “stable and predictable regulatory framework” that will ensure a level playing field for the NGEs. It will act as a promoter by setting up industry clusters and as the regulator, issue guidelines on liability issues.
- **The gaps**
- The policy sets out an ambitious role for IN-SPACe but provides no time frame for the necessary steps ahead. Neither is there an indicative timeline for ISRO’s transitioning out of its current practices nor is there a schedule for IN-SPACe to create the regulatory framework.
- The policy framework envisaged will need clear rules and regulations pertaining to FDI and licensing, government procurement to sustain the new space start-ups, liability in case of violations and an appellate framework for dispute settlement.
- A regulatory body needs legislative authority. IN-SPACE is expected to authorise space activities for all, both government and non-government entities. Currently, its position is ambiguous as it functions under the purview of the Department of Space. The Secretary (Space) is also Chairman of ISRO, the government entity to be regulated by IN-SPACE.

The Space Policy 2023 is a forward-looking document reflecting good intentions and a vision. But it is not enough. What is urgently needed is a time frame to provide the necessary legal framework to translate this vision into reality, to successfully launch India into the Second Space Age.

SOCIETY

- ❖ **The law on polygamy among religious groups in India**
- **CONTEXT:** Assam Chief Minister Himanta Biswa Sarma has said that the state government will move to ban the practice of polygamy through “legislative action”, and that an “expert committee” would be formed to examine the issue.
- **Practice of polygamy**
- Polygamy is the practice of having more than one married spouse — wife or husband. The issue is governed both by personal laws and the Indian Penal Code (IPC).
- Traditionally, polygamy — mainly the situation of a man having more than one wife — was practised widely in India. The Hindu Marriage Act, 1955 outlawed the practice.
- IPC Section 494 (“Marrying again during lifetime of husband or wife”) penalises bigamy or polygamy. The section reads: “Whoever, having a husband or wife living, marries in any case in which such marriage is void by reason of its taking place during the life of such husband or wife, shall be punished with imprisonment of either description for a term which may extend to seven years, and shall also be liable to fine.”
- ✓ This provision does not apply to a marriage which has been declared void by a court — for example, a child marriage that has been declared void.
- ✓ The law also does not apply if a spouse has been “continually absent” for the “space of seven years”. This means a spouse who has deserted the marriage or when his or her whereabouts are not known for seven years, will not bind the other spouse from remarrying.
- **The second marriage**
- Generally, the first wife files a complaint that her husband has remarried. The court will have to look into whether the husband has entered into a legally valid second marriage. This means that the second marriage would have to be performed as per prescribed customs, and the penal provision will not apply for adulterous relationships that do not qualify as valid marriages under the law.
- In *Kanwal Ram and Ors v The Himachal Pradesh Administration* (1965), the Supreme Court reiterated the legal position that the standard of proof must be of marriage performed as per customs. “In a bigamy case, the second marriage as a fact, that is to say, the ceremonies constituting it must be proved ”
- Section 495 of the IPC protects the rights of the second wife in case of a bigamous marriage. It reads: “Whoever commits the offence defined in the last preceding section (i.e. Section 494) having concealed

from the person with whom the subsequent marriage is contracted, the fact of the former marriage, shall be punished with imprisonment of either description for a term which may extend to ten years, and shall also be liable to fine.”

➤ **Under Hindu law**

- After Independence, anti-bigamy laws were adopted by provincial legislatures including Bombay and Madras. The Special Marriage Act, 1954, was a radical legislation that proposed the requirement of monogamy — subsection (a) of Section 4 of the SMA (“Conditions relating to solemnization of special marriages”) requires that “at the time of marriage neither party has a spouse living”.
- Parliament passed the Hindu Marriage Act in 1955, outlawing the concept of having more than one spouse at a time. Buddhists, Jains, and Sikhs are also included under the Hindu Marriage Code. The Parsi Marriage and Divorce Act, 1936, had already outlawed bigamy.
- Section 5 (“Conditions for a Hindu marriage”) of the Hindu Marriage Act lays down that “a marriage may be solemnized between any two Hindus, if [among other conditions] neither party has a spouse living at the time of the marriage.
- Under Section 17 of the HMA bigamy is an offence, “and the provisions of sections 494 and 495 of the Indian Penal Code, 1860, shall apply accordingly.
- However, despite bigamy being an offence, the child born from the bigamous marriage would acquire the same rights as a child from the first marriage under the law.
- A crucial exception to the bigamy law for Hindus is Goa, which follows its own code for personal laws. So, a Hindu man in the state has the right to bigamy under specific circumstances mentioned in the Codes of Usages and Customs of Gentile Hindus of Goa.
 - ✓ These circumstances include a case where the wife fails to conceive by the age of 25 or if she fails to deliver a male child by the age of 30. However Goa Chief Minister Pramod Sawant has said that the provision for Hindus is virtually “redundant” and that “no one has been given the benefit of it since 1910”.

