ForumIAS

7 PM COMPILATION

February, 2023

Features of 7 PM compilation

- Comprehensive coverage of a given current topic
- Provide you all the information you need to frame a good answer
- Critical analysis, comparative analysis, legal/constitutional provisions, current issues and challenges and best practices around the world
- Written in lucid language and point format
- Wide use of charts, diagrams and info graphics
- Best-in class coverage, critically acclaimed by aspirants
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- Best cost-benefit ratio according to successful aspirants

India-Egypt Relationship – Explained, pointwise
Topic:- International Relations
Sub topic:- Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

Economic Survey 2022-23: Key Highlights – Explained, pointwise
Topic:- Economic development
Sub topic:- Government Budgeting

Union Budget 2023-24: Key Highlights – Explained, pointwise
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Working of the MGNREGS: Challenges and Solutions – Explained, pointwise
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MSMEs: Significance, Challenges and Solutions – Explained, pointwise
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Sub topic:- changes in industrial policy and their effects on industrial growth

Energy Transition: Challenges and Solutions – Explained, pointwise
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Microfinance: Status, Benefits, Challenges and Solutions – Explained, pointwise
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Disinvestment in India: Trends and Challenges – Explained, pointwise
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Gender Budgeting: Status, Benefits and Challenges – Explained, pointwise
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Biogas: Advantages and Challenges – Explained, pointwise
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Domestic Workers in India: Status and Issues – Explained, pointwise
Topic:- Economic development
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[Kurukshetra February 2023 Summary] Decarbonisation of Transport Sector – Explained, pointwise
Topic:- Economic development
Sub topic:- Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

Issues with Mental Health and Mental Healthcare in India – Explained, pointwise
Topic:- Social Justice
Sub topic:- Issues relating to development and management of Social Sector/Services relating to Health

[Yojana February 2023 Summary] Youth and Health – Explained, pointwise
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Generative AI (Artificial Intelligence): Benefits and Challenges – Explained, pointwise
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Lithium Reserves in India: Strategic Significance and Concerns – Explained, pointwise
Topic:- Human and Economic Geography
Sub topic:- Distribution of key natural resources across the world (including South Asia and the Indian sub-continent)

Global Sea Level Rise: WMO Report – Explained, pointwise
Topic:- Environment and Bio-diversity
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Adoption of EVs: Challenges and Solutions – Explained, pointwise
Topic:- Science and Technology
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Domestic Manufacturing of APIs (Active Pharmaceutical Ingredients): Status, Challenges and Solutions – Explained, pointwise
Topic:- Economic development
Sub topic:- changes in industrial policy and their effects on industrial growth

[Kurukshetra February 2023 Summary] Powering Growth in Agriculture Sector – Explained, pointwise

Topic:- Economic development

Sub topic:- storage, transport and marketing of agricultural produce and issues and related constraints

Winter Heatwaves – Explained, pointwise

Topic:- Geophysical Phenomena

Sub topic:- Geophysical Phenomena

The Issue of Menstrual Leaves – Explained, pointwise

Topic:- Social Justice

Sub topic:- mechanisms, laws, institutions and Bodies constituted for the protection and betterment of vulnerable sections.

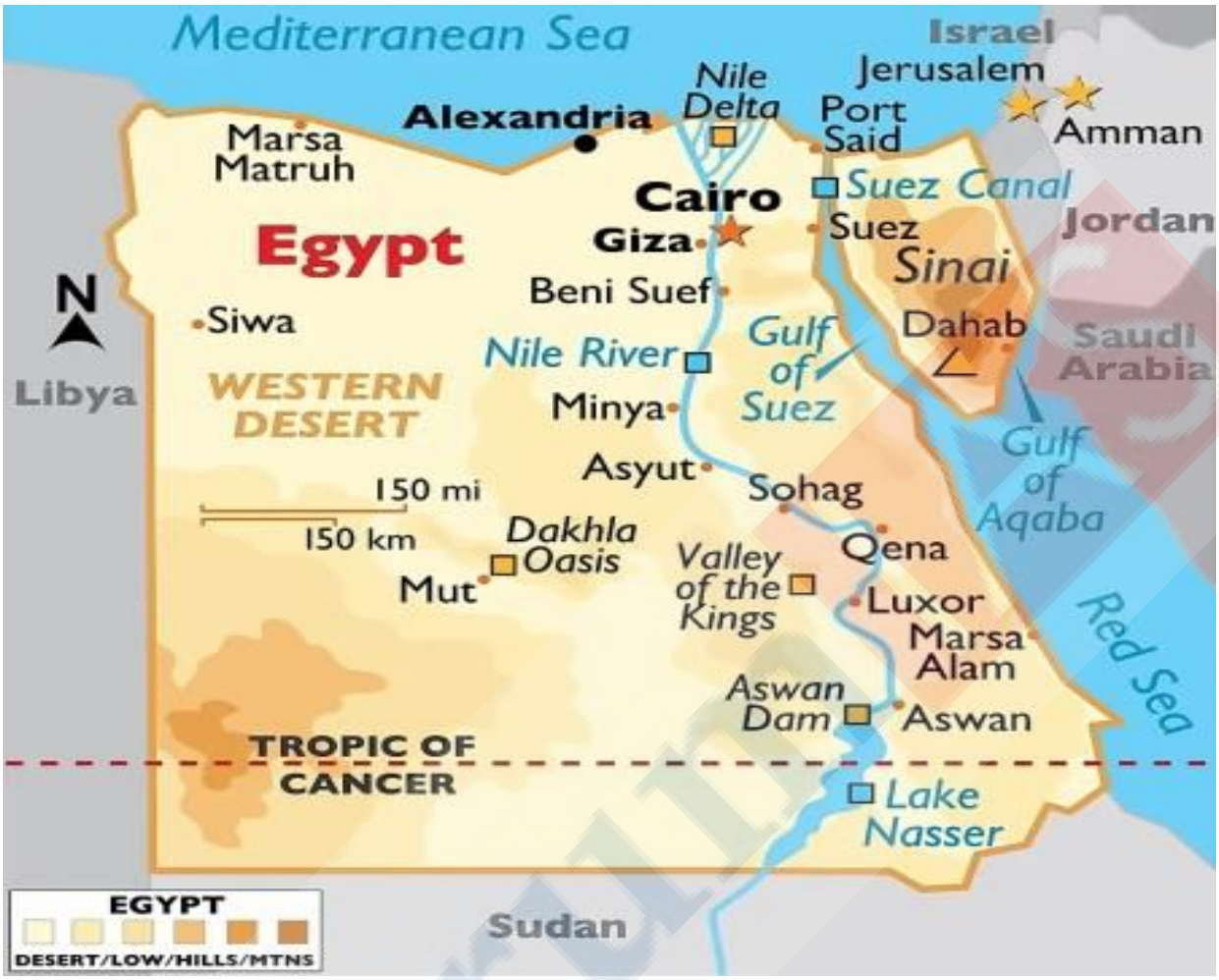
India-Egypt Relationship – Explained, pointwise

Introduction

The President of Egypt, Abdel Fattah El-Sisi was the Chief Guest at India's 74th Republic Day celebrations this year. In his meeting with the Prime Minister of India, the two nations agreed to elevate the India-Egypt Relationship to 'strategic partnership'. The strategic partnership will have broadly four elements: political, defence, and security; economic engagement; scientific and academic collaboration; cultural and people-to-people contacts. Egypt's presence at the Republic Day celebrations symbolizes the importance India accords to this relationship. The Government has pushed to enhance India's bilateral relationships with the Middle-East nations with a renewed vigour over the last decade, indicating strategic importance of the region to India's interests. Outreach to Egypt is a part of this approach.

What is the significance of Egypt to India?

Egypt's Strategic Location: The Suez Canal is a major transportation link in marine trade, handling about 12% of all international trade. It serves as a gateway to both Europe and Africa. India's business community can profit from Egypt's advantageous location as a hub for production and re-export to numerous nations connected by his nation's free trade agreements, particularly in the Arab world and Africa.



Source: ***WorldAtlas.com***

Energy Resources: India is a significant importer of Egyptian crude oil and natural gas. Petroleum Oil (46.2%) and Petroleum Gas (11.1%) were India's top imported items from Egypt in fiscal 2020-21. Egypt can be a reliable partner in fulfilling India's energy needs.

Egypt's Influence in the Arab World: The League of Arab States (Arab League) is headquartered in Cairo, the capital of Egypt, demonstrating its influential position in the Arab world. Arab League includes countries like Saudi Arabia, UAE, Oman, Bahrain, Iraq, Kuwait etc. among other, all of which have strategic importance. Furthermore, Egypt has productive diplomatic ties with the West. India views Egypt's diplomatic capital as extremely important. India can anticipate Egypt, as a responsible Arab power, providing the necessary assistance to it in contentious situations.

Egypt's Influence among the Islamic Nations: India views Egypt as a moderate Islamic voice among Muslim-majority countries, as well as a 'friend' within the Organisation of Islamic Cooperation (OIC). OIC is the 57-country grouping of Islamic nations. Pakistan, being a member of the OIC, uses its meetings as a platform to spread negative propaganda against India.

Shared Concerns: Both India and Egypt view the spread of violence, terrorism, and extremist ideology as a serious threat to global peace.

How has the India-Egypt Relationship evolved?

India and Egypt are home to world's oldest civilizations. They have had a long and fruitful history of cultural exchange e.g., **Ashoka's edicts** from before the Common Era make mention of his interactions with Egypt during the reign of Ptolemy II. In the Pre-Independence era, Mahatma Gandhi and Saad Zaghloul shared **common goals on the independence** of their countries. (*Saad Zaghloul was an Egyptian revolutionary and statesman. He led a civil disobedience campaign with the goal of achieving independence for Egypt from British rule. He played a key role in the Egyptian Revolution of 1919, as well as played a role in prompting the British Unilateral Declaration of Egyptian Independence in 1922).* Prime Minister Jawaharlal Nehru had an exceptionally close friendship with President Gamal Abdel Nasser of Egypt, leading to a **Friendship Treaty** between the two countries in 1955.

India **established its relationship with Egypt immediately after Independence** with the joint announcement of establishment of diplomatic relations at Ambassadorial level on 18 August, 1947.

In 1961, Prime Minister Nehru and President Nasser, along with Yugoslavia's President Josip Broz Tito, Indonesia's President Sukrano and Ghana's President Kwame Nkrumah, **established the Non-Aligned Movement (NAM)**. Between 1980 and 2010, there have been four Prime Ministerial visits from India to Egypt in 1985, 1995, 1997 and 2009. From Egypt, President Hosni Mubarak visited India in 1982, in 1983 (NAM Summit), and in 2008. High level exchanges with Egypt have continued after the 2011 Egyptian Revolution. President Mohamed Morsi visited India in March 2013. The incumbent President Sisi came to power in 2014 and had visited India earlier in 2016.

Year 2022-23 marks 75th anniversary of modern diplomatic relationship between India and Egypt. Keeping in mind the strategic importance of India-Egypt Relationship, **Egypt has also been invited as a 'Guest Country' during India's Presidency of G-20 in 2022-23**.

What are the areas of cooperation in India-Egypt Relationship?

Trade and Investments: The **India-Egypt Bilateral Trade Agreement** has been in operation since March 1978 and is based on the Most Favoured Nation clause. Bilateral trade has expanded rapidly in FY2021-22, amounting toUS$ 7.26 billion registering a 75% increase compared to FY 2020-21. India's exports to Egypt during this period amounted to US$ 3.74 billion. Egypt's exports to India have touched US$ 3.52 billion. According to the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS), India was the 6th most important trading partner for Egypt in FY2021-22. India imports Mineral Oil/Petroleum, Fertilizers, Inorganic Chemicals and Cotton.

At present, more than **50 Indian companies have investments in Egypt** totalling more than **US$ 3.15 billion**. There are many potential projects to establish overseas investments like the Metro projects in Cairo and Alexandria, the Suez Canal economic zone, the second Suez Canal channel, and a new administrative capital in Cairo's suburbs among others. The Egyptian Government is considering allocating a special area of land in the Suez Canal Economic Zone (SCEZ) for Indian industries.

Russia-Ukraine conflict had threatened Egypt with a **shortage for wheat**, 80% of which is imported from Russia and Ukraine. In April 2022, Egypt announced inclusion of India in the list of accredited wheat suppliers to Egypt and ended a long **Non-Tariff Barrier**. However, a ban on

wheat exports from India limited the trade, an initial shipment of 61,500 metric tons of wheat was cleared by India for Egypt in May 2022.

Bilateral mechanisms are in place to facilitate trade and economic relations between India and Egypt. The Indian Mission to Egypt regularly holds meetings at various fora for commercial collaboration.

Technical and Scientific Cooperation: The Government has been undertaking several projects related to technical and scientific cooperation like the **Pan Africa e-Network Project**, **Pan Africa Tele-medicine and Tele-education** project (Alexandria University), **Solar electrification** project(Agaween village) and Vocational Training Centre for **Textile Technology** (Shoubra, Cairo), **IT Centre** in Al Azhar University, CEIT, etc. ICAR and the Agricultural Research Center of Egypt are working in the field of **agricultural research**. 'Science & Technology' cooperation is implemented through biennial Executive Programmes and Scientific Cooperation Programme between CSIR (India) and NRC (Egypt).

Space cooperation is an emerging vertical of cooperation in India-Egypt Relationship. Joint Working Group meetings and discussions between **ISRO and NARSS** (National Authority for Remote Sensing and Space Sciences) have been held, since 2008. Egypt has establish EgSA (Egyptian Space Agency) in 2019 and both sides are exploring possibilities for collaboration.

Defence Relations: Egypt and India enjoy cordial defence relationship. There was close cooperation between the Air Forces, with **joint development of a fighter aircraft in 1960s**. IAF pilots also trained Egyptian pilots from 1960s until 1984. Since 2015, there have been several high-level exchange of visits by defense delegations. India and Egypt undertake multiple bilateral exercises for all three services on a regular basis.

Cultural Relationship: The **Maulana Azad Centre for Indian Culture** (MACIC) was set up in Cairo in 1992 to **promote cultural cooperation** between the two countries, through the implementation of the **Cultural Exchange Programme** (CEP). The Centre, in addition to popularizing Indian culture through Hindi, Urdu and Yoga classes and the screening of movies, also organizes cultural festivals. The **'India by the Nile' (IBN) annual cultural festival has emerged as the largest foreign festival in Egypt**. The strong ties between India and Egypt are evident from the affection towards India amongst the population. Three streets in Cairo are named after Indian leaders namely, Mahatma Gandhi, Pandit Nehru and Dr. Zakir Hussein.

At present, the Indian community in Egypt numbers at ~3200, most of whom are concentrated in Cairo. A majority of the Indians are either employed with Indian companies or are professionals with various MNCs. About 400 Indian students are studying in Egypt, mainly in Al Azhar University with around 275 students, and the rest in Ain Shams Medical University and Cairo University.

What are the challenges in India-Egypt Relationship?

First, Egypt is being seen as **getting close to China**. The Egyptian President has **visited China seven times in the past eight years**, including for the Beijing 2022 Winter Olympics. China-Egypt trade is more than double of India-Egypt bilateral trade. Chinese investments outnumber India's investments. Chinese influence over Egypt is not a good development from Indian perspective.

Second, Egypt is facing **domestic economic instability**. The Government is battling high inflation of 21%, which has resulted in historically high prices of commodities and daily-use

items. Forex reserves are also in bad shape. Prolonged economic instability may lead to mass discontent and movement similar to 2011 revolution. A new regime (like that came to power in 2013) may not be in India's strategic interests.

What can be done to strengthen India-Egypt Relationship?

First, India and Egypt had lead the way in establishing NAM in the 1950s. Amidst geopolitical uncertainties of present times, India and Egypt should collaborate to **strengthen the South-South Cooperation** and call for a rules-based global order. India's invitation to Egypt is a welcome step in this regard. Both countries can act as voice of Global South. India PM had remarked in 2015 that India and Egypt should work together to **reform the UN Security Council**.

Second, India should scale-up its investments in Egypt. Egypt is a gateway to both Arab World and Africa. Closer economic ties with Egypt can pave way for greater investments and **cooperation with African nations**.

Third, India should look to **expand the scope of defense relationship** from bilateral exercises to joint development/manufacturing projects. Egypt can be a potential destination for **India's defense exports**.

Fourth, India and Egypt should enhance cooperation to counter terrorism and radicalism.

Conclusion

Egypt holds strategic importance for India. Both nations have shared a strong relationship since ancient times. India and Egypt were the leading countries for the NAM. However, the India-Egypt relationship had witnessed a phase of inactivity and passiveness after the 1990s. There is need to renew the relationship with a new vigour. India and Egypt should collaborate to strengthen the voice of Global South at the global level and push for a rules-based global order in a multipolar world.

Syllabus: GS II, India and its neighbourhood relations.

Source: **Indian Express**, **Indian Express**, **The Hindu**, **MEA**, **MEA**

Economic Survey 2022-23: Key Highlights – Explained, pointwise

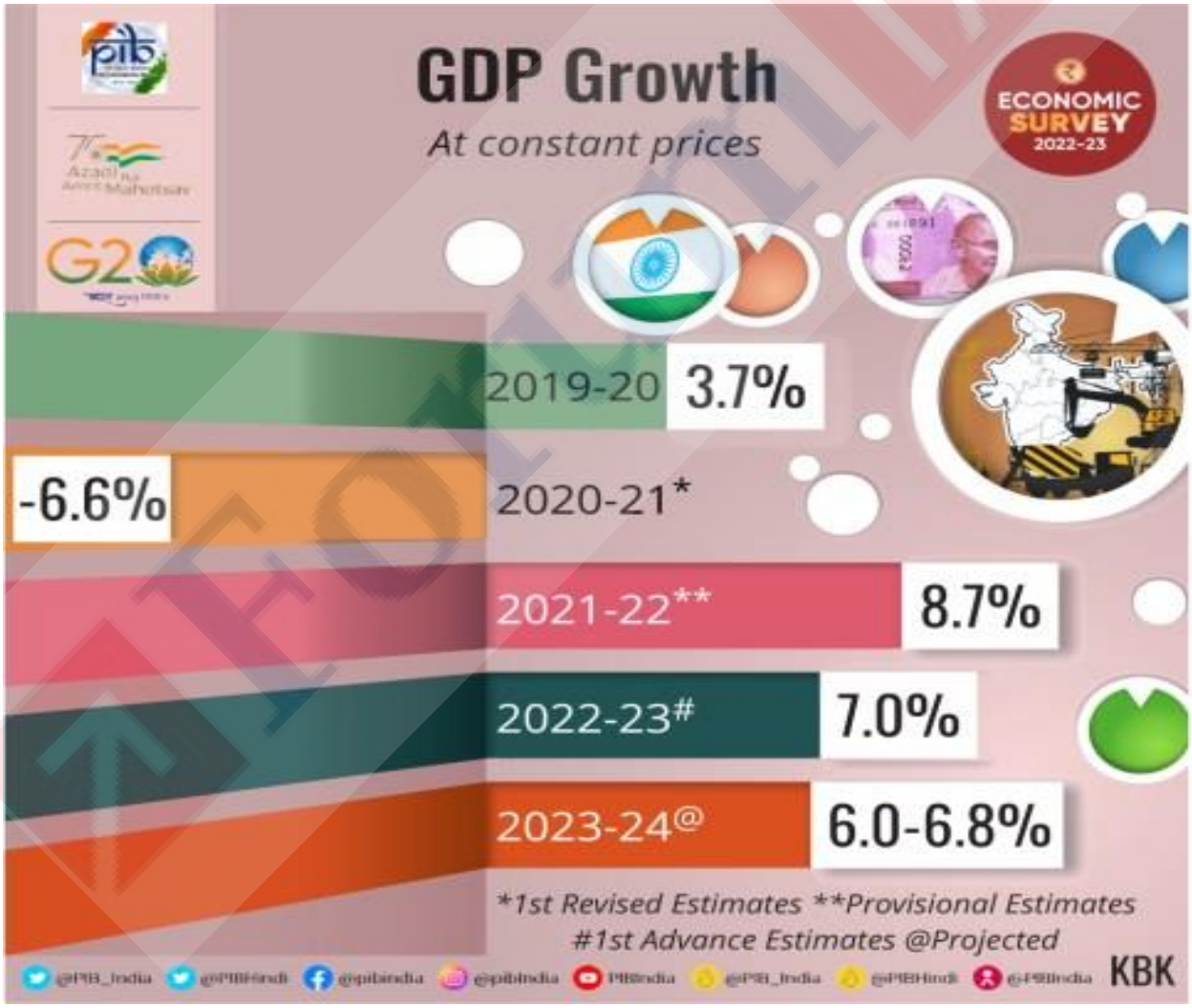
Introduction

The Economic Survey 2022-23 was tabled in the Parliament by the Union Finance Minister on January 31, 2023. The document has been prepared by the Economic Division of the Department of Economic Affairs (DEA). The Survey provides a detailed report of the national economy for the year along with forecasts. It touches upon everything from agriculture to unemployment to infrastructure. The comments, recommendation or policy solutions contained in the Survey are **not binding on the Government**. The document projects a baseline GDP growth of 6.5% in real terms in FY2023-24. The projection is broadly comparable to the estimates provided by multilateral agencies such as the World Bank, the IMF, the ADB etc. Growth is expected to be brisk in FY2023-24 driven by increased credit (loan) disbursal by banks and pick-up in investments. Further support to economic growth will come from the expansion of public digital platforms and path-breaking measures such as **PM *GatiShakti***, the **National Logistics Policy**, and the **Production-Linked Incentive** schemes to boost manufacturing output.

Key Highlights of the Economic Survey 2022-23

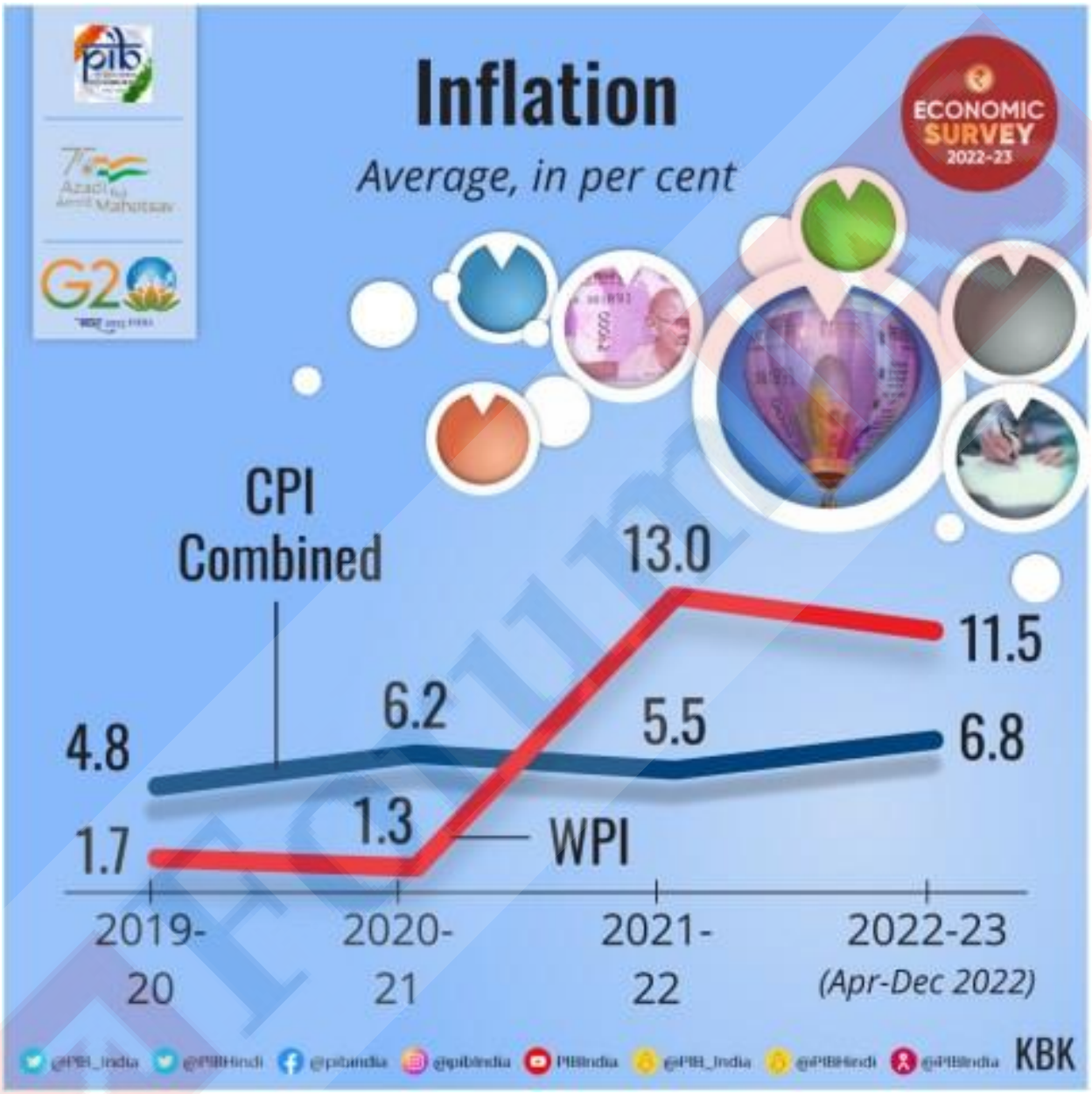
GDP Projections: In real terms, the economy is expected to grow at 7% for the year ending March 2023. (FY2022-23). This follows an 8.7% growth in the previous financial year, FY2021-22. The baseline GDP growth for 2023-24 has been projected at 6.5% in real terms. The survey has projected growth will be between 6.0%-6.8%, depending on the trajectory of economic and political developments globally.

India's growth outlook arises from : **(a)** Limited health and economic fallout for the rest of the world from the recent surge in COVID-19 infections in China and, therefore, continued **normalisation of supply chains**; **(b)** Inflationary impulses from the **reopening of China's economy** turning out to be neither significant nor persistent; **(c)** Recessionary tendencies in major Advanced Economies (AEs) triggering a cessation of monetary tightening and a return of capital flows to India amidst a stable domestic inflation rate below 6% (i.e., possibility of recession in developed countries has made their Central Banks (including US Fed) to slow down/stop the interest rate hikes, which will increase capital flow into India). This has improved investment sentiment in India.



Source: PIB

Inflation: India's retail inflation rate peaked at 7.8% in April 2022, above the Reserve Bank of India's (RBI) upper tolerance limit of 6%. Yet it was one of the lowest in the world. The inflation could be controlled through RBI's measured actions of calibrated interest rate hikes and controlling inflation expectations through regular communication.

