

OCTOBER

13

CRUX 10

10 News. 10 Sources. One Place



 **The Indian EXPRESS** live **mint** **पॉइंट**

DownToEarth
FORTNIGHTLY ON POLITICS OF DEVELOPMENT,
ENVIRONMENT AND HEALTH

**Science
Reporter**



विज्ञान एवं
प्रौद्योगिकी मंत्रालय
MINISTRY OF
SCIENCE AND
TECHNOLOGY



MK Yadav Sir

Table of Contents

- 1 Money Bill
- 2 International Criminal Court
- 3 Mera Yuva Bharat
- 4 Multilateral Development Banks
- 5 Bharatmala Pariyojana
- 6 RIDF
- 7 Methane Emissions
- 8 BrahMos Missile
- 9 Global Hunger Index
- 10 Asteroid Bennu

7-judge Bench to take a call on giving priority to Money Bill case

Centre requests top court to 'hear cases seniority wise' and not decide priority based on 'political exigencies'; the cardinal issue is whether amendments could be passed as a Money Bill, circumventing the Rajya Sabha, in violation of Article 110

Krishnasdas Rajagopal
NEW DELHI

A seven-judge Bench of the Supreme Court headed by Chief Justice of India D.Y. Chandrachud on Thursday said it will "take a call" on a request from petitioners to give priority to a reference concerning the manner in which the Centre got crucial amendments passed in Parliament as Money Bills.

The Centre objected to the request, saying the Bench should not give priority to the case based on a request made by the petitioners, who include Congress leader Jairam Ramesh, on the basis of "political exigencies".

"It is my request, give it [Money Bill reference] priority. It is a live issue," senior advocate Kapil Sibal, for the petitioners, urged the Constitution Bench.

But Solicitor-General Tushar Mehta, appearing for the Centre, said, "Priority is Your Lordships' discretion, but we would request the court to hear the cases seniority wise... We can't decide priority based



Hopefully, the final verdict will be forthcoming soon as it will have far-reaching implications on the very functioning of Parliament

JAIRAM RAMESH
Congress leader

on political exigencies." "Alright, leave it to us... we will take a call," Chief Justice Chandrachud replied.

The reference includes legal questions concerning amendments made from 2015 onwards in the Prevention of Money Laundering Act (PMLA) through Money Bills, giving the Enforcement Directorate almost blanket powers of arrest, searches, and so on. Though the court had upheld the legality of the PMLA amendments, it left the question whether the amendments could have been passed as Money Bills to the seven-judge Bench.

Similarly, the case also raises questions about the passage of the Finance Act of 2017 as a Money Bill to alter the appointments to

19 key judicial tribunals, including the National Green Tribunal and the Central Administrative Tribunal.

'To extend control'

Mr. Ramesh had argued that the 2017 Act was deliberately categorised as a Money Bill to "extend executive control over these institutions (tribunals) by altering the composition of the selection committees and vastly downgrading the qualifications and experience required to staff these bodies".

The seven-judge Bench is hearing the Money Bill question based on a reference made in November 2019 by a five-judge Bench headed by then Chief Justice Ranjan Gogoi in the case of *Rojer Mathew vs. South Indian Bank Ltd.* The

cardinal issue is whether such amendments could be passed as a Money Bill, circumventing the Rajya Sabha, in violation of Article 110 of the Constitution.

"Hopefully, the final verdict will be forthcoming soon as it will have far-reaching implications on the very functioning of Parliament," Mr. Ramesh posted on social media platform X (formerly Twitter).

Financial matters

A Money Bill is deemed to contain only provisions dealing with all or any of the matters under clauses (a) to (g) of Article 110(i), largely including the appropriation of money from the Consolidated Fund of India and taxation. In other words, a Money Bill is restricted only to the specified financial matters.

The Money Bill reference is numbered five in the list of cases scheduled before the seven judges. The Bench had convened on Thursday to iron out the pre-hearing formalities before the cases were to be heard. The question of passage of laws after dressing them up as Money Bills had

come up in the Aadhaar case too. However, the top court had, in a majority verdict in 2021, refused to review its 2018 judgment (*K. Puttaswamy case*) upholding the validity of the Aadhaar Act and its certification as a Money Bill. Justice Chandrachud, who is heading the current Bench, had delivered the dissenting opinion on the Review Bench in 2021.

