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1. Beta Pictoris d: Dimmest Exoplanet Directly Imaged

Why in News?

Astronomers have directly imaged **Beta Pictoris d**, the **dimmest exoplanet ever directly observed**, using the **James Webb Space Telescope (JWST)** and the **European Southern Observatory's Very Large Telescope (VLT)**.

Key Highlights

Particular	Details
Exoplanet	Beta Pictoris d
Type	Gas Giant
Distance from Earth	63 light-years
Host Star	Beta Pictoris
Discovery Instruments	James Webb Space Telescope (JWST) & ESO's Very Large Telescope (VLT)
Published In	<i>The Astrophysical Journal Letters</i>

About Beta Pictoris d

Beta Pictoris d is a **Jupiter-like gas giant** orbiting the young star **Beta Pictoris**. It is the **dimpest exoplanet ever directly imaged**, making it a major breakthrough in exoplanet detection and imaging technologies.

Key Features

- **Mass:** Approximately **2.4 times the mass of Jupiter**.
- **Orbital Period:** About **91 years**.
- **Location:** **63 light-years** away in the **Pictor constellation**.
- **Host Star Age:** Around **20–23 million years**, making it a relatively young planetary system.
- **Beta Pictoris** becomes only the **second known planetary system** with **more than two directly imaged exoplanets**.

Methods Used for Discovery

- **Very Large Telescope (VLT):** Directly imaged the planet using archival observations spanning over a decade.
- **James Webb Space Telescope (JWST):** Detected the planet through the **chemical fingerprint of its atmosphere**, demonstrating a new method of exoplanet detection.

What are Exoplanets?

Exoplanets (Extrasolar Planets) are planets that orbit **stars other than the Sun**. They help scientists understand **planetary formation, evolution, and the potential for life beyond the Solar System**.

Major Methods of Exoplanet Detection

Method	Principle
Transit Method	Detects dimming of a star when a planet passes in front of it.
Radial Velocity Method	Measures the wobble of a star caused by an orbiting planet.
Direct Imaging	Captures actual images of exoplanets by blocking the host star's light.
Gravitational Microlensing	Detects planets through the bending of light by gravity.

Significance

- Advancement of direct imaging techniques for detecting faint exoplanets.
- Improved understanding of planetary system formation around young stars.
- Validation of atmospheric detection methods using JWST.
- Support for future searches for potentially habitable exoplanets.

Challenges

- Extremely faint brightness of exoplanets compared to their host stars.
- High technological requirements for direct imaging.
- Long observation periods needed to confirm planetary orbits.

Way Forward

- Expand the use of next-generation space telescopes for exoplanet exploration.
- Strengthen atmospheric characterization studies to identify potentially habitable worlds.
- Develop advanced imaging and spectroscopy techniques for detecting Earth-like exoplanets.

UPSC Prelims MCQ

Q. With reference to exoplanets, consider the following statements:

1. Exoplanets are planets that orbit stars other than the Sun.
2. The Direct Imaging method captures actual images of exoplanets by suppressing the light from their host stars.
3. Beta Pictoris d is the dimmest exoplanet ever directly imaged.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) **1, 2 and 3**

Answer: (d)

UPSC Mains Question (10 Marks)

Recent advances in exoplanet discovery have significantly expanded our understanding of planetary systems beyond the Solar System. Discuss the importance of direct imaging techniques in exoplanet research. (150 words)

2.State of Food Security and Nutrition in the World (SOFI) Report 2026

Why in News?

The **State of Food Security and Nutrition in the World (SOFI) Report 2026**, released by UN agencies, revealed that **Africa has overtaken Asia for the first time as the region with the highest number of people facing hunger**, highlighting widening regional disparities in global food security.

