17th Jan, 2025

1. Eighth Pay Commission
GS 2 (Governance)

- **Why in News:** The government has approved the formation of the Eighth Pay Commission for central government employees.
- **What is the 8th Pay Commission?**
  - The Pay Commission is responsible for determining the salaries, allowances, and pensions of central government employees and pensioners.
  - It plays a crucial role in setting the financial terms for the workforce of the government.
  - The recommendations made by the Pay Commission generally lead to increased salariesand other benefits.
  - **Timeline for the 8th Pay Commission:**
    - The 7th Pay Commission was implemented in 2017, and its recommendations were effective until 2026.
    - The 8th Pay Commission will be formed before 2026, and its recommendations are expected to be implemented from January 1, 2026.
  - **Impact of the 8th Pay Commission:**
    - The 8th Pay Commission will benefit approximately 4.5 million central government employees and 6.8 million pensioners, including defence personnel.
    - In Delhi alone, about 400,000 employees (including those from the Delhi government) will also be affected.
    - This move is also timed strategically before the Delhi Assembly elections on February 5, which could have political and economic significance.
    - The increased expenditure due to the pay commission is expected to lead to a boost in consumption, stimulating economic growth, just like the 7th Pay Commission did, which resulted in an increase of Rs 1 trillion in expenditure.

PM approves constitution of Eighth Pay Commission

The Hindu Bureau
NEW DELHI

Days ahead of the Delhi Assembly election, the Union government approved the establishment of the Eighth Pay Commission here on Thursday, accepting a demand of the central trade unions and employees' organisations.

The commission's outcome will benefit about 50 lakh Union government employees and 65 lakh pensioners.

Union Minister Ashwini Vaishnaw said the Chairperson and two members of the commission would be appointed soon.

2. An Alliance of Democracies, With India at its Core
GS 2 (International Relations)

- **Why in News:**
  - The **year 2024, marked by critical elections worldwide**, set the stage for 2025 to become a pivotal moment for democracies to regroup and strengthen their alliances.
  - Among these, **the relationship between Europe and India stands out as an essential partnership** that has long been rich in strategies but **poor in tangible outcomes.**

An alliance of democracies with India at its core

Anders Fogh Rasmussen
served as North Atlantic Treaty Organization (NATO) Secretary General from 2009-14 and was the Prime Minister of Denmark from 2001-09

Europe and India need a more practical relationship; together, Europe, India and the United States can be unstoppable

The year 2024 was the super-election year around the world, and 2025 must be the year when the world's democracies regroup and find new ways to support each other. Nowhere is this truer than in the relationship between Europe and India, a partnership that, for too long, has been big on strategies, but small on delivery. For nearly 17 years, European Union (EU)-India relations were seen through the prism of on/off Free Trade Agreement negotiations. As a free trader, I believe that the benefits of the world's biggest democracy and its largest trading bloc coming together to buck protectionist headwinds would be an economic and geopolitical game-changer.

Look at the bigger picture

However, we cannot be naive to the hurdles ahead. If a big-bang trade deal eludes us in the short term, we should develop another track away from the negotiators and bureaucrats. Fixed firmly at the highest political levels, it would focus on bigger picture geostrategic issues such as economic security, defence cooperation and a common agenda for space, emerging technology, and critical industry sectors such as pharmaceuticals.

On the geopolitical level, Europe was undoubtedly frustrated with India's response to Russia's invasion of Ukraine and continued close ties. These ties are historic. Conversely, India has broad rivalry with China, despite cooperation through the BRICS group and a substantial trading partnership. As a growing economy I can understand why India would not want to be sucked into power competition as the world divides into democratic and autocratic blocs. However, fundamentally, India is a democracy and its entanglement with Moscow and Beijing is unnatural. In the same vein, India's accusations of double standards from Europe are not without substance. We cannot demand that India severs all ties with Russia without also addressing our own economic dependence on China.

A restart in relations should, therefore, start with a common assessment that Russia and China – with their 'No Limits' partnership – are both a threat to the global democratic world which includes India, Europe and the United States. What happens in the Atlantic affects the Indo-Pacific and vice versa.

On this basis we should focus on a series of practical measures to break down barriers to trade and investment piecemeal while strengthening our joint security, including economic security. This will include reducing dependencies on China in areas such as critical raw materials and developing new supply chains, with Europe seeing India as a 'Trusted Partner'.

Defence and trade

In defence, India and the U.S. already enjoy strong defence cooperation, with India being America's 'Major Defence Partner' and a member of the 'Quad' – sometimes referred to as the 'Asia-Pacific NATO'. Europe should support the continued development of this security alliance to give India more security guarantees.

EU-India defence discussions have increased but should accelerate to a high political level as Europe looks to bring much-needed investment into our industries, which can also offer India better weapons than Russia. The EU's new dedicated Defence Commissioner should visit India at the earliest opportunity and develop more collaboration, in defence and in space where both the EU and India have ambitious plans.

India and the EU have in place a Trade and Technology Council (TTC) to mirror a similar council with the Biden administration. Whether the EU-U.S. TTC survives President Donald Trump is unclear, but the EU-India Council has not reached its potential, especially in coordinating a technology agenda. Here, we can also draw inspiration from India's ties with the U.S., where the U.S.-India initiative on Critical and Emerging Technology (iCET); iCET is promoting collaboration at the National Security Adviser level.

The Australian Strategic Policy Institute illustrates the scale of the challenge. It tracks the top 64 emerging technologies. In 57 of them, China is winning the global race. The U.S. is hot on its heels. However, India is also emerging as a key centre of global research innovation, with many other European countries also still in the running. Individually, we are doing okay in this existential race, but by combining forces, the free world can jump ahead to lead the world in all emerging technology, from quantum computing to advanced biotech. We must not hand victory to China.

In perspective

Europe and India should focus on a far more practical relationship built on tangible connections, including stronger people-to-people ties. For Europe, the benefits are obvious: India will become the world's third largest economy in the next decade, at a time when European global GDP share continues to fall. But there is a wider prize: forming an alliance of democracies that has India at its core.

If Europe wants to anchor India in that alliance, we need to change our approach to the subcontinent. That does not mean brushing differences or difficulties under the table. India has many challenges to its democracy, but so does Europe. We should seek to address them together. Europe, India and the United States are individually powerful, but, together, we are unstoppable against the united autocrats.