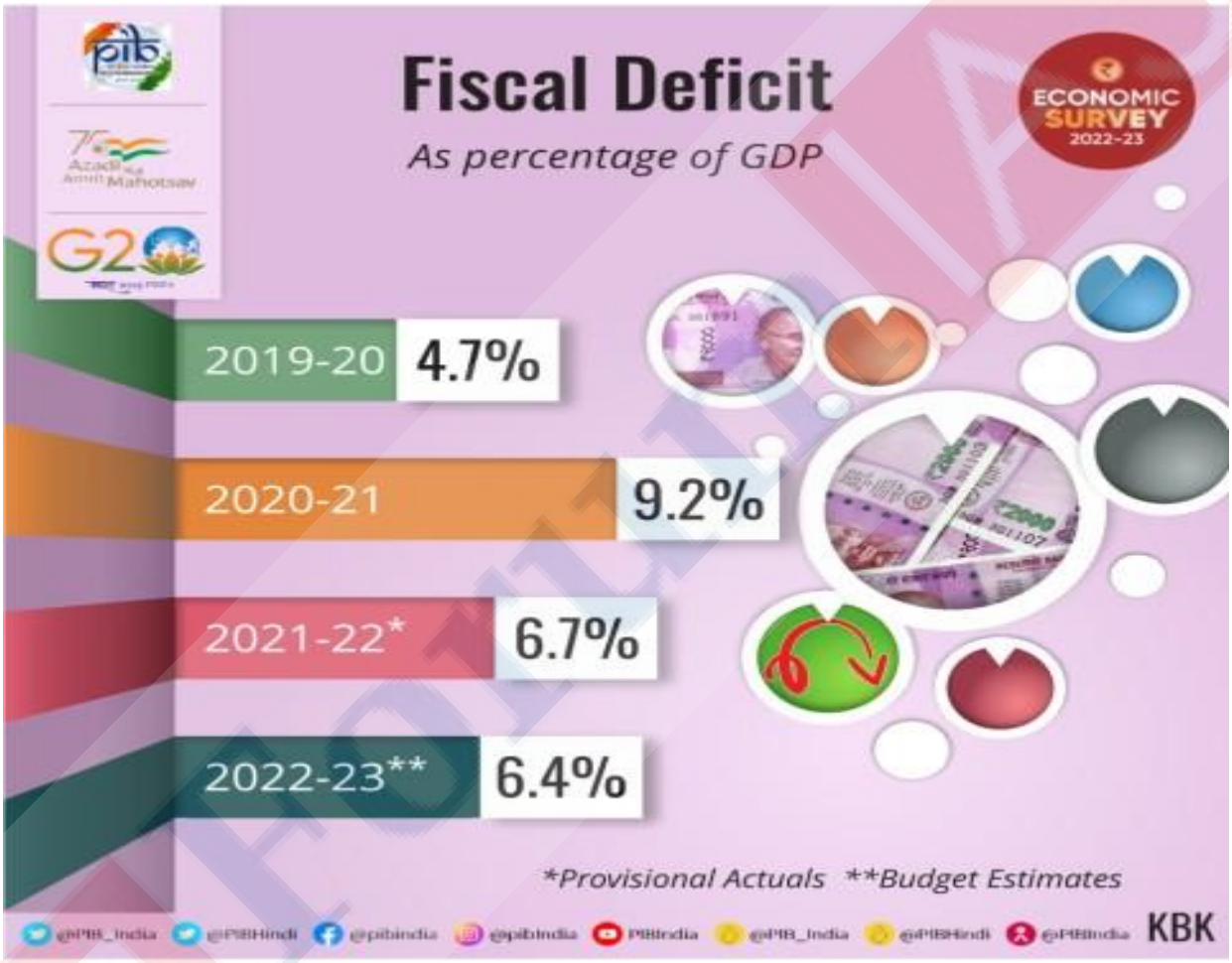


Source: PIB

Fiscal Developments: The Government's finances showed a resilient performance during the year, aided by the **recovery in economic activity**, buoyancy in revenues from direct taxes and goods and services tax (GST). The gross tax revenue registered a year-on-year growth of 15.5% from April to November 2022, driven by **robust growth in the direct taxes and GST**. **GST stabilised as a vital revenue source** for the Union and State Governments, with gross GST collections increasing 24.8% on a year-on-year basis from April to December 2022.

The Government's emphasis on Capital Expenditure (Capex) continued despite higher revenue expenditure requirements during the year. The Centre's capex rose from a long-term average of 1.7% of GDP (FY2008-09 to FY2019-20) to 2.5% of GDP in FY2021-22. Budgeted capital expenditure has risen 2.7 times in the last 7 years, from FY2015-16 to FY2022-23, re-invigorating the Capex cycle. The Government's capex-led growth strategy will enable India to keep the growth-interest rate differential positive, leading to a sustainable debt to GDP ratio in the medium run.

Despite capex push, the Government has been able to restrict **fiscal deficit** to the budgeted 6.4% of the GDP.



Source: PIB

Monetary Management: The Economic Survey 2022-23 observes that Monetary tightening by the RBI since April 2022 has led to a **moderation of surplus liquidity conditions**. The growth in credit off take is expected to sustain, and combined with a pick-up in private capex, will usher in a virtuous investment cycle (i.e. credit (loans) taken by corporate/private sector is rising, which is expected to boost investment in the economy). Credit disbursed by non-banking financial companies has also been on the rise. The gross non-performing assets ratio of scheduled commercial banks fell to a seven-year low of 5.0%.

Social Infrastructure and Employment: Government spending on the social sector witnessed a significant increase from INR 9.1 lakh crore in 2015-16 to INR 21.3 lakh crore in 2022-23. The Union and State Governments' budgeted expenditure on the health sector touched 2.1% of GDP in 2022-23 in the budget estimate and 2.2% in 2021-22 in the revised estimate.

The **JAM Trinity** (Jan-Dhan, Aadhaar and Mobile), combined with **Direct Benefit Transfers** (DBT), has **brought the marginalised sections of society into the formal financial system**, revolutionising the path of transparent and accountable governance by empowering the people. Aadhaar played a vital role in **developing the CoWIN platform** and in the transparent administration of over 2 billion vaccine doses. Due to several steps taken by the government on health, out-of-pocket expenditure as a percentage of total health expenditure declined from 64.2% in 2013-14 to 48.2% in 2018-19.

Source: PIB

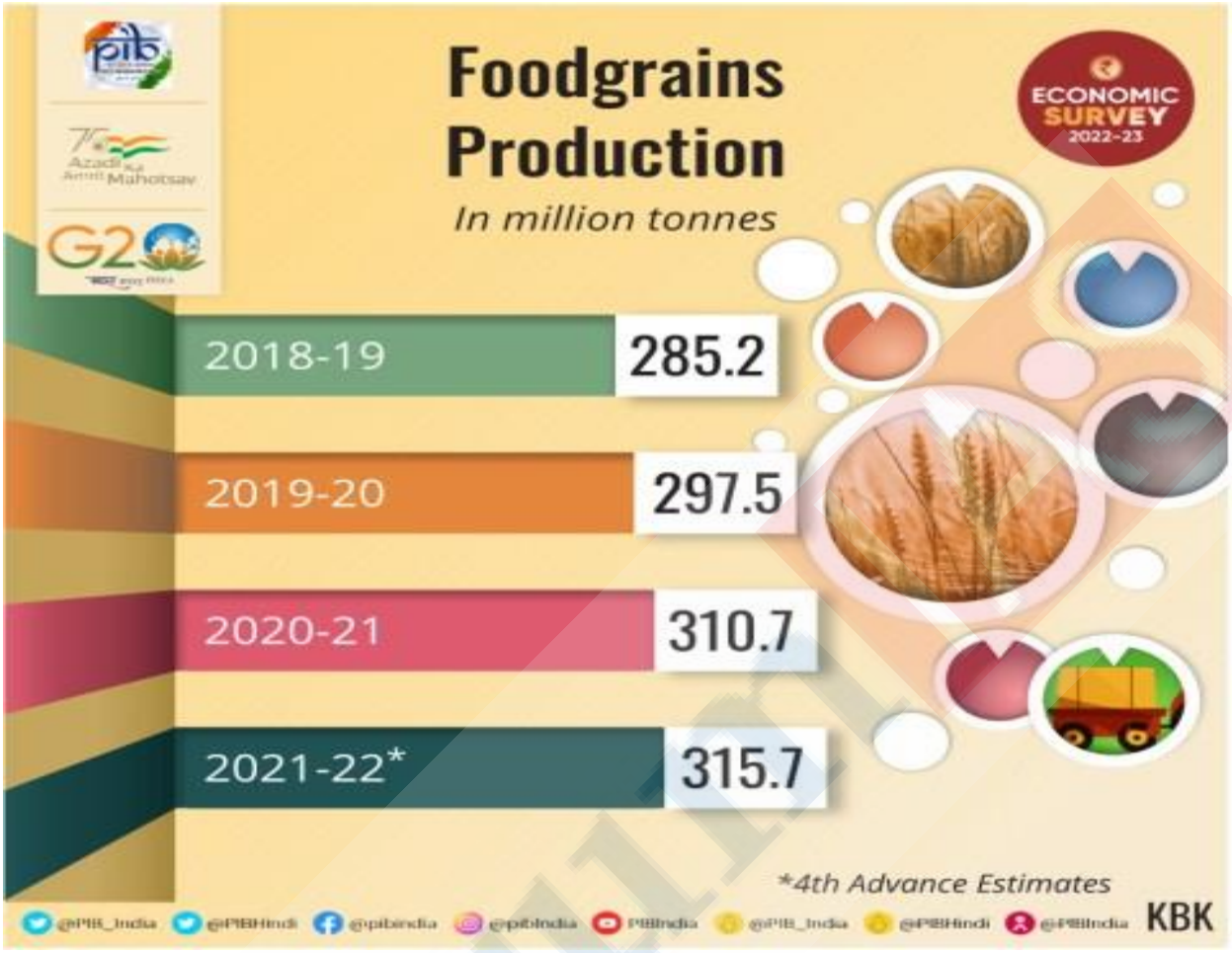
Labour markets recovered beyond pre-Covid levels, in both urban and rural areas, with **unemployment rates** falling from 5.8% in 2018-19 to 4.2% in 2020-21.

Source: PIB

Agriculture and Food Management: The performance of the agriculture and allied sector has been buoyant over the past several years, due to the measures taken by the government to **augment crop and livestock productivity**, ensure certainty of returns to farmers through **price support**, promote crop diversification, improve market infrastructure through the impetus provided for the setting up of **farmer-producer organisations** and promotion of investment in infrastructure facilities through the Agriculture Infrastructure Fund.

Source: PIB

According to the Economic Survey 2022-23, Private investment in agriculture rose to 9.3% in 2020-21. Institutional credit to the agricultural sector continued to grow to INR 18.6 lakh crore in 2021-22. The minimum support price for all mandated crops was fixed at 1.5 times of the all-India weighted average cost of production from 2018. Food grain production in India saw sustained increase and stood at 315.7 million tonnes in 2021-22.

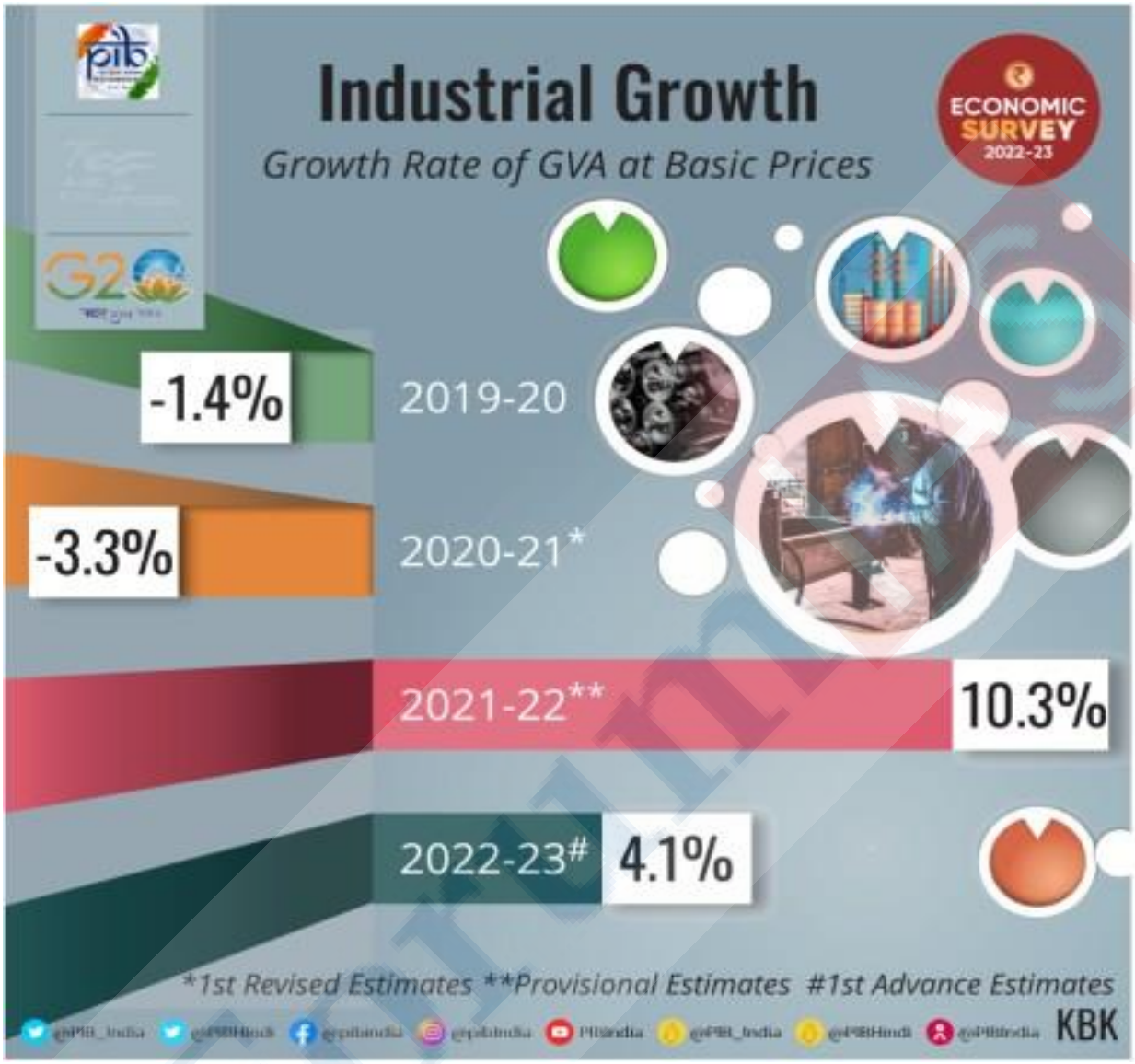


Source: PIB

Industry: Overall gross value added by the industrial sector (for the first half of 2022-23) rose 3.7%, which is higher than the average growth of 2.8% achieved in the first half of the last decade. Robust growth in private final consumption expenditure, **export stimulus** during the first half of the year, increase in investment demand triggered by **enhanced public capex** and **strengthened bank and corporate balance sheets** provided a demand stimulus to industrial growth.

Credit to micro, small and medium enterprises(MSME) has grown by an average of around 30% since January 2022 and credit to large industry has grown in double digits since October 2022. Electronics exports rose nearly threefold, from US$ 4.4 billion in 2018-19 to US$ 11.6 billion in 2021-22. India became the **second-largest mobile phone manufacturer globally**, with the production of handsets rising to 29 crore units in 2020-21 from 6 crore units in 2014-15.

The production-linked incentive (PLI) schemes were introduced across 14 categories, with an estimated capex of INR 4 lakh crore over the next five years, to plug India into global supply Investment of INR 47,500 crores has been seen under the PLI schemes in 2021-22, which is 106% of the designated target for the year.



Source: PIB

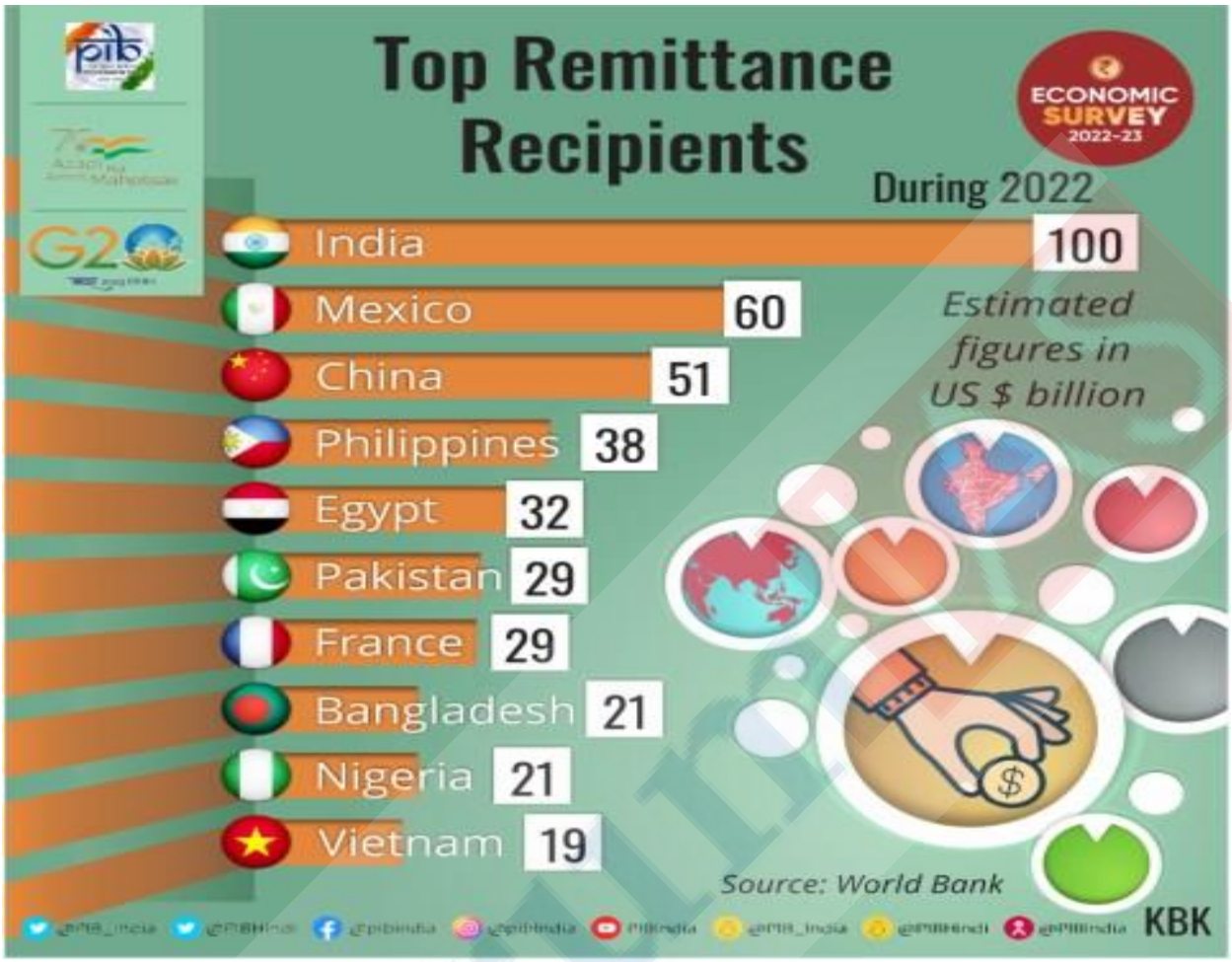
Services: The **services sector** is expected to grow at 9.1% in 2022-23, as against 8.4% in 2021-22. India was among the top ten services exporting countries in 2021, with its share in world commercial services exports increasing from 3% in 2015 to 4% in 2021.

Contact-intensive services are set to reclaim pre-pandemic-level growth rates in 2022-23. Hotel occupancy rates have improved from 30-32%t in April 2021 to 68-70% in November 2022. The **tourism sector** is showing signs of revival, with foreign tourist arrivals in India growing month-on-month. Sustained growth in the **real estate sector** is taking housing sales to pre-pandemic levels, with a 50% rise between 2021 and 2022. India's e-commerce market is projected to grow at 18% annually through 2025.

Source: PIB

External sector: Merchandise exports were $332.8 billion for April-December 2022. India has diversified its markets and increased its exports to Brazil, South Africa and Saudi Arabia. India has entered into a **Comprehensive Economic Partnership Agreement with the United Arab Emirates** and an **Economic Cooperation and Trade Agreement with Australia** in 2022.

India continued to be the **largest recipient of remittances in the world**, netting $100 billion in Remittances are the second-largest major source of external financing after service exports.



Source: PIB

As of December 2022, forex reserves stood at $563 billion covering 9.3 months of imports. As of end-November 2022, India was the **sixth-largest foreign exchange reserves holder** in the world.

Source: PIB

Climate Change and the Environment: The Economic Survey 2022-23 points out that the global nature of the problem makes India one of the most vulnerable regions despite having contributed only about 4% in the **cumulative global emissions** (for the period 1850-2019) and maintaining its per capita emission at far less than the world average.

India has integrated the development goals with ambitious climate action goals, be it in the form of augmented **solar power capacity** (installed), higher energy saving targeting notified in PAT cycle-VII, improved green cover facilitated by Green India Mission, among other targeted Government actions.

In August 2022, the country updated the **Nationally Determined Contributions** (NDCs) in line with the PM's vision expressed in the **26th meeting of the Conference of Parties** of UNFCCC.

The **National Hydrogen Mission** and **Green Hydrogen Policy** have been introduced to enable India to be energy independent by 2047. Its pivotal role is also reflected in **India's Long Term Low Emissions Development Strategy** (LT-LEDS).

Source: PIB

Other details mentioned in the Economic Survey 2022-23

Profits from Disinvestment: In the last 9 years, approximately INR 4.07 lakh crore have been realised as disinvestment proceeds, and after 2014, the government is engaging with the private sector as a co-partner in development. As of January 2023, 48% or more than INR 31,000 crore of the budgeted amount of INR 65,000 crore had been collected.

Cryptos not Financial Assets: The Economic Survey 2022-23 has noted that cryptocurrencies have no intrinsic cashflows and that the FTX collapse highlights their risks. The Survey has noted that, "*The recent collapse of the crypto exchange FTX and the ensuing crypto market sell-off have placed a spotlight on the vulnerabilities in the crypto ecosystem.*" Crypto assets are "self-referential instruments" without intrinsic cashflows and therefore **not financial assets**. US

regulators have disqualified Bitcoin, Ether, and other crypto assets as securities, according to the

Six challenges faced by the Global Economy

First, As noted by the WHO, COVID-19 pandemic is not over yet and the world is vulnerable to disruption in the economies due to an unanticipated wave and surge in cases.

Second, Russian-Ukraine conflict has caused an adverse impact on global economy with disruption in supply chains, mainly of food, fuel and fertilizers. Prolonged war will increase the uncertainties.

Third, The Central Banks across economies led by the US Federal Reserve have responded with synchronised policy rate hikes to curb inflation. This has lead to appreciation of US Dollar and the widening of the Current Account Deficits (CAD) in net importing economies. The possibility of recession has prompted the Banks to slow down the rate hike process, yet there are uncertainties of capital outflow should interest rates rise.

Fourth, Another challenge has emerged with the prospects of global stagflation. Developed economies, feeling compelled to protect their respective economic space, have been slowing cross-border trade affecting overall growth.

Fifth, China has experienced a considerable slowdown due to its policies. Slowdown in Chinese economy will have global repercussions, because of its impact on Chinese exports and imports.

Sixth, The impact of pandemic will pose a medium-term challenges due to loss of education and income-earning opportunities.

These challenges can have a direct and indirect impact on the Indian Economy.

Syllabus: GS III, Indian Economy

Source: Indian Express, PIB, MoneyControl, The Times of India, Business Standard

Union Budget 2023-24: Key Highlights – Explained, pointwise

Introduction

The Union Finance Minister has presented the Union Budget 2023-24 in the Parliament. This is the last full budget before the next year's General Elections. There were apprehensions that the Budget may resort to populist measures ahead of the election year. However, most economic experts have observed that the Government has tried to push for long term growth while ensuring macro-stability in the short term. The Government has focused on increasing the capital expenditure and raising more revenues through disinvestment and privatization. The Government has maintained fiscal prudence and has avoided splurging on populist schemes.

What is the vision of the Union Budget 2023-24?

The Union Finance Minister said that the vision for the *Amrit Kaal* includes **technology-driven and knowledge-based economy** with strong public finances, and a robust financial sector. To achieve this, *Jan Bhagidari* through *Sabka Saath Sabka Prayas* is essential. The Economic Agenda to achieve this focuses on 3 things: **(a)** Facilitating ample opportunities for citizens, especially the youth, to fulfill their aspirations; **(b)** Providing strong impetus to growth and job creation; **(c)** Strengthening macro-economic stability.

Source: PIB

To service these focus areas in the journey to **India@100**, **Four opportunities can be transformative** during *Amrit Kaal*, **(a) Economic Empowerment of Women**: Through formation of large producer enterprises or collectives; **(b) PM *ViIshwakarma KAushal Samman* (PM VIKAS)**: The art and handicraft created by traditional artisans represents the true spirit of *Atmanirbhar Bharat*. A package of assistance for them has been conceptualized to enable them to **improve the quality, scale and reach of their products**, integrating them with the MSME value chain. This will greatly benefit the SCs, STs, OBCs, women and people belonging to the

weaker sections; **(c) Tourism**: The sector holds huge opportunities for jobs and entrepreneurship for youth in particular. Promotion of tourism will be taken up on mission mode, with active participation of States, convergence of Government programmes and public-private partnerships; **(d) Green Growth**: India is implementing many programmes for green fuel, energy, farming, mobility, buildings, and equipment, and policies for efficient use of energy across various economic sectors. These green growth efforts help in reducing carbon intensity of the economy and provides for large scale green job opportunities.

What are the Priorities of the Union Budget 2023-24?