➤ **Under Muslim law**

- Marriage in Islam is governed by the Shariat Act, 1937. Personal law allows a Muslim man to have four wives. To benefit from the Muslim personal law, many men from other religions would convert to Islam to have a second wife.
- In a landmark ruling in 1995, the Supreme Court in Sarla Mudgal v Union of India held that religious conversion for the sole purpose of committing bigamy is unconstitutional. This position was subsequently reiterated in the 2000 judgment in Lily Thomas v Union of India.
- Any move to outlaw polygamy for Muslims would have to be a special legislation which overrides personal law protections like in the case of triple talaq.

➤ **Prevalence of polygamy**

- The National Family Health Survey-5 (2019-20) showed the prevalence of polygamy was 2.1% among Christians, 1.9% among Muslims, 1.3% among Hindus, and 1.6% among other religious groups.
- The data showed that the highest prevalence of polygynous marriages was in the Northeastern states with tribal populations. A list of 40 districts with the highest polygyny rates was dominated by those with high tribal populations.

PRELIMS

1. Indo-Thai Coordinated Patrol (CORPAT)

➤ **CONTEXT: The 35th edition of India-Thailand Coordinated Patrol (Indo-Thai CORPAT) between the Indian Navy and the Royal Thai Navy was conducted from 03 – 10 May 2023.**

- Indian Naval Ship (INS) Kesari, an indigenously built LST (L) and His Thai Majesty’s Ship (HTMS) Saiburi, a Chao Phraya Class Frigate, along with Maritime Patrol Aircraft from both navies participated in the CORPAT along the IMBL in the Andaman Sea.
- Towards reinforcing maritime linkages between the two countries and with an aim of keeping this vital part of the Indian Ocean safe and secure for international trade, the Indian Navy and the Royal Thai Navy have been undertaking CORPAT bi-annually since 2005 along the International Maritime Boundary Line (IMBL). CORPAT builds up understanding and interoperability between navies and facilitates instituting measures to prevent and suppress unlawful activities like Illegal Unreported Unregulated (IUU) fishing, drug trafficking, piracy and armed robbery. It further helps enhance the operational synergy by exchanging information for the prevention of smuggling, and illegal immigration and for the conduct of Search and Rescue (SAR) operations at sea.
- As part of the Government of India’s vision of SAGAR (Security And Growth for All in the Region), the Indian Navy has been proactively engaging with the countries in the Indian Ocean Region towards enhancing regional maritime security. This has been achieved through bilateral and multilateral exercises, Coordinated Patrols, Joint EEZ Surveillance, and Humanitarian Assistance and Disaster Relief (HADR) operations. The Indian Navy and Royal Thai Navy have enjoyed a close and friendly relationship covering a wide spectrum of activities and interactions, which have strengthened over the years.

- The 35th Indo-Thai CORPAT is another step towards enhancing Indian Navy's efforts to consolidate interoperability and forge strong bonds of friendship between India and Thailand.

2. **Deep Ocean Mission**

➤ **CONTEXT: Union Minister Dr Jitendra Singh chairs the first Steering Committee Meeting of Deep Ocean Mission**

- Dr. Jitendra Singh said that in the years to come, "Blue Economy" will be major contributor to India's overall economy and the Deep Ocean Mission will be the core component of it.

➤ **About**

- The Deep Ocean Mission was sanctioned in September 2021. The estimated cost of the Mission is Rs. 4047 Cr for 5 years with two phases.

- DOM is a mission mode project to support the Blue Economy Initiatives of the Government of India.

- Earlier, the Ministry of Earth Sciences had also rolled out the draft Blue Economy Policy.

- Blue Economy is the sustainable use of ocean resources for economic growth, improved livelihoods and jobs, and ocean ecosystem health.

➤ **The Deep Ocean Mission consists of 6 themes:**

- ✚ Development of Technology for deep sea mining, manned submersible and underwater robotics:

- ✓ A manned submersible will be developed to carry three people to a depth of 6,000 metres in the ocean with a suite of scientific sensors and tools.

- ✓ NIOT & ISRO is jointly developing a Manned Submersible Vehicle.

- ✓ National Institute of Ocean Technology (NIOT), an autonomous institute under the Ministry of Earth Sciences.

- ✓ An Integrated Mining System will be also developed for mining polymetallic nodules at those depths in the central Indian Ocean. Polymetallic nodules are rocks scattered on the seabed containing iron, manganese, nickel and cobalt.