The two questions before the Review Bench had been whether the Lok Sabha Speaker's decision to declare the proposed Aadhaar law as Money Bill was "final", and whether the Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016 was correctly certified as a 'Money Bill' under Article 110 (i) of the Constitution.

Justice Chandrachud, in his dissent, had said the Review Bench ought to wait till the seven-judge Bench decided the larger questions on Money Bill in the *Rojer Mathew* reference. The majority, led by Justice A.M. Khanwilkar (ret'd), had disagreed with him.

Context: Recently, a **seven-judge Bench**, led by Chief Justice of India D.Y. Chandrachud, considered a request to prioritise a reference on how the **Centre passed crucial amendments in Parliament as Money Bills**.

Money Bill

- **Article 110(1) of the Constitution:** Money Bills, which must contain specific provisions, primarily related to taxation, government finances, borrowing, and guarantees.
- The **procedure for passing Money Bills**, as **outlined in Article 109**, involves them being introduced only in the **House of the People (Lok Sabha)**.
- After passing the House of the People, a Money Bill is sent to the Council of States (Rajya Sabha) for **recommendations within 14 days**. Options LS have on RS recommendations:
 - **If the House of the People accepts** the Council's recommendations, the Money Bill is considered passed with those amendments.
 - **If the House of the People rejects** the Council's recommendations, the Money Bill is passed as originally proposed by the House of the People.
 - **If the Council of States doesn't return** the Money Bill **within 14 days**, it's deemed passed in the form it was passed by the House of the People.
- **Role of Speaker:** He takes the final call if a **bill is a money bill or not**. And his decision cannot be challenged in any court of the country.

Criteria of Money Bill

- Tax imposition, abolition, remission, alteration, or regulation.
- **Government of India's borrowing of money** or giving guarantees.
- Management of the Consolidated Fund or **Contingency Fund of India**, as well as deposits and withdrawals.
- **Allocation of funds** from the Consolidated Fund of India.
- **Identification of expenses as charges on the Consolidated Fund of India** or increases in such expenses.

Putin visits Kyrgyzstan in first foreign trip since arrest warrant by ICC

REUTERS
BISHKEK, OCTOBER 12

RUSSIAN PRESIDENT Vladimir Putin held talks in Kyrgyzstan on Thursday, a Central Asian nation with strong ties to Moscow, during what was his first foreign trip since the International Criminal Court (ICC) issued an arrest warrant for him in March.

The Kremlin chief has rarely travelled abroad since he sent troops into Ukraine in early 2022 and is not known to have left Russia since the ICC issued a warrant for him, accusing him of overseeing the illegal deportation of children from Ukraine.

Russia does not recognise the ICC's jurisdiction and has rejected its allegations.

Putin attended a ceremony marking the 20th anniversary of the founding of Russia's Kant military airbase outside Bishkek, the Kyrgyz capital, a strategically-important facility which allows Moscow to project power in the region.

"This military outpost significantly contributes to boosting Kyrgyzstan's defensive power

Kim writes to Putin, vows to advance ties

Seoul: North Korea leader Kim Jong Un exchanged letters with Russian President Vladimir Putin Thursday, vowing to advance their ties and wishing him victory over what he called hegemony and pressure from imperialists, Pyongyang's KCNA said. The letters mark the 75th anniversary of bilateral ties and came about a month after Kim's rare trip to Russia in which he and Putin discussed military cooperation. **REUTERS**

and ensuring security and stability in the whole region of Central Asia," said Putin, who said he expected Moscow to expand its military and defence ties with Kyrgyzstan.

His visit coincided with a Russian-led security bloc holding military drills in Kyrgyzstan.



Context: Russian President Vladimir Putin recently held talks in Kyrgyzstan, his first foreign trip since the ICC issued an arrest warrant for him.