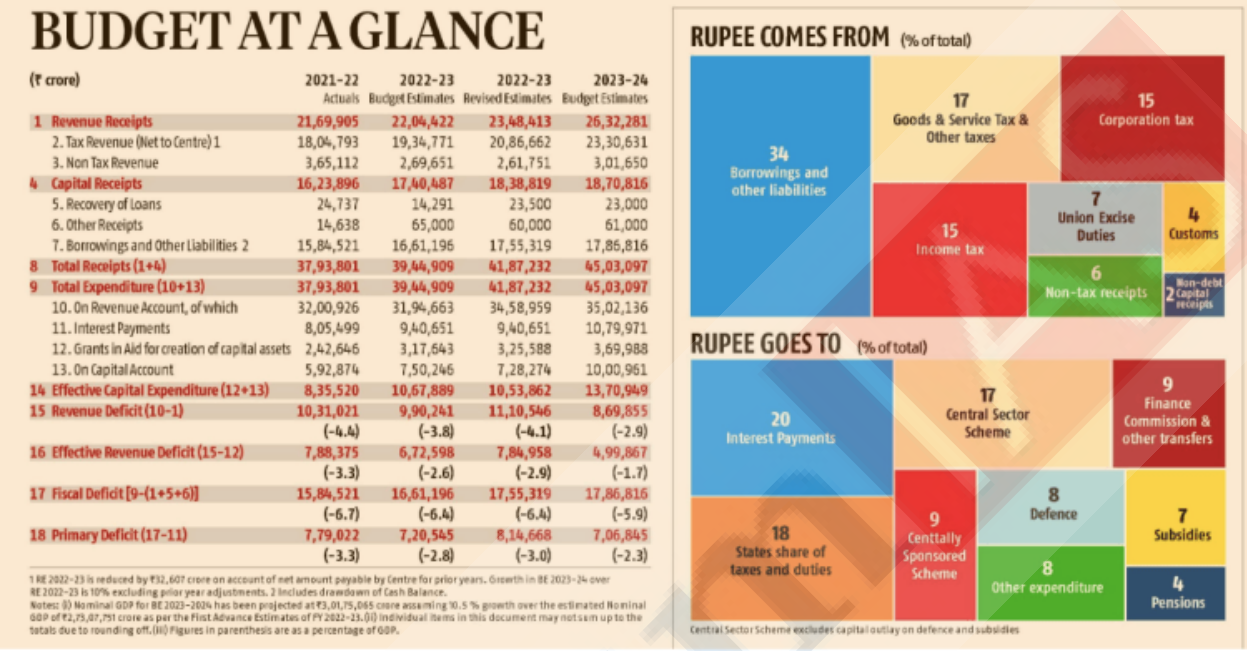
The Union Finance Minister has listed seven priorities of the Union Budget and said that they complement each other and act as the '***Saptarishi***' guiding us through the *Amrit Kaal.* They are: **(a)** Inclusive Development; **(b)** Reaching the Last Mile; **(c)** Infrastructure and Investment; **(d)** Unleashing the Potential; **(e)** Green Growth; **(f)** Youth Power; **(g)** Financial Sector.

Source: PIB

What is the break-up of Government's Revenue and Expenditure?

Revenues: The break-up of Government's Revenues are: **(a)** Corporation Tax: 15%; **(b)** Income Tax: 15%; **(c)** GST: 17%; **(d)** Union Excise Duties: 7%; **(e)** Non-Tax Receipts: 6%; **(f)** Customs: 4%; (g) Non-Debt Capital Receipts: 2%; **(h)** Borrowings (Loans etc): 34%.

Expenditure: The break-up of Government's Expenditure are: **(a)** Interest Payments: 20%; **(b)** States' Share of Taxes and Duties: 18%; **(c)** Central Sector Schemes: 17%; **(d)** Centrally Sponsored Schemes: 9%; **(d)** Finance Commission and Other Transfers: 9%; **(e)** Defence: 8%; **(f)** Subsidies: 7%; **(g)** Pensions: 4%; **(h)** Other Expenditure: 8%



BUDGET AT A GLANCE

(₹ crore)	2021-22 Actuals	2022-23 Budget Estimates	2022-23 Revised Estimates	2023-24 Budget Estimates
1 Revenue Receipts	21,69,905	22,04,422	23,48,413	26,32,281
2. Tax Revenue (Net to Centre) 1	18,04,793	19,34,771	20,86,662	23,30,631
3. Non Tax Revenue	3,65,112	2,69,651	2,61,751	3,01,650
4 Capital Receipts	16,23,896	17,40,487	18,38,819	18,70,816
5. Recovery of Loans	24,737	14,291	23,500	23,000
6. Other Receipts	14,638	65,000	60,000	61,000
7. Borrowings and Other Liabilities 2	15,84,521	16,61,196	17,55,319	17,86,816
8 Total Receipts (1+4)	37,93,801	39,44,909	41,87,232	45,03,097
9 Total Expenditure (10+13)	37,93,801	39,44,909	41,87,232	45,03,097
10. On Revenue Account, of which	32,00,926	31,94,663	34,58,959	35,02,136
11. Interest Payments	8,05,499	9,40,651	9,40,651	10,79,971
12. Grants in Aid for creation of capital assets	2,42,646	3,17,643	3,25,588	3,69,988
13. On Capital Account	5,92,874	7,50,246	7,28,274	10,00,961
14 Effective Capital Expenditure (12+13)	8,35,520	10,67,889	10,53,862	13,70,949
15 Revenue Deficit (10-1)	10,31,021	9,90,241	11,10,546	8,69,855
	(-4.4)	(-3.8)	(-4.1)	(-2.9)
16 Effective Revenue Deficit (15-12)	7,88,375	6,72,598	7,84,958	4,99,867
	(-3.3)	(-2.6)	(-2.9)	(-1.7)
17 Fiscal Deficit [9-(1+5+6)]	15,84,521	16,61,196	17,55,319	17,86,816
	(-6.7)	(-6.4)	(-6.4)	(-5.9)
18 Primary Deficit (17-11)	7,79,022	7,20,545	8,14,668	7,06,845
	(-3.3)	(-2.8)	(-3.0)	(-2.3)

1 RE 2022-23 is reduced by ₹32,607 crore on account of net amount payable by Centre for prior years. Growth in BE 2023-24 over RE 2022-23 is 10% excluding prior year adjustments. 2 Includes drawdown of Cash Balance.
Notes: (i) Nominal GDP for BE 2023-2024 has been projected at ₹3,01,75,085 crore assuming 10.5 % growth over the estimated Nominal GDP of ₹2,73,07,751 crore as per the First Advance Estimates of FY 2022-23. (ii) Individual items in this document may not sum up to the totals due to rounding off. (iii) Figures in parenthesis are as a percentage of GDP.

Source: Business Standard

Source: PIB

What is the core strategy adopted by the Union Budget 2023-24?

The Union Finance Minister chose to stick to the growth strategy that she first unveiled in 2019 when she announced a historic corporate tax cut. This growth strategy had two prongs.

Raising Capital Expenditure: Capital expenditure is the money that is spent on building productive assets such as roads, bridges and ports etc. Capital Expenditure has a greater return to the economy. The Budget has raised capital expenditure by the Government to INR 10 lakh crore. This is more than double the INR 4.39 lakh crore of 2020-21.

Fiscal Prudence: The Union Finance Minister has assured that the fiscal deficit will fall to 5.9% of the GDP. This is expected to have a salutary impact on the broader economy, as it suggests that money will be available for private entrepreneurs to borrow and invest.

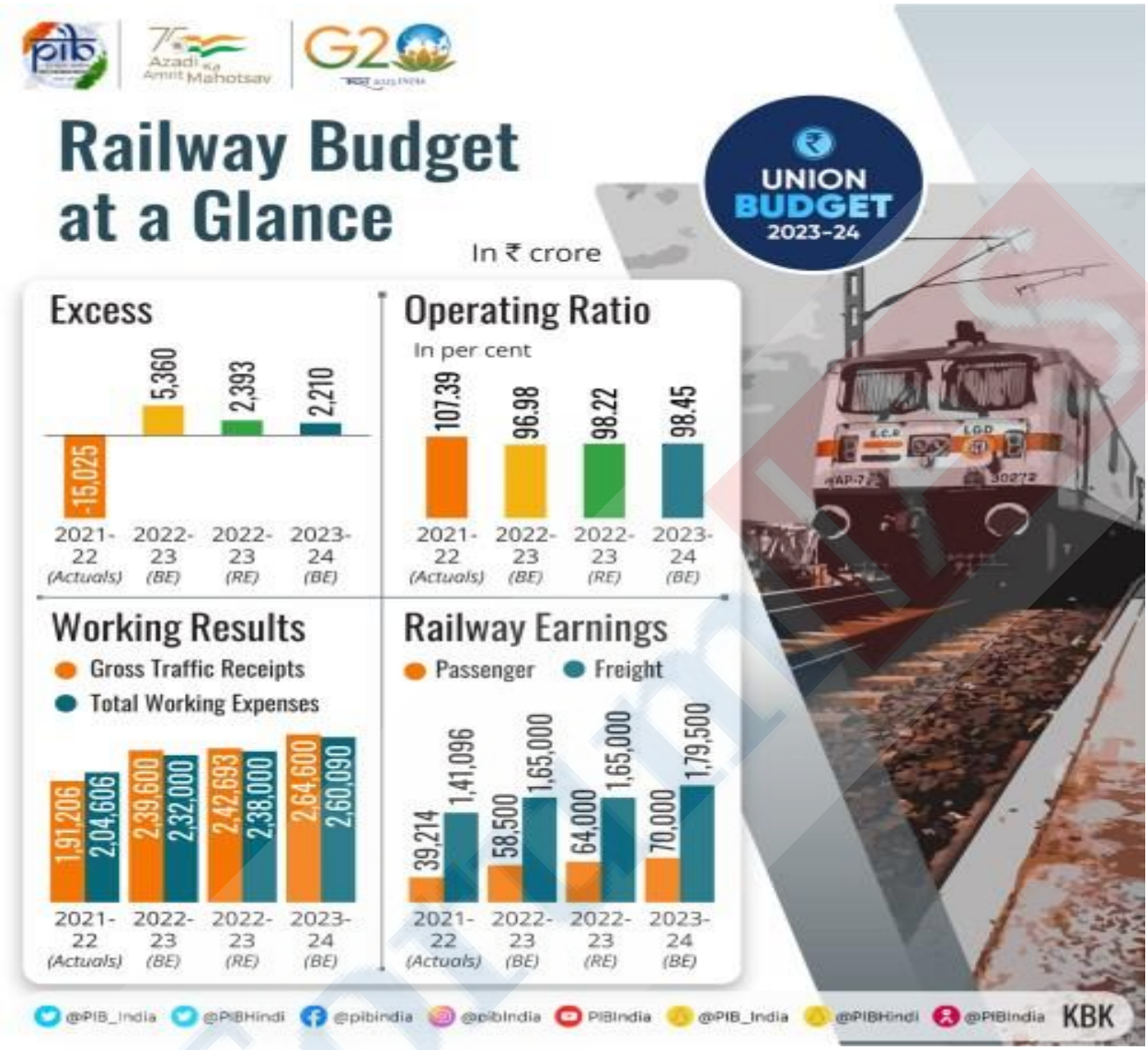
Read More: Fiscal Deficit in India: Trends and Concerns – Explained, pointwise

What are the major highlights of UnionBudget 2023-24?

Fiscal Position: The Fiscal deficit target of 6.4% for FY2022-23 has been retained in the Revised Estimate for FY2022-23. The **target for FY2023-24 has been reduced to 5.9%** (INR 17.86 lakh crore). The medium-term target is to reduce Fiscal Deficit to 4.5% by FY2025-26.

Capital Expenditure (Capex): The Capital Expenditure has been hiked by 33% to INR 10 lakh crores (3.3% of GDP). The aim is to enhance growth potential and job creation, crowd-in private investments, and provide a cushion against anticipated global slowdown. The Effective Capital Expenditure is INR 13.7 lakh crore (includes provision made for creation of capital assets through *Grants-in-Aid* to States).

Railways: An outlay of INR 2.4 lakh crore provided for Railways in FY2023-24. It's the highest ever highest ever allocation for Railways and is 9 times the amount allocated in FY2013-14.



Source: PIB

Defence Allocation: The allocation to defence sector has been hiked by 13%. Defence budget has increased to INR 5.94 lakh crore from last year's INR 5.25 lakh crore. INR 1.62 lakh crore has been set aside for capital expenditure including purchases of new weapons, aircraft, warships and other military hardware.

MSMEs: Revamped credit guarantee for MSMEs will take effect from April 1, 2023 with infusion of INR 9,000 crore in corpus. The scheme would enable additional collateral-free guaranteed credit of INR 2 lakh crore and also **reduce the cost of the credit** by about 1%. An **Entity DigiLocker** will be set up for use by MSMEs, large business and charitable trusts for storing and sharing documents online securely, whenever needed, with various authorities, regulators, banks and other business entities.

Banking: The Government has mooted amendments to the Banking Regulation Act to **improve governance in banks**.

Employment: ***Pradhan Mantri Kaushal Vikas Yojana* 4.0**, will be launched to skill lakhs of youth within the next 3 years covering **new age courses for Industry 4.0** like coding, AI, robotics, mechatronics, IOT, 3D printing, drones, and soft skills etc. 30 **Skill India International Centres** will be set up across different States to skill youth for international opportunities. **Direct Benefit Transfer** under a pan-India **National Apprenticeship Promotion Scheme** will be rolled out. A Promotion Scheme will be rolled out to provide stipend support to 47 lakh youth in three years.

Clean Energy: The Union Budget 2023-24 has provided INR 35,000 crore for priority capital investments towards energy transition and net zero objectives, and energy security. To steer the economy on the sustainable development path, Battery Energy Storage Systems with capacity of 4,000 MWH will be supported with **Viability Gap Funding**. **National Green Hydrogen Mission** with an outlay of INR 19,700 crore will facilitate the transition of the economy to low carbon intensity, reduce dependence on fossil fuel imports and enable India assume technology and market leadership.

Gems and Jewellery: To encourage the indigenous production of **lab-grown diamonds**, a research and development grant is to be provided to one of the IITs for 5 years. Basic customs duty on seeds used in the manufacture of Lab Grown Diamonds has also been reduced.

Aviation: 50 additional Airports, Heliports, Water Aerodromes, Advanced Landing Grounds will be revived to **improve regional air connectivity**.

Ease of Doing Business: The Government will bring another dispute resolution scheme ***Vivad Se Vishwas-2*** to settle commercial disputes. PAN will be used as common identifier for all digital systems of Government agencies. **One stop solution** for reconciliation and updating identity maintained by various agencies will be established using digi locker and Aadhaar as foundational identity.

Central Processing Centre will be setup for **faster response to companies** through centralized handling of various forms filed with field offices under the Companies Act. ***Jan Vishwas* Bill** to amend 42 Central Acts have been introduced to further **trust-based governance**.

The Union Budget 2023-24 has announced multiple measures to enhance business activity in **GIFT City**.

Digital Services: Scope of services in DigiLocker will be expanded. 100 labs for **developing applications to use 5G services** will be set up in engineering institutions.

Bharat Shared Repository of Inscriptions will be set up in a digital epigraphy museum, with digitization of one lakh ancient inscriptions in the first stage. **iGOT *Karmayogi***, an integrated online training platform, has been launched to provide continuous learning opportunities for lakhs of government employees to upgrade their skills and facilitate people-centric approach.

Phase 3 of e-Courts projects will be launched with outlay of INR 7,000 crore

Urban Development: Urban Infrastructure Development Fund (UIDF) will be established through use of Priority Sector Lending shortfall, which will be managed by the National Housing Bank, and will be used by public agencies to create urban infrastructure in Tier 2 and Tier 3 cities.

Cities will be incentivised to **improve creditworthiness for municipal bonds**.

Under the **NAMASTE (National Action Plan for Mechanised Sanitation Ecosystem) scheme**, the Union government will endeavour to enable **100% mechanical desludging of septic tanks and sewers** in all cities and towns.

Housing: Outlay for **PM *Awaas Yojana*** has been enhanced by 66% to over INR 79,000 crore. The Union Government will continue to provide **50-year interest-free loans** to State Governments for one more year.

Tribal Welfare: ***Pradhan Mantri* Primitive Vulnerable Tribal Group** (PM PVTGS) mission is being launched to improve socio-economic condition on PM PVTGS. INR 15,000 crore will be spent over next three years for providing safe housing, sanitation, drinking water, and electricity to tribals.

Health: The Union Budget 2023-24 has announced an allocation of INR 89,155 crore for the Ministry of Health, which is just 3.43% higher than its FY2022-23 outlay of INR 86,200.65 crore.

A new programme for research in pharmaceuticals will be formulated and the industry will be encouraged to invest in research. A Mission to **eliminate Sickle Cell Anaemia by 2047** will be launched, which will entail awareness creation, universal screening of 7 crore people in the age group of 0-40 years in affected tribal areas.

Education: 157 new nursing colleges will be established in colocation with the existing 157 medical colleges established since 2014. ***Eklavaya* Model Residential Schools** to be set up in the next 3 years. The Union Government will recruit 38,800 teachers and support staff for 740 schools serving 3.5 lakh tribal students.

National Digital Library will be set up for children and adolescents. States will be encouraged to set up physical libraries for children at panchayat and ward levels and provide infrastructure for accessing the National Digital Library resources.

Artificial Intelligence: Three **Centres of Excellence for Artificial Intelligence** to be set-up in top educational institutions to realise the vision of '**Make AI in India and Make AI work for India**'.

Agriculture: An **Agriculture Accelerator Fund** will be set up to **encourage agri-startups** by young entrepreneurs.

A new sub-scheme of **PM *Matsya Sampada Yojana*** with targeted investment of INR 6,000 crore will be launched to further enable activities of fishermen, fish vendors, and micro/small enterprises, improve value chain efficiencies, and expand the market.

Digital Public Infrastructure for Agriculture will be built as an open source, open standard and inter operable public good to enable inclusive farmer centric solutions and support for growth of agri-tech industry and start-ups. Computerisation of 63,000 Primary Agricultural Credit Societies (PACS) with an investment of INR 2,516 crore has been initiated.

PM Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth (PM-PRANAM) will be launched to incentivize States and Union Territories to **promote alternative fertilizers and balanced use of chemical fertilizers**. Over the next 3 years, one crore farmers will **get assistance to adopt natural farming**.

To make India a global hub for 'Shree Anna', the Indian Institute of Millet Research, Hyderabad will be supported as the Centre of Excellence for sharing best practices, research and technologies at the international level.

500 new '**Waste to Wealth' plants** under **GOBARdhan** (Galvanizing Organic Bio-Agro Resources Dhan) scheme will be established for promoting **circular economy** at total investment of INR 10,000 crore.

5% compressed biogas mandate will be introduced for all organizations marketing natural and bio-gas.

***Atmanirbhar* Clean Plant Program** with an outlay of INR 2200 crore will be launched to boost availability of disease-free, quality planting material for high value horticultural crops.

Source: PIB

Tourism: 50 tourist destinations will be selected through challenge mode to be developed as a whole package for domestic and international tourism. States will be encouraged to set a '**Unity Mall**' in State Capital or the most popular tourist destination in the State for the promotion and sale of '**OneDistrict, One product**' and GI products and other handicraft. Tourism infrastructure and amenities will be facilitated in border villages through the **Vibrant Villages Programme**.

What are the Tax proposals mentioned in Union Budget 2023-24?

Direct Taxes

To further improve tax payer services, it has been proposed to roll out a next-generation **Common IT Return Form** for tax payers' convenience, along with plans to strengthen the grievance redressal mechanism.

Rebate limit of Personal Income Tax has been increased to INR 7 lakh from the current Rs. 5 lakh in the **New Tax Regime** (NTR). New Tax slabs have also been proposed under the NTR. Highest surcharge rate is proposed to be reduced from 37% to 25% in the NTR. This to further result in reduction of the maximum personal income tax rate to 39%. The NTR will be made the **default tax regime**. However, citizens will continue to have the option to avail the benefit of the Old Tax Regime.

TDS rate will be reduced from 30% to 20% on taxable portion of EPF withdrawal in non-PAN cases.

Agniveer Fund will be provided **EEE status**. The payment received from the ***Agniveer* Corpus Fund** by the *Agniveers* enrolled in *Agnipath* Scheme, 2022 are proposed to be exempt from taxes. (*EEE stands for Exempt-Exempt-Exempt meaning part of income invested is exempted (not taxed), interest earned on investment is exempt and the investment at the time of withdrawal is exempt*).

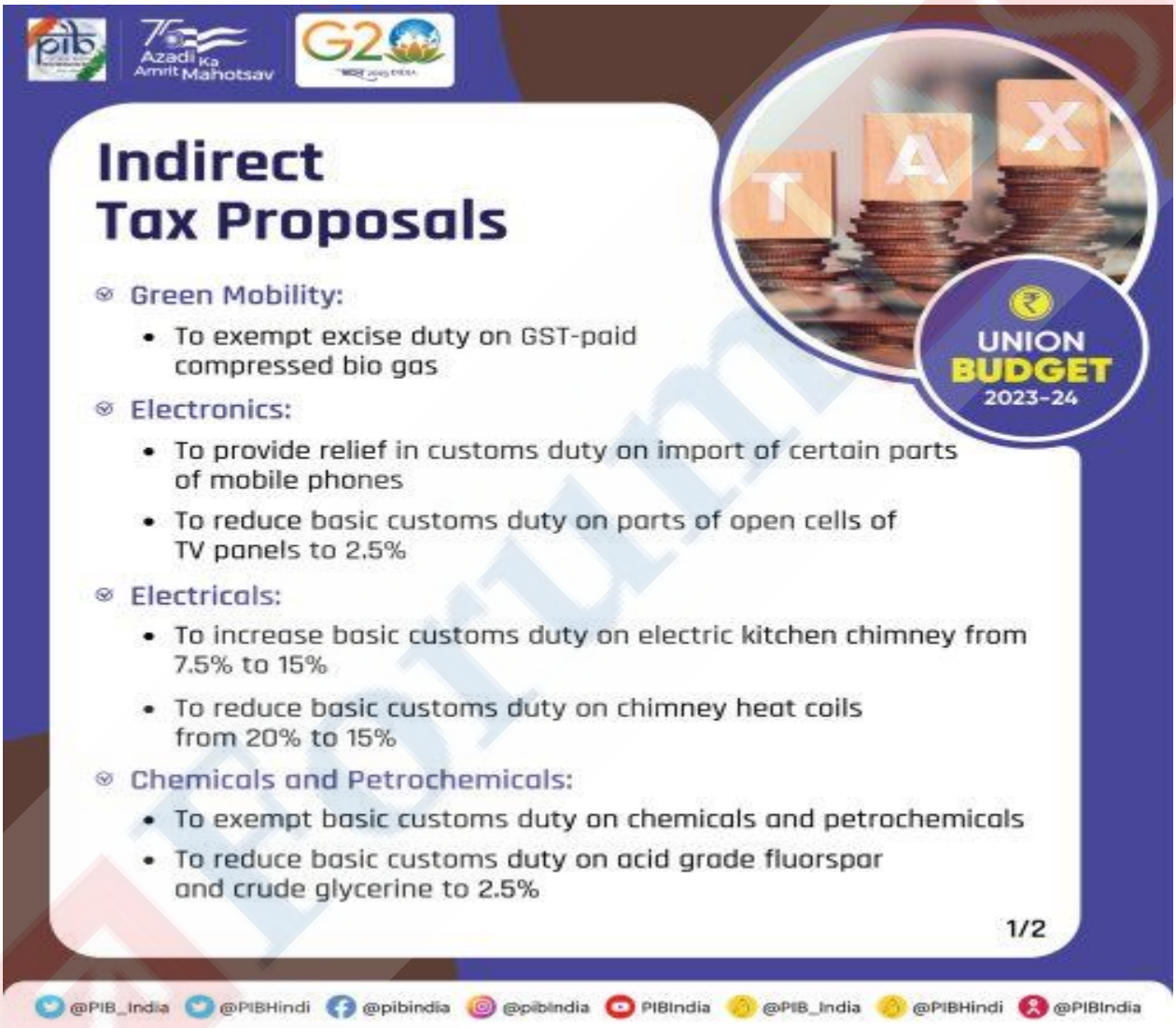
Source: PIB

Indirect Taxes

The number of basic customs duty rates on goods, other than textiles and agriculture, has been reduced to 13 from 21.

Excise duty has been exempted on **GST-paid compressed bio-gas** contained in blended compressed natural gas.

Customs Duty exemption on specified **capital goods/machinery for manufacture of lithium-ion cell** for use in battery of electrically operated vehicle (EVs) has been extended to March 2024.



Source: PIB

Legislative Changes in Customs Laws

Customs Tariff Act will be amended to clarify the intent and scope of provisions relating to Anti-Dumping Duty (ADD), Countervailing Duty (CVD), and Safeguard Measures.

The CGST Act will be amended to raise the minimum threshold of tax amount for launching prosecution under GST from INR One crore to Two crore. It will also decriminalise certain offences.

What are other significant proposals in the Union Budget 2023-24?

Aspirational Blocks Programme covering 500 blocks launched for saturation of essential government services across multiple domains such as health, nutrition, education, agriculture, water resources, financial inclusion, skill development, and basic infrastructure.

New Infrastructure Finance Secretariat will be established to enhance opportunities for private investment in infrastructure.

National Data Governance Policy will be brought out to unleash innovation and research by start-ups and academia.

Mangrove Initiative for Shoreline Habitats and Tangible Incomes, (MISHTI) will be taken up for mangrove plantation along the coastline and on salt pan lands, through convergence between MGNREGS, CAMPA Fund and other sources:

Green Credit Programme will be notified under the Environment (Protection) Act to incentivize and mobilize additional resources for environmentally sustainable and responsive actions.

***Amrit Dharohar* Scheme** will be implemented over the next three years to encourage optimal use of wetlands, enhance bio-diversity, carbon stock, eco-tourism opportunities and income generation for local communities.

National Financial Information Registry will be set up to serve as the central repository of financial and ancillary information for **facilitating efficient flow of credit**, promoting **financial inclusion**, and fostering financial stability. A new legislative framework will be designed in consultation with RBI to govern this credit public infrastructure.

To commemorate *Azadi Ka Amrit Mahotsav*, a one-time new small savings scheme, **Mahila Samman Savings Certificate** will be launched. It will offer deposit facility upto INR 2 lakh in the name of women or girls for tenure of 2 years (up to March 2025) at fixed interest rate of 7.5%.

What are the concerns associated with the Union Budget 2023-24?

First, Economists observe that the Income Tax exemptions under the Old Tax Regime promoted savings, which support investments. The New Tax Regime's push towards consumption may hurt India's savings rate.

Second, the funds allocated to the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) have been slashed by ~32% for 2023-24 (INR 60,000 crore compared to the revised estimate of INR 89,400 crore for FY2022-23).

Third, As compared to FY22-23 when INR 3,200 crore was allocated to the Department of Health Research, the allocation has been reduced by 6.87%.

Fourth, Higher import taxes can have detrimental effects on the jewellery industry, including an increase in cases of corruption and smuggling.

Syllabus: GS III, Indian Economy.