Key Highlights

Particular	Details
Report	State of Food Security and Nutrition in the World (SOFI) 2026
Released By	FAO, IFAD, UNICEF, WFP & WHO
Hungry Population in Africa (2025)	309 million
Hungry Population in Asia (2025)	292 million
Global Hungry Population (2025)	645 million (7.8% of world population)
SDG Concern	SDG 2 – Zero Hunger

About SOFI Report

The **State of Food Security and Nutrition in the World (SOFI)** is an **annual flagship report** jointly published by five UN agencies. It monitors global progress towards **Sustainable Development Goal (SDG) 2 – Zero Hunger** by assessing trends in hunger, food insecurity and nutrition.

Key Findings

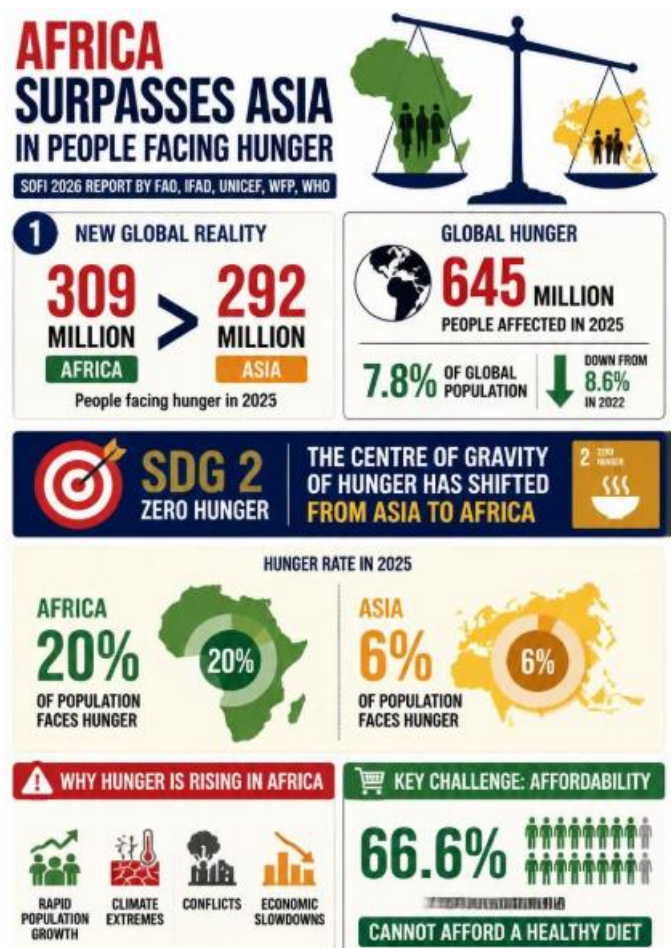
- **Africa became the region with the largest number of undernourished people**, surpassing Asia for the first time.
- **Nearly 20% of Africa's population** experienced hunger in 2025, compared to **about 6% in Asia**.
- **Two-thirds of Africans (66.6%)** could not afford a healthy diet.
- **Global hunger declined** from **8.6% (2022)** to **7.8% (2025)**, but progress remains uneven.
- **Rapid population growth, conflicts, climate change and economic slowdowns** continue to drive food insecurity in Africa.

Major Causes of Hunger

- Climate extremes affecting agricultural productivity.
- Armed conflicts disrupting food production and supply chains.
- Economic slowdowns and inflation reducing purchasing power.
- Rapid population growth increasing food demand.
- Poor access to affordable and nutritious diets.

Significance

- Highlights regional inequalities in achieving SDG 2 (Zero Hunger).
- Guides governments and international agencies in framing food security policies.
- Supports evidence-based interventions for nutrition and agricultural development.



- Draws attention to the need for climate-resilient agriculture and sustainable food systems.

Challenges

- Persistent conflicts and political instability in several African countries.
- Increasing impacts of climate change on food production.
- Limited access to nutritious and affordable food.
- Slow progress towards achieving Zero Hunger by 2030.

