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MINISTRY OF SCIENCE AND TECHNOLOGY



MK Yadav Sir

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HUMANOID'S SKULL
(Syllabus: GS Paper 3 – Sci and Tech)

HOW ISRO DESIGNED HUMANOID SKULL WHICH WILL BE USED IN GAGANYAAN

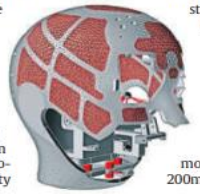
ANJALI MARAR
BENGALURU, AUGUST 28

THE INDIAN Space Research Organisation's (ISRO's) uncrewed Gaganyaan mission in 2025 will carry the female half humanoid Vyomitra (literally "space friend"). The design for Vyomitra's skull, fashioned by ISRO's Inertial Systems Unit in the Vikram Sarabhai Space Center in Thiruvananthapuram, Kerala, was finalised recently.

What are humanoids?

Humanoids (or half-humanoids) are robotic systems designed to resemble humans — Vyomitra comes with movable arms, a torso, a face, and a neck — and function autonomously in space.

In general, robotic systems are used to assist astronauts in performing repetitive and/or dangerous tasks in space, like cleaning of solar panels or fixing faulty equipment located outside the spacecraft. This protects astronauts, and allows them to work on the scientific mission at hand.



Final skull design with lattice structures. *Journal of Institution of Engineers, India*

Why will ISRO send a humanoid to space next year?

Next year's mission is primarily designed to be a technology demonstration of the Vyomitra. It will see the half humanoid use its robotic arms to perform operations at the crew console, visually monitor various systems inside the crew module, and communicate with the Earth-based mission control team.

ISRO will evaluate the performance of the robot's technology to measure the likely impacts of space travel on human beings, ahead of India's first crewed mission planned for later in 2025.

How did ISRO design the humanoid skull for Vyomitra?

The recently-designed Vyomitra skull will house the key components of the robot.It has been made using an aluminium alloy (AlSi10Mg) known for its high flexibility, light weight, heat resistance, and mechanical properties. This alloy is commonly used for making automotive engines and aerospace components.

Crucially, the skull has been designed to be incredibly sturdy, capable of withstanding some extreme vibrational loads that are experienced during a rocket launch. The high strength of the aluminium alloy offers a yield strength of more than 220 MegaPascals (1 MPa = 1 million pascals). Yield strength refers to the maximum stress that can be applied to a material before it begins to deform permanently.

The humanoid skull model has dimensions of 200mm x 200mm, and weighs only 800 grams.

AlSi10Mg is also amenable to the Additive Manufacturing (or AM) technique. This is how the humanoid skull was created. AM enables easy induction of lattice structures, as incorporated in the humanoid skull design. Importantly, it helps in significant reduction of the overall weight of the final product. Unlike conventional manufacturing techniques, AM follows a process in which a desired part or product is created in a layered manner, a commonly deployed mechanism in 3D printing.

Sturdy yet flexible, lightweight materials are often used to build payloads for space missions. This is because heavier the payload, more the fuel required to reach space, and larger the rocket needed.

Context: The Indian Space Research Organisation's (ISRO's) uncrewed Gaganyaan mission in 2025 will carry the female half humanoid Vyomitra (literally "space friend").

Humanoid's Skull

- **About:** These are robotic systems designed to resemble humans — Vyomitra comes with movable arms, a torso, a face, and a neck — and function autonomously in space.
- **Designed at:** ISRO's Inertial Systems Unit in the Vikram Sarabhai Space Center in Thiruvananthapuram, Kerala.
- **Weights & dimension:** 800 grams in 200 mm x 220 mm.
- **Made up from:** High-strength aluminium alloy to endure pressure and vibration.
- **Use:** To withstand the vibrational loads experienced during the launch.

How ISRO Designed the Humanoid Skull for Vyomitra

- **Material Selection**: The skull is made from an aluminium alloy (AlSi10Mg) known for its flexibility, light weight, and heat resistance.
- **Strength and Durability**: The skull is designed to withstand extreme vibrational loads during rocket launches, with a yield strength of over 220 MPa.
- **Additive Manufacturing (AM) Technique**: The skull was created using AM, which allows for the incorporation of lattice structures, significantly reducing the overall weight. AM follows a layered creation process, similar to 3D printing.

Vyommitra

- **About:** A female humanoid robot designed for space travel.
- **Developed by:** Indian Space Research Organisation (ISRO)
- **Function:** To aboard the spacecraft *Gaganyaan,* a crewed orbital spacecraft.
- **Features:** Resemble the upper human body, featuring movable arms, face, and neck equipped with sensors to perform human-like functions and assess the impacts of space travel.
  - Upper torso of a human body and will primarily demonstrate operations such as Crew Console related tasks.