Source: **Indian Express**, **The Hindu**, **Business Standard**, **PIB**

Working of the MGNREGS: Challenges and Solutions – Explained, pointwise

Introduction

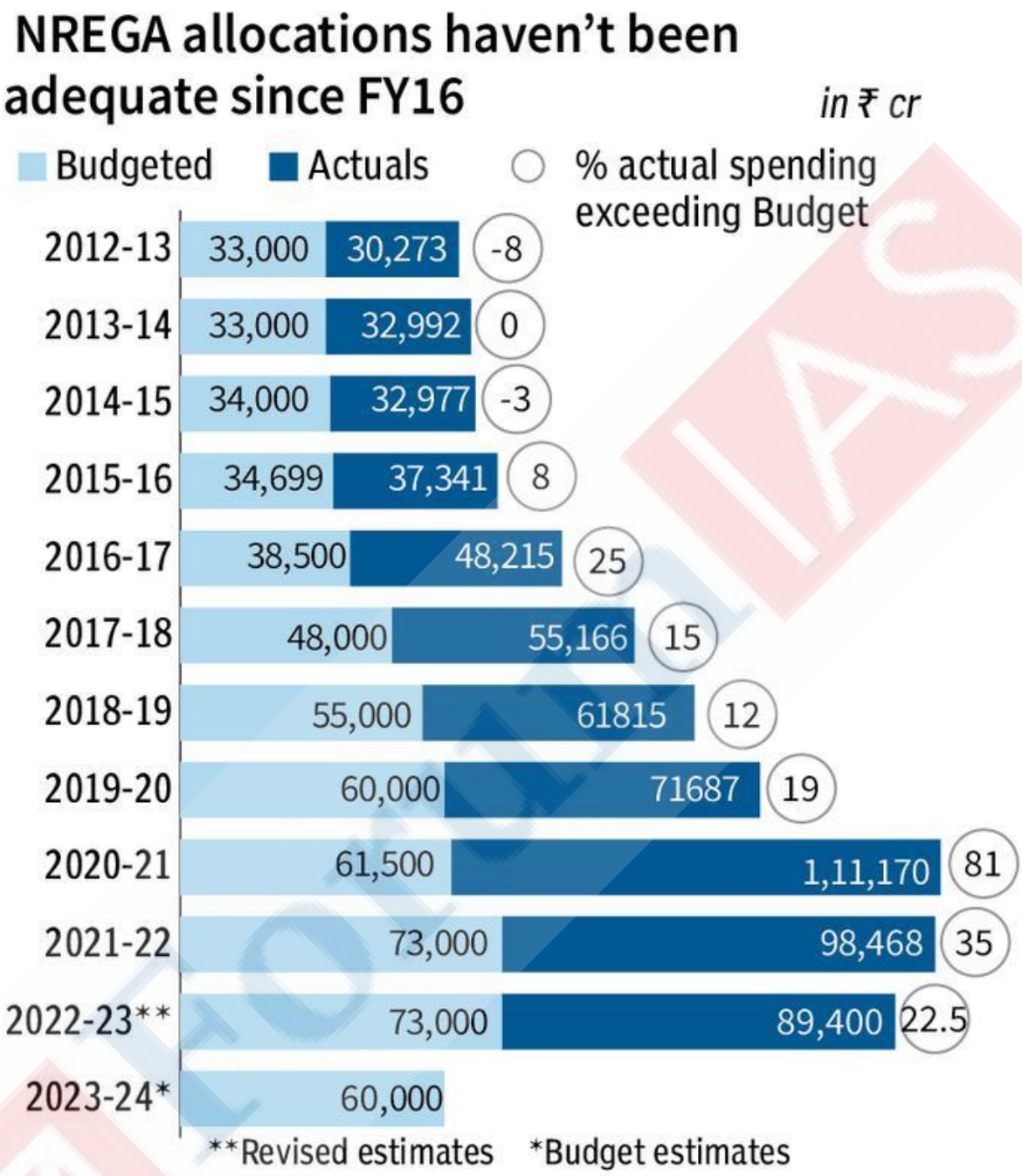
The Economic Survey 2022-23 showed that 6.49 crore households demanded work under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS). Of these, 6.48 crore households were offered employment by the government and 5.7 crore actually availed it. The Scheme was hailed for its role in **mitigating the impact of the COVID-19 pandemic**, when the number of workers had jumped post reverse migration from urban areas during the pandemic. In the **Union Budget 2023-24**, the Government has allocated INR 60,000 crore for the MGNREGS and **has cut the funds by 33%** compared to INR 89,000 crore in FY2022-23 (Revised Estimates). The step has been criticised as neglect of the poor sections and may lead to rural distress. However, the Ministry of Rural Development has sought to allay fears by clarifying that additional funds will be made available as and when the need arises.

What is the current status of MGNREGS?

The Union Budget 2023-24 has allocated INR 60,000 crore for the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) scheme for FY2023-24. That is 18% lower than the INR 73,000 crore budget estimates for the current year (2022-23), and 33% lower than the INR 89,000 crore revised estimates (FY2022-23). The allocation in FY2023-24 is only 1.3% of the total expenditure compared to 2.1% last year.

The average days of employment provided per household is at a 5-year low in this financial year. Till January 20, the average days of employment provided per household was only 42, while it ranged between 48 and 52 days in the preceding four years.

According to Ministry Of Rural Development, the total active workers in 2022–23 are 15.12 crores. The number of households benefited were 5.78 crore in 2022-23.



Source: The Hindu BusinessLine

What are the benefits of MGNREGS?

Rural Development: The programme mandates that at least 60% of the works undertaken must be related to land and water conservation. The creation of these productive assets boost rural incomes as the majority of villages are agrarian. In some instances e.g., in Barmani village of Madhya Pradesh's Sidhi district, creation of water conservation assets have increased availability of water. Some people who used to migrate earlier have now taken up farming.

Tackling Water Stress: The water conservation structures built under MGNREGS have potentially conserved at least 28,741 million cubic metres of water in the past 15 years. The scheme has helped to mitigate the water stress to an extent.

Curtailing Distress Migration: The scheme provides support in times of distress and individuals are not forced to migrate into cities. For instance, distress migration has stopped in Bandlapalli village in Andhra Pradesh's Ananthapuramu district and the village is drought-proof today.

Women Empowerment: Women workers account for more than 33% of the workers under MGNREGS. Money is transferred directly into the accounts of these women workers. This has supported women empowerment e.g., MGNREGS has led to the formation of the country's largest group of trained women well-diggers in Pookkottukavu village of Kerala's Palakkad district.

Battling Uncertainties: There was a big jump in the number of workers from 2019-20 to 2020-21 (pandemic year). MGNREGS proved to be vital in providing relief to the migrants during the distress. It ensured income support to the vulnerable during the pandemic.

Parameter	FY 2021-22		FY 2020-21		FY 2019-20
	Value (Cr)	% Change	Value (Cr)	% change	Value (Cr)
Total Persons demanded work	11.33	-10.6%	12.67	+43.5%	8.83
Total households worked	6.61	-8.7%	7.24	+38.4%	5.23
Total Persons worked	9.52	-10.5%	10.64	+42.4%	7.47
Total Person-days	305.74	-18.1%	373.06	+46.6%	254.42
Total Person-days by women	166.23	-15.9%	197.65	+42.6%	138.64

MGNREGA: Jump in demand since the onset of the Pandemic

The above data have been compiled from the MGNREGA Public Data Portal. The data clearly indicate the jump in the MGNREGA job demand in the wake of COVID pandemic. The demand jumped by >40% between 2019-20 and 2020-21. The fall from 2020-21 to 2021-22 indicates recovery, but the demand is still ~25-30% higher than the pre-pandemic level. (% change is with respect to previous fiscal year)

Community Assets: The scheme has led to the creation of common community assets. These assets are built by communities on common lands thereby creating a sense of responsibility towards the structure which results in better care e.g., many *Johads* (percolation ponds) had remained abandoned for several years in many villages of Haryana. However, villagers revived them under the MGNREGS.

What are the challenges with the working of MGNREGS?

Gender Issues: Women and Men get equal remuneration under MGNREGS. However, various cases of discrimination against women have been reported wherein some regions, less job cards are issued to women or there are delays in the issue of cards.

Regional Inequality: The success of MGNREGS depends on the performance of individual States. Although centrally funded, studies show uneven outcomes across different States. The performance of the MGNREGS, in terms of accountability, is much better in States like Andhra Pradesh and Tamil Nadu than in states like UP and Bihar.

Insufficient Budget Allocation: MGNREGS's success on the ground is dependent on proper and consistent funding flow to the states. Funds have dried up in States due to a lack of "mother sanctions" from the Union government, causing work to be difficult during peak season. Almost every year, more than 80% of funds are depleted in the first six months. As a result, the government's claim of "record allocation" does not hold up in practise. It has actually decreased because pending liabilities from the previous year are included in the current budget. Furthermore, the allocated funds are insufficient to ensure proper implementation on the ground.

Regular Delay in Payments: There is a regular delay in payments. Moreover, there is no provision of compensation in case of delayed payments despite the order of the Supreme Court. The delay is mainly due to failed payment transfer arising from inactive Aadhaar, and closed, blocked, or frozen bank account.

Workers Penalised for Administrative Lapses: The Ministry withholds wage payments for workers of States that do not meet administrative requirements within the stipulated time period (for instance, submission of the previous financial year's audited fund statements, utilisation certificates, bank reconciliation certificates etc). It is workers who end up being penalised for administrative lapses.

Issues with Rural Banks: The rural banks are lack capacity in terms of staff and infrastructure and thus always remain hugely crowded. The workers normally have to visit the banks more than once to withdraw their wages. Due to great rush and poor infrastructure, the bank passbooks are not updated in many cases. Often, the workers do not get their wages during times of need due to the hassle and the cost involved in getting wages from the bank.

Deletion of Job Cards: There are reports of genuine job cards are being randomly deleted as there is a huge administrative pressure to meet 100% Direct Benefit Transfer (DBT) implementation targets in MGNREGA. In states like Jharkhand, there are multiple examples where the districts had later requested to resume job cards after civil society interventions into the matter.

Centralisation: A real-time MIS-based implementation and a centralised payment system has reduced the role of the representatives of the Panchayati Raj Institutions in implementation, monitoring and grievance redress of MGNREGA schemes. They have little or no power to resolve issues or make payments. The over-centralisation of the scheme has diminished the local accountabilities.

Neglect of Local Priorities: MGNREGA could be a tool to establish decentralised governance. However, with the centralisation, the local issues are getting neglected. Linking MGNREGA to construction of *Pradhan Mantri Awas Yojana* (PMAY), individual household toilets, *anganwadi* centres and rural 'haats' have been destroying the spirit of the programme and **gram sabhas and gram panchayats' plans are being neglected**.

Online Attendance: The National Mobile Monitoring Software (NMMS) App allows for real-time attendance and geo-tagged photographs of workers at Mahatma Gandhi NREGA worksites. However, there are some concerns, such as **poor internet connectivity**, **limited access to smartphones**, and **app glitche**s that have disrupted workers' daily activities. Workers are being **forced to purchase smartphones**, which is causing them to leave their jobs. Many workers have expressed dissatisfaction with the process, and many are illiterate.

What steps can be taken to improve working of MGNREGS?

The Parliamentary Standing Committee on Rural Development and Panchayati Raj has made several recommendations to improve the implementation of the Scheme.

Increase in number of days of work: Under the scheme, State governments can ask for 50 days of work, in addition to the guaranteed 100 days, in case of exigencies arising from natural calamities. It recommended increasing the guaranteed days of work under the scheme from 100 days to 150 days.

Revision of permissible works: The Committee observed that the ambit of permissible works under the scheme requires frequent revision. It recommended the Ministry of Rural Development to consult stakeholders and include area-specific works under MGNREGA as per local needs. These may include, construction of bunds to stop land erosion during floods, and boundary works for agricultural fields to protect them from grazing animals.

Uniform Wage Rate: Wage rates notified under MGNREGA range from INR 193 to INR 318 in different States/UTs. The Committee noted that this fluctuation in wage rates across States/UTs is not justified. It recommended devising a mechanism for a unified wage rate across the country.

Increase in wages commensurate with inflation: The Committee noted that beneficiaries of MGNREGA generally belong to poor and marginalised sections of society. It observed that the nominal wages under MGNREGA discourage beneficiaries and propel them to either seek more remunerative work or migrate to urban areas. The Committee noted that **indexing MGNREGA wages to Consumer Price Index (CPI)-Rural** as opposed to CPI-Agricultural Labour, (as recommended by Dr. Nagesh Singh Committee), has not been implemented. The Standing Committee recommended the Ministry to review its position and increase the wages.

Delay in Compensation: In case of delay in payment of wages under MGNREGA, beneficiaries are entitled to compensation at the rate of 0.05% of unpaid wages per day for the duration of delay. The Committee noted that payment of delay compensation is not adhered to in most places in the country. The Ministry must ensure strict compliance in payment of compensation.

Social Audits: Under MGNREGA, the Gram Sabha must conduct regular social audits of all projects taken up within the Gram Panchayat. The Committee observed that implementation of this provision is poor. The Gram Panchayats must not go unaudited during the financial year. Also, Social audit reports are not publicly available. These reports must be placed in the public domain promptly after the audit exercise is over.

Appointment of Ombudsperson: Under the Act, there should be an ombudsperson for each district who will receive grievances, conduct enquiries, and pass awards. Out of 715 possible appointments, so far only 263 ombudsmen have been appointed which shows poor coordination between the Union and State nodal agencies. Punitive measures can be imposed or funds can be stopped for States for failing to appoint ombudsmen. The Committee recommended the Department of Rural Development to bring on board all State governments to comply with appointment of ombudsmen.

Syllabus: GS II, Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

Source: Indian Express, The Hindu, The Hindu, Down to Earth

MSMEs: Significance, Challenges and Solutions – Explained, pointwise

Introduction

The year 2023 has started on an optimistic note. The economy seems to be on the path of recovery post the challenges posed by the COVID-19 pandemic and the Russia-Ukraine War, although global uncertainties remain. The Industrial sector has received much attention especially the role of large businesses in economic recovery. However the Micro, Small and Medium Enterprises (MSME) sector is more crucial as MSMEs are the largest employers in India outside of agriculture. The Union Budget 2023-24 has introduced several enabling provisions for the growth of the MSMEs. However, MSMEs continue to face several challenges. Addressing these challenges can ensure not only faster overall economic growth, but also make the growth process more sustainable and inclusive.

What are the MSMEs?

MSME (Micro, Small, and Medium Enterprise) are regulated under the **Micro, Small & Medium Enterprises Development (MSMED) Act, 2006**. MSMEs are managed under the Ministry of MSME. Earlier, MSMEs were **categorised based on the amount invested in plant and machinery/equipment**. With revised regulations effective from July 2020, annual turnover has also been added as a criteria. The classification criteria are: **(a) Micro Enterprise**: Investment in Plant and Machinery or Equipment is less than INR 1 crore and Annual Turnover is less than INR 5 crore; **(b) Small Enterprise**: Investment in Plant and Machinery or Equipment is less than INR 10 crore and Annual Turnover is less than INR 50 crore; **(c) Medium Enterprise**: Investment in Plant and Machinery or Equipment is less than INR 50 crore and Annual Turnover is less than INR 250 crore.

Statutory Bodies: The Ministry of MSME heads 5 statutory bodies

Khadi and Village Industries Commission (KVIC): It is a statutory organisation engaged in promoting and developing khadi and village industries for providing employment opportunities in rural areas, thereby strengthening the rural economy.

The Coir Board: It is a statutory body established for promoting overall development of the coir industry and improving living conditions of workers in the industry.

National Small Industries Corporation Limited (NSIC): It was established in 1955. It is responsible for promoting, aiding and fostering growth of micro and small enterprises in the country, generally on commercial basis.

National Institute for Micro, Small and Medium Enterprises, (NI-MSME): It was established in 1960. It is responsible for enterprise promotion and entrepreneurship development, enabling enterprise creation, performing diagnostic development studies for policy formulation, etc.

Mahatma Gandhi Institute for Rural Industrialisation (MGIRI): The objectives of the Mahatma Gandhi Institute for Rural Industrialisation (MGIRI) are to accelerate rural industrialisation for sustainable village economy, empower traditional artisans, encourage innovation through pilot study and R&D for alternative technology using local resources.

These bodies are responsible for aiding MSMEs with respect to Government schemes and policies.

What is the significance of MSMEs?

Contribution to GDP and Exports: In 2020-21, MSMEs accounted for 26.8% of Gross Value Added (GVA). The contribution of MSMEs in exports stood at 42.6% (April 2022-August 2022).The contribution of Manufacturing MSME Gross Value Added (GVA) contributed 38.4% of India's total Manufacturing GVA (2020–21).

As Indian economy is poised to reach US$ 5 trillion status, the Ministry of MSME has set a goal of increasing its contribution to GDP to 50% by 2025.

Rural Development: 51% of MSMEs are located in rural areas. In contrast to large corporations, MSMEs have aided in the **industrialization of rural areas at a low capital cost**. The sector has made significant contributions to the **rural socioeconomic growth** while also supplementing major industries.

Creation of Employment: MSMEs are India's largest employer outside of agriculture. They employ over 11.1 crore people, or 45% of all workers, and have low capital and technology requirements. MSMEs are key to the Make in India mission.

Simple Structure: Given India's middle-class economy, MSMEs offers the **flexibility of starting with limited resources** under the owner's control. As a result, making decisions becomes easier and more efficient . A large corporation, on the other hand, requires a specialist for every departmental function due to its complex organisational structure.

Innovation Promotion: They support local resource mobilisation, capacity building, industrial development in rural areas, and give aspiring entrepreneurs a chance to develop innovative products. It has enormous potential for connecting India's MSME base with large corporations. Multinational corporations are increasingly purchasing semi-finished and auxiliary products from small businesses.

Social Inclusion: According to the Annual Report of The Ministry of MSMEs (2021-22), the socially backward groups owned almost 66.27% of MSMEs. In rural areas, almost 73.67% of MSMEs were owned by socially backward groups.

Statement No. 2.4: Percentage Distribution of enterprises by social group of owner in rural and urban Areas.

Sector	SC	ST	OBC	Others	Not known	All
Rural	15.37	6.70	51.59	25.62	0.72	100.00
Urban	9.45	1.43	47.80	40.46	0.86	100.00
All	12.45	4.10	49.72	32.95	0.79	100.00

Source: Annual Report, Ministry of MSMEs (2021-22)

MSMEs can play a significant role in creating an inclusive and sustainable society. They encourage **balanced regional development**, gender equity, and the use of banking services and products. In light of the information presented above, MSMEs can become the '**growth engine of the nation**'.

What are the challenges faced by MSMEs?

Financial Constraints: This is a significant impediment for the MSME sector. Only 16% of SMEs have timely access to finance, forcing small and medium-sized businesses to rely on their own resources.

Lack of Formalisation: Almost 86% of the country's manufacturing MSMEs are unregistered. Only about 1.1 crore of the 6.3 crore MSMEs are registered with the Goods and Services Tax (GST) regime, and the number of income tax filers is even lower. As a result of limited availability and access to data, as well as legacy underwriting methods, the credit requirement of Indian MSMEs' have largely gone unmet.

Access to Technology: Majority of MSMEs use outdated technology that prevents them from keeping up with the modern world. Adoption of new technology and training employees is difficult and expensive, especially in manufacturing where both physical equipment and software are involved. Lack of access to IT education contributes to the technological gap. Another significant factor is a **lack of awareness**, which **reduces willingness to invest in advanced technology solutions**.

Skill Development: Skilled employees are critical for business growth. Multinational corporations (MNCs) recognise this and place on-the-job training at the heart of their operations. Unfortunately, small-scale businesses **fail to upskill their workforce**, causing them to suffer unknowingly.

Creativity: Businesses are becoming more **knowledge-based**, and their success and survival are inextricably linked to their **creativity**, and **innovation**. To remain competitive, MSMEs must learn and incorporate the process of innovation into their daily operations. However, they lack the resources and capacity to undertake innovations.

Competition: Because of increased competition, Indian MSMEs are finding it difficult to sell their products in both domestic and international markets. Small-scale enterprises face stiff competition from global counterparts as well as domestic giants due to their **massive scale of operation** (large corporations). While the government does provide protection for such small-scale businesses, competition remains largely one-sided.

Red-Tapism: MSMEs require various approvals and entrepreneurs are forced to navigate various government departments in order to obtain construction permits, enforce contracts, pay taxes, start a business, and trade across borders. In addition, regulatory risks and policy uncertainty limit scaling-up of MSMEs.

What steps have been taken to support MSMEs?

Credit and Financial

Prime Minister's Employment Generation Programme: The scheme, implemented by the KVIC, aims to generate employment opportunities in rural and urban areas by setting up new self-employment ventures/projects/micro enterprises. The programme also aims to provide continuous sustainable employment to prospective artisans and unemployed youth and increase the wage-earning capacity of artisans and contribute to the growth of rural and urban employment.

Credit Linked Capital Subsidy Scheme: Its objective is to **facilitate technology upgrade** among MSEs (Micro and Small) by providing capital subsidy of 15% (on institutional finance of

up-to Rs 1 crore availed by them) for induction of well-established and improved technology in the specified 51 sub-sectors/products.

Credit Guarantee Trust Fund for Micro and Small Enterprises (CGTMSE): It provides collateral-free credit to the micro and small enterprise sector.

Special Credit Linked Capital Subsidy Scheme (SCLCSS): This scheme will help enterprises in the services sector meet various technology requirements. It also has a provision to grant 25% capital subsidy for procurement of plant & machinery and service equipments through institutional credit to MSMEs owned by SC/ST entrepreneurs without any sector specific restrictions on technology upgradation.

Raising and Accelerating MSME Performance (RAMP): The scheme aims at strengthening institutions and governance at the Centre and State, improving Centre-State linkages and partnerships and improving access of MSMEs to market and credit, technology upgradation and addressing issues of delayed payments and greening of MSMEs..

Mudra Loan Scheme: It was launched in April, 2015 for providing loans up to INR 10 lakh to the non-corporate, non-farm small/micro enterprises. It encompasses 3 financing loans: ***Tarun*** (loans up to INR 10 Lakhs), ***Kishore*** (loan up to INR 5 Lakhs), ***Shishu*** (loan up to INR 50,000).

Skill Development and Training

A Scheme for Promotion of Innovation, Rural Industry & Entrepreneurship (ASPIRE): The objectives of this scheme are to create new jobs, promote entrepreneurship culture in the country, promote innovation in the MSME sector.

Entrepreneurship and Skill Development Programmes (ESDP): Under this, the Ministry of MSME has been organising several programmes focussing on the process of improving skills and knowledge of entrepreneur, and enhancing the capacity to develop, manage and organise a business venture.

Infrastructure

Scheme of Fund for Regeneration of Traditional Industries (SFURTI): The objectives are to organise traditional industries and artisans into clusters to make them competitive and provide support for their long-term sustainability, enhance marketability of products of such clusters, build innovative products, improve technologies etc. The scheme cover **three types of interventions**, e.g., **soft intervention** wherein activities are held to build general awareness, counselling, skill development, etc.; **hard interventio**n which includes creating common facility centers, raw material banks, etc.; and **thematic intervention** on brand building, new media marketing, e-commerce initiatives, research and development, etc.

Scheme for Micro & Small Enterprises Cluster Development Programme (MSE-CDP): The Ministry of MSME has adopted the cluster development approach as a key strategy for enhancing productivity and competitiveness as well as capacity building of Micro and Small Enterprises (MSEs). The programme includes activities such as support funding for setting up **Common Facility Centres** (CFC) and **Infrastructure Development Projects** (IDP).

Technology Upgrade and Competitiveness

Financial Support to MSMEs in ZED Certification: The scheme promotes **Zero Defect and Zero Effect** (ZED) manufacturing among MSMEs. It provides **ZED Assessment** for their **certification** to encourage MSMEs to **constantly upgrade their quality standards** in products

and processes, promote adaptation of quality tools/systems and energy-efficient manufacturing, and drive manufacturing by adopting the Zero Defect production processes and without impacting the environment.

Support for Entrepreneurial and Managerial Development of SMEs through Incubators: The objective of the scheme is to promote and support the creativity of MSME enterprises and encourage **adoption of the latest technologies** in manufacturing as well as knowledge-based innovative MSMEs.

Digitalisation: Government initiatives such as the **Digital *Saksham*** and the interlinking of the ***Udyam***, **e-*Shram***, National Career Service (NCS), and Atmanirbhar Skilled Employee-Employer Mapping (ASEEM) portals show the promise of targeted digitalisation schemes.

Services

Building Awareness on Intellectual Property Rights (IPR) for MSMEs: It has been launched to promote awareness about IPRs among MSMEs by assisting them in technology upgrade and enhancing competitiveness and effective utilisation of IPR tools.

Trade, Import and Export for MSMEs: MSME support and development organisation, National Small Industries Corporation (NSIC), will assist MSMEs working with the Agricultural and Processed Food Products Export Development Authority (APEDA) across multiple areas. APEDA members will get access to NSIC schemes, which would help them address issues pertaining to technology adoption, skills, product quality and market access.

Miscellaneous

In June 2022, the Union Government announced a new initiative called '**Promotion of MSMEs in North Eastern Region and Sikkim**'. Its main purpose is to **stimulate MSMEs in the North East** by establishing mini-technological centres, developing new and existing industrial estates, and promoting tourism.

In November 2021, NITI Aayog released a discussion paper to introduce new financial entities called '**Digital Banks**' that would fundamentally aim to **bridge the current credit gap** among India's MSMEs and get them into the formal financial fold.

Support by Private Sector

The Small Industries Development Bank of India (SIDBI) has inked a pact with **Google** to pilot **social impact lending** with financial assistance up to INR 1 crore at subsidised interest rates to micro enterprises. To reinvigorate the Indian MSME sector, Google India Pvt. Ltd. GIPL, will bring a corpus of US$ 15 million for micro enterprises as a crisis response related to COVID-19.

Digital freight forwarder Freightwalla, launched a **shipment tracking service** for MSME exporters and importers based on **predictive analytics** to help businesses tackle risks associated with shipment delays and improve supply chain efficiency.

Bombay Stock Exchange (BSE) announced that it has collaborated with the All-India MSME Association (AIMA MSME) to encourage and **promote the listing of MSMEs and start-ups**.

Meta India has announced the launch of online resource centre '**Grow Your Business Hub**', to help MSMEs find relevant information, tools and solutions curated to cater to their business goals.

What more should be done to support MSMEs?

First, There is a need to push for for **Digitisation of MSMEs**. Owing to problems like the dearth of proper infrastructure, finance, and limited knowledge, the MSME sector has been slow in going digital. Digitising the sector could help in enhancing efficiency and reliability, cutting costs, and keeping up with latest technological trends.

Digital Initiatives in the MSME Sector

- **Udyog Aadhar Memorandum**: It is a 1-page **online registration system** for MSMEs based on **self-certification**.
- **MSME Databank**: It enables the Ministry of MSME to **streamline and monitor the schemes** and pass on the benefits directly to MSMEs. MSMEs can update their enterprise information as and when required.
- **MY MSME**: It is a web-based application module in the form of a mobile app to facilitate the MSMEs to enjoy benefits of various schemes.
- **MSME *Sampark***: It is a digital platform wherein jobseekers (students or trainees of MSME Technology Centres) and recruiters can register themselves for mutually beneficial interactions.
- **MSME *Sambandh***: For effective implementation of the Public Procurement Policy, Central Ministries and Public Sector Enterprises (CPSEs) must procure 25% annual procurement from MSEs. The Ministry of MSME has launched MSME Sambandh.
- **MSME *Samadhaan***: This portal gives information about pending payments with the Central Ministries, State Governments, with respect to micro and small enterprises (MSEs).
- **MSME *Sambhav***: It is a national-level awareness programme to push economic growth by promoting entrepreneurship and domestic manufacturing.
- **Grievance Monitoring**: The Ministry of MSME has started an **MSME internet grievance monitoring system** (e-Samadhan) to help track and monitor the grievances and suggestions.