- **Both entities must seize the opportunity to redefine their collaboration**, focusing on practical measures that align economic, technological, and security interests.

- **The First Step Towards Redefining EU-India Relations**
  - **Moving Beyond Trade Negotiations**
    - **For nearly two decades, EU-India relations have been primarily defined by the pursuit of a Free Trade Agreement (FTA),** with little progress to show.
    - While such an agreement between the world's largest democracy and the EU, **the largest trading bloc, could be transformative, hurdles persist.**
    - The **focus must shift from the technicalities of trade negotiations to higher-level strategic priorities.**
    - These **include economic security, defence cooperation, and partnerships in emerging technology and critical industries** like pharmaceuticals and space exploration.
  - **A Shared Understanding of Geopolitical Realities**
    - **India's historical ties with Russia** and pragmatic engagement with China **have often frustrated Europe,** especially in light of Russia's invasion of Ukraine.
    - However, **India's approach reflects its broader aim to avoid being drawn into the binary division** of democratic versus autocratic blocs.
    - While its democratic foundations make its alignment with Moscow and Beijing seem incongruous, **Europe must acknowledge its own double standards**, particularly its economic reliance on China.
    - **A reset in EU-India relations requires a shared understanding of the challenges** posed by the Russia-China partnership.
    - **Both are strategic threats to the global democratic order**, making it imperative for India, Europe, and the United States to align their priorities.
    - **Recognising the interconnectedness of events in the Atlantic and Indo-Pacific regions, Europe and India must take concrete steps** to enhance trade and security while reducing dependence on China.

- **Some Other Crucial Areas for India-EU Cooperation**
  - **Strengthening Defence and Security**
    - **India's strong defence ties with the United States,** particularly as a 'Major Defence Partner' and member of the Quad, **provide a model for Europe.**
    - **The EU should enhance its own defence collaboration with India,** offering advanced technologies and investments in place of Russia's outdated options.
    - **Appointing a dedicated EU Defence Commissioner to engage with India could accelerate progress** in this domain.
    - **Space exploration is another area** of potential cooperation, given the ambitious plans of both the EU and India.
    - By **developing joint ventures and shared investments in this field, the partnership can achieve significant breakthroughs**, further solidifying their strategic alignment.
  - **Leveraging Technology Collaboration**
    - The **establishment of the EU-India Trade and Technology Council (TTC) mirrors similar initiatives with the United States,** such as the U.S.-India Critical and Emerging Technology initiative (iCET).
    - **These frameworks are essential for coordinating technology agendas and tackling global challenges,** particularly in emerging technologies like quantum computing and advanced biotech.
    - The **competition in these sectors is intense, with China leading in 57 of the top 64 emerging technologies**, according to the Australian Strategic Policy Institute.
    - **India and Europe, alongside the U.S., must pool resources** and expertise **to maintain their competitive edge.**
    - By **focusing on collaborative research and innovation, these democratic partners can position themselves as global leaders** in critical technologies.

- **The Way Forward to a Robust EU-India Partnership**

- **Strengthening Economic Ties**
  - The **economic potential of an EU-India partnership is immense**. **India is on track to become the world's third-largest economy** in the next decade, offering a dynamic market for European businesses seeking growth beyond their borders.
  - Conversely, **Europe's advanced industrial capabilities and access to cutting-edge technology provide India with opportunities to modernise its economy** and industries.
  - **To facilitate these opportunities, both parties must break down barriers** to trade and investment.
  - The **EU and India should prioritise sectors with mutual benefits**, such as green energy, pharmaceuticals, advanced manufacturing, and digital innovation.
- **Deepening Cultural and Educational Exchanges**
  - **Europe and India must enhance cultural, academic, and professional exchanges** to build trust and mutual understanding.
  - **Programs that promote student and faculty exchanges between European and Indian universities can create a generation of leaders** with firsthand knowledge of both regions.
  - **Similarly, professional training programs and labour mobility agreements can address skills gaps in Europe** while providing employment opportunities for India's vast pool of talented professionals.
  - **Facilitating visa access and streamlining processes** for work and study permits **will further encourage these exchanges.**
- **Enhancing Collaboration on Global Challenges**
  - The EU and India share common concerns about climate change, public health, and global security, **making collaboration on these issues a practical necessity.**
  - For example, **joint initiatives in renewable energy development can help accelerate the transition to a green economy.**
  - **Europe's leadership in clean technologies, coupled with India's ambitious renewable energy targets**, offers a perfect opportunity for collaboration.
  - In public health, **the COVID-19 pandemic underscored the importance of global partnerships in developing and distributing vaccines.**
  - **India, as a pharmaceutical manufacturing powerhouse, and Europe**, with its strong research and regulatory infrastructure, **can work together to improve global health security.**
- **Creating a Model Partnership**
  - **The ultimate goal of building practical connections is to create a model partnership** that other democracies can emulate.
  - By demonstrating how regions with different historical and cultural contexts can work together effectively, **Europe and India can inspire other nations to forge similar alliances.**
  - **In this effort, both sides must commit to regular engagement at all levels**—political, economic, and social.
  - **High-level summits, business forums, and cultural festivals should be complemented by grassroots initiatives** that connect communities and individuals.
  - This **multi-level approach will ensure that the EU-India partnership is not just a strategic alliance but a living, dynamic relationship grounded in mutual respect** and shared aspirations.
- **Bridging Democratic Challenges**
  - **Both Europe and India face challenges** in maintaining and **strengthening their democratic institutions.**
  - **By working together, they can learn from each other's experiences** and develop strategies to address issues like polarization, misinformation, and the erosion of civil liberties.
  - F**orums for democratic dialogue, including joint research initiatives** and policy workshops, **can create mutual learning and innovation in democratic governance.**

- **Conclusion**
  - **Europe, India, and the United States are individually influential, but their collective power is unparalleled** in countering autocratic forces.
  - **By prioritising strategic cooperation in defence, technology**, and economic security, the **EU-India partnership can evolve into a cornerstone of global democratic stability.**
  - This is **not just a necessity for these regions but a vital step in shaping a future where democracies lead the way.**