INDIAN EXPRESS Page 12

PROHIBITION OF CHILD MARRIAGE BILL 2024

(Syllabus GS Paper 1 – Social Issues)

Himachal Bill raises women's marriage age; what happens next?

AJOY SINHA KARPURAM & SAURABH PARASHAR
NEW DELHI, SHIMLA, AUGUST 28

THE HIMACHAL PRADESH Assembly on Tuesday passed a Bill to raise the minimum age of marriage for women from 18 to 21 years. The Prohibition of Child Marriage (Himachal Pradesh Amendment) Bill, 2024, was passed by voice vote. The Bill amended the Prohibition of Child Marriage (PCM) Act, which was passed by Parliament in 2006.

What amendments has the Bill introduced to the PCM Act? How will the Bill's amendments to a central law come into force?

Why did the Himachal Pradesh Assembly pass the Bill?

While presenting the Bill in the Assembly on Tuesday, Health, Social Justice, and Empowerment Minister Dhani Ram Shandil said it was necessary to raise the minimum age of marriage for women to provide opportunities to them.

"Some girls still marry at a young age, which hinders their education and ability to progress in life... Additionally, many women are unable to achieve success in their careers due to early marriage," he said.

The minister also highlighted that early marriage and motherhood often severely impact the health of women. According to the 'Statement of Objects and Reasons' provided with the Bill, "The early marriages...act as a hindrance not only in the progress of their (women's) career but also in their physical development."

What amendments has the Bill introduced to the PCM Act?

As it stands, Section 2(a) of the PCM Act defines a "child" as someone "who, if male, has not completed twenty-one years of age, and if a female, has not completed eighteen years of age". The Himachal Bill eliminates this distinction on the basis of age between "males" and "females". It defines a "child" as "a male or female who has not completed twenty-one years of age".

The Bill also amends Section 2(b) of the PCM Act, which defines "child marriage" as "a marriage to which either of the contracting parties is a child". The Bill has added a clause giving it overriding effect over "anything contrary or inconsistent therewith contained in any other law...including any custom or usage or practice governing the parties".

This means that the new marriage age for women will apply to everyone in Himachal Pradesh regardless of what any other law may state, or even if the religious or cultural practices of the individuals getting married allow legal minors to get married. The Bill introduces Section 18A to the PCM Act, which gives the same overriding effect to the entire central law and its provisions.

The Bill increases the time-period for filing a petition to annul a marriage. Under Section 3 of the PCM Act, the "contracting party who was a child at the time of the marriage" can file a petition to annul the marriage within two years of attaining majority (before they turn 20 for women, and 23 for men). The Bill increases this period to five years, allowing both women and men to file petitions to annul the marriage before they turn 23 years old (the minimum age for marriage at 21 years is higher than the age of majority at 18 years).

EXPLAINED LAW

How will the Bill's amendments to the PCM Act come into force?

The Concurrent List – or List III under the Seventh Schedule of the Constitution of India – contains a list of subjects that both the central and state governments can pass laws on. Entry 5 of the Concurrent List comprises a number of subjects including "[m]arriage and divorce; infants and minors;...all matters in respect of which parties in judicial proceedings were immediately before the commencement of this Constitution subject to their personal law". This allows both the Centre and states to enact laws to address child marriage.

Typically, under Article 200 of the Constitution, a Bill passed by a state Assembly will be handed over to the Governor of that state for her assent. The Governor can then declare that she assents to the Bill (making it a law), return the Bill for reconsideration, or "reserve" it for consideration by the President. The President can then declare that she assents or withholds assent to the Bill, or direct the Governor to send it back for reconsideration.

However, the Bill passed by Himachal Pradesh amends the PCM Act by introducing a different marriage age for women, making it inconsistent with the Act passed by Parliament. Under Article 254(1) of the Constitution, if the state legislature enacts a law dealing with a subject in the Concurrent List and that law is "repugnant" – inconsistent or contradictory – with a central law, then the repugnant portion of the state law will be "void".

The exception to this is provided under Article 254(2). If the Bill in question is repugnant to an earlier or existing law made by Parliament, the Bill must be reserved for the President's consideration and needs to receive her assent as per Article 201. Only then can the repugnant provision in the state law be valid. So, for the Himachal Pradesh Bill to come into force, Governor Shiv Pratap Shukla must reserve the Bill for President Droupadi Murmu's consideration, who must then decide to give her assent to the Bill.