International Criminal Court (ICC)

- **Establishment:** In 2002 pursuant to the multilateral Rome Statute.
- **Headquarter:** The Hague, Netherlands.
- **About:** It is the first and only permanent international court with jurisdiction to prosecute individuals for the international crimes like - **genocide, crimes against humanity**, war crimes and the crime of aggression.
- **Members:** 123 countries. Countries like – **India, China and Pakistan have not signed the treaty** and not a party.
- **Jurisdiction:** The ICC's jurisdiction is limited only to natural persons (unlike the International Court of Justice, which hears disputes between states) with minimum age of the alleged perpetrator should be **18 years at the time of the commission of the crime**.
- **Relation with UN:** The ICC is not part of the UN. The Rome Statute was negotiated within the UN; however, it created an independent judicial body distinct from the UN.

Difference with International Court of Justice (ICJ)

- **Established:** In 1945 under the UN Charter.
- **Headquarter:** Hague, Netherlands.
- **Function:** To settle legal disputes **between states and to provide advisory opinions** on legal questions referred to it by UN bodies and specialized agencies. Every year the Court submits a report on its activities to the United Nations General Assembly.
- **Composition:** The Court is composed of **15 judges elected by the UN General Assembly and the UN Security Council (UNSC)**.

Cabinet approves establishment of an autonomous body Mera Yuva Bharat



Context: Recently, the **Union Cabinet, chaired by the Prime Minister** of India has approved the establishment of an autonomous body **Mera Yuva Bharat (MY Bharat)**.

Mera Yuva Bharat (MY Bharat)

- **About:** MY Bharat is an autonomous body.
- **Establishment:** 2023.
- **Ministry:** Ministry of Youth Affairs and Sports.
- **Aim:** It will serve as an overarching enabling mechanism powered by technology for youth development and youth-led development.
- **Objective:** The primary objective of Mera Yuva Bharat (MY Bharat) is to make it a whole Government platform for youth development.
- **Beneficiaries:** Youth in the age group of 15-29 years, in line with the definition of 'Youth' in the National Youth Policy.
- In the case of **programme components specifically meant** for adolescents, the beneficiaries **will be in the age group of 10-19 years**.
- It will provide equitable **access to youth to actualize their aspirations** and build Viksit Bharat across the entire spectrum of the Government.

Bigger, bolder, better MDBs: Expert group

Prashant Jha

letters@hindustantimes.com

WASHINGTON: To meet the objective of having bigger, better and bolder multilateral development banks (MDBs), the G20 independent expert group on the subject has laid out a vision where, by 2030, MDBs channel support through multi-year country platforms, process operations in half the time, work together as a system on regional and global approaches to global public goods (GPGs), triple lending volumes, quintuple private finance mobilisation, expand its use of guarantees, ensure simplified financing mechanisms, and provide automatic liquidity through debt and loan contracts in case of a disaster.

The independent expert group, which was led by former US treasury secretary Lawrence Summers and veteran Indian policymaker and chair of the 15th Finance Commission NK Singh, submitted volume two of its report, titled *The Triple Agenda: A Roadmap for Better, Bolder and Bigger MDBs*, to the ongoing fourth G20 finance ministers and central bank governors meeting in Marrakech during the annual meetings of World Bank and International Monetary Fund.

Volume one of the report, submitted to the G20 ministers in July in Gandhinagar, had recommended tripling the annual lending levels of MDBs to \$390 billion by 2030; adopting a triple mandate for MDBs of eliminating extreme poverty, boosting shared prosperity and contributing to global public goods; and expanding and modernising funding models. The final report has focused on three broad sets of rec-



NK Singh

tion calling for full and effective implementation of the 2030 agenda on sustainable development (the world has fallen behind in meeting SDGs), acceleration of efforts and enhancement of resources to meet Paris Agreement goals, and reforms for better, bigger and more effective MDBs, the expert group focused on how to realise these commitments. "The challenge we address in this report is how to move from individual sustainable projects to systematic programs of transformative change by 2030, matched with the right type and scale of financing," the report declared, adding that it cannot happen with a business-as-usual approach.

Better MDBs

The G20 expert group has said MDBs must rediscover where they add value, become more client-responsive, move faster, become cheaper, join hands with each other, and serve both middle-income and low-income countries with a different set of instruments.

The report calls on MDBs to adapt to multi-year country programmes by playing a supportive role, offering policy and regulatory advice in a focused manner,

figure up to \$40 billion by 2030.

In terms of additional instruments, the expert group recommended pooled portfolio guarantees, "under which participating donors provide first-loss coverage for default on specified portions of the MDB portfolio", which can result in an additional annual lending of \$11 billion. Hybrid capital can tentatively generate another \$29 billion a year.

