Today's Prelims Topics

Unified Pension Scheme (UPS)

Context

The recent Railway Ministry circular (May 2024) emphasizes better communication on UPS options, highlighting the government's focus on financial literacy and employee welfare.

About Unified Pension Scheme (UPS)

- It is a pension framework introduced by the Indian government to **streamline pension options** for employees, particularly in the **Railways.**
- It provides existing employees with a choice between the existing pension system and the **New Pension Scheme (NPS)**.
- **Key Features:**
    - **Objective**: To offer flexibility and clarity to employees regarding pension benefits.
    - **Options Available**: Existing Pension Scheme (Defined Benefit Scheme)
        - New Pension Scheme (NPS) (Defined Contribution Scheme)
    - **Applicability**: Primarily targets existing employees (new recruits are mandatorily enrolled under NPS).
- **Government's Initiative:**
    - The Railway Ministry has emphasized awareness campaigns to ensure employees make informed decisions.
    - Facilitation camps are being organized to assist employees in understanding options and completing registrations.

Facts

- **Pension Reforms in India:** UPS is part of broader reforms to modernize pension systems.
- **New Pension Scheme (NPS):** A contributory system introduced in 2004 for government employees (except armed forces).
- **Defined Benefit vs Defined Contribution:**
    - **Defined Benefit (Old Scheme):** Fixed pension based on salary and tenure.
    - **Defined Contribution (NPS):** Pension depends on market-linked returns.

Source: The Hindu: Inform Employees on details of Unified Pension Scheme, says Railway Ministry

Bharat Forecasting System (BFS)

Context

Bharat Forecasting System (BFS) was unveiled by the Government of India to improve accurate and localized weather forecasts.

About BFS

- **What is it?:** The **Bharat Forecasting System (BFS)** is a new weather forecasting model launched by the Government of India to provide **high-resolution, localized weather forecasts**.
- **Developed by: Indian Institute of Tropical Meteorology (IITM)**, Pune
- **Under Ministry: Ministry of Earth Sciences**
- **Key Features:**
    - **Forecast Resolution**: **6 km** – *Highest in the world*
    - **Enables prediction of small-scale weather phenomena**
    - **More localized and accurate forecasts** across India
- **Technological Backbone:** Enabled by the **supercomputer Arka**, installed at IITM in 2024
- **Significance:**
    - Improves **disaster preparedness**, **agricultural planning**, and **urban management**
    - Boosts **scientific infrastructure** for weather forecasting
    - Enhances India's global standing in **climate modeling and meteorology**

Source: The Hindu: Government unveiled Bharat Forecasting System (BSF)

Schistura densiclava

Context

A team of zoologists discovered a **new species of cave-dwelling fish** named **Schistura densiclava** in **Krem Mawjymbuin cave**, East Khasi Hills district, **Meghalaya**.

Key Facts

Feature	Details
Species Name	*Schistura densiclava*
Discovered In	Krem Mawjymbuin cave, East Khasi Hills, Meghalaya
Discovered By	Kangkan Sarma and team from Gauhati University
Type	**Troglophile loach** – a cave-dwelling fish that can survive aboveground
Family	**Nemacheilidae** (Stone loaches)
Habitat	Cool, fast-flowing cave stream (~60m inside cave, 18°C, low oxygen)
Unique Features	- Retains **pigment and eyesight** (unlike typical cave fishes)

Source: The Hindu: Meghalaya's new cave dwelling fish adapts to overground streams

Mosura fentoni

Context

Mosura fentoni is a newly discovered Cambrian-era sea creature from Canada's Burgess Shale. It has a unique body structure and advanced breathing adaptations, offering fresh insights into the early evolution of arthropods.

Scientific Classification & Background

- **Type:** Extinct **Cambrian radiodont**
- **Group:** Radiodonta – an extinct group of stem-arthropods
- **Relatives:** Distantly related to modern **insects, crabs, and spiders**
- **Era: Cambrian Period (~500 million years ago)**
- **Location Found: Burgess Shale**, Canada – a fossil-rich deposit known for exceptional preservation of soft-bodied organisms

Key Features

Feature	Description
Size	Small (1.5 to 6 cm in length)
Segments	26 body segments in 3 distinct zones
Head/Neck	Short neck supports a small head
Mesotrunk	6 paddle-like flaps – used like **propellers** for swimming
Posterotrunk	Up to 16 segments with rows of **gills** – specialized for **breathing**
Special Trait	The **posterotrunk acts as a "breathing tagma"** – a functional breathing unit similar to **horseshoe crab tails**

Source: The Hindu: Mosura fentoni

AI Matryoshka

Context

Google's "AI Matryoshka" refers to its layered AI strategy, where a core AI foundation (Gemini models) powers multiple interconnected products and services, much like a Russian nesting doll (*Matryoshka*).