This process was seen in action in the case of Uttarakhand's Uniform Civil Code (UCC) Bill, which provided common provisions for subjects such as marriage, divorce, etc. for everyone residing in the state.

These subjects were previously governed by personal laws (enacted by Parliament) and the customs of residents depending on their religious or cultural identity. The Bill passed by the state Assembly in February became law only after President Murmu gave her assent to it in March.

Process of law making in state legislature

- **Scope**: The Concurrent List in the Seventh Schedule of the Indian Constitution includes subjects on which both the central and state governments can legislate.
- **State Legislation Process:** Under Article 200, a Bill passed by a state Assembly is presented to the Governor for assent.
    - The Governor can assent to the Bill, return it for reconsideration, or reserve it for the President's consideration.
- **Inconsistency with Central Law**: If a state law conflicts with a central law on a Concurrent List subject, the inconsistent part of the state law is considered void under Article 254(1).
- **Exception Under Article 254(2)**: If a state Bill contradicts an existing central law, it must be reserved for the President's consideration and can only become valid if the President gives assent.

Context: The Himachal Pradesh Assembly passed a Bill to raise the minimum age of marriage for women from 18 to 21 years.

Prohibition of Child Marriage (Himachal Pradesh Amendment) Bill, 2024 (Provisions):

- **About:** The Bill amended the Prohibition of Child Marriage (PCM) Act, which was passed by Parliament in 2006.
- **Uniform Age Definition**: The Bill amends Section 2(a) of the PCM Act, redefining a "child" as any individual, male or female, under 21 years of age, eliminating the previous gender-based age distinction.
- **Revised Child Marriage Definition**: Section 2(b) of the PCM Act is amended to redefine "child marriage" as a marriage where either party is a child.
    - The Bill introduces a clause giving this definition precedence over any conflicting laws, customs, or practices.
- **Universal Application of Marriage Age**: The Bill ensures that the new legal marriage age for women (21 years) applies universally across Himachal Pradesh, overriding any other laws or cultural practices that allow for earlier marriages.
- **Introduction of Section 18A**: The Bill introduces Section 18A, which extends the overriding effect to the entire PCM Act and its provisions, ensuring uniform application of the law.
- **Extension of Petition Period**: The Bill extends the time period for filing a petition to annul a marriage from two years to five years after reaching the age of majority, allowing individuals to file until they turn 23.

PIB

Aug 28

GREAT SCHEME

(Syllabus: GS Paper 3 – Economy)

Government approves 4 Start-Ups in the field of Technical Textiles

Context: The 8th Empowered Programme Committee (EPC), Ministry of Textiles meeting held recently approved GREAT' scheme.

Great Scheme

- **About**: It is designed to support individuals and companies in translating prototypes into technologies and products, including commercialization.
- **Full form**: Grant for Research and Entrepreneurship across Aspiring Innovators in Technical Textiles.
  - It supports translating prototypes into technologies and products, including commercialization.
- **Objective**: To foster entrepreneurship and innovation in technical textiles.
- **Part of**: GREAT is part of the National Technical Textiles Mission (NTTM).
- **Nodal Ministry:** Ministry of Textiles.
- **Funding Amount**: Up to ₹50 lakhs for a period of up to 18 months.
- **Incubators**: IITs, NITs, Textiles Research Associations, and Centres of Excellence.
- **Eligibility Criteria**: Early-stage startups in the technical textiles sector.
  - **Researchers**: Individual researchers and research groups from recognized institutions.
  - **Entrepreneurs:** Aspiring entrepreneurs with innovative ideas in technical textiles.
- **Coverage**: Innovations under all segments of Technical Textiles.
- **Project Duration**: Up to 18 months, with milestones for project implementation.
- **Approved Startup**: These projects are focused on key strategic areas of Composites, Sustainable Textiles, and Smart Textiles. The approved Education Institutes have proposed to introduce new B.Tech courses in different fields and applications of technical textiles including Geotextiles, Geosynthetics, Composites, Civil Structures, etc.
- **Technical textiles**: These are a distinct type of fabric engineered for their performance and functionality rather than for aesthetic or decorative reasons.

THE PRINT Aug 28

GEOGLYPHS

(Syllabus: GS Paper 1 – Art and Culture)

Maharashtra's geoglyphs discovery is citizen archaeology at its best. It put India on the map

Context: The Maharashtra government has designated 1,500 geoglyphs across 70 sites in Ratnagiri district, spanning 210 square kilometers, as protected monuments.