The report also suggests a Global Challenges Funding Mechanism (GCFM) to target investors "that are seeking a vehicle to earn a financial return while also supporting SDGs, GPGs and other impact areas". In addition, the expert group suggests a mechanism for institutional investors to purchase hybrid capital bonds.

Entering the most controversial terrain in the domain of additional financing, which would require richer countries to support MDBs more, the report emphasises that the greatest expression of shareholder support is an increase in capital support and called for an initiation of the process.

Bolder MDBs

Suggesting that risk was a major reason for limited private investments in EDMs, the expert group has said that MDBs can play a role in partnering governments to mitigate and allocate this risk in global capital markets, particularly sovereign credit risk and policy/regulatory risk.

Given that only 10% of sustainable bond finance went to developing countries besides China, the report says it is time for the public and private arms of MDBs to "co-create" markets suitable for private investment, including

Context: The G20 independent expert group recently outlined a vision for bigger, better, and bolder multilateral development banks by 2030.

Multilateral Development Banks

- **About:** It is an international financial institution established by two or more countries with the aim of promoting economic development in less affluent nations.
- **Objective:** MDBs extend financial support to their member nations through loans and grants, which are utilized for projects that foster social and economic development, such as constructing infrastructure or providing clean water to communities.
- **Origin:** The roots of MDBs can be traced back to the post-World War II era when they were created to reconstruct war-torn countries and stabilize the global financial system.
- **Function:** Unlike commercial banks that prioritize profit generation from loans and financial services, MDBs focus on offering grants and low-interest loans to enhance the economic well-being of underprivileged or developing countries.
- **Major Multilateral Development Banks:** World Bank Group, International Monetary Fund, Asian Development Bank, New Development Bank, etc.

₹20 tn highway plan ready, may replace Bharatmala-2

Aim of the revised plan is to build more greenfield, access-controlled highways

Subhash Narayan
subhash.narayan@livemint.com
NEW DELHI

The second stage of the highway development programme Bharatmala may be withdrawn in favour of a ₹20 trillion, 20-year project, two persons aware of the development said. According to them, the new strategy is to move to the more ambitious Vision 2047 plan that would involve building 50,000 km of highways including about 30,000-35,000 km of fenced-off expressways, involving an investment of more than ₹20 trillion.

The government had finalized the more modest Bharatmala scheme in 2017, when the Cabinet approved the phase I programme.

Phase I involved construction of 34,800 km of highways that would link several of the existing road infrastructure while providing better connectivity to various industrial corridors.

Approval for phase 2 involving construction of just around 5,000 km of fenced-off highways with an investment of ₹3 trillion was expected this year as the ministry of road transport and highways (MoRTH) had finalized a note for the cabinet for quick approval.

"The thinking within the ministry now is to withdraw the Bharatmala stage 2 plan and move a fresh cabinet



It is hoped that the greenfield access-controlled highways will also substantially reduce logistics costs in the country.

access-controlled highways," MoRTH secretary Anurag Jain had told *Mint* in an interview earlier.

The ministry is working on its Vision 2047 document with the hope that the finance ministry would continue to plough record allocations for the sector in the coming years to help it complete capital intensive and long-gestation projects.

In the current year, MoRTH has been allocated a record ₹2.7 trillion, most of which would be used by state-run National Highways Authority of India (NHAI).

Efforts are also on by the ministry to attract private investment for greenfield roads by reviving the 'build own transfer' or BoT model that once drove the sector. This is expected to relieve pressure on the Centre.

Vision 2047 is likely to be much bigger than Bharatmala, with 30,000-35,000 km of access-controlled highways built before the 100th anniversary of Independence in 2047. In fact, the ministry expects to complete the work much earlier—in the next 13-14 years—if adequate funding is provided. The Vision programme is also likely to include the projects under Bharatmala.

As of July 2023, 47 expressways with a combined length of just over 5,000 km were operational, and around 9,000 km more were under construction.

note on the Vision 2047 plan which is in final stages of preparation with identification of new road alignments and completion of detailed project reports (DPR) for greenfield projects," said one of the two persons quoted above.

"The new Vision plan would also incorporate elements of Bharatmala 2 programme that also focuses on building a network of expressways across the country."