3. India and Singapore deepening cooperation in Semiconductors
GS 2 (International Relations)

- **Why in News:** Singapore's President, Tharman Shanmugaratnam, recently visited India, focusing on strengthening bilateral ties and exploring new initiatives in key sectors like technology and manufacturing.
- **Key-highlights of the Visit**
  - Singapore's President visited India to mark the **60th anniversary of diplomatic relations between the two countries.** He is focusing on strengthening ties, especially in the eastern states of India, like Odisha and Assam.
  - During his visit, the President underscored the growing partnership between Singapore and India, which has been upgraded to a "Comprehensive Strategic Partnership." This move reflects the desire to deepen cooperation in multiple sectors, including renewable energy, digital technologies, and advanced manufacturing.
  - **Semiconductor Cooperation:** Singapore is looking to help India build a semiconductor ecosystem, including advanced manufacturing and technological solutions. The collaboration aims to enhance India's capabilities in the semiconductor industry, an area of growing global importance.
  - **Digital and Financial Cooperation:** Singapore and India are also exploring a **data corridor between Gujarat's Gift City and Singapore.** This initiative will allow their financial institutions to safely exchange data, enhancing economic and technological collaboration.

Singapore to help India's semiconductor industry

President Tharman Shanmugaratnam says Singapore and India are exploring opportunities for manufacturing semiconductor chips in the country in the 60th year of diplomatic relationship

Kallol Bhattacherjee
NEW DELHI

Singapore is exploring new initiatives such as manufacturing of semiconductors and building a semiconductor ecosystem in India and participating in the creation of a new generation of technological solutions, the city-state's President, Tharman Shanmugaratnam, said on Thursday.

The visiting dignitary recounted his 2022 visit to India as the Senior Minister of Singapore when he toured Assam and announced that this time he is focusing on Odisha.

"We will never forget India was one of the first countries to recognise Singapore's independence in 1965. It's a natural partnership between a small country - Singapore - and a very large country - India. In a whole range of areas, our business relationships are thriving," said Mr. Shanmugaratnam highlighting that Singapore has been the "largest investor in India for many years now".

Prime Minister Narendra Modi with Singapore President Tharman Shanmugaratnam at the Rashtrapati Bhavan. SUSHIL KUMAR VERMA

Data corridor

"We are also exploring other initiatives in the digital space. We are exploring possibility of a data corridor between Gift City and Singapore so that our financial institutions can exchange data on a safe and trusted basis," he said after the official welcome accorded to him at the forecourt of the Rashtrapati Bhavan.

He mentioned the two sides were working in the areas such as renewable energy and spoke about India's "high ambition" for the eastern states such as Odisha and Assam.

The visiting President spoke about the "natural advantages" of the eastern States such as availability of natural resources and the desire among the people to develop in "logistics, connectivity, and petrochemicals". "We are now on a new trajectory with India with the upgrade of our relations to a Comprehensive Strategic Partnership which was announced during Prime Minister Modi's last visit to Singapore in September last year. We are working on cooperating with advanced manufacturing and semiconductors - helping to build up a semiconductor ecosystem in India," the Singapore President said in his remarks to the media.

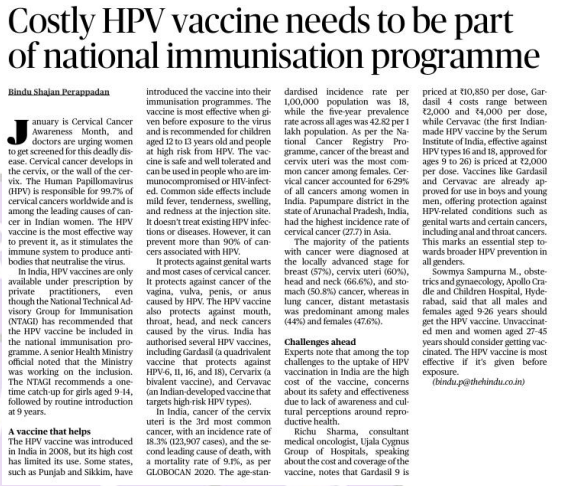
Later in the day, he and President Droupadi Murmu jointly launched the joint logo here to commemorate the 60th anniversary of the establishment of diplomatic relations between India and Singapore.

President Shanmugaratnam's visit is part of a series of exchanges that will take place during the year as both sides plan to celebrate the 60th anniversary through visits and events.

- **What are India's Current Semiconductor Capabilities?**
  - India is strong in the design stage of semiconductors. It is home to 20% of the global talent pool for chip design, with many professionals employed by global companies like AMD. India's domestic chip design sector is growing, especially with the government's **Design-linked Incentives (DLI)** program that supports local design firms.
  - **Chip Fabrication (Fabs)**: India is a newcomer in the manufacturing side of semiconductors.
    - Although India has no semiconductor manufacturing plants (fabs) of its own yet, a major step was taken in March 2024 with the launch of India's first semiconductor fab in 30 years at Dholera. This facility is a joint venture between Taiwan's PSMC and Tata Electronics. The Indian government is funding 70% of the investment, while Tata and PSMC are managing the technology transfer and training
  - **India's Semiconductor Value Chain:** The semiconductor value chain has four main stages:
    - **Design**: India has a strong presence here.
    - **Manufacturing (Fabs)**: India is developing this area.
    - **Assembly, Testing, and Packaging (ATP)**: India could focus more on this to get faster results.
    - **Distribution**: This is the final stage where chips are distributed to electronic manufacturers.