Way Forward

- Strengthen climate-resilient and sustainable agriculture.
- Enhance investments in nutrition, social protection and rural development.
- Improve agricultural productivity and food supply chains.
- **Promote international cooperation** to address food insecurity and build resilient food systems.

Related Index: Global Hunger Index (GHI)

Feature	Details
Published By	Concern Worldwide & Welthungerhilfe
Purpose	Measures and tracks hunger at global, regional and national levels
Indicators	Undernourishment, Child Wasting, Child Stunting, Under-5 Mortality

UPSC Prelims MCQ

Q. With reference to the *State of Food Security and Nutrition in the World (SOFI)* report, consider the following statements:

1. It is jointly published by FAO, IFAD, UNICEF, WFP and WHO.
2. The report monitors global progress towards Sustainable Development Goal 2 (Zero Hunger).
3. According to the SOFI Report 2026, Africa has surpassed Asia in the number of people facing hunger.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Answer: (d)

UPSC Mains Question (10 Marks)

Despite improvements in global food availability, hunger remains unevenly distributed across regions. Discuss the major findings of the State of Food Security and Nutrition in the World (SOFI) Report 2026 and examine the challenges in achieving Sustainable Development Goal 2 (Zero Hunger). (150 words)

3.Aravalli Hills Conservation: Supreme Court Committee Seeks Public Feedback

Why in News?

A **Supreme Court-appointed High-Powered Committee** has invited **public feedback within 21 days** on issues related to the **definition and protection of the Aravalli Hills**, particularly the proposed **100-metre elevation benchmark**, before submitting its report to the Court.

Key Highlights

Particular	Details
Committee	High-Powered Committee appointed by Supreme Court
Chairperson	Kanchan Devi, Director General, ICFRE
Public Consultation	21-day feedback window
Issue	Definition of Aravalli Hills and 100-metre elevation benchmark
Report Submission	By 31 August 2026

Background

- An **Environment Secretary-led panel (2025)** proposed defining the **Aravalli Hills** using a **100-metre elevation criterion**.
- The **Supreme Court initially accepted** the recommendation but later **stayed its own order** following widespread concerns.
- Environmental groups argued that the proposed definition could leave **over 90% of the Aravalli landscape** outside legal protection, exposing it to **mining and construction**.

Terms of Reference of the Committee

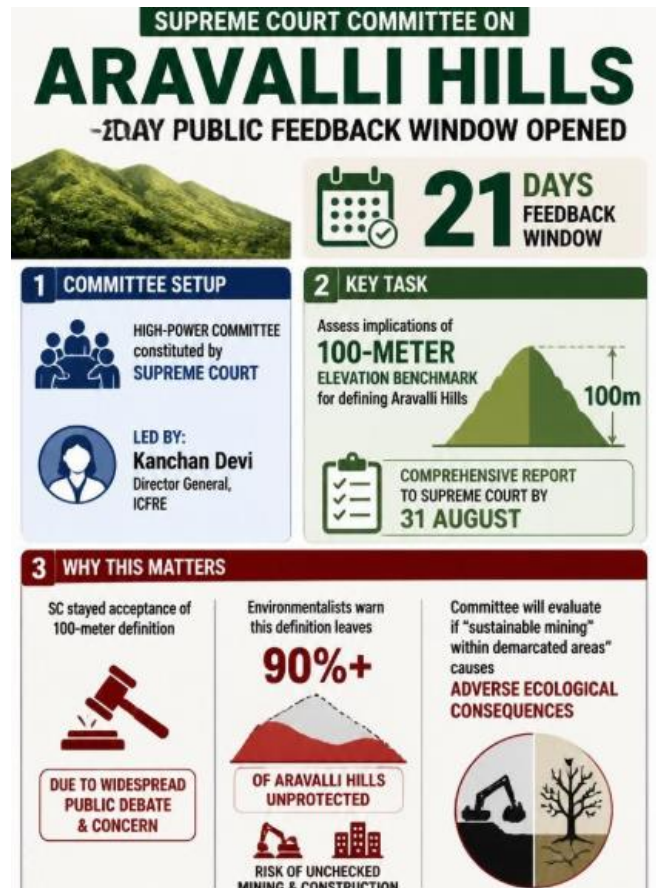
- **Examine the ecological implications** of the proposed 100-metre elevation benchmark.
- **Assess the impact of sustainable mining** in the newly demarcated areas.
- **Consult stakeholders**, including environmentalists, mining leaseholders, farmers, villagers and local communities.
- **Recommend an appropriate framework** for defining and conserving the Aravalli ecosystem.