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Second, The **National Logistics Policy** can also be used to **boost the competitiveness** of MSMEs. The NLP aims to reduce logistics costs as a percentage of GDP from 13-14 percent to 8%, putting the country on par with developed nations. While lower costs will encourage more MSMEs to use logistics services powered by technology.

Third, with the advent of online **e-commerce platforms**, MSMEs have got access to a **channel to expand their markets**. However, to meet the growing demand for e-commerce in suburban and rural areas, they will require assistance. To that end, the Government could enlist **India Post** as a technologically advanced **last-mile delivery partner** capable of facilitating cash-on-delivery transactions at competitive rates.

Fourth, similarly, the unparalleled **reach of Indian Railways** can be leveraged to quickly and cost-effectively ship goods to the most remote parts of the country. This can expand the reach of products manufactured by MSMEs.

Conclusion

MSMEs can play a vital role in growth of the economy as India enters the *Amrit Kaal* phase. They can help in inclusive and balanced development and make India a global manufacturing hub. The Government has been supporting the MSMEs through various initiatives, the need is to focus on the implementation and realizing the outcomes.

Syllabus: GS III, Indian Economy; GS III, Changes in Industrial Policy and their effects on industrial growth.

Source: **Indian Express**, **The Hindu**, **IBEF**, **PIB**

Energy Transition: Challenges and Solutions – Explained, pointwise

Introduction

The window for climate action is shortening rapidly. IPCC Sixth Assessment Report had pointed out that Earth will warm up by 1.5°C (above pre-Industrial level) over the next couple of decades. According to NASA, the planet's average temperature was 1.02°C warmer in 2020 than the mean temperature between 1950-80. If the temperature rise is to be limited to 1.5°C, the emissions must peak by 2025. To limit the temperature rise, it is essential to shift away from fossil fuels. Without the Energy Transition, the planet may face disastrous consequences with rising frequency of extreme weather events. However, the path to energy transition is riddled with several challenges which has slowed down the pace of the decarbonisation of the economy. Overcoming these challenges is necessary to ensure a just and equitable shift to the sustainable economy.

Read More: The IPCC Sixth Assessment Report (Part 2) – Explained, pointwise

What is the meaning of Energy Transition?

In the present context, Energy Transitions refers to the **transformation of the energy sector** from **fossil-based systems** of energy production and consumption to **renewable energy sources**. It involves a **shift in the energy mix** to reduce, if not eliminate, the carbon emissions (and other greenhouse gases).

Switching from nonrenewable energy sources like oil, natural gas, and coal to renewable energy has been made possible by **technological advancements** and a societal and Governmental **push toward sustainability**. Energy Transition involves structural and permanent changes to energy supply, demand and prices. Energy Transition is possible when all sectors which are major consumers of energy like industrial, transportation, domestic and commercial sectors etc. are decarbonized.

The human civilisation has witnessed energy transition in the past as well, e.g., the transition from wood (as primary source of energy) to coal happened in the 17th and 18th centuries. The shift from coal to oil occurred predominantly in the 20th century. These shifts or Energy Transitions were accompanied by structural shift in other sectors like industry, transportation, energy generation etc.

What steps have been taken by India towards Energy Transition?

Commitments under Nationally Determined Contributions (NDCs): India has committed to 3 targets under the Paris Climate Action (by 2030). These include **(a)** Bringing down the emission intensity of economy (GDP) by 45% (compared to 2005 levels) by 2030; **(b)** Achieve 50% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030; **(c)** To create an **additional carbon sink** of 2.5 to 3 billion tonnes of CO_2 equivalent through additional forest and tree cover by 2030; **(d)** To put forward and further **propagate a healthy and sustainable way of living** based on traditions and values of conservation and moderation, including through a **mass movement for 'LIFE'– 'Lifestyle for Environment'** as a key to combating climate change, among others.

Read More: India's New Climate Targets (INDCs) – Explained, pointwise

Other Climate Action: In addition to the NDCs: **(a)** India has committed to **achieve Net Zero by 2070**; **(b)** India is aiming to become a **global hub for green hydrogen** production and exports;

(c) India targets to achieve **20% ethanol blending** in petrol by 2025-26 (earlier target year was 2030).

Read More: India's Strategy for Net Zero – Explained, pointwise

Renewable Purchase Obligations (RPO): To expand capacity of renewable energy and to promote its adoption, a mandate of Renewable Purchase Obligation has been issue to the utility companies (i.e., all electricity distribution licensees should purchase or produce a minimum specified quantity of their requirements from Renewable Energy Sources).

International Solar Alliance: India is also showing global clean energy leadership through initiatives such as the International Solar Alliance, which has more than 70 member countries.

Policy Measures: The Energy Conservation (Amendment) Act, Missions like National Green Hydrogen Mission, National Policy on Biofuels, Fiscal incentives (production linked incentives), and market mechanisms (PAT Scheme, proposed Carbon Market) are examples of interventions that demonstrate India's serious commitment to energy transition.

Read More: Green Hydrogen Mission – Explained, pointwise

Other Government Initiatives: **(a)** Subsidies on Petrol and Diesel have been removed in the last decade; **(b)** Subsidies are being provided to EVs; **(c) FAME Scheme** (Faster Adoption and Manufacturing of Electric Vehicles) was launched in April 2015 under the National Electric Mobility Mission; **(d)** Government has provided fuel gas for cooking to millions of households enabling a steady transition away from the use of traditional biomass such as burning wood etc.

What are the challenges to Energy Transition?

Policy and Regulation: The introduction of new energy sources has required changes to current energy market regulation. The present energy transition has largely been **driven by Government policies and regulations**. In contrast, the previous energy transitions (wood to coal to oil and gas) had occurred through **inter-fuel competition**, efficiency of new fuels and market forces that accompanied the industrial development. **Misplaced policies can produce undesirable effects** e.g., critics argue that carbon tax in developed economies (the EU and the US) has shifted the polluting manufacturing units to Asian economies where regulation is lax. This has allowed MNCs to continue to emit GHGs. Such policies **haven't contributed to cut down in emissions, only shifted them from developed to developing countries**.

Read More: Carbon Markets: Benefits and Challenges – Explained, pointwise

In addition, many policies pose new associated challenges e.g., the promotion of use of ethanol as fuel has led to **diversion of crops for fuel generation**. This has raised food prices (due to diversion of maize and sugarcane for generation of fuel).

Technology: Energy generation and consumption through sustainable methods pose several technological challenges e.g., power generated through solar and wind energy is intermittent and poses challenges in **grid stability and load balancing** (e.g., solar energy is not available at night when load might be high). Hence there is requirement of large storage capacity (in batteries). Similarly, **hydrogen is highly explosive** in nature and will require **new technologies for safe production, storage, transportation and use**.

Finance: Restructuring the energy systems and development of technological solutions require access to finance. The IEA has estimated that over the next decade **US$ 1-1.3 trillion will need to be invested in the power sector per annum** (mainly in renewable energy and power

networks), plus up to US$ 1 trillion per annum in improving energy use in end-use sectors. Banks and Financial Institutions will find it difficult to **finance risky investments in technology development**. Moreover, developing countries **lack access to finance** to support the Energy transition (e.g., building solar power plants and corresponding distribution infrastructure).

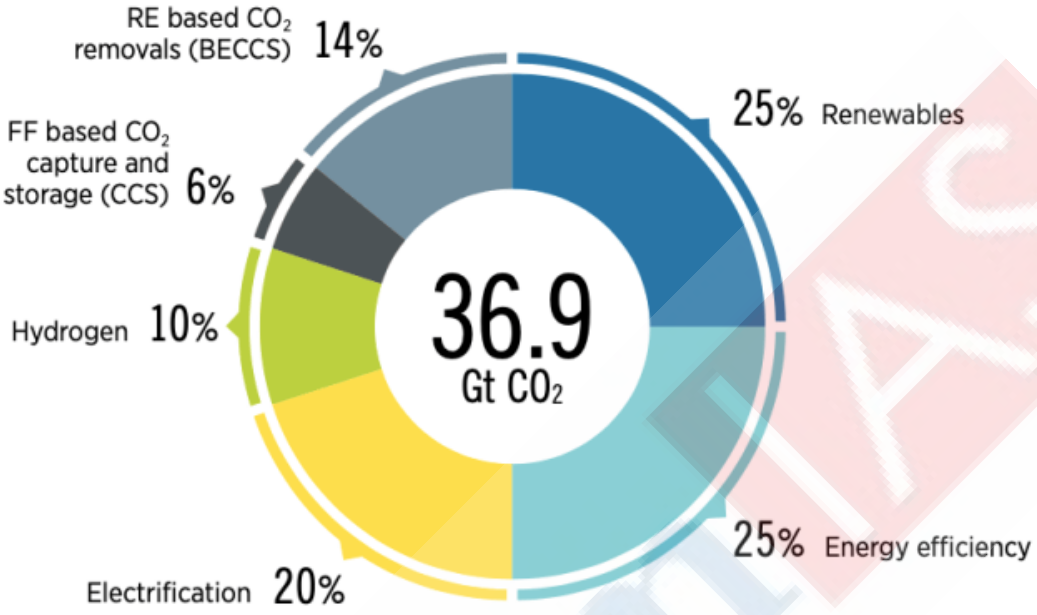
Read More: Climate Finance: Meaning, Need and Challenges – Explained, pointwise

Networks: The present energy system has large and complex network of storage and distribution systems e.g., the predominance of fossil fuel based system (hydrocarbons) has seen the development of a network of pipelines, shipping fleets, and distribution outlets that are the core asset base in the global energy system. This infrastructure will need to be **adapted or re-purposed** if it is to remain relevant to a decarbonised energy sector. There is a risk of lot of these assets ending up being stranded (i.e., rendered useless or without value). It will be difficult to adapt existing gas-based infrastructure for hydrogen as handing hydrogen requires much more safety measures.

Impact on Consumers (including energy justice and access issues): Energy transitions could give rise to **intra-generational**, **intergenerational**, and **spatial equity** concerns e.g., Transition away from fossil fuels can affect near-term fossil-dependent jobs. Government's obligation for climate action can shrink their capacity to spend on welfare programmes and thus exacerbate existing economic inequities. Consumers may be impacted by higher costs of energy from renewable resources. They may be **unwilling to adopt new systems** (e.g., Electric Vehicles) or to pay more in the short term for a product that can improve long-term welfare.

Differences about Transition Paths and Energy Mix: Different countries and regions are starting from different positions both in terms of their economic development, current energy mix, and carbon emissions. Different regions are endowed with different resources and will be try to adapt according to their circumstances. This has given rise to differences among countries (especially developed and developing) about which clean technologies should be adopted and how they should be financed.

FIGURE ES.1 Reducing emissions by 2050 through six technological avenues



Note: Abatement estimates include energy and process-related CO_2 emissions along with emissions from non-energy use. Renewables include renewable electricity generation sources and direct use of renewable heat and biomass. Energy efficiency includes measures related to reduced demand and efficiency improvements. Structural changes (*e.g.* relocation of steel production with direct reduced iron) and circular economy practices are part of energy efficiency. Electrification includes direct use of clean electricity in transport and heat applications. Hydrogen and its derivatives include synthetic fuels and feedstocks. CCS describes carbon capture and storage from point-source fossil fuel-based and other emitting processes, mainly in industry. BECCS and other carbon removal measures include bioenergy coupled with CCS in electricity, heat generation, and industry.

CCS = carbon capture and storage; BECCS = bioenergy with carbon capture and storage; $GtCO_2$ = gigatonnes of carbon dioxide; RE = renewable energy; FF = fossil fuel.

Source: World Energy Transitions Outlook, 2022 (IRENA). Pathway suggested by IRENA for Energy Transition.

Geopolitical and Energy Security Implications: During the 20th century the geopolitics was centered around oil and the oil rich regions. The shift to new technologies has given rise to new concerns e.g., China has large reserves of elements/materials used in new technologies and controls their supply chains. China has exploited its position for strategic purposes e.g., cutting down supply of materials to Japan.

Read More: Rare Earth Elements: Strategic Importance and Reducing Import Dependence – Explained, pointwise

What step can be taken to address challenges to Energy Transition?

Acceleration in Deployment Rates of Renewable Energy (RE): Acceleration in deployment of renewable energy (RE) is necessary to match the pace of demand growth. It is critical to India's

Just Energy Transition (JET). Meeting India's 2030 target requires accelerating non-fossil capacity addition from 16 GW a year in 2022 to 75 GW a year by 2030.

This can be accomplished through; **(a)** Solarisation of agricultural electricity demand; **(b)** Electrification of diesel-powered Micro, Small and Medium Enterprises (MSMEs); **(c)** Decentralised RE for residential cooking and heating etc. Stimulation of energy demand through rural productivity enhancement will further aid RE acceleration as well as help to address the rural-urban economic divide, create rural jobs, and thereby address inter-generational and spatial inequities.

Enhancing Finance and Technology Transfer: The developed countries must enhance climate finance and fulfil their obligations under the Paris Climate Agreement. Recognising their historical contributions, developed countries should share technology with developing countries to ensure equity in energy transition. To achieve net zero emissions by 2070, the IEA estimates that an average of $160 billion per year will be required across India's energy economy between now and 2030. That is three times the current level of investment. International financial support will be necessary.

Global Coordination: There is a need for global coordination to establish standards with respect to energy transition to ensure uniform transition (e.g., with respect to Electric Vehicles and associated infrastructure) without disruption.

Re-aligning utilization of Coal: In the long term coal will be phased out (with phase down in the medium term). In order to ensure there is minimum disruption and the existing assets are utilized there is a need to re-align the current use of coal resources to enhance efficiencies until the period of complete phase-out. Coal-fired power plants could be better utilised if located near coal mines rather than in states with the highest energy demand. This would allow coal to be used more efficiently because coal transportation requires more energy than electron transmission and would result in fewer emissions. It would also result in cheaper power, as transportation costs one-third of the cost of coal for power plants; the savings could also be used to fund much-needed emission control retrofits.

Government Support: The Government ought to support decentralised renewable energy technologies that can reduce reliance on thermal power plants, such as utility-scale battery energy storage systems. It is imperative to set aside special 'transition funds' to assist coal-dependent regions in India, some of which are among the most impoverished regions.

Alternate Livelihood Opportunities: People employed in fossil fuel based energy systems (coal mines, power plants etc.) will be losing their jobs as a result of energy transition. They will need to be retrained and provided with new employment opportunities as quickly as possible.

Decarbonising Heating and Cooling: All new buildings must be energy efficient. Decarbonising heating and cooling will require changes to building codes, energy performance standards for appliances, and mandates for r**enewables-based heating and cooling technologies**, including solar water heaters, renewables-based heat pumps and geothermal heating.

Demand-side Management: Innovation, recycling, and the circular economy will play significant roles in the pursuit of efficiency over the medium and long term.

Private Funding: Balance of private and public funding will be required to meet the investment requirements over the long term.

Conclusion

Energy Transition is the most vital aspect of shift towards green and sustainable economic systems. However, there are several challenges that may derail the transition. In addition, there are concerns related to equity especially the impact of energy transition on developing economies. There is a need for greater efforts in terms of financial support and technology sharing to ensure that the process of energy transition is equitable and least disruptive.

Syllabus: GS III, Infrastructure: Energy; GS III, Conservation.

Source: The Hindu, The Hindu BusinessLine, IRENA, TERI

Hydroelectric Projects in India: Status, Benefits and Concerns – Explained, pointwise

Introduction

The Joshimath crisis in Uttarakhand has led to large scale displacement of the local population. The Government has halted all construction activity in the region. The reason for the crisis is being attributed to development projects being undertaken in the region. This has brought attention to the large-scale hydroelectric projects being built in the region. Environmental experts argue that such large hydropower projects are not conducive to local ecology and end up doing more harm than good. Hydropower projects have several benefits and can help meet India's energy needs while meeting climate targets. However, due attention must be paid to their environmental impacts before undertaking such large projects.

What is the status of hydroelectric projects in India?

In 2022, hydropower capacity of 46,512 MW (megawatts) accounted for ~12% of total capacity. In the last two decades the most significant policy push for hydropower was the 2003 plan for developing 50,000 MW of hydropower capacity. Under the plan, 162 new hydro-electric projects were identified. Out of these, more than half the capacity identified was in Arunachal Pradesh and about a third was in the Himalayan and North-eastern states.

As of 2021, only one project of capacity of 100MW in Sikkim has been commissioned and about 4,345 MW capacity is under construction. 12 projects of total capacity of over 3,500 MW have either been terminated or held up due to local environmental concerns. 40 projects of capacity 13,633MW have either been abandoned or delayed due to local opposition to the projects.

Only 37 projects got their detailed project reports (DPR) prepared with a decreased capacity of 18,487 MW.

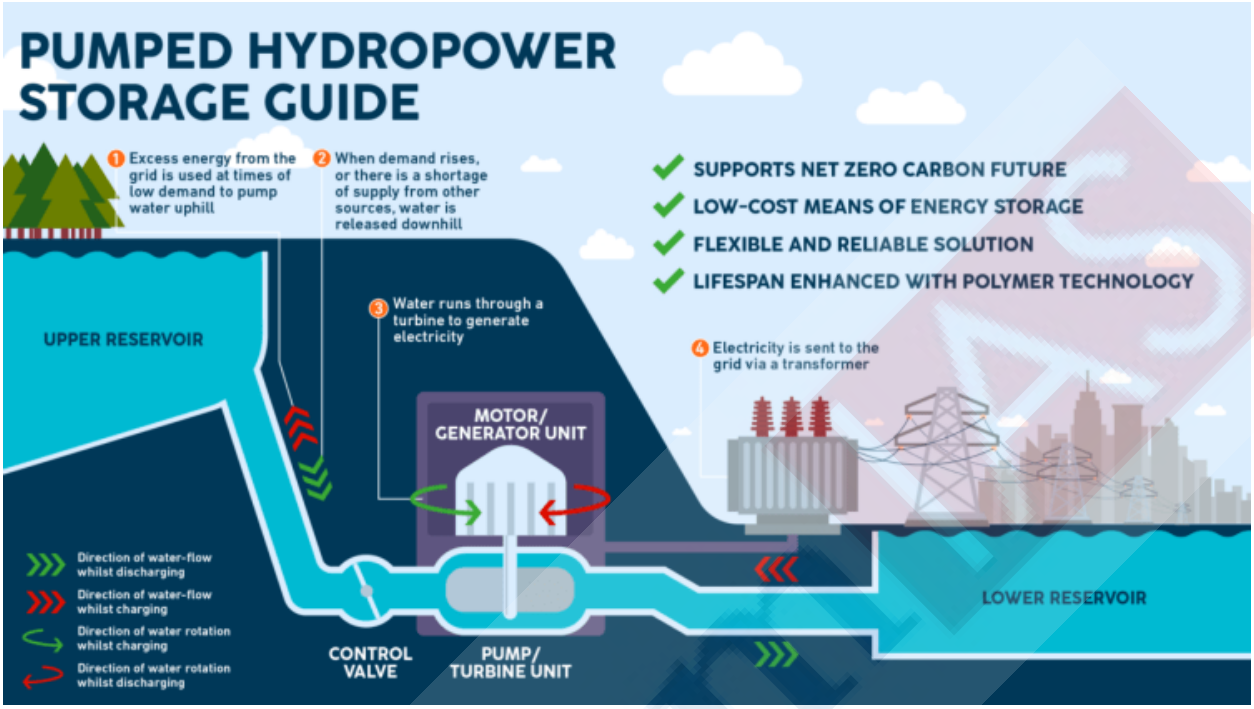
In the last few years, many of India's newer hydro-power projects on the Himalayan rivers (commissioned or under construction) have been damaged by floods and In some cases, people trapped in project sites have lost their lives or severely injured.

What are the benefits of hydroelectric projects?

Low Carbon Emissions: Unlike the traditional fossil fuel sources of energy, using hydropower to produce electricity does not release any pollutants in the air or dirty water.

Renewable Energy: Hydropower is a renewable source of energy. The energy generated through hydropower relies on the water cycle, which is driven by the sun, making it renewable. Unlike fossil fuels, it needs no extraction of resource. It requires flow of water. It also complements other

renewable energy sources. Technologies like Pumped Storage Hydropower (PSH) store energy to use in tandem with renewables such as wind and solar power when demand is high.



Source: energy.gov. Pumped Storage Hydropower. Excess energy from grid (during day) is used to pump water uphill. When demand rises, the water is released downhill generating energy.

Economic Benefits: Hydroelectric projects provide economical and reliable power over long time. They have high initial construction costs, but the long duration of projects and relatively low maintenance costs make them more viable in the long term.

Irrigation and Drinking Water: Hydropower projects have large associated benefits like provision of irrigation and drinking water.

Other Benefits: Reservoirs/Storage-based hydropower projects aid in **flood control**. Local communities can benefit from **fisheries** and other activities in the reservoirs. Large hydropower projects also support **tourism** and **recreational activities**.

Employment Generation: Hydroelectric projects support lot of economic activities and generate additional employment including in manufacturing, utilities, business services, construction, transportation, energy systems, water management, tourism etc.

Reduce Dependence on Fossil Fuel: India has large hydroelectric potential. Harnessing the potential can reduce dependence on fossil fuels (electricity mix) and save foreign exchange reserves.

What are the concerns associated with hydropower projects?

Environmental Impact: Although hydroelectric projects have little or no emissions, they have several negative environmental impacts. The storage/reservoir based dams can **disrupt the flow of rivers**, and impact its temperature and chemistry. It can reduce the flow of useful sediments

downstream. It can also cause **erosion**, **landslides** and **sedimentation** that have a negative impact on the local environment. Critics have attributed the recent crisis in Joshimath and other parts of Uttarakhand on construction of large-scale hydropower electric projects among other other infrastructure products.

Land Use and Social Impact: Large hydroelectric power plants take up a large expanse of land. Submergence of land under reservoirs leads to loss of people's homes and livelihoods, important natural areas, agricultural land, or historical landmarks. Submergence can impact local wildlife and ecology.

Flooding: Dams help in flood control by acting as buffer and taking up excess water during heavy rainfall. However, in extreme weather conditions/breach of dams, the severity of floods may get worsened. This was evident in the Rishiganga tragedy in Uttarakhand in 2021.

Impact on Aquatic Life: Constructing large hydropower plants usually involves manipulating the natural course of river systems. It often blocks a river's natural flow and **obstructs fish migration routes**. Consequently, inhibited fish migration will deplete fish populations over time especially downstream the reservoir. A reduced fish population has drastic consequences for both human food supply and marine ecosystem stability.

Disruption of River System: Hydropower projects change the **concentration of nutrients**, water temperature, and the river's flow. Downstream river flow suffers a **loss of water and silt loads**, reducing water quality. These changes directly affect the ecological characteristics of the rivers that harm native plants and fish species. Dams affect the productivity and stability of estuaries . This led to a loss of habitat for aquatic life and a **decline in biodiversity**.

Greenhouse Gas Emissions: Hydroelectric generation is not 100% emission-free. Studies have shown that reservoirs created by dammed rivers emit greenhouse gases. **Dead plants** and other **organic materials in the reservoir** water decompose and **release methane** (a strong greenhouse gas) and carbon dioxide into the atmosphere. Emissions can also come from the **heating and cooling systems** used to maintain the hydroelectric equipment. The amount of greenhouse gas a hydropower reservoir emits may depend on regional factors and the specific location.

What are the benefits of Small Hydroelectric Projects ?

In India, hydro power plants with **capacity of 25 MW or below** are classified as small hydropower projects. Micro hydro systems can be classified into two main types: **run-of-river** and **storage systems**. Run-of-river systems **use the natural flow of water** in a stream or river to generate electricity. In contrast, storage systems use a reservoir to store water and release it as needed to generate electricity.

Electricity in Remote/Underserved areas: Micro-hydroelectric power generation system generates up to 100 kilowatts of electricity. The electricity generated by micro/small hydropower projects can be used for various applications, including powering homes, businesses, and small communities. They can provide electricity to **remote underserved communities** that are not connected to the grid.

Low Cost: Small hydro systems are typically **less expensive to build and maintain** than large hydroelectric dams and have a smaller environmental footprint. Their low cost makes them viable to support underserved areas (in terms of electrical connectivity).

Lesser Impact on Environment: Micro/Small hydro systems can address many environmental challenges posed by large hydroelectric projects. Being run-of-the-river, they have minimal impact on river ecology (upstream or downstream) and aquatic life. They do not disturb the fragile and unstable slopes of mountains.

Durable: They have low maintenance and operating costs. Small projects can last up to 50 years without major new investments.

What should be the approach going forward?

Ecological Sustainability: Ecological sustainability should be the topmost priority in fragile ecosystems like the Himalayas. Large hydroelectric projects should be avoided in Uttarakhand. In an affidavit filed before the Supreme Court in 2021, the Union Government had said that no new big project would be established in the upper reaches of Ganga.

Promote Small-Hydro Projects: In such fragile environments only small run-of-the-river projects should be allowed that have minimal impact on the ecosystem.

Accelerated Hydropower Development: In other areas, where ecology is not so fragile, the hydropower potential should be utilized. This is necessary to meet rising energy demand in India amidst the need to reduce dependence on fossil fuels as primary energy resources.

Private Sector Participation: The involvement of the private sector and joint ventures with the neighbouring countries can go a long way towards achieving the goal of "power to all" in the coming years

Resolving Inter-State Conflicts: Inter-State issues regarding large projects and water sharing etc. could be solved by conducting dialogues, understanding core issues and addressing these issues through various modes of discussions, negotiations, arbitrations or at last legal proceedings.

Eco-sensitive Zones: Wild life areas and national parks or national reserves should be identified. Eco-sensitive zones should be well defined before handing over of the project to the project developer.

Infrastructure Development: Inadequate infrastructure like roads, bridges etc. particularly in Arunachal Pradesh and NE states results in longer construction periods, thereby increasing the project cost. Agencies like BRO, State PWD, implementing the road sector projects need to be provided adequate support to complete the projects expeditiously. National Clean Energy Fund (NCEF) (Coal cess) can be used for development of Roads, Bridges and Infrastructure common for many Hydro projects (especially small hydro projects).

Syllabus: GS III, Infrastructure: Energy; GS III, Conservation.

Source: Indian Express, The Hindu, Economic Times, ORF

Microfinance: Status, Benefits, Challenges and Solutions – Explained, pointwise

Introduction

The RBI had recently released its 26th Financial Stability Report (December 2022). In the report, the RBI remarked that the credit to the Microfinance sector has grown at a steady pace. However, the report highlighted the building stress levels in the loans portfolio (i.e., bad loans are

increasing). The share of loans overdue by more than 90 days has risen to 14% in September 2022, from 12% in March 2022. Microfinance is considered a potent tool to ensure balanced and inclusive growth, especially by providing access to credit to the rural citizens and small entrepreneurs. The rising delinquency (Being delinquent refers to a situation wherein the borrower is overdue on a loan payment by a certain number of days) in Microfinance is indicative of the challenges faced by the sector. The Government has been supporting the sector through various initiatives. The Government has to step in to address the issues faced by the sector.

