

DEFENCE❖ **India's fighter jet conundrum**

➤ **CONTEXT:** Against the sanctioned strength of 42 fighter squadrons, India today at 31 squadrons which won't go up in the next decade, but on the contrary can go further down by 2029, an Indian Air Force (IAF) representative informed the Parliamentary standing committee on defence as per a report tabled in Parliament recently. This sums up the conundrum faced by one of the world's largest Air Forces in modernising its fleet which has been beset with unending delays in procurement.

➤ **Phase-outs and orders**

- It must be noted that of the 31 squadrons at present, the three Mig-21 squadrons will be phased by 2025. Also, the Jaguars, Mirage-2000s and Mig-29s will begin going out by the end of the decade. For instance, by 2027-28 the first of the MIG-29s, inducted in the late 1980s, will start going out and by early 2040s, when most of these types will be phased out, some of the earlier batch of SU-30s will also start going out.
- The IAF has in total contracted 272 SU-30s. A deal to procure 12 additional SU-30MKIs to replace the ones lost in accidents as well 21 additional MIG-29s from Russia has been stuck, though both IAF and Russian officials state that it has only been delayed but is on track.
- India has an ambitious plan lined up for the acquisition of over 500 fighter jets, a bulk of them to be indigenously designed and manufactured, with a majority of them being for the IAF. However, these are at various stages of development. Their manufacturing and timely deliveries are critical.
- Even with the LCA-Mk1A, LCA-Mk2 and the MRFA India will still be at 35-36 (squadrons) by middle of next decade.(2030-2040)
- Apart from the new inductions planned, the IAF is confident that increasing the low availability rates of Su-30 and other fighters in service will offset some of the shortfall in the interim. However, that could be potentially impacted due to the Ukraine war, which has already affected payments to Russia for deals underway as well as delays and uncertainty in timely supply of spares for equipment in service.

➤ **Indigenous fighter ecosystem**

- The LCA which is the fulcrum of the indigenous jet development programme, originally intended as a Mig-21 replacement, has seen a series of delays and has now come back on track. The LCA achieved Initial Operation Clearance (IOC) in December 2013 and Final Operational Clearance (FOC) in February 2019.
 - ✓ The IAF had earlier signed two contracts with Hindustan Aeronautics Limited (HAL), for 20 IOC configuration aircraft including four IOC trainers on March 31, 2006 and for 20 FOC configuration jets along with four trainers on December 23, 2010.
 - ✓ On this, the IAF representative noted that they were supposed to get the 40 LCA from HAL much earlier but they are getting them now. Even now, IAF's two aircraft short of 40.
- Two decades since the first flight, in February 2020, the Defence Ministry signed a ₹48,000 crore deal with HAL for 83 LCA-MK1A. According to HAL the project is on track to begin deliveries from February 2024. HAL will be delivering the first three aircraft in 2024 and 16 aircraft per year for the subsequent five years. In march 2023 HAL inaugurated the third LCA assembly line, with the need now being to ramp up production rate.
 - ✓ In addition to the LCA-MK1A, an even more capable and a larger LCA-MK2, which received sanction from the Cabinet Committee on Security (CCS) in September 2022 at a total cost of ₹9000 crore, is expected to be ready for production by 2027.
 - ✓ Moreover, the fifth generation Advanced Medium Combat Aircraft (AMCA) is awaiting CCS sanction, the development of which would take 10 years after that, according Aeronautical Development Agency (ADA). The project cost of AMCA is estimated to be around ₹15,000 crore.
- The LCA-MK2 will be similar to the Mirage-2000 in terms of capability and will be an important fillip as several jets currently in service begin going out.
 - ✓ There is also a Twin Engine Deck Based Fighter (TEDBF) on the drawing board for the Navy's aircraft carriers. Aeronautical Development Agency looking at six squadrons of LCA-Mk2, seven squadrons of AMCA and upto 100 TEDBF.
- At Aero India, HAL expect an additional order for upto 50 LCA-Mk1A. A squadron typically has 18 aircraft. The TEDBF is expected to take first flight by 2026 and be ready for production by 2031. Indian Navy may get upto 45 TEDBF by 2040. For the Navy, a decision for 26 carrier based fighters is expected shortly, a contest between Boeing F/A-18 E/F Super Hornet and the Dassault Aviation Rafale-M.
- The other critical programme, the MRFA, is a reincarnation of the earlier Medium Multi-Role Combat Aircraft (MMRCA) contest for 126 jets.
 - ✓ The MMRCA began when the Request for Information (RFI) was issued in 2007 and dragged on for a decade only to end up in knots and give way to the emergency procurement of 36 Rafale jets, earlier shortlisted under the MMRCA, under a €7.87 billion deal with France.