- **Challenges India Faces in Building Semiconductor Fabs:**
    - **High Cost of Semiconductor Fabs**: Building a semiconductor fabrication plant (fab) is extremely expensive. In the early 2020s, the cost of setting up a fab was over $20 billion, a significant increase from USD 200 million in the 1980s. These costs make it a risky investment, especially since achieving technological sovereignty (self-reliance) is not guaranteed.
    - **Resource-Intensive Nature of Fabs**: Fabs need a constant, reliable power supply and vast amounts of **ultrapure water** (up to 10 million gallons daily) to clean silicon chips. This could put pressure on India's already strained water resources and energy grid, especially as India works towards meeting **net-zero emission targets**.
    - **Shortage of Skilled Workers**: There is a shortage of skilled workers in semiconductor manufacturing in India. The **National Skill Development Corporation (NSDC)** report from 2022 highlights this issue, estimating that India could face a shortage of **250,000 to 300,000 professionals** in the semiconductor industry by 2027.
    - **Dependence on Imports**: India is highly dependent on imports for critical raw materials, especially **Rare Earth Elements (REEs)**, which are crucial for chip manufacturing. Despite holding 6% of global REE reserves, India has not developed its mining infrastructure for these materials since the 1950s. Only 10-20% of India's exploration capacity for critical minerals has been used.
- **India's Semiconductor Strategy (Moving Forward):**
    - **Short-Term Strategy (ATP Focus)**: Instead of immediately focusing on expensive and resource-heavy semiconductor fabs, India could prioritize the **back-end stages** like **Assembly, Testing, and Packaging (ATP)**. These stages are capital-light (require less money) but still labor-intensive and can be more easily integrated into India's existing industrial landscape. This could be a faster, more feasible way to get involved in semiconductor manufacturing.
    - **India Semiconductor Mission (ISM)**: Launched in December 2021, this initiative is crucial for India's semiconductor ambitions. It offers two key types of incentives:
        - **Production-Linked Incentives (PLI)**: For companies that set up manufacturing units in India.
        - **Design-Linked Incentives (DLI)**: For domestic companies involved in chip design. The ISM also focuses on establishing **semiconductor fabs**, **testing facilities**, and **design centers** within India.
- **What Needs to Be Done:**
    - **Invest in Fabs**: India needs to continue its investments in semiconductor fabrication plants, like the Dholera fab, while ensuring cost-effectiveness and efficiency.
    - **Develop Resource Infrastructure**: India should focus on improving its water management systems and energy supply to meet the needs of semiconductor fabs without overburdening resources.
    - **Bridge the Skill Gap**: India must focus on upskilling its workforce to meet the growing demand for semiconductor professionals. This includes training more engineers and technicians and expanding semiconductor education programs.
    - **Boost Rare Earth Element Mining**: India should begin exploring and developing its reserves of **Rare Earth Elements (REEs)** to reduce dependence on imports, ensuring a steady supply of critical materials for semiconductor manufacturing.
    - **Support ATP Development**: India should prioritize developing the ATP (Assembly, Testing, and Packaging) part of the semiconductor process, as it is more cost-effective and can be rapidly scaled.
- **What is a semiconductor?**
    - Semiconductors are materials that possess properties between those of conductors (such as metals) and insulators (such as glass or plastic).
    - The most commonly used semiconductor material is silicon (Si).
    - The conductivity component of semiconductors can be altered by introducing impurities through a process called "doping." By adding specific impurities, the semiconductor's electrical properties can be controlled.
    - **Application:** Microprocessors, memory chips, commodity integrated circuits, microcontrollers, transistors and others.

- **Government Interventions**
  - **India Semiconductor Mission (ISM)** has been a major government intervention to attract investments and incentivise local production. Launched in December 2021, ISM offers production-linked and design-linked incentives for firms to establish semiconductor fabrication units, testing facilities, and design centres within India.
  - **India's first National Security Semiconductor Fabrication Plant:** India, with the help of US Space Force, is planning to set up its first semiconductor fabrication plant solely dedicated to national security, an initiative that will provide critical chips to the US military, allied forces, and India's own defence sector Named 'Shakti,' the fabrication plant will be one of the world's first multi-material fabs dedicated to national security.
  - India has been elected Vice Chair of the Indo-Pacific Economic Framework's Supply Chain Council.
  - India is also a significant partner in the QUAD Semiconductor Supply Chain Initiative.
  - The chip fabrication facility in Dholera, Gujarat, is being set up by Tata Electronics.
  - The Semiconductor Assembly, Testing, Marking and Packaging (ATMP) facility in Morigaon, Assam is being set up by Tata Electronics.
  - The Maharashtra government has approved a chip manufacturing project (Panvel in Raigad district), to be jointly set up by Israel's Tower Semiconductor and the Adani Group.
  - The Outsourced Semiconductor Assembly and Test (OSAT) facility in Sanand, Gujarat is being set up by CG Power and Industrial Solutions Ltd.
  - The Cabinet has also approved the proposal of Kaynes Semicon to set up a semiconductor unit in Sanand, Gujarat



Costly HPV vaccine needs to be part of national immunisation programme

Bindu Shajan Perappadan

January is Cervical Cancer Awareness Month, and doctors are urging women to get screened for this deadly disease. Cervical cancer develops in the cervix, or the wall of the cervix. The Human Papillomavirus (HPV) is responsible for 99.7% of cervical cancers worldwide and is among the leading causes of cancer in Indian women. The HPV vaccine is the most effective way to prevent it, as it stimulates the immune system to produce antibodies that neutralise the virus.

In India, HPV vaccines are only available under prescription by private practitioners, even though the National Technical Advisory Group for Immunisation (NTAGI) has recommended that the HPV vaccine be included in the national immunisation programme. A senior Health Ministry official noted that the Ministry was working on the inclusion. The NTAGI recommends a one-time catch-up for girls aged 9-14, followed by routine introduction at 9 years.

A vaccine that helps

The HPV vaccine was introduced in India in 2008, but its high cost has limited its use. Some states, such as Punjab and Sikkim, have introduced the vaccine into their immunisation programmes. The vaccine is most effective when given before exposure to the virus and is recommended for children aged 12 to 13 years old and people at high risk from HPV. The vaccine is safe and well tolerated and can be used in people who are immunocompromised or HIV-infected. Common side effects include mild fever, tenderness, swelling, and redness at the injection site. It doesn't treat existing HPV infections or diseases. However, it can prevent more than 90% of cancers associated with HPV.

It protects against genital warts and most cases of cervical cancer. It protects against cancer of the vagina, vulva, penis, or anus caused by HPV. The HPV vaccine also protects against mouth, throat, head, and neck cancers caused by the virus. India has authorised several HPV vaccines, including Gardasil (a quadrivalent vaccine that protects against HPV-6, 11, 16, and 18), Cervarix (a bivalent vaccine), and Cervavac (an Indian-developed vaccine that targets high-risk HPV types).