Geoglyphs

- **About:** These are colossal designs on the earth's surface, created by excavating rock and removing sand, soil, and stone.
- **Types**: Geoglyphs can be anthropomorphic (human-like), zoomorphic (animal-like), or geometric shapes.
- **Forms of Geoglyphs**: They can represent naturalistic or abstract forms, either as a singular large figure or an ensemble of smaller figures.
- **Visibility and Proportions**: Due to their large size, geoglyphs are visible from a distance, indicating the creators' understanding of proportions and mathematics.
- **Significance**: Geoglyphs are often linked to religion and spirituality and are culturally significant, lasting as a testament to the civilizations that created them.
- **Global Distribution:** Ancient geoglyphs have been found across Europe, the Americas, Australia, Africa, Asia, the Near East, and India.
  - Significant geoglyphs include the Cerne Abbas Giant, the Uffington White Horse, the Atacama Giant, and the Nazca lines.
- **World's largest geoglyph:** Eight geoglyph sites in the Jaisalmer district of Rajasthan.

The Geoglyphs of India

- **Lack of Early Geoglyph Evidence**: For a long time, India lacked known examples of geoglyphs despite its rich rock art heritage, which includes diverse painted motifs and petroglyphs in various regions.
- **Discovery**: In the 1980s, engineer and petroglyph conservationist Sudhir Risbud discovered abstract relief patterns near Niwali, Ratnagiri, marking the beginning of a new chapter in the Konkan region's prehistoric research.
- **Geoglyphs of Konkan Coastline**: Approximately 1,500 geoglyphs are scattered along 900 km of the Konkan coastline, representing the largest concentration of geoglyphs on the laterite plateaus, with notable sites including Jambhrun, Kasheli, and Barsu.
- **Notable Geoglyphs**: At Barsu, one prominent geoglyph depicts a man with two leaping tigers across 17.5 by 4.5 meters, with stylistic parallels to Harappan Civilization motifs found on seals from Harappa and Mohenjo Daro.

FINANCIAL EXPRESS

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AGRICULTURE INFRASTRUCTURE FUND (AIF)

(Syllabus: GS Paper 3 – Economy)



Agri-infra fund scope expanded

FE BUREAU
New Delhi, August 28

THE UNION CABINET on Wednesday expanded the scope of the ₹1-lakh crore Agriculture Infrastructure Fund (AIF), launched in 2020, to make it more attractive as part of its objective to boost farm infrastructure in the country.

The revamped AIF, which is to be disbursed by banks and financial institutions till FY26, is expected to facilitate development of viable projects which would enhance community farming capabilities, thereby improving productivity and sustainability of the agriculture sector.

The government has allowed all eligible beneficiaries of AIF for creation of infrastructure covered under "viable projects for building community farming assets". The revamped AIF will include integrated primary-secondary processing projects in the list of eligible activities. However, standalone secondary projects would not be eligible and would be covered under the ministry of food processing industries' scheme.

Since its launch in 2020, ₹47,575 crore has been sanctioned for 74,508 projects under Agriculture Infrastructure Fund

"These initiatives aim at expanding the scope of eligible projects and integrate additional supportive measures to foster a robust agricultural infrastructure ecosystem," it added. The government has also allowed the convergence the PM-KUSUM scheme for clean energy with AIF.

In addition to credit guarantee fund trust for micro and small enterprises (CGTMSE), the government has proposed to extend AIF credit guarantee coverage of FPOs through the NABSanrakshan Trustee Company. Under the AIF, beneficiaries receive a 3% interest subvention on loans up to ₹2 crore, with a maximum repayment period of 7 years. In addition, it covers the reimbursement of credit guarantee fees paid by banks.

Since its launch in 2020, ₹47,575 crore has been sanctioned for 74,508 projects under AIF.

Context: The union cabinet expanded the scope of the 1 lakh crore Agriculture Infrastructure Fund (AIF).

Agriculture Infrastructure Fund (AIF)

- **About:** It is a central sector scheme that will enable a financing facility of Rs.1 lakh crore for funding agriculture infrastructure projects at farm-gate and aggregation points.
- **Origin**: It was announced in May 2020 under the ambitious Atma Nirbhar Bharat Package as a dedicated Central Government scheme that provides medium-long term credit facility for investment in creation of post-harvest management infrastructure and community farming assets.
- **Nodal Ministry**: Ministry of Agriculture and Farmers Welfare.
- **Objective**: To mobilize a medium to long term debt financing facility for investment in viable projects for post-harvest management Infrastructure and community farming assets through incentives and financial support in order to improve agriculture infrastructure in the country.