- ✓ The RFI for 114 MRFA was issued in April 2019 to global aircraft manufacturers but there has been no progress and the project is yet to receive the Acceptance of Necessity (AoN), the starting point of the procurement process.
- ✓ Given the huge budgetary outlays committed for the indigenous programmes, it has to be seen how the finances for the MRFA, which involves the manufacturer to set up plant in India, would be managed.
- **Evolution of the LCA**
 - While the LCA project did see long delays, it has also evolved in tune with the changing technological requirements. It was conceived in the 90s', but what the IAF is flying today is very different from what was actually conceived at that point of time.
 - According to the IAF, what was envisioned in the beginning and what they are flying today are two different architectures. The one they flying today is called federated architecture. Further, the House panel was informed that as far as avionics, airframe and other parts are concerned, we are very close to where the world is, except for some technologies like actuators, which are undergoing flight testing at the moment, according to the IAF. Also, critical technologies like flyby wire are not shared by anyone and were developed indigenously over time.
 - Stressing on indigenisation, the Air Force submitted before the standing committee, If India keep buying them from the open market in the world, India will never become self-reliant. So, it need to give a push to own industry also.

ECONOMICS

❖ **What are the challenges India faces in assuring resilient critical minerals supply chains?**

➤ **CONTEXT: A recent working paper from Centre for Social and Economic Progress (CSEP) extends the earlier minerals assessment for 23 minerals by assessing the criticality levels of 43 select minerals for India based on their economic importance (demand-side factors) and supply risks (supply-side factors) which are determined through the evaluation of specific indicators.**

- Critical minerals refer to mineral resources, both primary and processed, which are essential inputs in the production process of an economy, and whose supplies are likely to be disrupted due to the risks of non-availability or unaffordable price spikes. To tackle such supply risks, major global economies periodically evaluate which minerals are critical for their jurisdiction through a quantitative assessment.
- Minerals such as antimony, cobalt, gallium, graphite, lithium, nickel, niobium, and strontium are among the 22 assessed to be critical for India. Many of these are required to meet the manufacturing needs of green technologies, high-tech equipment, aviation, and national defence.
- However, while India has a significant mineral geological potential, many minerals are not readily available domestically.
- Hence, India needs to develop a national strategy to ensure resilient critical minerals supply chains, which focuses on minerals found to be critical in this study.

➤ **What are the challenges?**

• India faces global and domestic challenges in assuring resilient critical minerals supply chains. On the international front, there currently exist four significant risks.

- ✓ **First**, China, the most dominant player in the critical mineral supply chains, still struggles with Covid-19-related lockdowns. As a result, the extraction, processing and exports of critical minerals are at risk of slowdown.
- ✓ **Second**, Russia is one of the significant producers of nickel, palladium, titanium sponge metal, and the rare earth element scandium. Ukraine is one of the major producers of titanium. It also has reserves of lithium, cobalt, graphite, and rare earth elements, including tantalum, niobium, and beryllium. The war between the two countries has implications for these critical mineral supply chains.
- ✓ **Third**, as the balance of power shifts across continents and countries, the critical mineral supply chains may get affected due to the strategic partnership between China and Russia. As a result, developed countries have jointly drawn up partnership strategies, including the Minerals Security Partnership (MSP) and G7's Sustainable Critical Minerals Alliance, while developing countries have missed out.
- ✓ **Fourth**, manufacturing renewable energy technologies would require increasing quantities of minerals, including copper, manganese, zinc, and indium. Likewise, the transition to electric vehicles would require increasing amounts of minerals, including copper, lithium, cobalt, and rare earth elements.
- However, India does not have many of these mineral reserves, or its requirements may be higher than the availability, necessitating reliance on foreign partners to meet domestic needs.