In India, cancer of the cervix uteri is the 3rd most common cancer, with an incidence rate of 18.3% (123,907 cases), and the second leading cause of death, with a mortality rate of 9.1%, as per GLOBOCAN 2020. The age-standardised incidence rate per 1,00,000 population was 18, while the five-year prevalence rate across all ages was 42.82 per 1 lakh population. As per the National Cancer Registry Programme, cancer of the breast and cervix uteri was the most common cancer among females. Cervical cancer accounted for 6.29% of all cancers among women in India. Papumpare district in the state of Arunachal Pradesh, India, had the highest incidence rate of cervical cancer (27.7) in Asia.

The majority of the patients with cancer were diagnosed at the locally advanced stage for breast (57%), cervix uteri (60%), head and neck (66.6%), and stomach (50.8%) cancer, whereas in lung cancer, distant metastasis was predominant among males (44%) and females (47.6%).

Challenges ahead

Experts note that among the top challenges to the uptake of HPV vaccination in India are the high cost of the vaccine, concerns about its safety and effectiveness due to lack of awareness and cultural perceptions around reproductive health.

Richu Sharma, consultant medical oncologist, Ujala Cygnus Group of Hospitals, speaking about the cost and coverage of the vaccine, notes that Gardasil 9 is priced at ₹10,850 per dose, Gardasil 4 costs range between ₹2,000 and ₹4,000 per dose, while Cervavac (the first Indian-made HPV vaccine by the Serum Institute of India, effective against HPV types 16 and 18, approved for ages 9 to 26) is priced at ₹2,000 per dose. Vaccines like Gardasil and Cervavac are already approved for use in boys and young men, offering protection against HPV-related conditions such as genital warts and certain cancers, including anal and throat cancers. This marks an essential step towards broader HPV prevention in all genders.

Sowmya Sampurna M., obstetrics and gynaecology, Apollo Cradle and Children Hospital, Hyderabad, said that all males and females aged 9-26 years should get the HPV vaccine. Unvaccinated men and women aged 27-45 years should consider getting vaccinated. The HPV vaccine is most effective if it's given before exposure.

(bindu.p@thehindu.co.in)

4. Cervical Cancer Awareness and the HPV Vaccine
GS 2 (Health)

- **Why in News:** January is **Cervical Cancer Awareness Month**, a time when doctors urge women to get screened for cervical cancer, an important health issue, especially in India. Let's break down why this disease is a concern and what can be done to prevent it.
- **What is Cervical Cancer?**
  - Cervical cancer develops in the **cervix**, the lower part of the uterus (womb) that connects to the vagina.
  - It is one of the **leading causes of cancer** among women in India. The primary cause of cervical cancer is **Human Papillomavirus (HPV)**
  - Around **7% of cervical cancers worldwide** are caused by certain types of HPV.
  - **Cervical Cancer Burden in India:** Cervical cancer is the **third most common cancer** among women in India, with an **incidence rate of 18.3%**, translating to around **123,907 cases** It is also the **second-leading cause of cancer-related deaths** among women in the country.
  - **Key statistics:**
    - **Cervical cancer** accounts for **6-29% of all cancers** in Indian women.
    - The highest incidence of cervical cancer is found in **Papumpare district**, Arunachal Pradesh (27.7 cases per 100,000 people).
- **HPV Vaccine:**
  - The **HPV vaccine** is a powerful tool in preventing cervical cancer. It works by stimulating the body's immune system to produce antibodies that fight against HPV infections, the leading cause of cervical cancer. Vaccination is most effective when given before a person is exposed to the virus, ideally in **pre-teens or teenagers**.
  - **Vaccine Availability in India**

- The **HPV vaccine** has been available in India since **2008**, but its high cost has made it less accessible.
- Currently, HPV vaccines can only be obtained **through private practitioners** in India.
- Some states like **Punjab and Sikkim** have already included the HPV vaccine in their immunization programs.
- The **National Technical Advisory Group on Immunization (NTAGI)** has recommended the inclusion of the vaccine in India's **national immunization program**, particularly for girls aged **9-14**.
- The **Indian government** announced its plans to focus on cervical cancer prevention in its **Interim Budget 2024**. This marks a significant step toward making the vaccine more accessible to the public.
- **Importance of HPV Vaccination for Both Genders:** The HPV vaccine is not only recommended for women but also for men and boys. It helps prevent genital warts, and certain cancers related to HPV, including anal, throat, and penile cancers. Boys and young men aged 9–26 should get vaccinated, as well as unvaccinated adults up to 45 years.

- **HPV Vaccine Options in India**
  - India has authorized several HPV vaccines:
    - **Gardasil** (a quadrivalent vaccine) – Protects against HPV types 6, 11, 16, and 18.
    - **Cervarix** (a bivalent vaccine) – Protects against HPV types 16 and 18.
    - **Cervavac** – An **India-made** vaccine developed by the **Serum Institute of India**, which also protects against HPV types 16 and 18, and is approved for ages **9 to 26**.
    - **Cervavac** is priced at around **Rs 2,000 per dose**, making it more affordable than imported options like **Gardasil**.
    - **Gardasil 9** costs around **Rs 10,850 per dose**, while **Gardasil 4** is priced between **Rs 2,000 and Rs 4,000 per dose**.
- **Challenges to HPV Vaccination in India**
  - Despite the proven effectiveness of the HPV vaccine, there are several **challenges** that affect its uptake in India:
    - **High Cost**: Vaccines like **Gardasil** are expensive, making it unaffordable for many.
    - **Lack of Awareness**: Many people are unaware of the vaccine and its importance in preventing cervical cancer.
    - **Cultural Barriers**: Cultural perceptions around **reproductive health** and **vaccination** prevent many women from getting vaccinated.

5. ISRO's Third Launch Pad
GS 3 (Science and Tech)

- **Why in News:** Recently, the Union Cabinet approved the establishment of the Third Launch Pad (TLP) at Satish Dhawan Space Centre of Indian Space Research Organisation (ISRO) at Sriharikota, Andhra Pradesh.
- **About Third Launch Pad:**
  - The Third Launch Pad project envisages the establishment of the launch infrastructure at Sriharikota, Andhra Pradesh for the **Next Generation Launch Vehicles of ISRO.**
  - It also support as standby launch pad for the **Second Launch Pad at Sriharikota.** This will also enhance the launch capacity for future Indian human spaceflight missions.
  - **Implementation strategy and targets:**
    - It is designed to have configuration that is as universal and adaptable as possible that can support not only NGLV but also **the LVM3 vehicles** with **Semicryogenic stage** as well as scaled up configurations of NGLV.