- To enhance and strengthen the agricultural infrastructure in the country and support the farming community, the Government has announced a series of measures to expand the scope of Agricultural Infrastructure Fund (AIF) scheme:
  - **Viable Farming Assets**: To allow all eligible beneficiaries of scheme for creation of infrastructure covered under 'viable projects for building community farming assets'.
  - **Integrated Processing projects**: To include integrated primary secondary processing projects in list of eligible activities under AIF.
  - **PM KUSUM Component-A**: To allow convergence of Component-A of PM-KUSUM with AIF for farmer/group of farmers/ Farmer Producer Organizations/ Cooperatives/ Panchayats.
    - ✓ The alignment of these initiatives aims to promote sustainable clean energy solutions alongside the development of agricultural infrastructure.
  - **NABSanrakshan**: In addition to CGTMSE, it is proposed to extend AIF credit guarantee coverage of FPOs through the NABSanrakshan Trustee Company Pvt. Ltd. also.
    - ✓ This expansion of credit guarantee options is intended to enhance the financial security and creditworthiness of FPOs, thereby encouraging more investments in agricultural infrastructure projects.

TIMES OF INDIA

Aug 28

EASTERN EQUINE ENCEPHALITIS (EEE) VIRUS

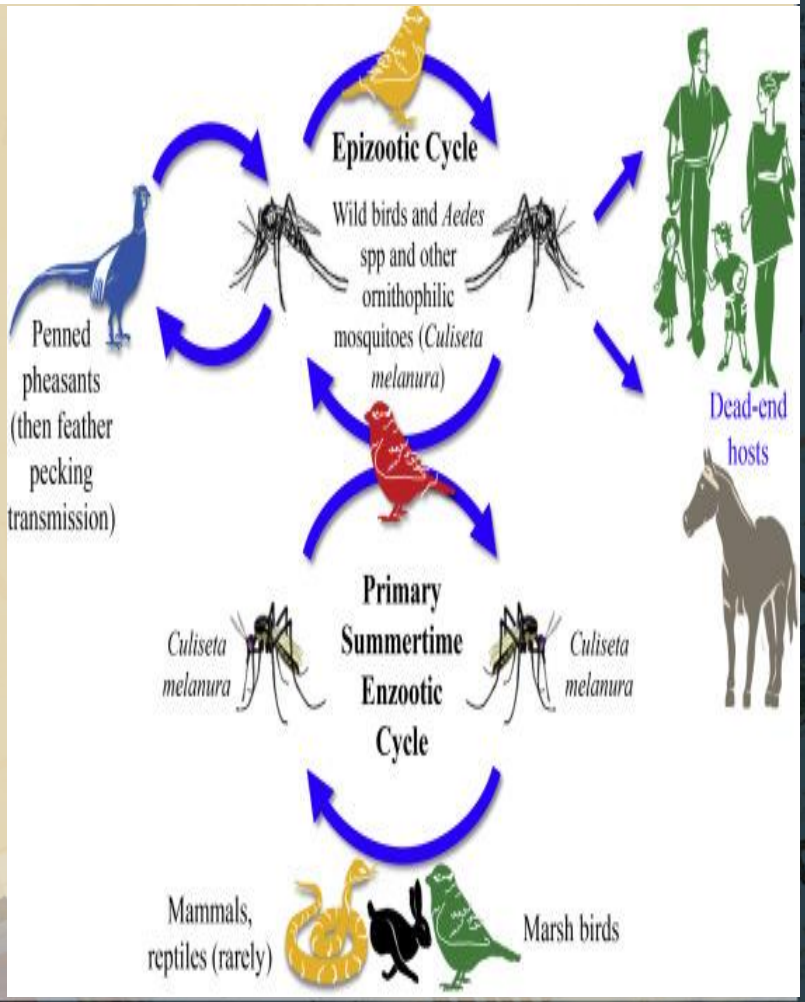
(Syllabus: GS Paper 3 – Sci and Tech)

New Hampshire patient dies from rare mosquito-borne disease

Context: Health officials in New Hampshire, United States, have reported the death of a person who contracted the rare mosquito-borne Eastern Equine Encephalitis (EEE) virus.

Eastern Equine Encephalitis (EEE) Virus

- **About:** It is an extremely rare but serious and often fatal infection that causes encephalitis or inflammation of the brain.
- **Last Record**: The last recorded human case of EEE in New Hampshire was in 2014.
- **Spread:** To people by the bite of an infected mosquito.
    - EEEV can also infect a wide range of animals including mammals, birds, reptiles, and amphibians.
- **Symptoms of EEEV**: Infection typically appear 4-10 days after being bitten by an infected mosquito.
    - Severe cases of EEE infection begin with the sudden onset of headache, high fever, chills, and vomiting that may progress into disorientation, seizures, encephalitis (inflammation of the brain), and coma.
    - About 30% of people ill from EEE die, and many who survive the infection are left with permanent neurologic damage.
- **Treatment**: There is no specific treatment for EEE.