➤ **What is the way forward?**

- On the domestic front, while India has a geological potential similar to mining-rich Western Australia, much still needs to be explored. India faces four significant challenges to enable their sustainable extraction.

- ✦ **First**, many critical and strategic minerals constitute part of the list of atomic minerals in the Mines and Minerals (Development and Regulation) (MMDR) Act, 1957.
 - ✓ However, the present policy regime reserves these minerals only for public sector undertakings. Some of these are minerals and ores bearing beryllium, lithium, niobium, titanium, tantalum, zirconium, beach sand minerals, and rare earth group minerals containing uranium and thorium.
- ✦ **Second**, given the increasing importance of critical and strategic minerals, there is an imperative need to create a new list of such minerals in the MMDR Act. The list may include minerals such as molybdenum, rhenium, tungsten, cadmium, indium, gallium, graphite, vanadium, tellurium, selenium, nickel, cobalt, tin, the platinum group of elements, and fertiliser minerals such as glauconitic, potash, and phosphate (without uranium).
 - ✓ These minerals must be prospected, explored, and mined on priority, as any delays may hinder India's emissions reduction and climate change mitigation timeline.
- ✦ **Third**, the reconnaissance and exploration of minerals must be encouraged, with particular attention given to deep-seated minerals. This will call for a collective effort by the government, 'junior' miners, and major mining companies.
- ✦ **Fourth**, an innovative regime must be devised to allocate critical mineral mining assets, which adequately incentivises private explorers, including 'junior' explorers.
 - ✓ Given the long lead times of setting up new exploration, extraction, and processing activities, these issues must be addressed soon if India is to utilise its natural wealth for its manufacturing needs.
- ✦ **Fifth**, India needs to determine where and how the processing of minerals and assembly of critical minerals-embedded equipment will occur. Currently, India relies on global supplies of various processed critical minerals, as there are limited domestic sources.
- India requires a critical minerals strategy comprising measures aimed at making the country AatmaNirbhar (self-reliant) in critical minerals needed for sustainable economic growth and green technologies for climate action, national defence, and affirmative action for protecting the interests of the affected communities and regions.
- In addition, India must actively engage in bilateral and plurilateral arrangements for building assured and resilient critical mineral supply chains.
- Furthermore, the assessment of critical minerals for India needs to be updated every three years to keep pace with changing domestic and global scenarios.
- A national critical minerals strategy for India, underpinned by the minerals identified in this study, can help focus on priority concerns in supply risks, domestic policy regimes, and sustainability.

PRELIMS

1. Hakki Pikki people

➤ **CONTEXT:** More than 181 members of the Hakki Pikki tribal community from Karnataka are stuck in violence-hit Sudan, even as the government is making efforts to bring them back.

➤ **Who are the Hakki Pikki?**

- The Hakki Pikki is a tribe that lives in several states in west and south India, especially near forest areas. Hakki Pikki (Hakki in Kannada means 'bird' and Pikki means 'catchers') are a semi-nomadic tribe, traditionally of bird catchers and hunters.
- According to the 2011 census, the Hakki Pikki population in Karnataka is 11,892, and they live majorly in Davangere, Mysuru, Kolar, Hassan and Shivmogga districts. In different regions, they are known by different names, such as Mel-Shikari in northern Karnataka and Maharashtra.
- According to anthropologist the Hakki Pikki move in groups from place to place in search of livelihood. They are divided into four clans, called Gujaratia, Panwar, Kaliwala and Mewaras. These clans can be equated with castes in the traditional Hindu society. In the olden days, there was a hierarchy among the clans, with the Gujaratia at the top and the Mewaras at the bottom. The forest is the main natural resource of the Hakki Pikki."