Govt nod for third launch pad as ISRO reaches docking milestone

EXPRESS NEWS SERVICE
NEW DELHI, JANUARY 16

AS THE Indian Space Research Organisation (ISRO) completed a historic docking experiment on Thursday, the Union Cabinet approved the setting up of a third launch pad at India's only spaceport in Andhra Pradesh's Sriharikota. India has become the fourth country to demonstrate space docking capability after successfully docking two satellites launched under SpaDeX.

The new launch pad will help the space agency be future-ready for heavier rocket Next Generation Launch Vehicle (NGLV), which is currently being developed. The NGLV, along with facilities to launch it, will be essential for India's plan of setting up the Bharatiya Antariksh Station by 2035, and sending a human to the Moon by 2040.

The third launch pad and all associated facilities, such as vehicle assembly, satellite preparation, and fuelling, will be set up at a cost of ₹3984.86 crore. It is expected to come up within four years, and will be realised with maximum industry participation, a government statement said.

"The new launchpad would be required for the proposed NGLV. It would be key to achieving the Prime Minister's vision of setting up a space station and sending humans to moon. The facility will be capable of handling launches with the LOX/Methane engine that will be in the NGLV. NGLV is also one of the largest launch vehicles at the height of around 91 metres," said A Rajarajan, director of the Satish Dhawan Space Centre at Sriharikota.

The height of the NGLV — also referred to as Soorya — will be as high as a 30-storey building, as per current designs. This is more than two times taller than LVM3, which is the heaviest vehicle that ISRO operates. It will be available in two configurations — Soorya and Soorya Heavy — with the biggest vehicle capable of carrying 30 tonnes of payload into the low earth orbit. The LVM3 can carry 8 tonnes to the low earth orbit.

The spaceport will enhance ISRO's capability of launching humans to space, and support its plans of a sustained human spaceflight programme.

At present, the spaceport in Sriharikota has two launch pads. The first was set up 30 years ago and is designed to support the launch of smaller vehicles, such as PSLV and SSLV. The second was set up 20 years ago, primarily for the launch of heavier vehicles like GSLV and LVM3, but can also be used as a standby for the workhorse PSLV.

Union Minister Ashwini Vaishnaw with ISRO chief Dr V Narayanan during a Cabinet briefing, Thursday. *Anil Sharma*

- It will be realized with **maximum industry participation** fully utilizing ISRO's experience in establishing the earlier launch pads and maximally sharing the existing launch complex facilities.
- TLP is targeted to be established within a duration of 48 months or 4 years.

- **Funding:** The total fund requirement is **3984.86 Crore** and includes the establishment of the Launch Pad and the associated facilities.
- **Significance:** The Project will **boost the Indian Space ecosystem** by enabling higher launch frequencies and the national capacity to undertake human spaceflight & space exploration missions.
- **Background:**
  - Presently, Indian Space Transportation Systems are completely reliant on two launch pads viz. **First Launch Pad (FLP) & Second Launch Pad (SLP).**
  - FLP was realized 30 years ago **for PSLV** and continues to provide launch support for PSLV & SSLV.
- SLP was established primarily **for GSLV & LVM3** and also functions as standby for PSLV. SLP has been operational for almost 20 years and has enhanced the launch capacity towards enabling some commercial missions of PSLV/LVM3 along with the national missions including the Chandrayaan-3 mission

6. New fast-track immigration for Indians
GS 2 (Governance)

- **Why in News:**
  - Union Home Minister Amit Shah inaugurated the Fast Track Immigration – Trusted Traveller Programme (FTI-TTP) at seven airports: Mumbai, Chennai, Kolkata, Bengaluru, Hyderabad, Cochin, and Ahmedabad, on January 16 from Ahmedabad.
  - Initially launched at Delhi's IGI Airport seven months ago, FTI-TTP aims to simplify and secure international travel.
  - The programme will provide world-class immigration facilities with accelerated pathways, including automated gates for faster screening of international travellers.

HOW FTI-TTP WILL ENSURE FASTER, SMOOTHER IMMIGRATION CLEARANCE

Union Home Minister Amit Shah launches FTI-TTP at the Sardar Vallabhbhai Patel International Airport in Ahmedabad on Thursday. *MHA*

MAHENDER SINGH MANRAL
NEW DELHI, JANUARY 16

UNION HOME MINISTER Amit Shah on Thursday inaugurated the Fast Track Immigration-Trusted Traveller Programme (FTI-TTP) at the Sardar Vallabhbhai Patel International Airport in Ahmedabad.

FTI-TTP was first introduced at the Indira Gandhi International Airport in Delhi last June. It has since been implemented at the airports in Mumbai, Chennai, Kolkata, Bengaluru, Hyderabad, and Kochi.

What is FTI-TTP?

The program seeks to simplify international travel by accelerating the immigration pathway by using automated gates. It will eventually be implemented in 21 airports across India.

At the moment, the first phase of FTI-TTP seeks to facilitate secure but faster and smoother immigration clearance for the Indian Nationals and Overseas Citizen of India (OCI) cardholders. The next phase will extend these facilities to foreign travellers.

The Bureau of Immigration under the Ministry of Home Affairs (MHA) is the nodal agency for the program, which is currently available free of cost for passengers.

How does FTI-TTP work?

Those interested have to first enroll on an online portal on the MHA's website. They have to provide their details, and upload required documents. After necessary verification, a white list of 'Trusted Travellers' will be generated and fed for implementation through e-gates at the airport.

Biometrics of these travellers will be captured either at Foreigners Regional Registration Office (FRRO) or at the airport, at the time of the registered traveller's first passage. The registration will be valid till the validity of the passport, or for a period of five years, whichever is earlier.

Registered travellers will simply have to scan their boarding pass and passport at the airport's e-gate, and authenticate their biometrics.

"On such authentication, the e-gate will open automatically and immigration clearance will be deemed to have been granted," Bandi Sanjay Kumar, Minister of State for Home Affairs had said in a written reply to a question raised in Lok Sabha last July.

What are the documents required for FTI-TTP registration?