A query sent to MoRTH remained unanswered at press time.

MoRTH presented Vision 2047 to the council of ministers recently and hopes specific projects under it would

be separately approved by the cabinet soon, before a go-ahead is given to its implementation.

Though the total cost of all projects under the Vision plan is still being worked out, going by past record under Bharatmala, the investment may well exceed ₹20 trillion.

"We started building expressways on a large scale for the first time under Bharatmala programme. Later, a study suggested that building greenfield expressways would contribute substantially to reducing logistics cost in the country. So, under Vision 2047, we are looking at a network of greenfield

50,000
km of
highways
to be built

35,000
km of
access-controlled
expressways

Context: The recently proposed ₹20 trillion, 20-year project/plan (**Vision 2047 plan**) might replace the second stage of the **Bharatmala highway development programme**.

Key Features

- **Vision 2047 plan** which is in final stages of preparation with identification of new road alignments and completion of detailed project reports (DPR) for greenfield projects.
- The new Vision plan would also incorporate elements of Bharatmala 2 programme that also focuses on building a network of expressways across the country.

Bharatmala Project

- **About:** Bharatmala Pariyojana is an **umbrella program** for the highways sector envisaged by the Ministry of Road Transport and Highways that focuses on optimizing the efficiency of freight and passenger movement across the country.
- **Under Phase-I of Bharatmala Pariyojana**, the implementation of 34,800 km of national highways in 5 years (from 2017 to 2022) has been approved at an estimated outlay of Rs. 5,35,000 crore.
- The Bharatmala project envisions **improving the efficiency of the National Corridor** including the **Golden-Quadrilateral and North, South –East West corridors** by decongesting the choke points through the construction of elevated corridors, **bypasses, ring roads, lane expansion**, and logistics parks at identified points.
- The project plan includes the **construction of Border Roads** of strategic importance **along international boundaries** and International Connectivity roads to promote trade with Myanmar, Bangladesh, Bhutan, and Nepal.
- The program has **identified around 26,200 km of Economic Corridors or routes** that have heavy freight traffic.
- Emphasis on the **use of scientific and technological planning** for Project Preparation and Asset Monitoring.
- **Satellite mapping** of corridors to identify up-gradation requirements.

Dr. Vivek Joshi, Secretary, Department of Finance Services (DFS) chairs stakeholders meeting on Rural Infrastructure Development Fund (RIDF) in New Delhi

Context: The Secretary of the Department of Finance Services (DFS) chaired the stakeholder's meeting on the Rural Infrastructure Development Fund (RIDF) recently.

Rural Infrastructure Development Fund (RIDF)

- **Establishment**: The Rural Infrastructure Development Fund (RIDF) was established in 1995-96.
- **Implementing Agency**: The National Bank for Agriculture and Rural Development (NABARD) oversees RIDF.
- **Inception**: RIDF was introduced within NABARD as part of the Union Budget for 1995-96.
- **Objective**: RIDF aims to provide affordable financial support to State Governments and State-Owned Corporations to expedite ongoing projects related to medium and minor irrigation, soil conservation, watershed management, and other rural infrastructure initiatives.
- **Funding**: NABARD manages and maintains the fund.

NABARD

- **About**: It is an apex regulatory body for the overall regulation of regional rural banks and apex cooperative banks in India.
- **Establishment**: 1982.
- **Ministry**: Ministry of Finance, Government of India.
- **Owned by**: The Government of India.

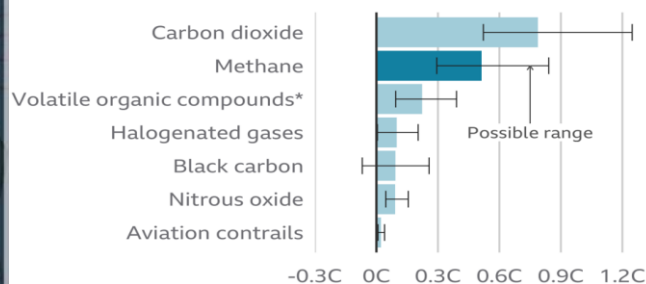
Targeted methane mitigation can avoid 0.1°C warming in 2050, should be adopted with decarbonisation efforts: Report

Context: According to a **new report**, recently, dedicated actions to reduce methane emissions are crucial to limit global warming to **1.5 degrees Celsius**.