Key Layers of AI Matryoshka

- **Core AI Models (Innermost Layer)**
  - **Gemini 2.5 Pro & Flash**: Advanced AI models with enhanced reasoning (Deep Think), efficiency, and multi-speaker text-to-speech.
  - **Imagen 4 & Vec 3**: AI for visual media generation.
  - **Lyra 2**: AI for music generation.
  - Powered by **7th-gen TPU (Ironwood)**, offering high-performance computing.
- **Platforms & APIs (Middle Layer)**
  - **Gemini API & Vertex AI**: Enable developers to integrate AI.
  - **Model Context Protocol (MCP)**: Allows AI agents to share contextual data.
- **User-Facing Applications (Outermost Layer)**
  - **AI in Search**: "Deep Search" for cited reports.
  - **Gemini App**: Live features, image/video generation, and Deep Research (accessing private documents).
  - **Agentic Commerce**: Virtual try-ons and AI checkout.
  - **Jules (Coding Agent)**: AI assistant for developers.

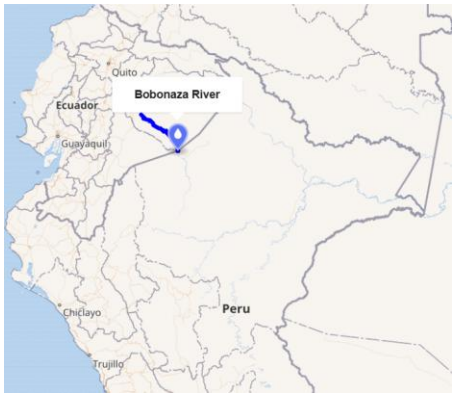
Key Concerns:

- **Data Privacy**: AI uses personal data (e.g., Deep Research in Gemini).
- **Copyright Issues**: AI models trained on copyrighted content (e.g., Imagen 4, Lyra 2).
- **Digital Divide**: Advanced AI features may require paid subscriptions (Google AI Ultra).

Source: The Hindu: Google's AI Matryoshka: restructuring the search giant

News in Short

Bobonaza River



- The **Bobonaza River** is located in **Ecuador**.
- It flows into the **Pastaza River**, then the **Marañón River**, and finally the **Amazon River** at Iquitos, Peru.
- Its path primarily traverses the largely uninhabited **Amazonian tropical rainforest**.
- **Sarayaku** is one of the few significant settlements found along the Bobonaza River.

Editorial Summary

Recognise the northeast's diversity to tap its potential

Context

PM Modi in the **Rising North East Investors Summit 2025** highlighted the **immense potential of the Northeast region and its importance** in the country's development journey.

Potential of the Northeast Region

- **Strategic Location:** Proximity to Southeast Asian countries—shares borders with Bangladesh, Bhutan, China, and Myanmar—making it key to the *Act East Policy*.
- **Natural Resources:** Rich in forests, oil, natural gas, coal, limestone, and immense hydroelectric potential.
- **Cultural Diversity:** Home to over 200 ethnic communities with diverse traditions, festivals, and crafts—ideal for *cultural tourism*.
- **Biodiversity Hotspot:** Eastern Himalayas and Indo-Burma region make it ecologically significant with rare flora and fauna.
- **Agro-Climatic Diversity:** Suitable for organic farming, horticulture (pineapple, orange, ginger, bamboo), and floriculture.
- **Tourism Potential:** Scenic landscapes (Keibul Lamjao National Park, Kaziranga National Park, Ziro Valley), adventure tourism (trekking, river rafting), and spiritual tourism (Buddhist circuits).

Reasons for Remaining Untapped

- **Infrastructural Deficit:** Hilly terrain, low road and rail connectivity, poor digital infrastructure.
- **Insurgency and Ethnic Conflicts:** Presence of multiple insurgent groups and inter-tribal tensions (e.g., Kuki-Meitei, Naga issues).
- **Historical Neglect:** Lack of sustained political and economic attention in post-independence India.
- **Geographical Isolation:** "Chicken's Neck" (Siliguri Corridor) bottlenecks integration with the mainland.
- **Bureaucratic Hurdles:** Slow project clearances, land acquisition issues, and environmental clearances.
- **Lack of Private Investment:** Perceived as unstable, thus deterring investors despite high potential.