The following documents have to be uploaded on the program's online portal:

- A passport size photograph in which the applicant's face, including ears, take up three-quarters of the area of the image. The image should be no more than six months old, and the backdrop of the image should be plain white.
- A scanned copy of a passport with at least six months of validity. The scan should include the front page comprising the individual's photo and personal information, and last page giving family details.
- For OCI cardholders, a scanned copy of the OCI card — both the first and the last pages, posted separately — is also required.

- **Fast Track Immigration – Trusted Traveller Programme (FTI-TTP)**
  - **FTI-TTP and 'Viksit Bharat @2047' Vision**
    - The FTI-TTP aligns with the Centre's agenda for 'Viksit Bharat @2047,' aiming for India to become a developed nation by its independence centenary.
  - **Launch and Objectives**
    - It was First introduced in June 2024 at IGI Airport Terminal 3.
    - The programme facilitates faster, smoother, and secure immigration clearance for Indian Nationals and Overseas Citizens of India (OCI) passengers arriving from abroad.
  - **Key Features**
    - Initially offered free of cost (gratis basis) for Indian nationals and OCI cardholders.
    - Focus on enhancing international mobility with automated, streamlined immigration processes.
  - **Implementation**
    - The **Bureau of Immigration**, under the Ministry of Home Affairs, is the nodal agency responsible for implementing the programme.

- **Working**
  - **FTI-TTP Enrollment Process**
    - Applicants register online via the portal (https://ftittp.mha.gov.in).
    - Required details and documents are uploaded for verification.
    - Approved applicants are added to the 'Trusted Travellers' whitelist for implementation through e-gates.
  - **Biometric Verification**
    - Biometrics are captured at the Foreigners Registration Office (FRRO) or during airport passage.
    - Registration is valid until the passport's expiry or five years, whichever comes first, with an option for renewal.
  - **Immigration Clearance Process**
    - **Boarding Pass Scan**: Registered travellers scan their boarding pass at the e-gates to retrieve flight details.
    - **Passport is scanned** to confirm the traveller's identity.
    - **Biometric Authentication** at the e-gates.
    - **Automated Clearance**: Once verified, the e-gate opens, completing the immigration process automatically.
- **Implementation Phases**
  - **Phase 1**:
    - Covers Indian citizens and OCI cardholders.
    - Initially implemented at 7 airports, including Mumbai, Chennai, Kolkata, Bengaluru, Hyderabad, Cochin, and Ahmedabad.
  - **Phase 2**:
    - Expands coverage to foreign travellers.
    - Total implementation across 21 major airports nationwide.

- **Global Fast-Track Immigration Programmes**
  - **United States: Global Entry Programme (2008)**
    - Offers expedited clearance for pre-approved, low-risk travellers.
    - Self-service kiosks for passport and fingerprint scans at designated airports.
    - Includes citizens from select countries, including India.
    - Approval requires a detailed background check and in-person interview.
  - **United Kingdom: Registered Traveller Service (2015)**
    - Targets frequent visitors from specific countries, including India.
    - Enables use of eGates or fast-track channels at major UK airports.
    - Eligibility criteria: valid visa or frequent visits to the UK within a set timeframe.
  - **European Union: Smart Borders Initiative (2016)**
    - Modernises border checks for non-EU nationals entering the Schengen Area.
    - Uses the Entry/Exit System (EES) to pre-register traveller data, including biometrics.
    - Enhances security and efficiency, especially with rising international travel demands.
  - **Australia: SmartGate System (2007)**
    - Streamlines immigration for eligible travellers, initially Australian and New Zealand passport holders.
    - Expanded to include select foreign citizens.
    - Automated kiosks verify identity through passport scans and photographs.
  - **Saudi Arabia: Smart Travel System (2019)**
    - Utilises automated e-gates for faster immigration clearance.
    - Covers Saudi nationals and select foreign travellers with pre-verified documents.
    - Biometric verification, including facial recognition and fingerprints, ensures security.
    - Expanded under the Vision 2030 initiative to accommodate rising international visitors, especially during peak seasons like the Hajj pilgrimage

7. 150 years of the India Meteorological Department (IMD)

Recent events of importance

- **Why in News:** The India Meteorological Department (IMD) celebrated its 150th anniversary on January 15, 2025.
- **India Meteorological Department (IMD)**
  - **About**
    - The IMD is a government agency that is responsible for weather forecasting, seismology, and meteorological observations.

150 years of IMD: What the weather agency has planned for the future

ANJALI MARAR
NEW DELHI, JANUARY 16

THE INDIA Meteorological Department (IMD) celebrated its 150th anniversary on Wednesday. Here's how India's weather agency has improved its operations, and the plans it has for the future.

Improvements in forecasting

The IMD's overall forecast accuracy has improved by 40% over the last decade, thanks to an overall strengthening of its meteorological observation network across land, sea, and space.

The number of doppler weather radars went up from 15 in 2014 to 39 in 2024, while the number of automatic weather stations increased from 675 to 1,208. The IMD went from having 19 high wind speed recorders in 2014 to 37 in 2024. The number of district-wise rainfall monitoring stations increased from from 3,995 to 6,095. Seven automated weather observing systems and heliport weather observing systems were introduced.

Two geostationary satellites, INSAT 3DR and 3DS, are now monitoring weather round-the-clock, as opposed to the single INSAT 3D in 2014. Crucially, weather model resolution has improved from 25 km to 12 km for medium-range forecasts (with up to 10 days of lead time). A resolution of 12 km means that the IMD now has the ability to forecast events over a 12 km x 12 km area — the better the resolution, the smaller the area for which the IMD can make accurate forecasts.

This improved observational infrastructure has meant that the forecast accuracy across multiple weather forecast windows has increased manifold. Heatwaves can now be predicted with 95% accuracy upto two days in advance, as against 50% accuracy in 2014. Thunderstorms can be detected on an hourly basis with 86% accuracy, as against 50% accuracy in 2017.

The chances of detecting heavy rainfall, upto three days in advance, is 78% today as opposed to only 50% a decade ago. Meanwhile, the accuracy of cyclone track prediction has improved some 35-40% over the past decade, enough to bring down the loss of human lives to zero.