- Methane is a powerful **greenhouse gas** and is estimated to have been responsible for 30 percent of the global warming since the **Industrial Revolution**, according to the report.
- Methane is the **primary reason** for ground-level ozone pollution

Methane is a major contributor to global warming

Contribution to warming in degrees Celsius



Figures are for contributions to 2010-2019 warming relative to 1850-1900
 *Volatile organic compounds and carbon monoxide

Methane Emissions

- Methane ranks as the **second most prevalent human-caused** greenhouse gas (GHG) following CO₂, contributing to approximately 20% of worldwide emissions.
- **Nearly half of all human-induced methane emissions** can be attributed to China, the United States, Russia, India, Brazil, Indonesia, Nigeria, and Mexico.
- **Due to methane's potent greenhouse gas** properties and relatively short atmospheric lifespan compared to carbon dioxide, substantial reductions could swiftly and significantly impact its potential for atmospheric warming.

Methane

- **Composition:** Methane, with the chemical formula CH₄, is the most basic hydrocarbon, comprising a **single carbon atom** and **four hydrogen atoms**.
- **Utility:** It serves as a globally employed fuel due to its flammable nature.
- **Greenhouse Gas:** Methane qualifies as a **potent greenhouse gas**.
- **Warming Potential:** Over its initial 20 years in the atmosphere, methane possesses over 80 times the heat-trapping capacity of carbon dioxide.

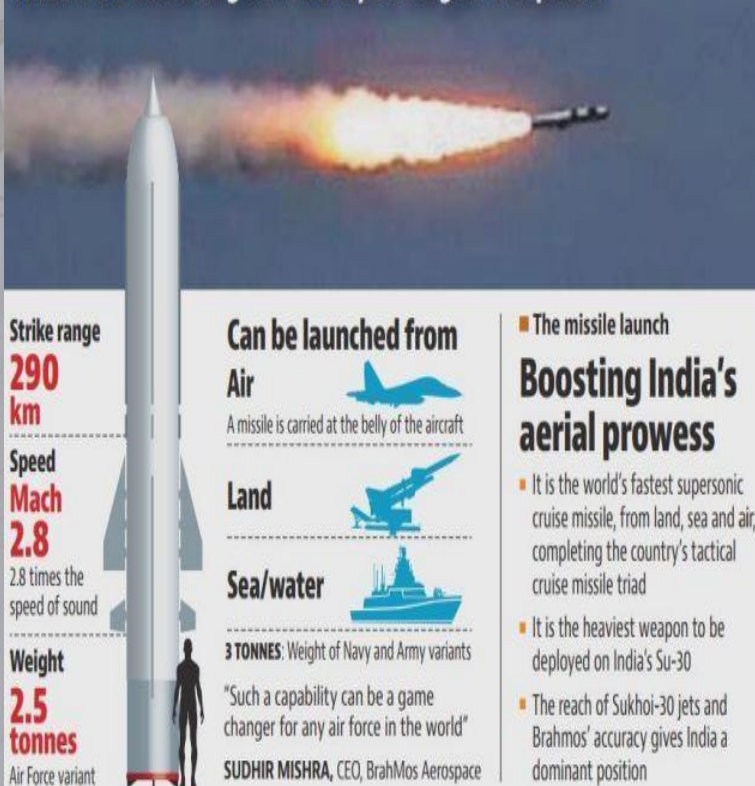
Emission by India

- India ranks as the **fourth-largest global methane emitter**, following China, the United States, and Russia.
- The **Global Methane Tracker 2022** reveals that agriculture contributes to 61% of total methane emissions in India, while the energy sector accounts for 16.4%, and waste for 19.8%.

Bull's Eye! Indian military undertakes successful test of BrahMos cruise missile variant – Watch video

INDIA COMPLETES MISSILE TRIAD

Air variant of BrahMos missile test-fired from a Sukhoi-30MKI fighter jet to hit a sea-based target in the Bay of Bengal. A snapshot:



Context: The Indian military recently conducted successful trials of the **BrahMos** supersonic cruise missiles.