➤ **Where do they live?**

- Hakki Pikki people are believed to hail originally from the bordering districts of Gujarat and Rajasthan.
- To Karnataka, they seem to have arrived via Andhra Pradesh, as they still remember a place called Jalapally near Hyderabad as their ancestral home, where their forefathers lived for a considerable period. They are now spread across south India.
- Till a few years ago, women used to wear the ghagra (skirt) common in Rajasthan, although now they wear saris and other garments.

➤ **What were their traditional jobs, and what do they do now?**

- Traditionally, Hakki Pikkis lived in forest areas, leading a nomadic life for nine months a year and coming back to their permanent camps for three. Locals in Pakshirajapura, a Hakki Pikki village in Mysuru district men of

the tribe would hunt while women begged in villages. But as the wildlife protection laws became stricter, the Hakki Pikkis in Karnataka started selling spices, herbal oils, and plastic flowers in local temple fairs.

- The community moved to villages from the forests in the 1950s. Earlier they killed animals to make a living. But then some of community members were booked and jailed under wildlife laws. So they shifted to selling herbal oils and other materials in villages and towns.
- The herbal oil business took off, and now the tribe members go to many places across the globe to sell their products.
- the Hakki Pikkis in Tamil Nadu travelled to Singapore, Thailand and other places about 20-25 years ago to sell some marbles, in the process discovering there was a huge demand for Ayurvedic products in the African continent. They started selling their products in Africa, and Karnataka Hakki Pikkis followed them. People from the state have been traveling to African countries for the past 20 years now.
- Education levels among the Hakki Pikkis are still low. For example, in the 2,000-strong population of Pakshirajapura, only eight people have completed graduation-level courses and one person works as a police constable.
- **What are their rituals and customs?**
- Hakki Pikkis in Karnataka follow Hindu traditions and celebrate all Hindu festivals. They are non-vegetarians. The eldest son in a family is not supposed to cut his hair so that he can be identified easily.
- The tribe prefers cross-cousin marriages. the usual age of marriage is 18 for women and 22 for men. The society is matriarchal. Monogamy is the norm.
- **How well do they earn in African countries?**
- African countries offer them an opportunity to escape poverty faster.
- ✓ There is demand for products in the African continent. If a person invests lakh on raw materials (hibiscus powder, oil extraction, gooseberry, Ayurvedic plants, etc.), they have a chance to double or triple it in a matter of 3-6 months in African countries.

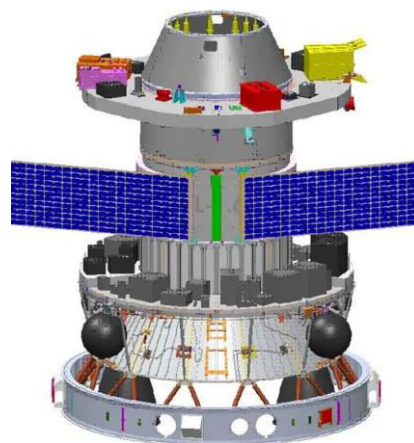
PRELIMS

2. EXERCISE INIOCHOS-23

- **CONTEXT: At the multi-national air exercise known as INIOCHOS-23, which the Hellenic Air Force will host, participants from the Indian Air Force (IAF) will be present. From the 24th of April until the 4th of May, 2023, the training will be conducted at the Andravida Air Base in Greece.**
- The Indian Air Force will send two Su-30 MKIs and four C-17s to participate in the exercise. This will be the third exercise that the IAF will be taking part in simultaneously.
- The purpose of the exercise is to strengthen international collaboration, synergy, and interoperability among the air forces that are participating. The training will be conducted in a scenario that is representative of actual warfare and will involve a variety of air and surface forces. In addition to that, it will make it possible for the participating contingents to communicate in a professional setting and get valuable insight into each other's most effective procedures.
- Other participants include France with its Rafale jets, the United States of America with its F-16 jets and MQ-9 drones, Jordan with its F-16 jets, Spain with its EF-18 aircraft, Italy with its Tornado aircraft, Cyprus with its AW139 helicopter, Saudi Arabia with its F-15 jets, Slovenia with its PC-9 aircraft, Austria with its Intelligence personnel and Canada with its Air Traffic Controllers.
- The realistic exercises will be conducted in a large area with various geomorphological features, and the drill is one of the most competitive in Europe and the Mediterranean.