Major Government Initiatives for the Northeast

- **Act East Policy**: Upgraded version of Look East; emphasizes connectivity with ASEAN through NE.
- **Infrastructure Push: Sela Tunnel** (Arunachal), **Bhupen Hazarika Setu** (Assam).
    - 11,000 km of highways, new airports, rail lines, and **Northeast Gas Grid** (1,600 km).
- **Peace Accords:**
    - **Framework Agreement** with NSCN-IM (2015)
    - **Bodo Peace Accord** (2020)
    - **Bru-Reang Settlement** (2020)
- **AFSPA Rollback:** Withdrawn from large parts of Assam, Manipur, and Nagaland.
- **Investment Promotion:** North East Industrial Development Scheme (NEIDS)
    - Tata's ₹27,000 crore semiconductor unit in Assam.
- **Digital & Social Programs:** Expansion of mobile and internet connectivity.
    - Skill development under PMKVY and startups through Atal Innovation Missions.

What India Can Do to Tap These Opportunities

- **Inclusive Governance:** Address grievances of indigenous communities, resolve border disputes, and ensure tribal participation in policy-making.
- **Improve Connectivity:** Complete and expand road, rail, air, and internet infrastructure.
    - Operationalize the India-Myanmar-Thailand Trilateral Highway and Kaladan Multi-Modal Transit.
- **Boost Tourism:** Promote eco-tourism and heritage tourism with adequate facilities and safety measures.
- **Sustainable Development:** Focus on environment-friendly hydro and solar power projects with local consent.
- **Skill Development:** Invest in skill and entrepreneurship programs tailored for youth in the region.
- **Cross-border Trade:** Enhance border trade points with Myanmar and Bangladesh and align policies with Act East.

Conclusion

The Northeast is not merely a geopolitical frontier but a growth engine with immense untapped potential. However, unlocking it requires balancing **development with sensitivity**, resolving historical grievances, and ensuring ecological sustainability. An integrated approach aligning **infrastructure, inclusion, and international linkages** can make the region a pillar of India's growth story and regional diplomacy.

Source: The Hindu: Frontier of progress

Time for a new India-Africa digital compact

Context

- Africa Day (May 25) commemorates the founding of the **Organisation of African Unity (now African Union)** in 1963.

More in News

- In this context, the **African Union's Digital Transformation Strategy (2020–2030)** positions digital infrastructure and innovation at the center of its socio-economic agenda.
- The Strategy emphasizes **public digital goods, connectivity, digital literacy, and cross-border digital integration**.

India's Efforts for India-Africa Digital Compact

India has steadily enhanced its **digital development diplomacy** with Africa, evolving from capacity-building to co-development:

- **Pan-African e-Network (2009):** Provided **tele-medicine and tele-education** using Indian expertise via satellite and fibre-optic infrastructure.
    - Implemented by TCIL (Telecommunications Consultants India Ltd).
- **Digital Public Infrastructure (DPI) Sharing:** India is exporting its **low-cost, scalable, open-source DPIs** like:
    - **Aadhaar (Digital ID)**: Adopted by Togo through IIIT-B collaboration.
    - **UPI (Payments Platform)**: Namibia signed an MoU with NPCI (2024); Ghana and Zambia are also engaging.
    - **CoWIN & DIKSHA**: Potential for health and education systems in Africa.
- **Institutional Collaborations: Zambia's Smart Government Initiative** supported by IIIT-B.
    - **IIT-M Zanzibar Campus (2023)**: Offering courses in Data Science and AI.
    - Integration with Indian private sector to fund **scholarships** and technical education.
- **Diplomatic and Development Channels:**
    - **Lines of Credit** for digital infrastructure.
    - **IAFS (India-Africa Forum Summit)** platforms promoting digital cooperation.
    - Participation in **Smart Africa Alliance** and **Policy and Regulatory Initiative for Digital Africa (PRIDA)**.

Opportunities for India

- **Soft Power Expansion:** India's open-source, inclusive digital model offers a **values-based alternative** to surveillance-heavy or proprietary systems (e.g., China or Big Tech platforms).
- **Technology Diplomacy:** Potential to become **Africa's digital transformation partner of choice** by offering *affordable, interoperable, and customizable solutions*.
- **Strategic Influence:** Digital diplomacy can counterbalance China's dominance and position India as a **reliable South-South partner**.
- **Market Expansion:** India's fintech, edtech, and healthtech startups can tap into **Africa's young, digital-savvy population**.
- **Workforce and Education:** India can help train Africa's next-gen digital workforce, boosting **India-Africa knowledge partnerships**.

Challenges

- **Digital Divide:** High cost of data, low device penetration, and **gender gap** in access across Africa.
    - Sharp rural-urban disparities in connectivity.
- **Energy Bottlenecks:** Digital infrastructure requires **reliable power**, which is lacking in many African regions.