INDIAN EXPRESS

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NICD PROGRAMME

(Syllabus: GS Paper 3 – Economy)

Cabinet approves 12 industrial smart cities to spur investments; outlay ₹28,602 crore

RAVI DUTTA MISHRA
NEW DELHI, AUGUST 28

THE UNION Cabinet on Wednesday approved 12 "industrial smart cities" in 10 states to boost domestic manufacturing with an estimated investment of Rs 28,602 crore.

The chosen cities for the industrial projects are Khurpia in Uttarakhand, Rajpura-Patiala in Punjab, Dighi in Maharashtra, Palakkad in Kerala, Agra and Prayagraj in Uttar Pradesh, Gaya in Bihar, Zaheerabad in Telangana, Orvakal and Kopparthy in Andhra Pradesh, and Jodhpur-Pali in Rajasthan. These projects, designed to attract foreign direct investment from countries such as Singapore and Switzerland, aim to foster an industrial ecosystem by facilitating investments from both large anchor industries and micro, small, and medium enterprises (MSMEs), Commerce Minister Piyush Goyal said at a press briefing.

'NECKLACE OF INDUSTRIAL CITIES'



File

THE CHOSEN cities for the industrial projects are Khurpia in Uttarakhand, Rajpura-Patiala in Punjab, Dighi in Maharashtra, Palakkad in Kerala, Agra and Prayagraj in Uttar Pradesh, Gaya in Bihar, Zaheerabad in Telangana, Orvakal and Kopparthy in Andhra Pradesh, and Jodhpur-Pali in Rajasthan

The projects, spanning across 10 states and six major industrial corridors, will create a 'necklace of industrial cities' along the Golden Quadrilateral, the minister said, adding that the cities will feature 'plug-and-play' infrastructure, including potable drinking water and 24-hour electricity.

"We hope investors can easily acquire land in India. We have granted environmental clearance for all these 12 projects, which will simplify the process for investors," Goyal said, adding that single-window clearance will further streamline the process.

Goyal said that Singapore and Switzerland have shown interest in dedicated industrial spaces. The government plans to partner with Invest India for marketing these projects and a Special Purpose Vehicle (SPV) will be established to implement the parks, with a three-year completion timeline, provided states cooperate.

The Cabinet approval follows the Finance Minister Nirmala Sitharaman's announcement during the Union Budget speech, in which she outlined a plan to sanction 12 industrial parks under the National Industrial Corridor Development Programme (NICDP).

"Our government will facilitate the development of investment-ready 'plug-and-play' industrial parks with complete infrastructure in or near 100 cities, in partnership with states and the private sector, by utilising town planning schemes better," Sitharaman said.

"Earlier, the Odisha government did not provide land, but after the change in government, the land has been allotted for the project. West Bengal had submitted a proposal, but they themselves withdrew. Wherever states support the Centre, industrial projects will be established," Goyal said.

These industrial nodes are expected to act as catalysts for achieving $2 trillion in exports by 2030. The new industrial cities will be developed as greenfield smart cities of global standards, built 'ahead of demand' on the 'plug-and-play' and 'walk-to-work' concepts, according to an official statement.

"The projects under the NICDP are designed with a focus on sustainability, incorporating ICT-enabled utilities and green technologies to minimise environmental impact. By providing quality, reliable, and sustainable infrastructure, the government aims to create industrial cities that are not just hubs of economic activity but also models of environmental stewardship," the statement added.

"In addition to these new approvals, the NICDP has already seen the completion of four projects, with another four currently under implementation. This continued progress highlights the government's commitment to transforming India's industrial sector and fostering a vibrant, sustainable, and inclusive economic environment," the statement read.

- **These industrial areas will be located in**: Khurpia in Uttrakhand, Rajpura-Patiala in Punjab, Dighi in, Maharashtra, Palakkad in Kerela, Agra and Prayagraj in UP, Gaya in Bihar, Zaheerabad in Telangana, Orvakal and Kopparthy in AP and Jodhpur-Pali in Rajasthan.
- **Smart Cities and Modern Infrastructure**: The new industrial cities will be developed as greenfield smart cities of global standards, built "ahead of demand" on the 'plug-n-play' and 'walk-to-work' concepts. This approach ensures that the cities are equipped with advanced infrastructure that supports sustainable and efficient industrial operations.

Context: India is set to develop a network of industrial smart cities as the Cabinet Committee on Economic Affairs, chaired by Prime Minister Narendra Modi, has approved 12 new projects under the National Industrial Corridor Development Programme.