What is the meaning of Microfinance?

Micro Finance is defined as 'provision of credit and other financial services and products of **very small amounts** to the poor in rural, semi urban or urban areas, for enabling them to **raise their income levels** and **improve living standards**'. It is an economic tool designed to **promote financial inclusion** which enables the poor and low-income households to come out of poverty.

Components of Microfinance

Micro credit: Micro credit is the extension of **very small loans** to borrowers who typically lack collateral, steady employment or income stream and verifiable credit history. It is designed to support small-scale entrepreneurship, alleviate poverty, empower women and uplift the poor social class by extension. Microcredit is delivered through a variety of institutional channels including Scheduled Commercial Banks (through Business Correspondents), Regional Rural Banks (RRBs), Cooperative Banks, Non-Banking Financial Companies (NBFCs) and Microfinance Institutions (MFIs).

Micro Insurance: It is the insurance with low premiums and low coverage. Micro-insurance covers low income/net-worth persons and transactions are of low value. Like normal insurance, it can cover wide range of risks including damage to crops and livestock.

Micro Saving: Micro saving is targeted at people with low incomes and low savings. They are similar to saving accounts, but designed for small deposits. Typically, the limit of minimum deposit/balance is low and there are no service charges.

Microfinance Institutions: Institutions providing Microfinance services are called Microfinance Institutions (MFIs). A large number of organisations with varied size and legal forms offer Microfinance services. The MFIs exist as separate institutions because of the unique features of Microfinance like high transaction costs, short duration of loans, high frequency of repayment/instalments, absence of collateral and relatively higher rate of default.

Types of Microfinance Institutions in India

Joint Liability Groups: JLGs are informal group of 4-10 people that seek mutually assured loans. Agriculture-related loans are typical. Farmers, rural labourers, and renters are among the debtors in this category. JLG members are **equally responsible for loan repayment**.

Self-Help Groups: An SHG is a group of people in similar socioeconomic situations who come together to help each other. They are self-governed. Members come together (often for a limited time) to form a shared fund for their mutual business requirements. This type of cooperative financing does not necessitate the use of collateral. In addition, borrowing rates are often cheap. Several banks have formed partnerships with SHGs in order to **increase financial inclusion** in the country's rural areas e.g., the NABARD-SHG linkage program, allows numerous self-help groups to borrow money from banks if they can show that their borrowers have made regular payments.

Regional Rural Bank Model: The main purpose of this strategy is to boost the rural economy. They have been created to serve rural areas with basic banking and financial services.

Cooperatives: Rural cooperatives were established at the time of India's Independence. Through the cooperatives, resources of the poor are pooled and financial services are made available.

MFIs, based on their set-up, are regulated as NBFCs by the RBI, or through Companies Act, 2013.

Status of Microfinance
According to NABARD, the SHG-Bank Linkage Programme, covers 14.2 crore families through 119 lakh SHGs (87% of which are women) with savings deposits of INR 47,240.48 crore (March 31, 2022).

NABARD has sanctioned a cumulative grant assistance of INR 255.81 crore to Joint Liability Groups Promoting Institutions (JLGPIs) for promoting 12.77 lakh JLGs (March 31, 2022). There are 188 lakh JLGs of which 54 lakh were promoted during FY 2021-22 (as against 41 lakh promoted in FY 2020-21). During FY 2021-22, loan disbursed was INR 112,772.75 crore.

According to NABARD, Microfinance operations in India are spread across 595 districts of 28 States and 5 Union Territories. As on 31 March 2022, the combined micro credit portfolio of 225 lenders is INR 262,599 crores.

What are the benefits of Microfinance?

Credit to Low-Income Borrowers: Microfinance provides credit to the poor people with low income and assets who face difficulty in accessing finance from formal banking institutions. They help in providing funds to small entrepreneurs in poor regions.

Collateral-Free Loans: No collateral is required for Microfinance loans. This helps persons with little or no assets to access credit.

Financial Inclusion: Microfinance helps those sections of population who are unable to access credit from Banks/formal institutions.

Income Generation: Loans provided by MFIs help small entrepreneurs set-up/expand/scale-up their operations. This enables them to improve their income.

Women Empowerment: Microfinance facilities have proven to be vital in providing financial independence to women and thus empowering them. As noted by NABARD Report, SHG-Bank Linkage Programme has benefited 119 lakh SHGs, 87% of which are women. Access to finance will help increase women-led MSMEs.

Rehabilitation: Microfinance is able to provided access to finance in naxal areas as well. It has thus helped in rehabilitation of the conflict-affected people.

Rural Development: Microfinance boosts economic activities in the rural area and thus aids in rural development. It helps create livelihood opportunities as well.

Encourage Self-Sufficiency and Entrepreneurship: MFIs can provide much-needed funds to an individual for the establishment of a new business that requires small investment and offers long-term profit. Thus they promote entrepreneurship and self-sufficiency among the lower-income population.

What are the challenges associated with Microfinance?

Financial Illiteracy: Financial illiteracy leads to lack of awareness about various MFIs, and the services the offer. This makes the poor people reluctant to approach the MFIs.

Inability to Generate Funds: MFIs face difficulty to raise sufficient funds as they are generally not 'for-profit'. This restricts their access to funds from private equity investors or other market-based avenues of funding.

Heavy Dependence on Banks: MFIs are dependent on borrowing from banks. For most MFI's funding sources are restricted to private banks. Funds available from these banks are typically for short term, generally 2 years. Moreover, Banks tend to disburse loans at the end of financial year to meet the targets. This can create issues for MFIs if there is delay in repayment of loans by borrowers.

Weak Governance: Many MFI's are not willing to convert to a corporate structure; hence there is lack of transparency. This also limits their ability to attract capital. MFI's face challenge to strike a balance between social and business goals.

Interest Rate: Some MFIs charge high interest rates, which the poor find difficult to pay. MFIs are private institutions and do not get any subsidized credit for their lending activities. Thus they tend to charge higher interest rate.

Regional Imbalances: There is unequal geographical growth of MFIs and SHGs in India. About 60% of the total SHG credit linkages in the country are concentrated in the Southern States. In poorer regions like in Jharkhand, Bihar etc. where the proportion of the poor is higher, the coverage is comparatively lower. This could be attributed to lack of State government support, NGO concentration and public awareness

What steps have been taken to promote Microfinance in India?

Government Programmes: **(a) SHG-Bank Linkage Programme** (SHG-BLP): This channel was initiated by NABARD in 1992. This model incentivises women to unite together to form a group of 10-15 members. Women belonging to financial backward classes contribute by giving their individual savings to the group at regular intervals. Loans are provided to the members of the group by their contributions; **(b) Micro Enterprise Development Programme (MEDPs)**: The programme enables SHG members to be up-skilled to take up income generating livelihood activities. The main objective of the programme is to **enhance the capacities of participants** through appropriate skill up-gradation in existing or new livelihood activities in farm or non-farm activities. It helps enrich knowledge of participants on enterprise management, business dynamics and rural markets; **(c) Livelihood and Enterprise Development Programme (LEDP)**: It was initiated on a pilot basis in 2015 with a view to **create sustainable livelihoods** among matured SHG members and to obtain optimum benefit from skill up-gradation. LEDP is a holistic intervention mechanism conceived to take care of the entire ecosystem required for livelihood promotion in both farm and off-farm activities. It is implemented through cluster-based approach within contiguous villages. It has a provision for intensive training for skill building, refresher training, backward-forward linkages, handholding and escort support for credit linkage; **(d) Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE)**: It implements the credit guarantee scheme for Micro and Small Enterprises (MSEs). It has added MFIs to the list of member lending institutions (MLIs).

Financial Support by NABARD and SIDBI: **(a)** NABARD supports MFIs in their formative years (as NGO-MFIs) with grant support and **Revolving Fund Assistance** (RFA). NABARD had also created the **Micro Finance Development and Equity Fund** (MFDEF) in 2006 to help a number of MFIs with quasi-equity and subordinated debt instruments; **(b)** SIDBI has aided the growth of MFIs through its **SIDBI Foundation for Micro Credit** (SFMC). The **India Microfinance Equity Fund** (IMEF) of SIDBI has also supported MFIs, especially the medium and smaller ones with equity and quasi-equity. Since IMEF had similar function as MFDEF, it (MFDEF) was withdrawn in 2013; **(c) MUDRA**: Support to Microfinance sector was scaled up by Government of India by setting up the **Micro Units Development & Refinance Agency Ltd (MUDRA)** in 2015. It is an NBFC that focuses on micro-enterprises, extending **financial support to MFIs** for on-lending to individuals/groups/JLGs/SHGs.

Regulatory Initiatives: **(a) Y H Malegam Committee**: It was set-up in the wake of AP Microfinance crisis in 2010. It was constituted by the RBI to study issues and concerns in the Microfinance sector; **(b) Introduction of Regulations for NBFC-MFIs**: Based on the recommendations of the Malegam Committee, RBI introduced a comprehensive regulatory framework for NBFC-MFIs in December 2011. The regulations prescribed **eligibility criteria for Microfinance loans** linked to core features of Microfinance i.e., lending of small amounts to borrowers belonging to low-income groups, without collateral, and with flexible repayment schedules; **(c) Regulatory Framework for Microfinance Loans**: RBI has implemented Regulatory Framework for Microfinance Loans, effective from April 1, 2022, to update Microfinance regulatory policy. This will create regulatory parity between Regulated Entities (RE) that provide Microfinance, harmonise regulations to protect customers from over-indebtedness, and define Microfinance. Microfinance loans are now collateral-free loans for households having annual income up to INR 3 lakh.

What more can be done?

Regulation: The Microfinance sector has expanded a lot in the last 2 decades. Hence there is a need for a comprehensive regulatory framework for the sector, instead of piecemeal and reactive regulatory initiatives.

Interest Rate Transparency: MFIs are employing different patterns of charging interest rates and a few are also levying additional charges. MFIs should transparently inform the borrowers regarding the interest rate charged on the loans.

Encourage Microfinance Penetration: Encouraging MFIs for opening new branches in areas of low Microfinance penetration by providing financial assistance will increase the outreach of the Microfinance. This will increase **rural penetration** of Microfinance.

Expand Product Range: MFIs should provide complete range of products including credit, savings, remittance, financial advice and non-financial services like training and support. This will enable the people from underserved access all financial services.

Use of Technology: MFIs should use new technologies, IT tools, and applications to reduce operational costs.

Different Sources for Raising Funds: In the absence of sufficient finances, the reach of MFIs becomes limited. MFIs should look for other sources for funding their loan portfolio e.g., by converting to for-profit company (NBFC).

Conclusion

The Microfinance sector has played an important role in ensuring inclusive and balanced development. Yet the benefits of Microfinance have been limited to some regions. Moreover, the sector faces issue of rising bad loans along with several operational challenges for the MFIs. There is a need for comprehensive regulation of the sector to make it more inclusive and sustainable.

Syllabus: GS III, Indian Economy.

Source: **Financial Express**, **NABARD**, **RBI**,

Disinvestment in India: Trends and Challenges – Explained, pointwise

Introduction

In the Union Budget 2023-24, the Government has set a target of INR 51,000 crore for Disinvestment. This is the lowest target set by the Government in the last 7 years. The Government has not met the disinvestment target for 2022-23. So far, the Government has realised INR 31,106 crore to date, of which, INR 20,516 crore (~66% of the budgeted estimate) came from the IPO of 3.5% of its shares in the Life Insurance Corporation (LIC). Since 2010-11, the Government has been able to realize the budget target of Disinvestment only twice, in 2017-18 and 2018-19. While some experts have commended the Disinvestment policy of the Government, some other have criticized it, both for its policy approach as well as execution.

What is Disinvestment?

Disinvestment, or divestment, refers to sale of assets or a subsidiary by the Government like the sale of Public Sector Enterprise/Unit (PSE/PSU) by Union or State Government. The sale of Enterprise can be full (i.e., 100% of Government ownership is sold) or partial. Accordingly the disinvestment can be classified as minority disinvestment, majority disinvestment or complete privatisation.

In **minority disinvestment**, the **Government retains a majority in the company**, typically greater than 51%, thus ensuring management control. In the case of **majority divestment**, the government hands over control to the acquiring entity but **retains some stake**. In complete privatisation, 100% control of the company is passed on to the buyer.

Methods of Disinvestment

Initial Public Offering (IPO): It is offer of shares by an **unlisted PSE** or the Government out of its shareholding or a combination of both to the public for subscription **for the first time**.

Further Public Offering (FPO): It is offer of shares by a **listed PSE** or the Government out of its shareholding or a combination of both to the public for subscription.

Offer for Sale(OFS) of Shares by Promoters through Stock Exchange: This method allows auction of shares on the platform provided by the Stock Exchange. This method has been extensively used by the Government since 2012.

Strategic Sale: It refers to **sale of substantial portion of the Government share holding** of a PSE, up to 50%, or such higher percentage as the competent authority may determine, along with transfer of management control.

Institutional Placement Program (IPP): Under IPP, only **Qualified Institutional buyers** can participate in the offering. Qualified Institutional Buyers are those institutional investors who are perceived to possess expertise to evaluate and invest in the capital markets.

CPSE Exchange Traded Fund (ETF): Disinvestment through ETF route allows **simultaneous sale of Government's stake** in various PSEs across diverse sectors through single offering. It provides a mechanism for the Government to monetize its shareholding in those CPSEs which form part of the ETF basket.

What are the reasons for undertaking Disinvestment?

Government Revenue: With disinvestment the Government can earn revenue which can be used for meeting expenditure obligations including on welfare measures. Proceeds from disinvestment of assets are used to finance the budget deficit, invest in the economy and various development/social sector programmes, and pay the national debt.

Improve Competition: The privatisation of State-owned companies paves the way for the entry of increasing number of businesses into the industry. This **boosts market competitiveness** and ultimately results in an improvement in market efficiency. Additionally, it assists businesses that are run by the public sector in modernising their technology in order to boost their level of competitiveness.

Reduce Government's Role: According to economy and policy experts, the Government should be involved only in strategic sectors. For rest of the sectors, the Government should let the private sector efficiencies take control (subject to effective regulation). Government should focus more on the welfare sector.

Efficiency: It is commonly believed that interference by the Government in the PSUs impact their independence and functioning e.g., in PSEs, new investments can driven by political factors rather than pure economic logic. Similarly PSEs may employ more workers than actually needed. Private sector firms tend to be more competitive. Hence, reduction in Government control enhances overall economic efficiency. So it makes sense to privatize inefficient public sector enterprises.

Valuation: Dilution of Government shareholding, and giving the shares for retail trading opens up the market. It increases the liquidity of the shares and helps get better/realistic valuation.

What has been the trend of disinvestment in India?

The process of disinvestment began in 1991, post the economic reforms. The **Industrial Policy Statement of 1991** stated that the Government would divest a portion of its holdings in selected PSEs, but it did not specify the extent of the disinvestment.

Between **1991-1998**, the Government could realize only INR 17,557 crore (equivalent to ~INR 90,000 crore in 2022 prices). The pressure of coalition politics limited the political will to push for disinvestment.

In 1996, the Government established the Public Sector **Disinvestment Commission** (under G. V. Ramakrishna) for a 3-year term with the goal of developing an **overall long-term disinvestment programme** (like extent of disinvestment, mode of disinvestment) for PSEs.

Between **1999 and 2004**, the Government implemented some of the recommendations of the Disinvestment Commission like reducing the government's shareholding in selected PSEs to 26% in order to facilitate ownership changes. In 1999, the Government stated its policy would be to

strengthen strategic PSEs and **privatise non-strategic PSEs** through disinvestment. In December 1999, the Department of Disinvestment was established.

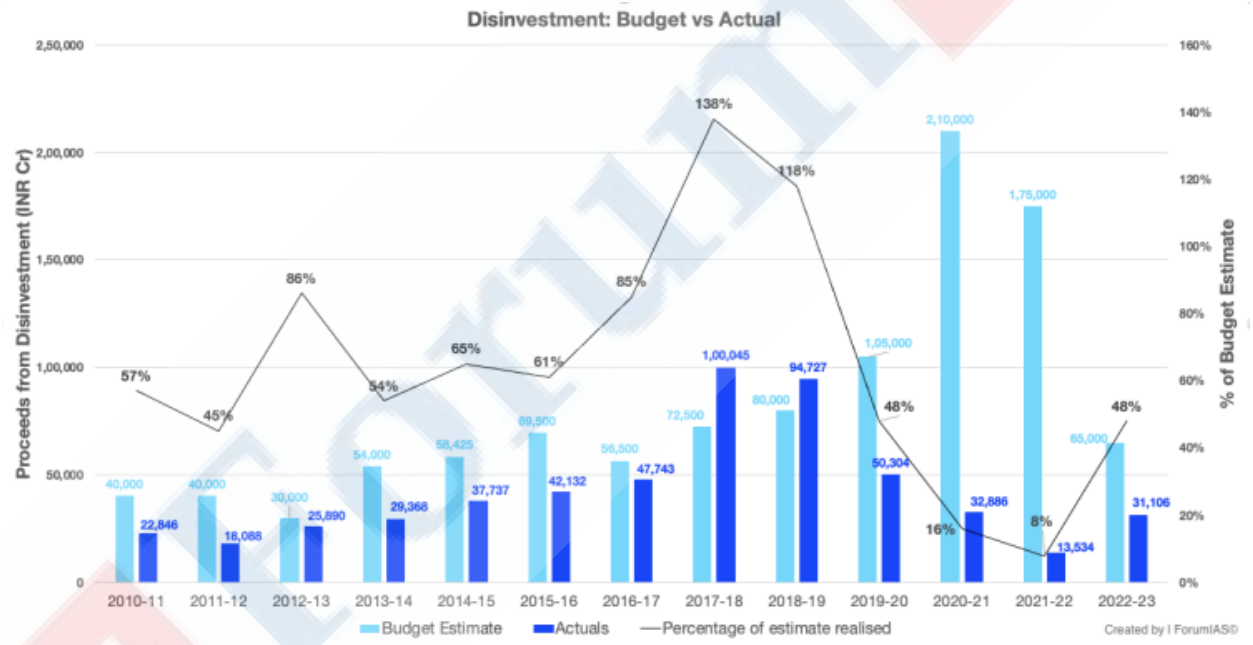
During this period (1999-2004), the Government realized **INR 27,599 crore** (~ INR 93,300 crore in 2022 prices) in just five years (1999-2004).

Between **2004-09**, the pace of disinvestment fell, again due to pressure of coalition politics. In this period, **INR 11,591** crore were earned through disinvestment. The pace picked between 2009-14, with proceeds rising to **INR 1.2 lakh crore**.

The revenues through disinvestment have risen rapidly since 2014. Total INR 4.48 lakh crore have been earned. This represents **~70% of the earning through disinvestment since 1991**.

As part of the May 2020 *Atmanirbhar Bharat* package to stabilise the lockdown-hit economy, the Government announced a Public Sector Enterprise Policy to encourage private sector participation and reduce government involvement in business. In the Union Budget 2020-21, the Government announced a new policy for strategic disinvestment in PSEs.

The government also launched the **National Monetisation Pipeline** (NMP) to generate new revenue streams by unlocking the value of previously unutilised and underutilised public assets.



What is the latest policy on Disinvestment?

The disinvestment policy will cover existing Central Public Sector Enterprises (CPSEs), Public Sector Banks, and Public Sector Insurance Companies.

The government has classified the public sector under 2 categories: **Strategic Sector** and **Non-strategic Sector**.

In Non-strategic sectors, the Government will exit from all businesses. It will keep only a '**bare minimum**' presence in four broad strategic sectors, i.e. **(a)** Atomic energy, Space and Defence; **(b)** Transport and Telecommunications; **(c)** Power, Petroleum, Coal, and other minerals; **(d)** Banking, Insurance, and financial services.

The government will incentivize States for disinvestment of their Public Sector companies.

The new policy is significant as it goes beyond the past case-by-case approach and lays down a rationale for deciding the future ownership pattern of 439 CPSEs, including their subsidiaries. For instance, it is now clear that 151 public sector firms in non-strategic sectors (including 83 holding companies and 68 subsidiaries) will either be closed or sold. The policy also brings **public sector banks** and **insurance entities** into the ambit of disinvestment for the first time.

The Government will also monetize the surplus land with Government Ministries and Departments and PSEs. The Cabinet has already approved the creation of **National Land Monetisation Corporation**.

What are the challenges and concerns related to Disinvestment?

First, the Sale of profit-making and dividend-paying PSUs would result in the **loss of regular income** to the Government. Disinvestment has become just a resource raising exercise by the government. There is **no emphasize on reforming the PSUs**.

Second, the valuation of shares has been affected by the Government's decision not to reduce government holdings below 51%. With the continuing majority ownership of the Government, the public enterprises would continue to operate with the earlier culture of inefficiency.

Third, Government is not willing to give up its control even after strategic disinvestment. In the Budget (2019-20) Speech the Union Finance Minister stated that government will change the policy of 'directly' holding 51% or above in a CPSU to one whereby **Government's total holding, 'direct' plus 'indirect', is maintained at 51%**. It means government will still exercise its control over PSUs. This will **reduce the interests of buyers**.

Fourth, The process of disinvestment is suffering from **bureaucratic control**. Almost all processes starting from conception to the selection of bidders are suffering due to it. Moreover, bureaucrats are reluctant to take timely decisions in the **fear of prosecution** after retirement.

Fifth, Strategic Disinvestment of **Oil PSUs** is seen by some experts as a **threat to National Security**. Oil is a strategic natural resource and possible ownership in the foreign hand is not consistent with strategic goals.

Sixth, Loss-making units don't attract investment. It depends upon the perception of investors about the PSU being offered. This perception becomes more important in the case of strategic sales, where the amount of investment is very high.

Seventh, Complete Privatization may result in public monopolies becoming **private monopolies**, Private monopoly has a tendency to exploit their position to **increase costs** of various services and earn higher profits.

Eighth, using funds from disinvestment to bridge the fiscal deficit is an unhealthy and short-term practice. This is not sustainable in the long term. Government should focus on increasing its revenue from more reliable resources and cut down **Fiscal Deficit**.

What are the NITI Aayog's recommendations on Disinvestment?

First, The Aayog's disinvestment proposals should go to directly to the Cabinet Committee on Economic Affairs (CCEA) instead of the respective Ministry. This would shorten the process.

Second, Government should consider appointment of Advisors and Asset valuers to speed up the process of disinvestment.

Third, an independent professional agency should be set-up to speed-up the Asset Monetisation Programme.

What should be the approach going ahead?

First, the Government should increase the **operational autonomy** of PSEs. It can be supplemented by **strong governance measures** like listing on stock exchanges. It will increase the transparency in their performance.

Second, the government must also try to provide the bidders with a **fair valuation** of the Government entities. It will boost their confidence in the disinvestment process.

Third, the Government should also reduce its involvement in the management and day-to-day operations of the PSEs. The Government should reform their boards and reorganize the structures. This will attract more buyers and get better valuations.

Conclusion

Disinvestment has several benefits. It can help enhance competition in various sectors and improve efficiencies. It also helps raise revenue for the Government, which can be spent on welfare measures. However, the Government should take care to ensure its presence in certain strategic sectors like banking, energy etc. It will ensure the social obligations and strategic interests intricately linked with these sectors are secured.

Syllabus: GS III, Indian Economy and Issues related to mobilization of resources.

Source: The Hindu, The Hindu BusinessLine, Economic Times, PRS, DIPAM

Gender Budgeting: Status, Benefits and Challenges – Explained, pointwise

Introduction

The Union Budget 2023-24 has been presented in the Parliament. In 2005, the Government had started releasing a Gender Budget along with the Union budget. Gender Budgeting is a strategy to ensure that promises on gender equality show up in public budget allocations as well. However, achieving gender equality through Gender Budgeting has remained a challenge. The share of Gender Budget (in total Government Budget) has remained low despite growing at an annualized rate 13% since inception. With some reforms in the implementation, the Government can improve the efficacy of Gender Budgeting in terms of outcomes.

What is the meaning of Gender Budgeting (GB)?

Gender Budgeting is the **use of fiscal policies** and public financial management tools to **promote gender equality**. It is an exercise that applies a '**Gendered-lens**' to the allocation and tracking of public funds. This is done in order to ensure that governments are acutely aware of the impact of their choices on gender outcomes. Gender Budgeting is not limited to funding explicit gender equality initiatives. It also entails analyzing fiscal policies and budgetary decisions to **understand their impact on gender equality** and using this information to **design and implement more effective gender policies**. It translates the gender commitments into fiscal commitments.

The 'Gender Budgeting Handbook, 2015' released by the Ministry of Women and Child Development notes that Gender Budgeting is a tool for **gender mainstreaming**. It observes that, "*Gender Budgeting is concerned with gender-sensitive formulation of legislation, policies, plans,*

programmes and schemes; allocation and collection of resources; implementation and execution; monitoring, review, audit and impact assessment of programmes and schemes; and follow-up corrective action to address gender disparities." It is not only about the Budget and it is not just a one-time activity. It is a **continuous process** that must be applied to all levels and stages of the policy process.

Evolution of Gender Budgeting: It was first introduced in 1984 in Australia to evaluate the impact of the national budget on women and girls. The approach was adopted by other countries including Canada, South Africa and Philippines etc. In 1995, the **United Nation's Beijing Platform for Action** called for **integrating a gender perspective into government budget processes**.

In 2015, the UN's **Sustainable Development Goals** (SDGs) called for adequate resources and tools to track **budget allocations for gender equality** (SDG indicator 5.c.1). The **Addis Ababa Action Agenda for Development** (2015) recognized the importance of tracking resource allocations for gender equality and strengthening capacity for Gender Budgeting.

In 2020, **G20-Women**, an official engagement group to the G20, called for greater investment in GB to ensure that fiscal policies advance gender equality in the short and long-term recovery from the COVID-19 pandemic.

What is the status of Gender Budgeting in India ?

The Government of India had adopted Gender Budgeting in 2005-06.

In India, Gender Budgeting comprises two parts: **(a)** Part A reflects **Women-Specific Schemes** i.e., those which have 100% allocation for women; **(b)** Part B reflects **Pro-Women Schemes** i.e., those where at least 30% of the allocation is for women.

The gender budgeting framework has helped the gender-neutral ministries to design new programs for women.

Gender Budgeting Cells (GBC): The Government has mandated the establishment of Gender Budgeting Cells in all Ministries and Departments as an institutional mechanism to implement Gender Budgeting. The GBCs conduct gender-based impact analyses, beneficiary needs assessments, and beneficiary incidence analyses and determine the room for re-prioritizing public expenditures and better implementation.