About the Aravalli Range

Feature	Details
Type	One of the world's oldest fold mountain ranges
Length	About 692 km
States Covered	Gujarat, Rajasthan, Haryana and Delhi
Highest Peak	Guru Shikhar (1,722 m) , Rajasthan
Direction	South-West to North-East

Ecological Significance

- Acts as a natural barrier against the eastward expansion of the **Thar Desert**.
- Supports rich **biodiversity**, including leopards, sloth bears and numerous bird species.
- Facilitates **groundwater recharge** in north-western India.
- Functions as an important **watershed**, separating the **Luni basin** from the **Banas basin**.
- Regulates local climate and monsoon patterns.



Major Threats

- Illegal and excessive mining.
- Urbanisation and infrastructure expansion.
- Deforestation and habitat fragmentation.
- Encroachment and land-use changes.
- Declining groundwater levels and ecological degradation.

Way Forward

- Adopt a scientifically robust definition of the Aravalli ecosystem rather than relying solely on elevation.
- Strengthen regulation of mining and land-use activities in ecologically sensitive areas.
- Promote landscape-level conservation involving local communities.
- Enhance afforestation, ecological restoration and groundwater conservation across the Aravalli region.

UPSC Prelims MCQ

Q. With reference to the Aravalli Range, consider the following statements:

1. It is one of the oldest fold mountain ranges in the world.
2. Guru Shikhar is the highest peak of the Aravalli Range.
3. The Aravalli Range acts as a natural barrier against the eastward expansion of the Thar Desert.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) **1, 2 and 3**

Answer: (d)

UPSC Mains Question (10 Marks)

The Aravalli Range performs critical ecological functions in north-western India. Discuss its environmental significance and examine the major challenges in its conservation in the light of recent judicial interventions. (150 words)

4.Mission Golden Spice for Lakadong Turmeric

Why in News?

The Union Government has launched **Mission Golden Spice – Integrated Lakadong Turmeric Value Chain Enhancement Project** in Meghalaya to strengthen the production, processing, branding and export of **GI-tagged Lakadong Turmeric**.

Key Highlights

Particular	Details
Mission	Mission Golden Spice
Launched By	Union Minister Jyotiraditya M. Scindia

Total Outlay	₹175.45 crore
Duration	2025–2030 (5 Years)
Implementing Agencies	Ministry of Development of North Eastern Region (MDoNER) & North Eastern Council (NEC)
Focus Crop	GI-tagged Lakadong Turmeric

Objectives of the Mission

- Increase farmers' remuneration from ₹30–40/kg to ₹80/kg.
- Expand cultivation area from 2,500 hectares to 7,500 hectares by 2030.
- Develop an integrated value chain covering production, processing, branding and exports.
- Establish the Northeast's largest organic turmeric processing and curcumin extraction facility.
- Strengthen women-led farmer institutions and enterprises.

About Lakadong Turmeric

Lakadong Turmeric is a premium variety of turmeric grown mainly in the **West Jaintia Hills of Meghalaya**, renowned for its exceptionally high **curcumin content**.