- **Competition from Other Powers: China's low-cost, infrastructure-heavy digital model** is more attractive to some governments.
    - The **EU and U.S.** also offer alternative frameworks with stronger financial backing.
- **Scalability and Local Adaptation:** One-size-fits-all Indian solutions may **fail without localization** and state involvement.
- **Security & Data Sovereignty Concerns:** African nations are increasingly sensitive to **data privacy, sovereignty, and cyber risks**.

Way Forward

- **Co-development Over Technology Transfer:** Shift from exporting Indian solutions to **co-creating platforms** with African stakeholders.
- **Contextual Customization:** Tailor DPI models to **local needs, languages, and governance frameworks**.
- **Energy-Digital Nexus:** Integrate digital plans with **renewable energy investments** for long-term sustainability.
- **Institutional Partnerships:** Scale successful models like **IIT Zanzibar** in other countries; build **joint research centres** and digital universities.
- **Multi-Stakeholder Approach:** Involve Indian **startups, universities, civil society**, and private sector in Africa-focused digital innovation.
- **Respect for Digital Sovereignty:** Position India as a partner that respects **data autonomy, transparency**, and **citizen rights**.

Conclusion

India's digital diplomacy in Africa stands at a crucial juncture. Its DPI model offers a compelling, people-first approach to digital governance—**affordable, adaptable, and ethical**. By building long-term institutional partnerships and co-developing digital ecosystems, **India-Africa digital cooperation** can not only bridge divides but also **empower nations for the digital age**, marking a true partnership of equals in the Global South.

Source: The Hindu: Time for a new India-Africa digital compact

Trade deals will bring opportunities for Indian agriculture

Context

Amid shifting tariffs and global geopolitical tensions, India's trade performance in FY 2024-25 warrants reflection. While the India-UK FTA has been concluded, talks for a bilateral trade deal with the US are ongoing.

India's Overall Trade Performance (FY 2024-25)

- **Total Exports (Goods + Services):** $820.93 billion (↑ 6.5% from FY24)
  - **Merchandise:** $437.42 billion (53%)
  - **Services:** $383.51 billion (47%)
- **Total Imports:** $915.19 billion (↑ 6.85% from FY24)
  - **Merchandise:** $720.24 billion (79%)
  - **Services:** $194.95 billion (21%)
- **Trade Deficit:** $94.26 billion (↑ from $78.39 billion in FY24)
- **Trade-to-GDP Ratio:** 41.4% (Nominal GDP: $4.19 trillion)

Agricultural Trade Performance

- **Agri-Exports:** $52 billion (↑ 6.3% from $48.9 billion in FY24)
- **Agri-Imports:** $38.2 billion (↑ 16.5% from $32.8 billion in FY24)
- **Agri-Trade Surplus:** $13.8 billion (↓ from $27.7 billion in FY14)
- **Key Agri-Exports:**
  - **Rice:** 20.2 MMT worth $12.5 billion
  - **Marine Products:** $7.4 billion
  - **Spices:** $4.5 billion
  - **Buffalo Meat:** $4.1 billion
  - **Processed Foods, Tea/Coffee, Sugar** also significant
- **Key Agri-Imports:**
  - **Edible Oils:** $17.3 billion for 16.4 MMT (45.4% of agri-imports)

Challenges in India's Agricultural Trade

- **Policy Uncertainty:** Frequent export bans and curbs on essentials (e.g., rice, wheat) disrupt long-term trade momentum.
- **Stagnant Growth:** Agri-exports grew only 2.3% annually (FY15–FY25), vs. 20% in FY05–FY14.
- **Environmental Concerns:** Over-reliance on water-intensive crops like rice drains groundwater (~40 bcm exported as "virtual water").
- **Global Price Volatility:** Indian agri-exports are vulnerable to fluctuations in global commodity prices.
- **Heavy Subsidy Dependency:** Global competitiveness in crops like rice is driven by unsustainable subsidies (electricity, water, fertilisers).
- **Import Dependence:** Excessive reliance on edible oil imports (55–60% of domestic consumption), especially palm oil.

Way Forward

- **Policy Stability:** Minimise ad-hoc trade restrictions; adopt predictable export policies.
- **Sustainable Exports:** Impose moderate export duties (10–15%) on price-sensitive crops like rice to optimise revenue.
- **Boost Productivity:** Invest in R&D, precision agriculture, better seeds, and modern irrigation methods (e.g., fertigation).
- **Oil Palm Push:** Promote domestic palm oil cultivation with financial support during gestation and regulated corporate-FPO partnerships.

- **Water Efficiency:** Incentivise low-water crops and promote sustainable farming to reduce environmental strain.
- **Market Diversification:** Explore new markets and reduce overdependence on a few export items or regions.

Source: The Hindu: Cultivating a global farm