- ✓ The exploration studies of minerals will pave the way for commercial exploitation in the near future, as and when commercial exploitation code is evolved by the International Seabed Authority, a United Nations (UN) organisation.

- ✚ Development of Ocean Climate Change Advisory Services: It entails developing a suite of observations and models to understand and provide future projections of important climate variables on seasonal to decadal time scales.

- ✚ Technological Innovations for Exploration and Conservation of Deep-sea Biodiversity: Bio-prospecting of deep-sea flora and fauna including microbes and studies on sustainable utilisation of deep-sea bio-resources will be the main focus.

- ✚ Deep Ocean Survey and Exploration: It will explore and identify potential sites of multi-metal Hydrothermal Sulphides mineralization along the Indian Ocean mid-oceanic ridges.

- ✚ Energy and Freshwater from the Ocean: Studies and detailed engineering design for offshore Ocean Thermal Energy Conversion (OTEC) powered desalination plants are envisaged in this proof of concept proposal.

- ✓ OTEC is a technology that uses ocean temperature differences from the surface to depths lower than 1,000 metres, to extract energy.

- ✚ Advanced Marine Station for Ocean Biology: It is aimed at the development of human capacity and enterprise in ocean biology and engineering.

- ✓ It will translate research into industrial application and product development through on-site business incubator facilities.

➤ **Significance of DOM**

- Leveraging Ocean Resources: Oceans, which cover 70% of the globe, remain a key part of our life. About 95% of the Deep Ocean remains unexplored. Three sides of India are surrounded by the oceans and around 30% of the country's population lives in coastal areas, the ocean is a major economic factor supporting fisheries and aquaculture, tourism, livelihoods and blue trade.

- ✓ Considering the importance of the oceans on sustainability, the UN has declared the decade, 2021-2030 as the Decade of Ocean Science for Sustainable Development.

- Long Coastline: India has a unique maritime position. Its 7517 km long coastline is home to nine coastal states and 1382 islands. The Government of India's Vision of New India by 2030 announced in February 2019 highlighted the Blue Economy as one of the ten core dimensions of growth.

- Technology Expertise: The technology and expertise needed in such missions are now available in only five countries - the US, Russia, France, Japan and China. India will now be the sixth country to have it.

➤ **What are other Blue Economy Initiatives**

- India-Norway Task Force on Blue Economy for Sustainable Development: It was inaugurated jointly by both the countries in 2020 to develop and follow up joint initiatives between the two countries.

- Sagarmala Project: The Sagarmala project is the strategic initiative for port-led development through the extensive use of IT-enabled services for the modernization of ports.

- O-SMART: India has an umbrella scheme by the name of O-SMART which aims at regulated use of oceans, marine resources for sustainable development.
- Integrated Coastal Zone Management: It focuses on the conservation of coastal and marine resources, improving livelihood opportunities for coastal communities etc.
- National Fisheries Policy: India has a National Fisheries policy for promoting the 'Blue Growth Initiative' which focuses on sustainable utilisation of fisheries wealth from marine and other aquatic resources.

ANSWER WRITING

Q. Analyze the impact of the pandemic on India's federal structure and the challenges faced by the Centre and the states in tackling the crisis. Discuss the measures taken by the government to strengthen inter-governmental coordination during the pandemic.

Introduction

The Covid-19 pandemic has had a significant impact on India's federal structure, affecting the balance of power between the central government and the states. The challenges faced by the Centre and the states in tackling the crisis have been numerous and have varied in severity across different regions of the country.

Body

Impact of pandemic on federal structure of the nation:

- One of the most significant impacts of the pandemic on India's federal structure has been the increased role of the central government in policy making and decision-making. The central government has been responsible for coordinating the national response to the pandemic, including the distribution of essential medical supplies, vaccines, and financial aid. This has led to some tensions between the Centre and the states, as some states have felt that the central government has not done enough to support them in their efforts to combat the pandemic.
- The pandemic has also highlighted existing inequalities between different regions of the country, particularly in terms of access to healthcare and economic opportunities. Some states have been better equipped to handle the pandemic than others, due to factors such as higher levels of investment in healthcare infrastructure, more diversified economies, and better governance. This has led to disparities in the level of support provided by the central government, with some states receiving more assistance than others.
- Another impact of the pandemic on India's federal structure has been the increased decentralization of decision-making and governance. The states have had to take on greater responsibility for managing the pandemic within their own borders, including implementing lockdowns, managing the healthcare system, and distributing vaccines. This has been a significant challenge for some states, particularly those with weaker healthcare infrastructure or limited financial resources.