BrahMos

- BRAHMOS represents a collaborative effort between India's Defence Research and Development Organisation (**DRDO**) and Russia's **NPOM**.
- The name **BRAHMOS** is derived from the rivers **Brahmaputra** and **Moskva**.
- The missile serves both Anti-Ship and Land-Attack roles through two variants.
- BrahMos operates at **Mach 2.8**, making it one of the **fastest cruise missiles**, with a launch weight ranging from 2,200 to 3,000 kg.
- Employing the "**Fire and Forget**" principle, it utilizes various flight modes enroute to its target.
- The missile incorporates stealth technology for reduced radar visibility and includes an **inertial navigation system (INS)** for targeting both ships and land.

GLOBAL HUNGER INDEX

(Syllabus: GS Paper 2 – Social Issues -Health)

India drops to 111 on Hunger Index, Centre slams 'malafide intent'

New Delhi: The long-festering fight between the government and two international NGOs over the prevalence of hunger in the country erupted again on Thursday, with the women and child development ministry trashing the Global Hunger Index, which ranked India 111 out of 125 countries with a score of 28.7.

In a sharp response, the ministry asserted that the index "continues to be an erroneous measure of hunger with serious methodological issues and shows a malafide intent". India was ranked 107 out of 121 last year with a score of 29.1.

As in several previous years, the two NGOs, Ireland's Concern World Wide and Germany's Welthungerhilfe, defended the ranking. TNN

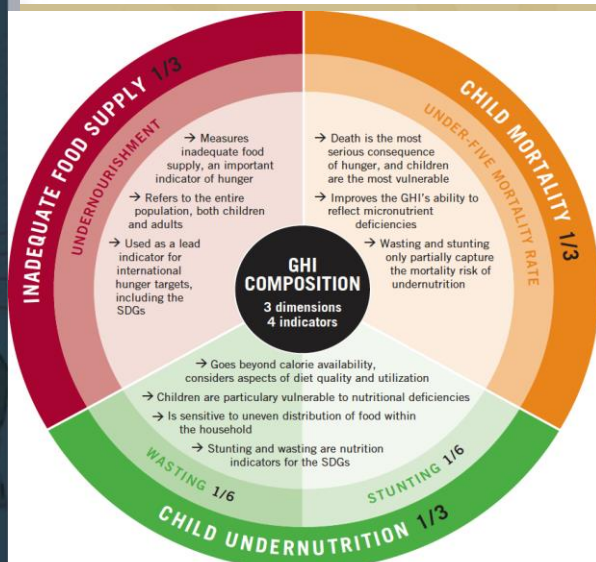
► Child-wasting rate, P 20

Context: India recently ranked **111th out of 125 countries** in the 2023 Global Hunger Index, with a **score of 28.7**, signalling a serious hunger concern.

- The country came after **neighbouring countries** Pakistan (102nd), Bangladesh (81st), Nepal (69th) and Sri Lanka (60th). However, India fared better than South Asia and Africa South of the Sahara, **which recorded a score of 27 each**.
- As per the index, **India also has the highest child wasting rate** in the world at 18.7 percent, **reflecting acute undernutrition**.

Global Hunger Index (GHI)

- **About:** The GHI serves as a comprehensive instrument for measuring and monitoring **hunger on a global, regional, and national scale**.
- **Objective:** The GHI is a tool designed to comprehensively measure and track hunger at global, regional, and national levels, reflecting multiple dimensions of hunger over time.
- **Published by:** Concern Worldwide and Welthungerhilfe
- **Calculation:** The GHI score for each country is determined by a formula that combines **four indicators to capture** the multidimensional nature of hunger:
 - **Undernourishment:** The percentage of the population with inadequate caloric intake.
 - **Child stunting:** The percentage of children under the age of five with below-average height for their age, indicating chronic undernutrition.
 - **Child wasting:** The percentage of children under the age of five with below-average weight for their height, indicating acute undernutrition.
 - **Child mortality:** The percentage of children who die before their fifth birthday, reflecting a combination of insufficient nutrition and unhealthy environments.



NASA finds proof of carbon, water in asteroid Benu samples

OSIRIS-REx THE MISSION

WHAT WILL THE OSIRIS-REx MISSION DO?

- Collect a sample from a near-Earth asteroid called Benu, and return the sample to Earth for study.
- Help scientists better determine the orbit of the asteroid.
- Acquire knowledge about the asteroid's composition, which could give clues about how planets formed and how life began.