EXPLAINED METEOROLOGY

Towards zero-error forecasting

The IMD's *Vision Document 2047* released on Wednesday provides a detailed roadmap for making the country climate smart and weather ready by 2047, the centenary year of India's independence. The document has chalked out elaborate plans for upgrading the IMD's capabilities over the next two, five, 10, and 22 years (till 2047).

The agency aims to ensure that at the block level, its forecasts for all severe weather phenomena up to three days in advance are "zero-error" by 2047. For forecasts upto five days in advance, it aims for an accuracy of 90%, and for forecasts with a week's lead time, it aims for an accuracy of 80%. The IMD aims for an accuracy of 70% of 10-day advance forecasts.

With better monitoring, and issuance of timely warnings, the IMD wants to ensure that the loss of human lives due to any severe weather event is brought to zero over the next two decades. Besides, the IMD will improve the resolution of its weather models from 12 km at present to 5-6 km, which will make it possible to provide hyper-localised weather information at the level of the village panchayat.

Forecasting to management

The IMD is working to introduce critical interventions that will, in the coming decades, take it from merely being a weather forecaster to a weather manager. The department is particularly interested in managing weather phenomena like rain, hail, and fog, which often cause the most havoc.

Mission Mausam, inaugurated by Prime Minister Narendra Modi on Tuesday, provides a roadmap for the IMD to enter the arena of weather modification, and ultimately, management. Among other things, the mission will see the the establishment of a first-of-its-kind cloud chamber at the Indian Institute of Tropical Meteorology (IITM), Pune. This chamber will help IMD scientists to better understand cloud physics, and eventually perfect cloud seeding, a process by which the amount, type, or time of precipitation can be modified through human interventions.

In future, observations could be made using unmanned aerial vehicles, fully-automated weather stations, and sensors based on the Internet of Things which can be placed in the most remote locations in the country. There are plans for climate reference stations at the regional level, and smaller Met centres.

The establishment of mechanisms for having round-the-clock upper atmosphere monitoring at 100 km x 100 km grid using satellites, aircraft-based profilers, radars, and wind profilers are also on the cards.

The IMD will eventually boast 100% detection capabilities for all kinds of weather phenomena. Better data will help improve the performance of the IMD's weather models, and minimise errors in forecasting.

    - It was established in 1875 and is headquartered in New Delhi.
    - The IMD has hundreds of observation stations across India and is the country's National Meteorological Service.
  - **Mandate:** The IMD's mandate includes:
    - Observations: Taking meteorological observations
    - Forecasting: Providing current and forecast information for weather-dependent activities
    - Warnings: Giving warnings against severe weather phenomena
    - Statistics: Providing met-related statistics
    - Research: Engaging in research
  - **Nodal Ministry:** Ministry of Earth Sciences of the Indian Government
- **Improvements in Forecasting by IMD**
  - **Enhanced Observation Network from 2014-2024**
    - **Doppler Weather Radars**: Increased from 15 to 39
    - **Automatic Weather Stations**: Increased from 675 to 1,208.
    - **High Wind Speed Recorders**: Increased from 19 to 37.
    - **Rainfall Monitoring Stations**: Increased from 3,995 to 6,095.
  - **Introduction of New Systems**:
    - Seven automated weather observing systems.
    - Heliport weather observing systems.
  - **Satellite Monitoring**:
    - Two geostationary satellites, INSAT 3DR and 3DS, monitor weather round-the-clock (replacing INSAT 3D in 2014).
  - **Improved Weather Model Resolution**
    - Medium-range forecast resolution improved from 25 km to 12 km.
    - Better resolution enables forecasting for smaller areas with greater accuracy (12 km x 12 km grids).
  - **Significant Gains in Forecast Accuracy**
    - **Heatwave Prediction**: 95% accuracy up to two days in advance (compared to 50% in 2014).
    - **Thunderstorm Detection**: Hourly detection accuracy improved to 86% (from 50% in 2017).
    - **Heavy Rainfall Prediction**: Accuracy up to three days in advance increased to 78% (from 50% a decade ago).
    - **Cyclone Track Prediction**: Accuracy improved by 35-40%, leading to zero loss of human lives.
- **Towards Zero-Error Forecasting by IMD**
  - **Vision Document 2047**
    - **Objective**: To make India climate-smart and weather-ready by 2047, the centenary year of independence.
    - **Roadmap**: Upgradation of IMD's capabilities over the next two, five, 10, and 22 years.

- **Forecast Accuracy Goals**
  - **Zero-Error Block-Level Forecasts**:
    - Aim: Accurate severe weather predictions up to three days in advance by 2047.
  - **Accuracy Targets for Extended Forecasts**:
    - Five-day advance forecasts: 90% accuracy.
    - Weekly forecasts: 80% accuracy.
    - 10-day advance forecasts: 70% accuracy.
- **Enhanced Monitoring and Warnings**
  - **Goal**: Eliminate human fatalities from severe weather events within 20 years.
- **Improved Weather Model Resolution**
  - Current resolution: 12 km.
  - Target resolution: 5-6 km for hyper-localised weather forecasts at the village panchayat level.

- **From Forecasting to Weather Management**
  - **Transitioning to Weather Management**
    - IMD aims to evolve from a weather forecaster to a weather manager, focusing on managing rain, hail, and fog, which cause significant disruptions.
    - Mission Mausam, inaugurated by PM Modi, lays the foundation for weather modification and management.
  - **Key Initiatives under Mission Mausam**
    - **Cloud Chamber at IITM, Pune**:
      - First-of-its-kind in India.
      - Aims to enhance understanding of cloud physics.
      - Focus on perfecting cloud seeding to modify precipitation through human interventions.
  - **Advanced Observation Systems**
    - **Technological Innovations**:
      - Use of unmanned aerial vehicles (UAVs), automated weather stations, and IoT-based sensors for data collection in remote areas.
      - Establishment of regional climate reference stations and smaller Meteorological (Met) centres.
    - **Upper Atmosphere Monitoring**:
      - Round-the-clock monitoring at 100 km x 100 km grids using satellites, aircraft-based profilers, radars, and wind profilers.
  - **Enhanced Forecasting Accuracy**
    - Goal: 100% detection capabilities for all weather phenomena.
    - Improved data collection and analysis to minimise forecasting errors and enhance weather model performance.