The Indian government has taken several measures to strengthen inter-governmental coordination during the Covid -19 pandemic. Some of the key measures are:

- National Disaster Management Act (NDMA): The NDMA was invoked by the central government to coordinate the country's response to the pandemic. This act empowers the National Disaster Management Authority (NDMA) to take measures for the prevention of the spread of Covid -19.
- Formation of Empowered Groups: The central government formed Empowered Groups to coordinate with the states and UTs in various areas such as medical infrastructure, logistics, and information management. These groups provided guidelines to the states and ensured that they are following them.
- Regular Video Conferences: The Prime Minister of India regularly conducted video conferences with the Chief Ministers of all states and Union Territories to discuss the pandemic situation in their respective states. This allowed the central government to understand the challenges faced by the states and provide them with necessary support.
- Financial Assistance: The central government provided financial assistance to the states under the State Disaster Response Fund (SDRF) and National Disaster Response Fund (NDRF) for Covid -19 related activities. The government also announced an economic package of Rs. 20 lakh crores to provide relief to different sectors affected by the pandemic.
- Inter-State Movement of Goods and People: The central government coordinated the inter-state movement of essential goods and people during the pandemic. This was done by issuing standard operating procedures (SOPs) and guidelines for the movement of goods and people across different states.
- Vaccine Distribution: The central government has been coordinating the distribution of vaccines across the country. The government created a digital platform called CoWIN to register and schedule vaccination appointments. The vaccines were distributed to the states based on their population and the number of healthcare workers and frontline workers.

Conclusion

The pandemic has posed challenges for both the Centre and the states in India, with the need for national coordination and state autonomy being a balancing act. The government has taken measures to strengthen inter-

governmental coordination, but there is still room for improvement. Strengthening the federal structure and addressing existing inequalities are crucial for building a resilient and equitable society.

MCQs

1. With reference to Indian Space Policy, 2023 consider the following statements::
1. The operational part of ISRO's missions will be moved to the New Space India Limited (NSIL).
 2. Indian National Space Promotion and Authorization Center (IN-SPACE) will be the interface between Indian Space Research Organisation and non-governmental entities.
 3. The involvement of private sector in the space sector has been made limited to building satellites.

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
2. The Fair and Remunerative Price (FRP) of Sugarcane is approved by which of the following?
- a) **Cabinet Committee on Economics Affairs**
 - b) Commission for Agricultural Costs and Prices
 - c) Directorate of Marketing and Inspection, Ministry of Agriculture
 - d) Agricultural Produce Market Committee
3. With reference to Deep Ocean Mission consider the following
1. It aims to explore marine biodiversity for the sustainable use of resources
 2. It is overseen by the Ministry of Earth Sciences (MoES)
 3. A manned submersible will be developed to carry three people to a depth of 6,000 metres in the ocean

Which of the above statement/s is/are correct?

- a) 1 and 2 only
 - b) 2 and 3 only
 - c) 1 and 3 only
 - d) **1,2 and 3**
4. The Climate Vulnerability Index (CVI) is prepared by which of the following?
- a) **CEEW (Council on Energy, Environment and Water)**
 - b) UNFCC
 - c) UNEP
 - d) UNDP
5. With reference to O-SMART scheme, consider the following statements:
1. It is a flagship scheme of Ministry of Environment Forest and Climate Change.
 2. It aims to develop technologies and exploratory surveys for the sustainable harnessing of oceanic resources
 3. One of its sub-schemes is related to maintenance of research vessels.

Which of the statements given above is/are correct?

- a) 1 and 2 only
 - b) **2 and 3 only**
 - c) 1 and 3 only
 - d) 1,2 and 3
6. Kaliningrad province often seen in news is associated to which of the following country?
- a) Poland
 - b) Lithuania
 - c) **Russia**
 - d) Finland
7. Which of the following Ministry recently launched SAKSHAM Learning Management Information System?
- a) Ministry of Education
 - b) **Ministry of Health and Family Healthcare**
 - c) Ministry of Women and Child Development
 - d) Ministry of Micro Small and Medium Enterprises
8. Consider the following statements:
1. Ammonia is produced through the Haber-Bosch process.
 2. Ammonia produced using natural gas as a power source is considered to be green ammonia.

Which of the statements given above is/are correct?

- a) **1 only**
 - b) 2 only
 - c) Both 1 and 2
 - d) Neither 1 nor 2
9. With reference to Dhruv advanced light helicopter consider the following
1. It is indigenously designed and developed by DRDO.
 2. It is capable of operating in all-weather conditions and powered by twin shakti engines.

Which of the above statement/s is /are correct?

- a) 1 only
 - b) **2 only**
 - c) Both 1 and 2
 - d) Neither 1 nor 2
10. With reference to Thermobaric weapons, consider the following statements:
1. They use oxygen from the air for a large, high-temperature blast.
 2. There are no international laws specifically banning their use.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) **Both 1 and 2**
- d) Neither 1 nor 2