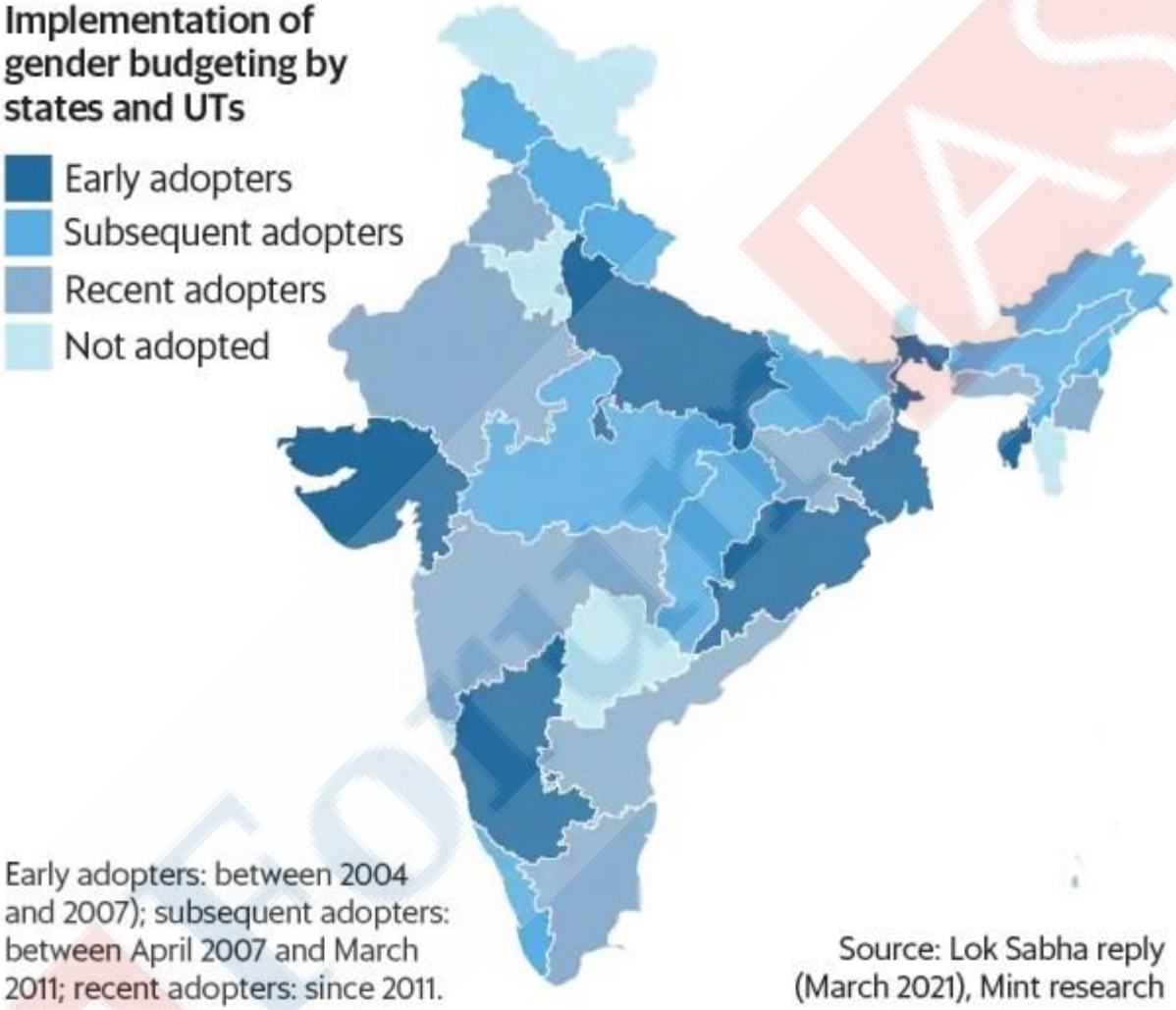
Role of The Ministry of Women and Child Development in Gender Budgeting: The Ministry has made consistent efforts to support the institutionalization of GB at the State/UT level. The Ministry also provides financial support to Government training institutions for **capacity building of Government officials** to enhance Gender Budgeting in States/UTs.

Role of States/UTs in Gender Budgeting: In a reply to a question in the Lok Sabha (March 2021), the Government responded that 27 States/UTs have adopted Gender Budgeting and have taken various steps to address gender gaps and advance gender equality. Goa, Haryana, Meghalaya, Mizoram, Telangana, Chandigarh, Ladakh, Puducherry haven't adopted GB yet.

Matching steps

Complementing the central goverment's initiative, most states and Union territories have adopted gender budgeting initiatives. A handful of them are yet to follow suit.

Implementation of gender budgeting by states and UTs



Early adopters: between 2004 and 2007); subsequent adopters: between April 2007 and March 2011; recent adopters: since 2011.

Source: Lok Sabha reply (March 2021), Mint research

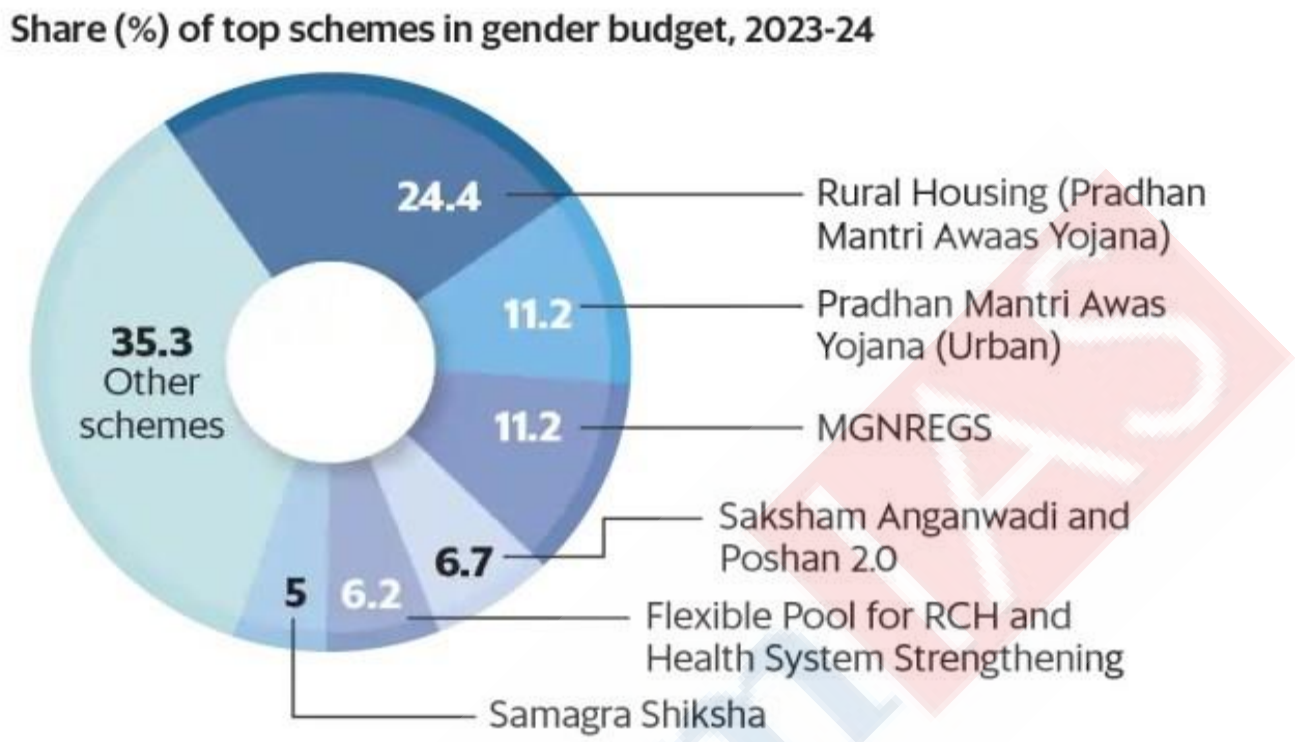
Early Adopters	Subsequent Adopters	Recent Adopters
Odisha (2004-05) Tripura (2005-06) Uttar Pradesh (2005) Karnataka (2006-07) Gujarat (2006) Lakshadweep (2006-07) West Bengal(2005-06)	Madhya Pradesh (2007-08) Jammu &Kashmir (2007-08) Arunachal Pradesh (2007-08) Chhattisgarh (2007-08) Uttarakhand (2007-08) Himachal Pradesh (2008) Assam (2008-09) Bihar (2008-09) Kerala (2010-11) Nagaland (2009)	Rajasthan (2011) Dadra and Nagar Haveli (2011-12) Andaman & Nicobar Islands (2012) Punjab (2012) Maharashtra (2013) NCT of Delhi (2013-14) Jharkhand (2015-16) Andhra Pradesh (2017) Tamil Nadu (2018-19) Manipur (2020)

Source: Mint, Lok Sabha

These steps take by States include identification of a nodal Department for Gender Budgeting, constitution of Gender Budgeting Cells, formulation of State Women/Girls Policy, creation of Gender Data Bank and adding Gender Budget Statement in the State Budget. Additionally, 21 States/UTs have established designated State Nodal Centres for sustained capacity building efforts on GB.

Budgetary Allocations: India's Gender Budget has allocated INR 2.23 lakh crore in the Union Budget 2023-24. This is ~30% higher than Budgetary allocation in 2022-23 (INR 1.71 lakh crore, Budget estimate) but only ~2% than actual allocation (INR 2.18 lakh crore, Revised Estimate).

Part A of the Gender Budget has allotted over INR 88,000 crore in FY2023-24. It is dominated by the *Pradhan Mantri Awas Yojana* (both Urban and Rural housing). These two schemes attracted 90% of the total funding for Part A of the Gender Budget. Part B has received INR 1.35 lakh crore. Part B comprise several schemes pertaining to rural development, health, education and women empowerment.



Souce: Mint

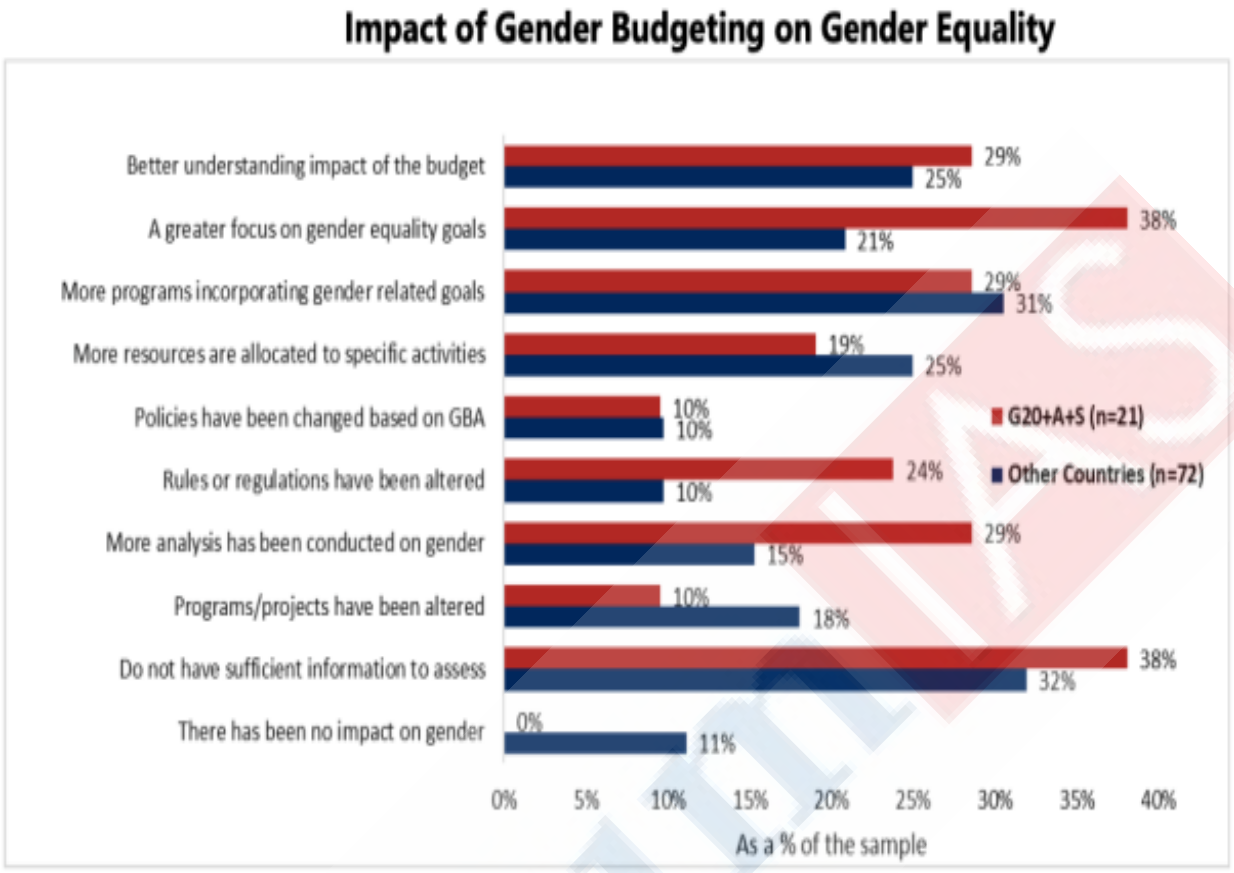
Important women-centric schemes include: **(a)** Safe City Project, an initiative under the Nirbhaya Fund scheme for ensuring safety of women and children; **(b) SAMBAL**, a sub-scheme comprising of old schemes like One Stop Centre, Women Helpline and *Beti Bachao Beti Padhao*; **(c) SAMARTHYA**, includes women empowerment programmes like *Pradhan Mantri Matru Vandana Yojana* and *Swadhar Greh*. SAMBAL and SAMARTHYA are part of the larger umbrella scheme '**Mission *Shakti***', an integrated women empowerment programme.

What are the benefits of Gender Budgeting?

Understanding Impact of Budget: Gender Budgeting approach leads to better informed policy choices. This approach makes the policy makers more aware of the potential impact of policy decisions on gender.

Better Utilisation of Resources: It can support efforts to not only design, but re-design fiscal policies, adjusting resources to better address persistent gender gaps.

Achievement of Gender Equality Goals: It leads to greater focus on achieving gender equality goals. A focused approach leads to better results. An IMF Working paper on the impact of Gender Budgeting in G20 countries notes that Gender Budgeting leads to more programmes incorporating gender related goals. Every country analysed in the research paper had some positive outcome in terms of gender equality.

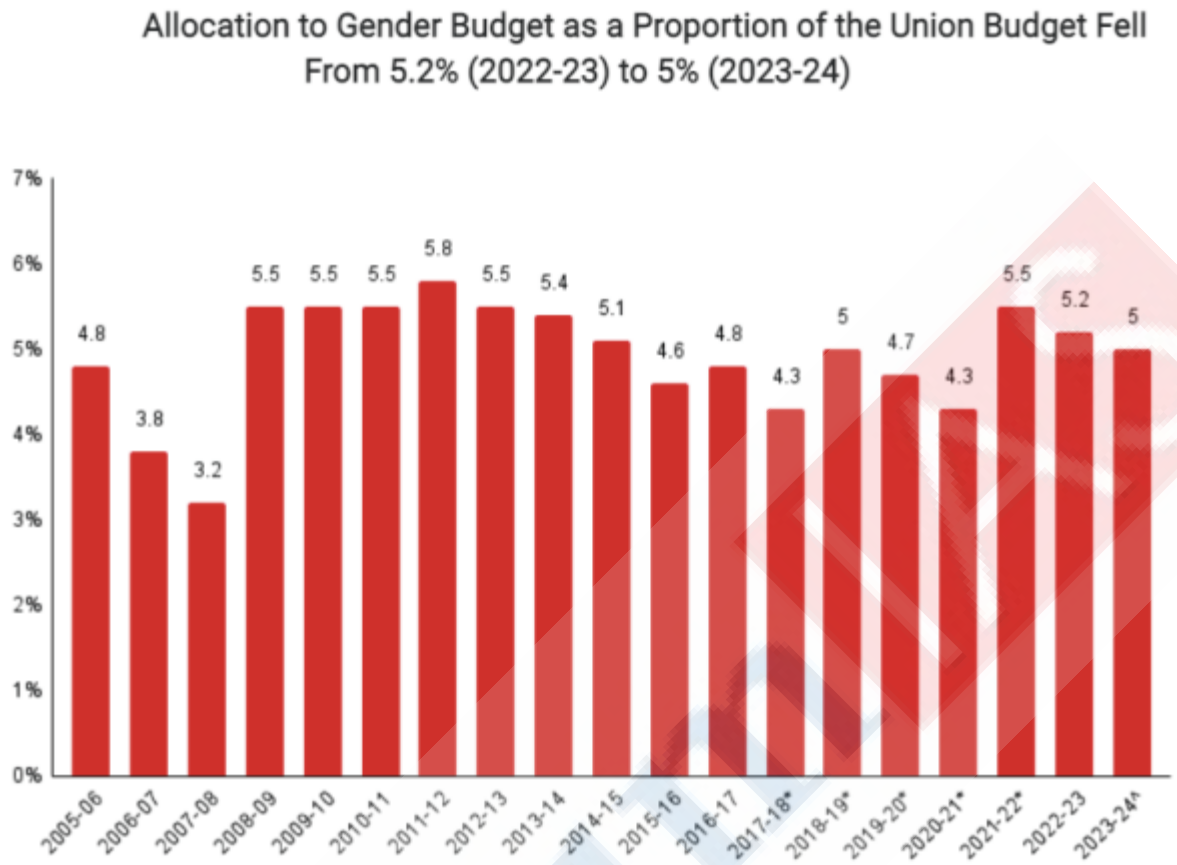


Source: IMF

Wider Societal Outcomes: There are many other factors that impact the achievement of gender equality, including societal attitudes and behaviours. Gender Budgeting practices can make a difference in the way governments consider policy in respect to gender and lead to more conscious and better-informed decision making.

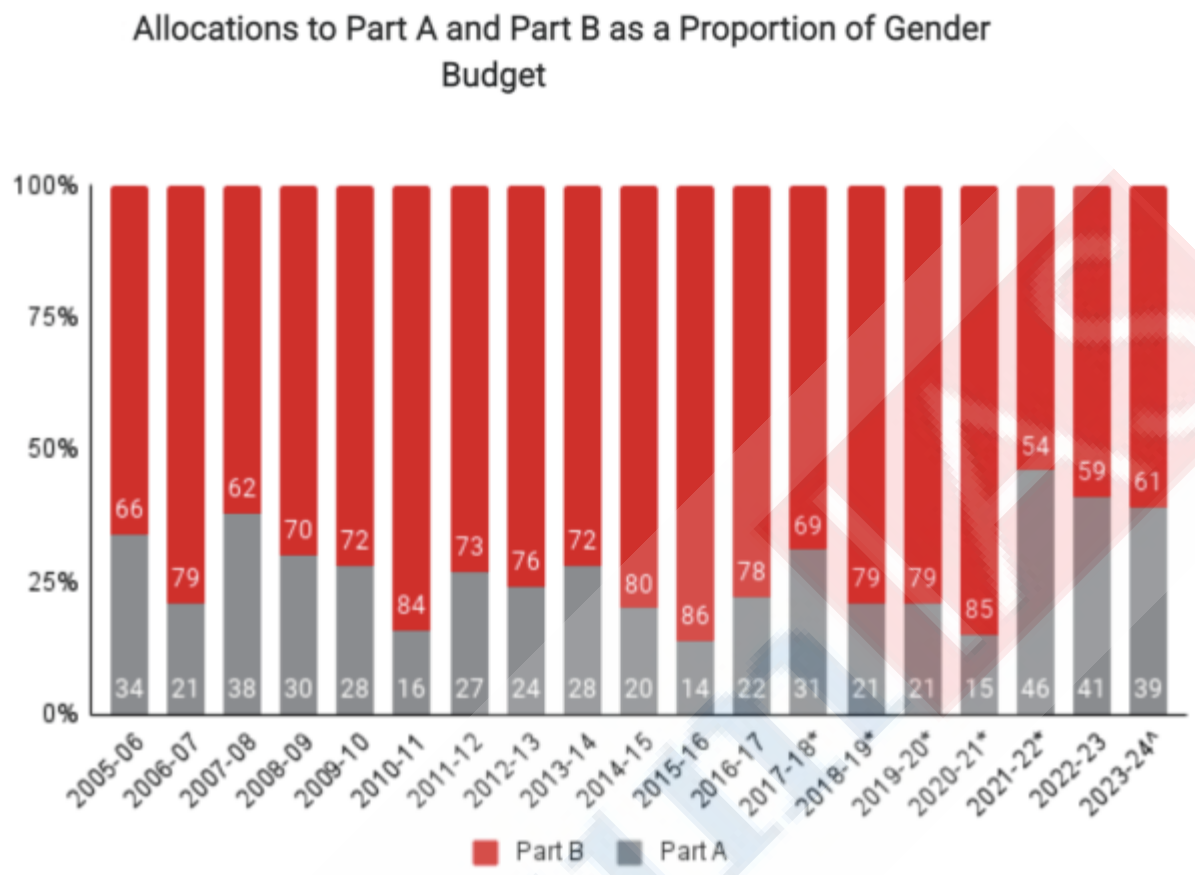
What are the challenges in Gender Budgeting?

Low Allocation: Despite increase in allocation in absolute terms, the share of Gender Budget in overall Union Budget has always remained less than 6%. The highest allocation was in 2011-12 at 5.8%.



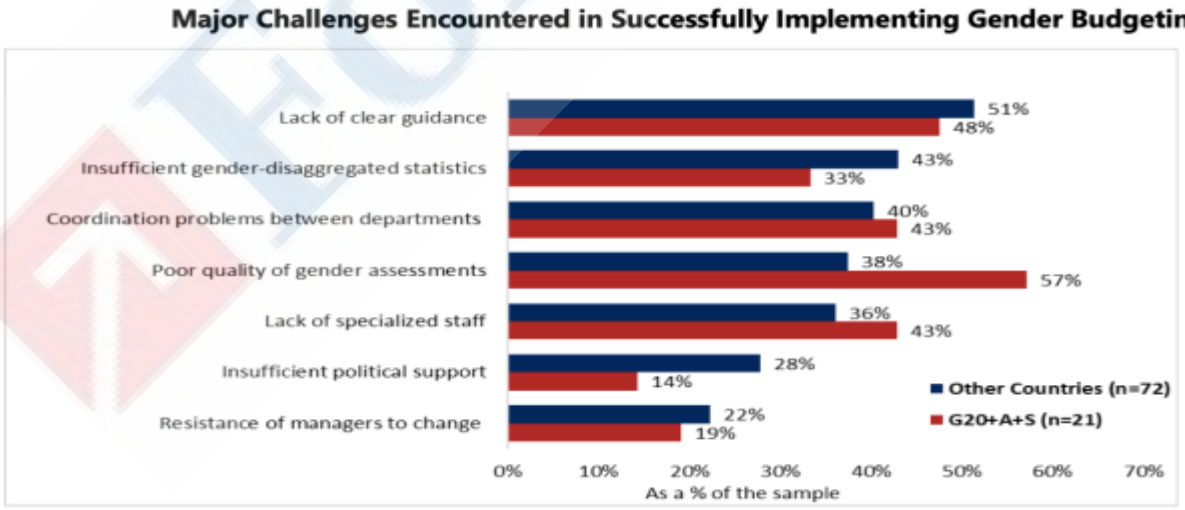
Source: CPR

Skewed Allocation: The Gender Budget consists of two parts based on fund allocation. Part A with 100% allocation for women has lower share in the Gender Budget. The highest share for Part A was 46% in FY2021-22. Since 2005-06, the share of Part A was less than 30% of the overall Gender Budget for 12 years.



Source: CPR

Technical Challenges: Implementation of Gender Budgeting faces several challenges like lack of guidance, coordination, expertise among personnel, and low quality of gender impact assessments (GIAs).



Source: IMF

Absence of Gender Disaggregated Data: Lack of gender disaggregated data make it difficult to formulate effective policies. Additionally, it limits the ability to accurately measure the effectiveness of the Gender Budgeting policies and initiatives. IMF paper notes that Governments often point out to their inability to track gender-sensitive policies over their implementation cycle, due to lack of budget classifications or failure to incorporate gender classifiers in the financial management information systems (FMIS).

Skewed Implementation: Many sectors/schemes that can have impact on women, do not practice Gender Budgeting. NITI Aayog paper on Gender Mainstreaming (June 2022) has noted that only 62 out of 119 centrally-sponsored schemes are practising GB. The paper noted that the record of Ministers associated with Environment and Climate Change, Urban Transformation, Skill etc. have done poorly.

Relative performance by sector

Sector	Inclusiveness of gender	Gender Budgeting	Inclusion of Transgender
Agriculture			
Water resources, Environment & Forest Climate Change			
Health			
Rural Development			
Social Inclusion			
Urban Transformation			
Jobs & Skills			
Human Resource Development			
Women & Child Development'			

Poor Average Good

Sectoral Performance on Gender Mainstreaming, Source: NITI Aayog

Under-Reporting: The Gender Budget does not take into account some of the major schemes that benefit women. For instance, the ***Jal Jeevan* Mission** (JJM) aims to provide household tap connections to all rural households by 2024. Tap water can particularly improve women's quality of life because it is mostly women and girls who gather water in households that do not have regular water access. Yet, none of the allocations in the JJM have been reported in the Gender Budget.

Moreover, the schemes that allocate less than 30% funds for women, are not covered in Part B of the Gender Budget.

In addition, there is lack of clarity on the way schemes allocate at least 30% of their funds for women. For instance, the ***Pradhan Mantri Awaas Yojana – Gramin*** (PMAY-G) accounted for 24% of the Gender Budget in 2023-24 and was placed in Part A of the GB because the scheme encourages houses to be owned by women and thereby might benefit women. On the other hand, only 27% of the funds allocated under the Mahatma Gandhi National Rural Employment

Guarantee Scheme (MGNREGS) accounted for Part B of the GB, despite women being 55% of MGNREGS workers

Lack of Accountability: There is no mandate to have a minimum allocation with respect to Gender Budget. In the absence of any accountability mechanisms regarding Gender Budgeting, monitoring and implementation continue to be inadequate.

What can be done to make Gender Budgeting more effective?

First, NITI Aayog has recommended that a **Gender Budgeting Act** can mainstream gender-based budgeting across all Ministries and States/UTs. The Act can also mandate all data collecting institutions to analyse and publish gender-disaggregated statistics. This can make the process of GB more scientific.

Second, the NITI Aayog has also recommended that the Ministry of Women & Child Development (MWCD) should encourage State Governments to **increase budgetary allocation towards women** and child development, protection and welfare schemes to ensure improved fund availability and utilisation of schemes. It has also emphasised on the need of finalising the National Policy for Women with revision in 2016 Draft Policy.

Third, there is a need to have **uniform guidelines** regarding Gender Budgeting. Evidence from the IMF survey shows that without guidelines or a common methodology for impact assessments, it is difficult for line Ministries to implement a common approach to GB analysis.

Fourth, the **tools to monitor implementation and collect data** must be improved. Better data can help in deeper analysis that can help in accurate measurement of outcomes and designing targeted initiatives for gender equality.

Fifth, the IMF recommends that fiscal policies should focus on areas where gender gaps persist. **Gender Impact Assessments** (GIAs) should be undertaken to help understand the gender impact of current and alternative policies. The analysis can be utilized to better redesign the policy interventions.