Feature	Details
GI Tag	Granted in 2024
Main Growing Region	West Jaintia Hills, Meghalaya
Curcumin Content	7–10% (among the highest in the world)
Cultivation	Predominantly organic and traditional
Uses	Pharmaceuticals, nutraceuticals, cosmetics and food industry

Significance

- Enhancement of farmers' income through value addition and better market access.
- Promotion of organic farming and sustainable agricultural practices.
- Strengthening of exports of high-value agricultural products.
- Boost to rural livelihoods, particularly for women farmers.

- Support to the "Ashtalakshmi" vision for holistic development of the North Eastern Region.

Challenges

- Limited processing and storage infrastructure.
- Weak market linkages and branding.
- Post-harvest losses due to inadequate supply chains.
- Need for quality certification and export standards.

Way Forward

- Develop integrated processing and cold-chain infrastructure.
- Promote Farmer Producer Organizations (FPOs) and women-led enterprises.
- Strengthen branding and global marketing of GI-tagged Lakadong Turmeric.
- Expand research on high-curcumin varieties and sustainable cultivation practices.

UPSC Prelims MCQ

Q. With reference to Lakadong Turmeric, consider the following statements:

1. It is a **Geographical Indication (GI)-tagged** variety of turmeric from Meghalaya.
2. It is known for its exceptionally high **curcumin content** compared to ordinary turmeric.
3. Mission Golden Spice aims to strengthen its entire value chain from cultivation to exports.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) **1, 2 and 3**

Answer: (d)

UPSC Mains Question (10 Marks)

Discuss the significance of GI-tagged agricultural products in promoting rural livelihoods and exports. Examine the role of Mission Golden Spice in enhancing the value chain of Lakadong Turmeric. (150 words)

5.Ken–Betwa Link Project (KBLP)

Why in News?

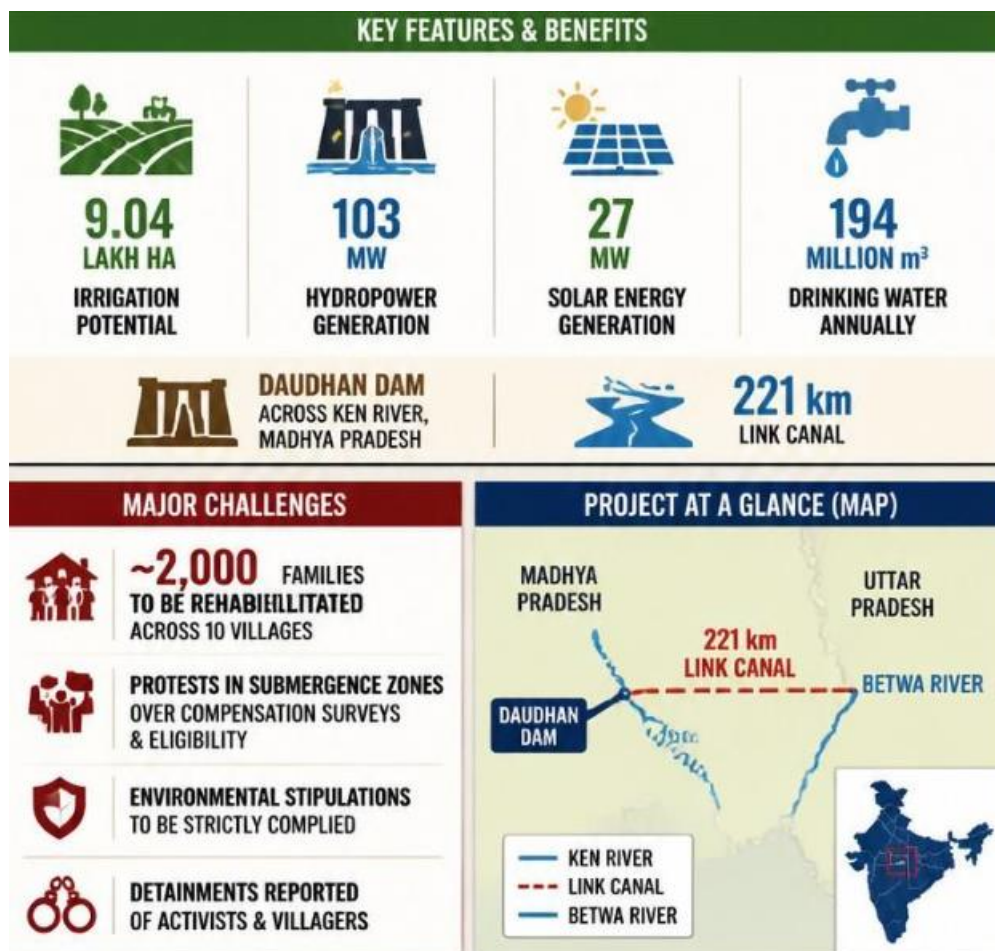
The **Ken–Betwa Link Project (KBLP)**, India's first **inter-basin river linking project**, is progressing with construction but has sparked protests over **rehabilitation, land acquisition, and environmental concerns**, particularly the displacement of nearly **2,000 families**.