3. PSLV-C55 mission

- **CONTEXT: The Indian Space Research Organisation (ISRO), which is scheduled to launch the Polar Satellite Launch Vehicle C55 (PSLV-C55) mission on April 22 2023, will carry out in-orbit scientific experiments by using the spent PS4 (fourth and final stage of PSLV) as an orbital platform.**
- The PSLV-C55 will have Singapore's TeLEOS-2 as primary satellite and Lumelite-4 as a co-passenger satellite.
- The PSLV-C55 mission has the PSLV Orbital Experimental Module (POEM), where the spent PS4 of the launch vehicle would be utilised as an orbital platform to carry out scientific experiments through non-separating payloads.
- This is the third time that PS4 will be used after satellite separation as a platform for experiments.
- According to the space agency, the POEM has seven experimental



non-separable payloads.

- The PSLV-C55 mission is a dedicated commercial mission.
- The TeLEOS-2 and Lumelite-4 satellites are intended to be launched into an eastward low inclination orbit.
- The ISRO said that the TeLEOS-2 satellite is developed under a partnership between DSTA (representing the Government of Singapore) and ST Engineering.
 - ✓ Once deployed and operational, it will be used to support the satellite imagery requirements of various agencies within the Government of Singapore.
- The TeLEOS-2 will be able to provide all-weather day and night coverage, and be capable of imaging at 1m full-polarimetric resolution.

4. **Sloth Bear**

➤ **CONTEXT:** it was in news for its conflicts with human habitat in Thiruvananthapuram district.

➤ **About**

- Sloth bears are found in Sri Lanka, India, Bhutan and Nepal, predominantly in lowland areas.
- Sloth bears primarily eat termites and ants, and unlike other bear species, they routinely carry their cubs on their backs.
- They are also very fond of honey, hence their alternative name of “honey bear”.
- Sloth bears do not hibernate.
- Scientific Name: *Melursus ursinus*
- Habitat: It is a forest-dwelling member of the family Ursidae (comprises 8 species of bears) that inhabits tropical or subtropical regions of India and Sri Lanka.
- Protection Status:
 - ✓ IUCN Red List: Vulnerable
 - ✓ CITES listing: Appendix I
 - ✓ Indian Wildlife Protection Act, 1972: Schedule I
- Threats: Habitat loss, poaching for body parts and are sometimes captured for use in performances or hunted because of their aggressive behavior and destruction of crops.



ANSWER WRITING

Q. Examine how the partnership between India and the UAE can strengthen regional food security for the global south.

As countries around the world cope with supply shortages of staple foods, India and the United Arab Emirates are coming together for strengthening food security by creating food corridor and food parks. The UAE is focusing on the twin objectives of food access and readiness to confront supply chain crises and India, the world's second-largest food producer, is an essential partner in the UAE's ambition to strengthen food security. The India-UAE partnership stands to benefit from multiple points of convergence and can strengthen food security in the southern rim of Eurasia.

India-UAE capabilities in strengthening regional food security:

- UAE's investments in the food sector in India: During the I2U2 (India, Israel, the United Arab Emirates and the United States) summit, the UAE committed \$2 billion in investment towards constructing food parks in India (in Madhya Pradesh and Gujarat).
- Food security corridor initiative under CEPA: The food corridors to be established under the India-UAE comprehensive economic partnership agreement (CEPA) seeks to address the food security challenge in a holistic manner and aims at achieving three main goals:
 - ✓ Increasing crop yield in India.
 - ✓ Enhancing Indian farmer's incomes by supplying them with high-quality seeds, equipping them with the best possible and emerging agri-tech facilities and marketing their agricultural products at better rates.
 - ✓ To maintain export quality standards to cater to the South Asian and Middle Eastern markets.
- Development of food processing value chain: Business conglomerates in Abu Dhabi for e.g., the Lulu Group is planning to invest \$8 million in setting up cold storage and sorting facilities in the Union Territory of Jammu & Kashmir to facilitate the export of fruits and vegetables grown in the state. This will lead to the development of a food processing value chain and will enhance export capabilities.
- Food assistance to countries facing food crises: India has in recent years acted as a humanitarian provider of food to developing countries. The UAE-India partnership can further strengthen food security in the entire Middle-East North African region.