National Industrial Corridor Development Programme

- **About**: It is India's most ambitious infrastructure programme aiming to develop new industrial cities as "Smart Cities" and converging next generation technologies across infrastructure sectors.
- **Objective**: To foster a vibrant industrial ecosystem by facilitating investments from both large anchor industries and Micro, Small, and Medium Enterprises (MSMEs).
- **Implementation**: Each Industrial Corridor is envisaged to be implemented by a Special Purpose Vehicle (SPV) in the form of a company set up under the Companies Act, 2013 as a joint venture between the central and the state governments.
- **Implementing Agency**: National Industrial Corridor Development Corporation Limited.
- **Vision and Goals:**
  - **Smart Cities Development:** Transforming industrial cities into smart, technology-driven hubs.
  - **Global Competitiveness:** Positioning Indian cities as leading global manufacturing and investment destinations.

PIB Aug 28

INS TABAR
(Syllabus: GS Paper 3 – Sci and Tech)

INDIAN NAVAL SHIP TABAR REACHES MALAGA, SPAIN FOR A TWO DAY VISIT

Context: Indian Navy's stealth frigate, INS Tabar, arrived in Malaga, Spain for a two-day visit aimed at strengthening bilateral relations between India and Spain.

INS Tabar

- **About**: It is a stealth frigate built for the Indian Navy in Russia.
- **Class and Commissioning**: It is the third of the Talwar-class frigates of the Indian Navy, commissioned on 19 April 2004 in Kaliningrad, Russia.
- It is equipped with a versatile range of weapons and sensors and is among the earliest stealth frigates of the Indian Navy.
- The ship is part of the Indian Navy's Sword Arm Fleet which is based at Mumbai under the Western Naval Command.
- **Capabilities**: The frigate can handle air, surface, and sub-surface missions, operating either independently or as part of a larger naval task force.
- **Fleet Assignment:** INS Tabar is part of the Indian Navy's Western Fleet, based in Mumbai under the Western Naval Command.
- **Features**
  - **Displacement:** Fully loaded, INS Tabar has a displacement of 4,035 tons.
  - **Speed**: The ship can reach speeds of 30 knots (56 km/h; 35 mph).
  - **Range**: It has a maximum range of 4,850 nautical miles (8,980 km; 5,580 mi) at 14 knots (26 km/h; 16 mph) and a reduced range of 1,600 nautical miles (3,000 km; 1,800 mi) at 30 knots (56 km/h; 35 mph).
  - **Weapons and Sensors:** The ship is equipped with a versatile range of weapons and sensors.
  - **Missile Armament**: INS Tabar is the first Talwar-class vessel to be armed with supersonic BrahMos anti-ship cruise missiles and also equipped with Barak-1 missiles.

THE HINDU Page 14

CHANDIPURA VIRUS

(Syllabus: GS Paper 3 – Sci and Tech)

Further transmission of Chandipura virus possible in coming weeks, warns WHO

Bindu Shajan Perappadan
NEW DELHI

The current outbreak of the Chandipura virus (CHPV) infection in India is considered the largest in the past 20 years, says the World Health Organization (WHO).

While the authorities are making efforts to control the transmission of CHPV, further transmission is possible in the coming weeks, considering the favourable conditions for vector populations during the monsoon season in affected areas, warned the WHO.

The WHO has not recommended any general travel or trade restrictions based on the available information. However, it maintained that surveillance efforts should be enhanced in high-risk areas, focusing on people at risk, such as children younger than 15 years presenting with acute onset of fever and central nervous system symptoms.



A worker fumigates a slum area in Ahmedabad to prevent the spread of CHPV, on July 31.

Between early June and August 15, the Health Ministry reported 245 cases of acute encephalitis syndrome (AES), including 82 deaths (case fatality rate 33%). Of these, 64 are confirmed cases of Chandipura virus infection.

CHPV is transmitted by vectors such as sandflies, mosquitoes, and ticks.

According to the note released by the WHO, survival can be increased with early access to care and intensive supportive care of patients.

Of the 64 confirmed cases, 61 cases have been reported from Gujarat and three from Rajasthan, the note said.

Current Status: A total of 43 districts in India are currently reporting AES cases. Cases are sporadically present across various districts as in previous outbreaks.

- Of the 64 confirmed cases, 61 cases have been reported from Gujarat and three from Rajasthan. A declining trend in the number of new cases of AES has been observed daily since July 19, 2024.
- The Health Ministry reported 245 cases of acute encephalitis syndrome (AES), including 82 deaths (case fatality rate 33%). Of these, 64 are confirmed cases of Chandipura virus (CHPV) infection.