Key Highlights

Particular	Details
Project	Ken–Betwa Link Project (KBLP)
Approved By	Union Cabinet (December 2021)
Estimated Cost	₹44,605 crore
Implementing Agency	National Water Development Agency (NWDA), Ministry of Jal Shakti
States Involved	Madhya Pradesh & Uttar Pradesh

About the Ken–Betwa Link Project

The **Ken–Betwa Link Project** is the **first project under the National Perspective Plan (NPP) for Interlinking of Rivers**, aimed at transferring surplus water from the **Ken River** to the **water-deficit Betwa River** to improve irrigation, drinking water supply, and power generation in the drought-prone **Bundelkhand region**.



Major Components

- Daudhan Dam across the Ken River in Madhya Pradesh.
- 221-km Ken–Betwa Link Canal.
- Lower Orr Project.
- Kotha Barrage.
- Bina Complex Multipurpose Project.
- Restoration of the Ken Canal System in Uttar Pradesh

Expected Benefits

Component	Benefit
Irrigation	Around 9.04 lakh hectares of land
Drinking Water	194 million cubic metres (MCM) annually

Hydropower	103 MW
Solar Power	27 MW
Beneficiary Region	Water-scarce Bundelkhand (MP & UP)

Significance

- Mitigation of chronic drought in the Bundelkhand region.
- Enhancement of agricultural productivity and rural livelihoods.
- Improvement in drinking water availability for water-stressed districts.
- Generation of renewable energy through hydropower and solar power.
- Strengthening of national water security under the Interlinking of Rivers Programme.

Challenges

- Displacement of nearly 2,000 families, including tribal communities.
- Submergence of forest and village lands, affecting biodiversity and livelihoods.
- Concerns over rehabilitation and resettlement (R&R), including compensation and exclusion of eligible beneficiaries.
- Potential ecological impacts, including effects on river ecosystems and wildlife habitats.
- Implementation delays due to land acquisition and public protests.

Way Forward

- Ensure fair and transparent rehabilitation and resettlement before project commissioning.
- Strengthen environmental safeguards and biodiversity conservation measures.
- Adopt participatory decision-making involving affected communities.
- Balance developmental needs with ecological sustainability through continuous environmental monitoring.

UPSC Prelims MCQ

Q. With reference to the Ken–Betwa Link Project, consider the following statements:

1. It is India's first inter-basin river linking project under the National Perspective Plan.
2. It aims to transfer water from the Ken River to the Betwa River.
3. The project is being implemented by the National Water Development Agency (NWDA).

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) **1, 2 and 3**

Answer: (d)

UPSC Mains Question (10 Marks)

River interlinking projects are viewed as a solution to regional water scarcity but raise significant environmental and social concerns. Discuss with reference to the Ken–Betwa Link Project. (150 words)