SCIENTIFIC OBJECTIVES

- Collect a sample and return it to Earth
- Map the asteroid
- Determine Benu's physical and chemical properties
- Measure the orbit deviation caused by sunlight (the Yarkovsky effect)
- Compare observations with data from telescopes

CANADIAN CONTRIBUTION

The OSIRIS-REx Laser Altimeter (OLA) is the Canadian contribution to the spacecraft. OLA will make a 3D map of Benu and sleuth out the best site for a sample.

WHY ASTEROID BENNU?

- 1 PROXIMITY TO EARTH**
Every six years, Benu's orbit brings it near Earth – less than 450,000 km away. Its orbit allows a spacecraft to travel there and back safely.
- 2 SIZE**
Asteroids less than 200 m wide spin very quickly, which makes it difficult for a spacecraft to safely interact with them. Benu is nearly 500 m in size and revolves once every 4.3 hours, slowly enough to collect a sample.
- 3 COMPOSITION**
Scientists will be able to analyze the asteroid's chemistry and mineralogy to learn more about its composition and how it compares to other asteroids.

MISSION TIMELINE

2016	2018	2020	2023
LAUNCH	ENCOUNTER 19 months collecting data and preparing for sample collection.	SAMPLE COLLECTION, JULY 2020 3 ATTEMPTS Bringing a sample to Earth will allow scientists to study Benu for decades using highly sophisticated instruments and techniques.	RETURN TO EARTH

Canadian Space Agency / Agence spatiale canadienne

Context: Recently returned samples from **asteroid Benu** suggest potential building blocks of life on Earth, with **evidence of high-carbon content** and water-bearing clay minerals.

Asteroid Benu

- Situated approximately **200 million miles from Earth**.
- **Discovered in 1999** by the NASA-funded Lincoln Near-Earth Asteroid Research team.
- **Classified as a B-type asteroid**, indicating a high carbon and mineral content.
- Estimated to have **20-40 percent of its interior as empty space**, suggesting it formed within the first 10 million years of the solar system's existence, making it around 4.5 billion years old.
- Believed to have originated in the **Main Asteroid Belt between Mars and Jupiter**, and its orbital dynamics are gradually bringing it closer to Earth due to gravitational interactions and the Yarkovsky effect, caused by absorbed sunlight.

OSIRIS-Rex Mission

- Launched **by NASA in 2016**, the OSIRIS-Rex Mission, or the Origins Spectral Interpretation Resource Identification Security - Regolith Explorer, embarked on a voyage to Benu.
- It journeyed to the **near-Earth asteroid Benu** with the goal of returning a sample to Earth for study.
- This **mission aims to aid scientists** in studying planetary formation, the origins of life, and enhancing our comprehension of asteroids with potential Earth impact.

Secure Top Rank with the **IAShub** Courses

Prelims 2023 Courses

01

Prelims Crash Course
Score Enhancement
Program (SEP)

02

INA Current Affairs
(Prelims)

03

TACKLE - Prelims
Test Series

04

Geography - Prelims
Crash Course

Quality Enrichment Courses (Mains 2023)

01

Quality Enrichment Program (QEP)

02

Science of Answer Writing (SAW)

Prelim Cum Mains 2024 Courses

01

NEEV GS Foundation 2024/25

02

INA Current Affairs Pre Cum Mains - 2024

FREE



Download PDF



Login to theiashub.com



**Aaj Ka
Quality Enrichment**
(Toppers' Favourite PDF)



News-CRUX-10
(10 News. 10 Sources. One Place)



Monthly Editorials
(The Hindu & Indian Express)



Daily Quiz (Prelims)



**Government Schemes &
Ministry Wise Year End
Review**



Free Enrichment PDFs
(Tailor Made Crisp Study Material)

FREE

**India's Best Answer Writing Sessions
with**



Ritika Jindal



Simi Karan



Gaurav Budania



Mridul Shivhare

IAS OFFICERS

Log On To Our Unique
Free Answer Writing Sessions with Toppers (FAST) Portal
& Start Practicing!



**SCAN
HERE**



9560082909



t.me/theiashub



www.theiashub.com



/mkyadav



www.theiashub.com