Context: The WHO has labeled the current Chandipura virus outbreak in India as the largest in 20 years. This alarming development highlights the severity and scale of the ongoing epidemic.

Chandipura Virus

- **About:** CHPV is a virus of the Rhabdoviridae family, which also includes other members such as the lyssavirus that causes rabies.
- **CHPV Discovery**: The CHPV infection was first isolated in 1965 during an investigation of a dengue/chikungunya outbreak in Maharashtra.
- **Affected States**: Maharashtra, Northern Gujarat and Andhra Pradesh.
    - The virus predominantly affects children under the age of 15 in rural areas.
    - During the 2003 outbreak in Andhra Pradesh, affected children were between 9 months and 14 years old, with most deaths occurring within 48 hours of hospital admission.
    - In recent outbreaks, such as in Gujarat, all suspected deaths have been among children.
- **Vectors**: Several species of sandflies like Phlebotomine sandflies and Phlebotomus papatasi, and some mosquito species such as Aedes aegypti (which is also the vector for dengue) are considered vectors of CHPV.
- **Transmission**: The virus resides in the salivary gland of these insects, and can be transmitted to humans or other vertebrates like domestic animals through bites.
- **Infection Progression**: The infection caused by the virus can then reach the central nervous system, leading to encephalitis — inflammation of the active tissues of the brain.
- **Symptoms**: Fever, body ache, and headache. It may then progress to altered sensorium or seizures and encephalitis.
    - **Additional Symptoms**: Retrospective studies from India have also reported other symptoms such as respiratory distress, bleeding tendencies, or anaemia.
- **Treatment**: Currently there is no specific antiretroviral therapy or vaccine available for treatment.
    - The case fatality ratio from CHPV infection is high (56-75%), and there is no specific treatment or vaccine available.

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SIG 716

(Syllabus: GS Paper 3 – Sci and Tech)

India signs repeat order for 73,000 SIG 716 rifles; deliveries by 2025-end

Dinakar Peri
NEW DELHI

The Ministry of Defence has signed a repeat order for 73,000 SIG 716 rifles from Sig Sauer of the U.S. and deliveries are expected to completed by end-2025.

"The contract was signed in June 2024 and delivery is within 18 months of contract," a defence official said. The Army has earlier procured and inducted 72,400 SIG 716 rifles through fast-track procurement under a ₹700-crore contract signed in February 2019.

"We are proud to be a partner in the modernisation effort of the Indian Army, and prouder still that the SIG 716 rifle achieves the Ministry of Defence's modernisation goals with the second largest Army in the world," Ron Cohen, president and CEO, Sig Sauer, said in a statement issued on August 26. "Since the initial fielding of the SIG 716, we have received phenomenal end-user feedback on the performance and reliability of the platform."

The successful fielding and overwhelming soldier acceptance led to this follow-on award for an additional 73,000 rifles, the company added.

The Army has for long been looking to replace the indigenous INSAS (Indian National Small Arms System) rifles in use with a modern rifle.

The Army has inducted 66,400 of the 72,400 SIG 716 assault rifles procured under the deal in February 2019 and these have been provided to frontline troops involved in counter-insurgency operations.

The SIG 716, weighing 3.82 kg, has an effective range of 600 m and is more capable and reliable than the INSAS in use.



The Army has inducted 66,400 of the 72,400 SIG 716 assault rifles procured under a ₹700-crore deal in February 2019. FILE PHOTO



Context: The Ministry of Defence has signed a repeat order for 73,000 SIG716 rifles from Sig Sauer of the U.S. and deliveries are expected to completed by end-2025.

SIG 716

- **About**: The SIG 716 is an advanced assault rifle chambered in 7.62 NATO.
- **Specifications**: It features a 16-inch barrel and a 6-position telescoping stock.
- Equipped with an M-LOK handguard for modular accessory attachment.
- **Design and Production**: SIG SAUER designs and builds the SIG 716 for the Indian Army and U.S. customers.
- **Compatibility**
- **Picatinny Rails:** The SIG 716 comes with picatinny rails for attaching accessories.
- **Versatile Attachments**: Accessories include optical sights, grenade launchers, forehand grips, bipods, and laser pointers.
- **Firing Mode**: Offers automatic firing mode similar to the AK-47, unlike the INSAS rifle's three-round burst mode.
- **Bipod Procurement**: The Army has acquired bipods to enhance the weapon's versatility and effective range.

Performance Comparison

- **Effective Range and Lethality**: The SIG 716 boasts a higher caliber compared to the INSAS and AK-47.
- **Range**: It offers an extended effective range and increased lethality, but with higher recoil.

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