- This is particularly important as The Food and Agricultural Organizations' (FAO) report of 2022 stated that of the 50 countries direly affected by food crisis due to the ongoing war, 10 are in the Middle East and North Africa, namely, Lebanon, Egypt, Oman, Syria, Saudi Arabia, Yemen, Tunisia, Iran, Jordan and Morocco.
- Other benefits for the food sector: UAE's investments in India will improve the certainty of supplies and improve productivity and efficiency in the Indian food sector landscape. For e.g.: The Dubai Multi Commodities Centre, the UAE's largest free trade zone, launched Agriota, an agri-trading and commodity platform to link Indian farmers to food companies in the UAE.

Therefore, India's G-20 presidency offers an opportune moment for both India and the UAE to showcase viable strategies and frameworks that can forge the basis of food security in the Global South. As it sets the global developmental agenda, India can look to leverage and strengthen trade pathways with the UAE to forge a sustainable, inclusive, efficient, and resilient future of food.

MCQs

- Consider the following with reference to Cabinet Committee on Security (CCS)
 - The CCS of the Central Government decides on India's defence expenditure, matters of National Security, and makes significant appointments.
 - It is chaired by Minister of Defence
 - The National Security Adviser has also been attendees of the CCS meetings.

Which of the above statement/s is/are not correct?

a) 1 only b) 2 and 3 only c) 1 and 3 only **d) 2 only**
- With reference to MiG 21 fighter jet consider the following statement
 - It is a supersonic jet fighter
 - India plans to phase out all four MiG-21 squadrons by 2025.
 - The high rate of accidents earned the aircraft the nickname of 'Flying Coffin'.

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**
- With reference to Minerals Security Partnership (MSP) consider the following
 - It is a US-led partnership initiative that aims to bolster critical mineral supply chains.
 - Only the NATO members are eligible to join the initiative

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
- "Sustainable Critical Minerals Alliance" often mentioned in news is associate with which of the following?

a) G20 **b) G7** c) European Union d) Nordic Countries
- Which of the following is/are fertiliser minerals?
 1. Glauconitic 2. Potash 3. Phosphate 4. Molybdenum 5. Rhenium

Choose the correct answer using the codes given below?

a) 1,2,4 and 5 only b) 2,3 and 5 only c) 1,2 and 4 only **d) 1,2 and 3 only**
- Hikki Pikki tribe recently seen in news is a scheduled tribe of which of the following state?

a) Karnataka b) Odisha c) Gujarat d) Kerala
- With reference to EXERCISE INIOCHOS-23 consider the following
 - It is a multi-national Navy exercise hosted by the Greece
 - This is for the first time that the Indian Navy will be taking part in it.

Which of the above statement/s is/are not correct?

a) 1 only b) 2 only **c) Both 1 and 2** d) Neither 1 nor 2
- Consider the following statements Polar Satellite Launch Vehicle C55 (PSLV-C55) mission
 - This is a dedicated commercial mission through New Space India Limited
 - TeLEOS-2 as primary satellite and Lumelite-4 as a co-passenger satellite both belong to Singapore.

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
- Consider the following statement/s is/are correct regarding sloth bear
 - They are endemic to Indian sub continent
 - Sloth bears do not hibernate.
 - They are protected under schedule 1 of the Indian subcontinent.
 - They are also known as the least researched bear species.
 - The first World Sloth Bear Day was observed recently on January 12, 2023

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

a) 1,2 and 3 only b) 2,3 and 4 only c) 3,4 and 5 only **d) 1,2,3 and 4 only**
- Navej Singh Johar case often mentioned in news is related to which of the following?

a) Decriminalisation of consensual sex among adults, including homosexual sex

b) The Karnataka government to revoke the four percent reservation for Muslims in the state.

c) Agneepath Scheme

d) Rafale fighter jet