Conclusion

Gender Budgeting is one of the most potent tool for gender mainstreaming and achieving gender equality. India has been one of the early adopters of Gender Budgeting. Yet the process faces several challenges. The next step should be to plug these gaps and make the process more effective. As India enters the phase of *Amrit Kaal*, the Prime Minister has highlighted the importance of the role of *Nari Shakti* in achieving the goal of developed economy by 2047. This should be actioned through more responsive and effective Gender Budgeting.

Syllabus: GS I, Social empowerment; GS II, Welfare schemes for vulnerable sections of the population by the Centre and States and the performance of these schemes; GS III, Government Budgeting.

Source: **Mint**, **Centre for Policy Research**, **IMF**, **NITI Aayog**

Biogas: Advantages and Challenges – Explained, pointwise

Introduction

The **Union Budget 2023-24** has given a new push for clean energy. Apart from providing INR 35,000 crore for priority capital investments towards energy transition and net zero objectives, the Budget has earmarked INR 10,000 crore for establishing 500 new '**Waste to Wealth**' **plants** under **GOBARdhan** (Galvanizing Organic Bio-Agro Resources Dhan) scheme for promoting **circular economy**. Of the 500 new plants announced, 200 will be **Compressed Biogas Plants** (CBG), including 75 in cities and the remaining 300 will be community or cluster-based plants. Biogas is an environment friendly solution to ensure energy security as well as a small step towards reducing dependence on fossil fuels.

What is Bio-gas and how is it produced?

Biogas is a mixture of Methane (CH_4), Carbon-dioxide (CO_2)and small quantities of other gases. It is produced by **anaerobic fermentation** of **organic matter** in an **oxygen-free environment**. The precise composition of biogas depends on the type of feedstock and the production method used. The organic matter to produce biogas can be **biodegradable waste** such as agricultural waste, animal waste like dung and segregated organic fraction of municipal solid waste.

Generally, the fermentation goes through **four** stages to turn the organic material into biogas. In the first step (**Hydrolysis**), bacteria break down carbohydrates. In the second stage (**Acidogenesis**), acidogenic bacteria turn sugars and amino acids into carbon dioxide, organic acids, hydrogen, and ammonia. In the third stage (**Acetogenesis**), these organic acids are transformed into acetates. In the final stage (**Methogenesis**), methanogens break the components (acetates) to obtain methane and carbon dioxide.

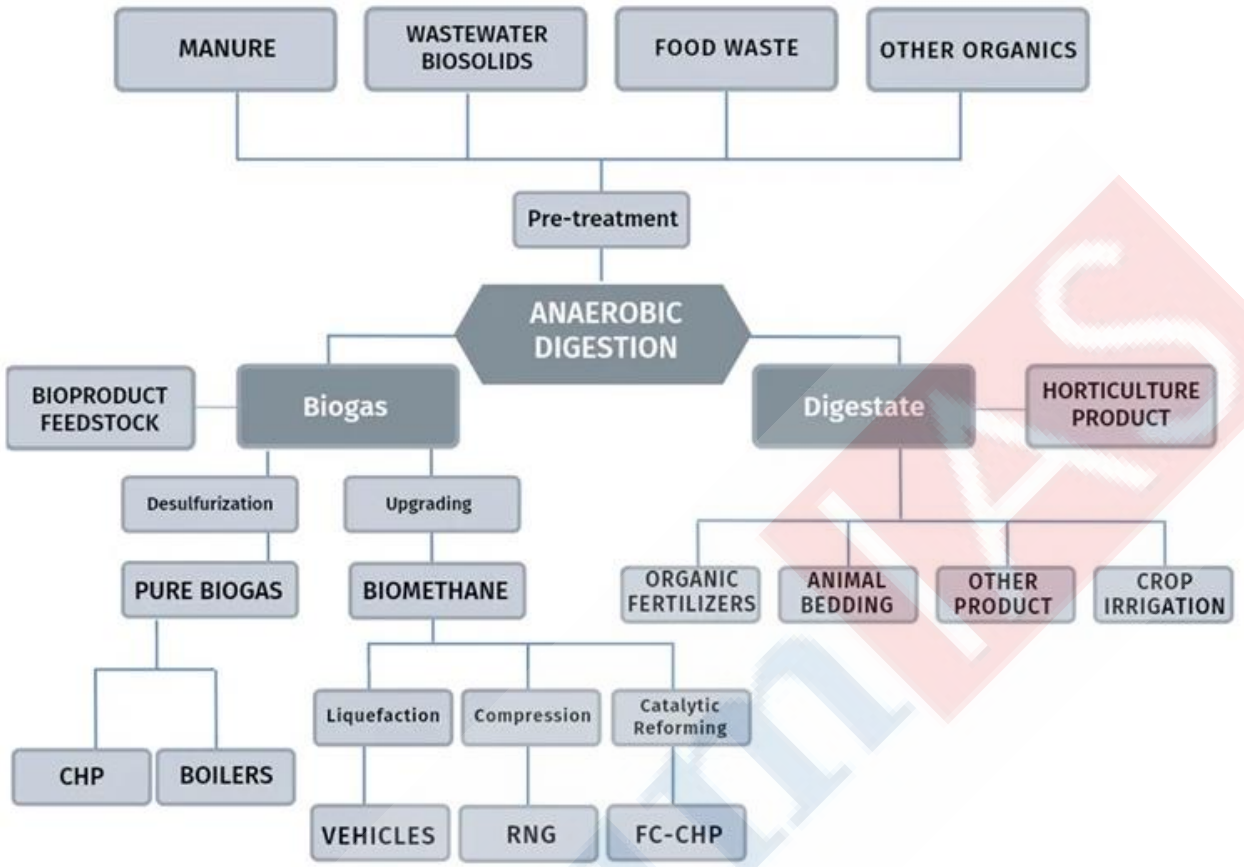
Anaerobic digestion yields a variety of products in three different forms. The **slurry** obtained from the process is used to extract liquid fertiliser and the fermented organic manure (FOM) in solid form.

The solid part of products is used as soil conditioner and fertiliser.

The gaseous products are known as Biogas. It contains about 55-65% Methane, 35-44% of carbon dioxide and traces of other gases such as hydrogen sulphide, ammonia and nitrogen.

Compressed Biogas (CBG): Biogas can be purified and upgraded up to 98% of purity to make it suitable to be used as a green fuel for transportation or filling of cylinders. The process relies on a high pressure of ~250 bar and hence is called Compressed Biogas (CBG).

Bio-Methane: It is also known as 'renewable natural gas'. It is a near-pure source of methane produced either by 'upgrading' biogas or through the gasification of solid biomass followed by Methanation. Upgradation refers to a process that removes any CO_2 and other contaminants present in the biogas.



What are the various initiatives taken by the Government with respect to Biogas?

First, Under the **Sustainable Alternative to More Affordable Transportation** (SATAT) programme (launched 2018), the Government of India has been encouraging private businesses to establish Compressed Biogas (CBG) plants and provide CBG to oil marketing companies so that it can be sold as an automotive and industrial fuel.

Second, **Galvanizing Organic Bio-Agro Resources (GOBAR)-Dhan** was launched by the Government of India in April 2018 as a part of the biodegradable waste management component under the Swachh Bharat Mission-Gramin.

Third, the Waste to Energy Division of the Ministry of New and Renewable Energy's (MNRE) has notified a five-year-long **National Bioenergy Programme** (2021-22 to 2025-26).

Fourth, the Government of India and NITI Aayog have devised road maps to speed up the country's transition to environmentally friendly fuels and to boost the use of liquefied natural gas (LNG), hydrogen, and methanol.

What are the advantages of Biogas?

Environment Friendly: It is a renewable and **environmentally friendly** energy source. **Less energy is required to produce Biogas** compared to extracting natural gas.

Moreover, **Methane has higher greenhouse/warming potential than carbon-dioxide**. Hence, capturing and combusting methane to produce carbon-dioxide reduces the overall global warming, compared to a situation where methane is allowed to escape to the atmosphere.

Energy Diversification: Biogas production reduces reliance on fossil fuels such as oil and coal.

Renewable: The raw materials used in biogas production are renewable, as trees and crops will continue to grow. Manure, food scraps, and crop residue are always available raw materials, making it a highly sustainable option.

Reduce Soil and Water Pollution: Producing biogas from waste reduces dumping of wastes in landfills. Overflowing landfills not only emit foul odours, but also allow toxic liquids to enter underground water sources. As a result, another advantage of biogas is that it may improve water quality. Furthermore, anaerobic digestion deactivates pathogens and parasites, making it effective in **reducing the prevalence of waterborne diseases**.

Similarly, waste collection and management improve dramatically in areas with biogas plants. This, in turn, leads to improvements in the environment, sanitation, and hygiene.

Organic Fertilizers: The byproduct of the biogas generation process is enriched organic digestate, which is an excellent supplement to or **replacement for chemical fertilisers**. The fertiliser discharge from the digester can accelerate plant growth and resistance to diseases, whereas commercial fertilisers contain chemicals that are toxic and can cause food poisoning, besides other harmful effects.

Promotes Circular Economy: It is a simple and low-cost technology that promotes a circular economy. The technology used to generate biogas is relatively inexpensive. It is simple to set up and requires little investment when used on a small scale. Small biodigesters can be used at home, utilising kitchen waste and animal manure. After a while, a household system pays for itself, and the materials used in generation are completely free.

Biogas can also be compressed to the quality of natural gas and used to power automobiles in large plants. Such plants require little capital investment and **create green jobs**.

Healthy Alternative for Cooking Fuel: Biogas generators relieve women and children of the laborious task of gathering firewood. As a result, more time is available for other productive activities. More importantly, cooking on a biogas rather than an open fire keeps the family safe from smoke in the This aids in the prevention of deadly respiratory diseases.

Achieving SDGs: According to the Linköping University's Biogas Research Center report, Biogas contributes to all 17 of the United Nation's Sustainable Development Goals.

What are the challenges in Production and Use of Biogas?

Lack of Technological Advances: According to some experts, the systems used to produce biogas are inefficient. There is **lack of a new technology that can simplify the process**, make it accessible, and reduce the cost of doing so. This means that large-scale production to meet the needs of a large population is still impossible. Although current biogas plants can meet some energy needs, many governments are unwilling to invest in the sector.

Impurities: Impurities remain in biogas after refinement and compression. Use of Biogas in automobiles can corrode the engine's metal parts. Corrosion would result in higher maintenance costs. The gaseous mixture is far more appropriate for kitchen stoves, water boilers, and lamps.

Temperature Limitation: Biogas generation, like other renewable energy sources (such as solar and wind), is influenced by the weather. The ideal temperature for bacteria to digest waste is

around 37°C. **Digesters in cold climates require heat energy** to maintain a constant biogas supply. Hence its use is limited to warm regions.

Suitability for Metropolitan Areas: Another disadvantage is that industrial biogas plants only make sense where raw materials (food waste, manure) are abundant. As a result, **biogas generation is much better suited to rural and suburban areas**. The material used in biogas generation emit bad smells. Hence it is necessary that the plants are sufficiently far from the inhabited areas

To power a 1MW power plant, at least 300 hectares of land is required, as minimum usable area. Large quantities of land must therefore be available, which poses a challenge in urban areas.

Transport: If the plant is located far away, suitable means of transport will be needed to transport the raw materials and the final product. This will add to costs and emissions.

Conclusion

Biogas can prove to be a sustainable alternative to fossil fuels. It is an ideal source to ensure energy security in the rural areas. It can also contribute to **decarbonization of the agriculture sector** through conversion of methane. There is a need to invest in new technologies that can help scale up the use of Biogas in urban areas. This can help in achieving the climate targets in the long run.

Syllabus: GS III, Infrastructure: Energy; GS III, Conservation.

Source: **Down to Earth**, **SBM**, **IEA**, **Outlook**

Domestic Workers in India: Status and Issues – Explained, pointwise

Introduction

The abuse faced by a domestic worker in her employer's home in Gurgaon has sparked outrage. However, such outrage is often short-lived. Violence against domestic workers in India has been reported for many years. Yet, their exploitation receives attention only when individual cases of violence get reported in the media. The response of the Union and State Governments is also reactive e.g., in the present case the Government of Jharkhand has set up a team to probe the case. There no uniform policy or legislation has been formulated regarding the domestic workers. As majority of such workers are migrants, there is a need for greater coordination between the Union and State Governments to address the challenges faced by the domestic workers

What is domestic work and the current status with respect to Domestic Workers in India?

According to the International Labour Organisation (ILO) **Domestic Workers Convention**, 2011, Article 1: **(a)** The term 'domestic work' means work performed in or for a household or households; **(b)** The term 'domestic worker' means any person engaged in domestic work within an employment relationship; **(c)** A person who performs domestic work only occasionally or sporadically and not on an occupational basis is not a domestic worker.

Based on everyday working hours and nature of employment, domestic workers are classified into part-time, full-time and live-in workers.

CATEGORISATION OF DOMESTIC WORKERS

Category	Definition
Part-Time Worker	Works for more than one employer for a specified number of daily working hours or performs specific tasks for each of the multiple employers everyday.
Full-Time Worker	Works for a single employer everyday for a specified number of hours, and returns to her/ his home every day after work.
Live-In Worker	Works full time for a single employer and stays in the premises of the employer or in a dwelling provided by the employer and does not return to her/his home every day after work.

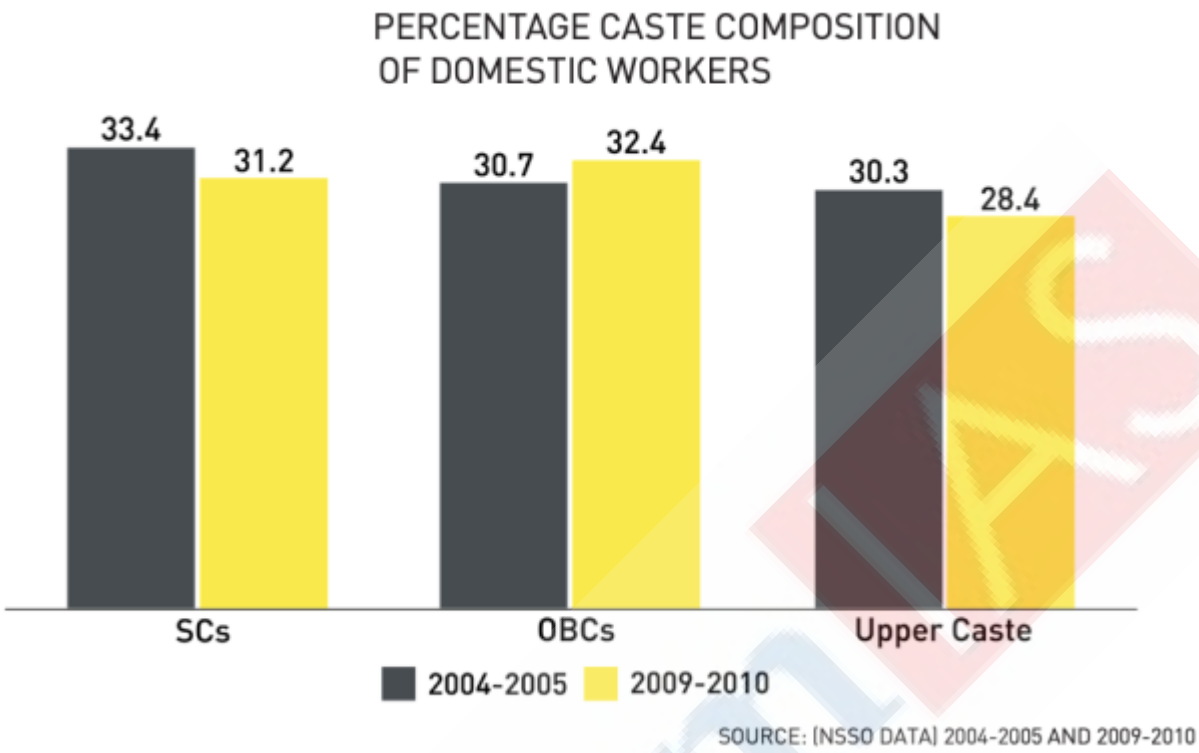
Source: SPRF

Current Status: It is estimated that there are 4.8 million domestic workers including 2.9 million female domestic workers. Domestic work accounts for 3.5% of women's total employment. Domestic workers form the third-largest category of workers after agriculture and construction. However, according to the National Domestic Workers' Movement, the number of domestic workers exceeds 50 million. More than 66% of the workers are working in urban areas. The share of women and girls in domestic work is rising at a much rapid pace, accounting for 75% increase in the number of workers in the last decade.

The majority of domestic workers in India are illiterate/ minimally educated and low-skilled. ~200,000 children are employed as domestic help and in *dhabas*.

What are the challenges faced by Domestic Workers in India?

Poor Working Conditions: Domestic workers are **denied minimum wages**. They lack any **social security cover**. Many workers are exploited to work for long hours. Live-in workers are more vulnerable to physical abuse and harassment. Most domestic workers are poor migrants with no other skills. Moreover, a majority of domestic workers belong to the SC/STs. They are more vulnerable to exploitation due to their lack of literacy and their social status.



Source: SPRF

Lack of Laws to Protect Rights: The domestic workers in India are not covered by any Act. The National Commission for Women had drafted the **Domestic Workers (Registration, Social Security and Welfare) Bill** in 2008-10. The Bill had sought to cover various aspects like wages, working conditions, offences and penalties, and creation of Domestic Workers Welfare Fund among others. However, the Bill wasn't passed. Similarly, the **Draft Policy on Domestic Workers has been waiting for approval** since 2017. In the absence of any regulation regarding working condition, workers remain vulnerable to exploitation.

Issues in Implementation: Domestic work was added to the list of scheduled employment under the **Minimum Wages Act, 1948**, which coincided with the 2011 ILO convention 189. However, the implementation remains poor, with most domestic workers working below minimum wage level. Only 13 States/UTs have passed legislation requiring minimum wages for domestic employees.

The **Unorganized Workers' Social Security Act, 2008**, requires all States to establish welfare boards to ensure domestic workers receive benefits. However, several States have not complied with the requirement.

Insufficient Data: There is lack of reliable data regarding number of domestic workers. There is large variation among estimates, with number of workers varying from 4 million to 50 million. The absence of data acts as a barrier to the formulation of appropriate plans and the allocation of resources for the improvement of the conditions of domestic workers.

Informal Placement Agencies/Housekeeping Companies: The companies that provide domestic workers in urban areas themselves function in an informal manner. They are more

focused on their own profits and care little about the rights of the workers. Lack of scrutiny of their functioning contributes to the exploitation of the workers.

Neglect of Domestic Labour Rights: Legislation pertaining to workers such as the Industry Disputes Act, 1947, the Employee's Provident Fund Act, 1952, and the Factories Act, 1948, **do not recognise the labour performed by domestic workers in private households as 'work'**.

Poor Unionisation: Only a small fraction of domestic workers are unionised or are part of organised groups. Lack of unionisation **reduces their bargaining power** to demand better wages. In the absence of any union, **no support mechanism** is available to workers facing exploitation and physical abuse.

What steps have been taken for the welfare of Domestic Workers?

Safeguards: There are some Constitutional safeguards e.g., Article 23 (under Fundamental Rights) prohibits traffic in human beings, begar and other forms of forced labour. Article 39(e) under Directive Principles exhorts the State to ensure that the health and strength of individuals are not abused and that no one is forced by economic necessity to do work unsuited to their age or strength.

Domestic workers in India have been included in **The Unorganized Workers' Social Security Act**, **2008** and **The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013**. **The Child Labour Act** has included domestic work in prohibited employment for children only up to age of 14 years. **The Juvenile Justice Act, 2000** has been effective to some extent in the rescue of workers below the age of 18 years.

Schemes and Other Initiatives: The *Rashtriya Swasthya Bima Yojana* (RSBY) was extended to cover domestic workers. They are now covered under the *Pradhan Mantri Jan Arogya Yojana*.

The **e-Shram portal** aims to register 38 crore unorganised workers in the country.

A Voluntary Employers' Pledge to **Promote Decent Work for Domestic Workers** in India was launched and adopted by All India Organizations of Employers and Employers Federation of India.

The Union Minister for Labour and Employment has flagged off the first ever All India Survey on Domestic Workers (DW).

Global Initiatives: **(a)** The **Palermo Protocol**, part of the United Nations Convention on Transnational Organized Crime, provides the definition of '**trafficking in persons**'. A definition of trafficking that is in accordance with the Palermo Protocol has been integrated into the domestic law of India; **(b)** The International Labor Organization (ILO) and the European Commission have collaborated to establish operational indicators of trafficking in humans; **(c) Convention 29** of the International Labor Organization was passed in 1930. It has defined forced or compulsory labour. **Convention 189** of the ILO mandates decent working conditions for domestic workers.

What more steps should be taken going ahead?

First, there is a need for greater social and political commitment to address the challenges faced by domestic workers. In the absence of such commitment, the abuse will continue.

Second, Due to differences among categories of domestic workers (like part-time, live-in etc.), the methods of determining minimum wages are complex (employing either 'a need-based

formula' or a living wage, based on time and piece rate). There is a **need to standardise** the type and amount of work performed.

Third, The data regarding migrant workers must be improved. This will help in better assessment regarding the status of domestic workers.

Fourth, Since most domestic workers in India are migrants, there is need for **better cooperation among States** to address the issues. The Union Government can step-in to ensure better coordination. A **draft Model Act can be enacted by the Parliament** which can be adapted by States according to their local conditions.

Fifth, A report by the Commonwealth Human Rights Initiative (CHRI) recommends that the **Government should formulate a binding National Policy on Domestic Workers**, instead of providing general guidelines.

Sixth, The Government has developed an **Integrated National Plan of Action against Trafficking**. The Government is also taking steps to put some remedial measures in place in the form of **Integrated Anti-Trafficking Units** and Anti-Trafficking nodal cells. However, there is a need for a **more comprehensive legislation on labour trafficking**.

Seventh, the CHRI Report recommends that the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act of 2013, must be reviewed to improve complaint mechanisms for domestic workers.

Eighth, There is a need to sustain and support organizations for domestic workers to improve their bargaining power. Civil society should take the lead in encouraging collective action among the workers.

Conclusion

Domestic Workers in India have been facing exploitation for long. Several social and political factors make them vulnerable. The lack of dedicated legal provisions and poor implementation of existing provisions has led to the present status. The Union and State Governments must step in formulate comprehensive policy and legislation to protect their rights. Violation of rights of workers should be dealt with strictly. At the same time, there is a need for greater sensitization to prevent instances of physical abuse.

Syllabus: GS I, Social Empowerment; GS II, Welfare schemes for vulnerable sections of the population by the Centre and States and the performance of these schemes.

Source: **Indian Express**, **SPRF**, **National Domestic Workers' Movement**, **The Leaflet**

[Kurukshetra February 2023 Summary] Decarbonisation of Transport Sector – Explained, pointwise

Introduction

The most critical and pressing issue in front of the world and coming generations is to contain the global temperature rise within 1.5°Celsius. Greenhouse gases (GHGs) are the reason for this temperature rise. Therefore, all the mechanisms and sustainable alternatives must be implemented to mitigate the climate risk. Climate change is having profound impacts on India. This includes adverse impacts on agriculture, water resources, forest and biodiversity, health, coastal management, and an increase in temperature. Heat waves have become more common

and severe with many cities reporting temperatures above 48°Celsius. The decline in agricultural productivity is the significant impact of climate change on India. Recognising the impact, India is championing climate action to achieve the nationally determined climate goals, mainstream sustainability, and reduce the carbon footprint. In this context, decarbonisation of transport sector is vital to achieve the climate goals.

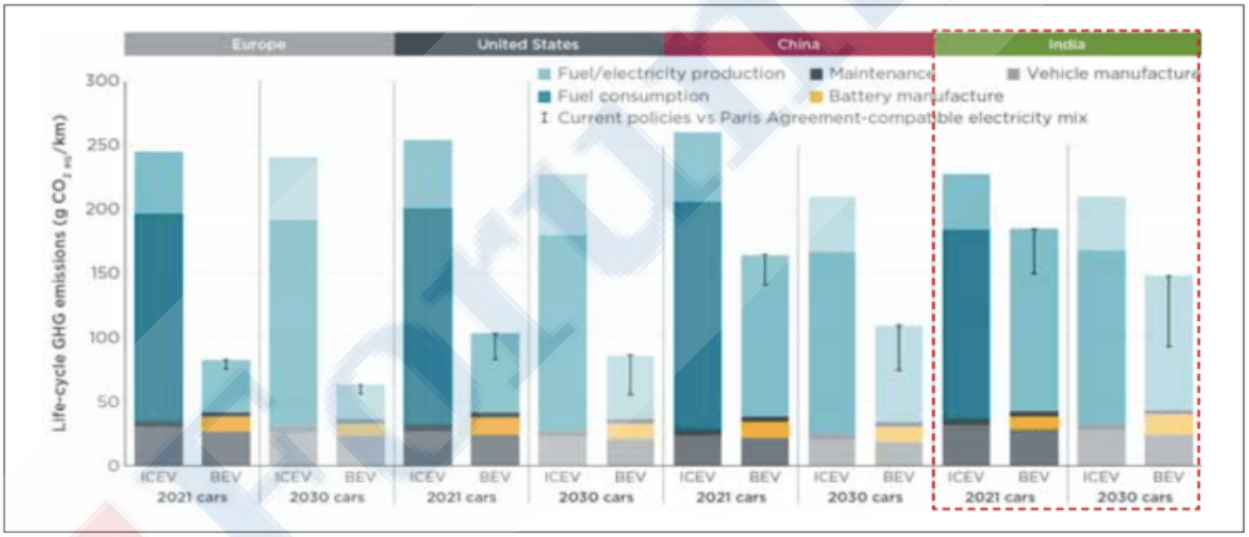
Current Status of Transportation in India

The average **carbon footprint of a person in India is 0.56 tonnes per year**, compared to the global average of four tonnes per person per year. India's transport demand is expected to increase by 2.7 times in over 30 years. Bus transport in India accounts for 38% of passenger km, though its share in overall registered vehicles in India is just around 3.5%. Two- wheelers account for 76-80% of the total registered automotive in India. Last-mile connectivity is still a big issue and mainly depends on three- wheelers and sub-seven-meter buses.

Sale of electric two-wheelers has jumped from 4,073 units in June 2021 to 42,260 in July 2022. The prices of electric buses is falling rapidly. In a **recent tender** by the Convergence Energy Services Limited (under Ministry of Power), the price discovered for EV buses has come to be 27% and 25% below diesel and CNG buses respectively (without subsidy).

India is the biggest manufacturer and market for two wheelers globally. The same status is expected to be carried over to EV segment. The EV segment is led by start-ups at present, but large traditional manufacturers are also scaling-up their EV segments.

Lifetime emissions from EVs are 19-34% lower than (Internal Combustion Engines) ICE vehicles.



Lifetime Emissions of EVs vs ICE in Different Countries

Source: Kurukshetra February 2023

Initiatives for Decarbonisation of Transport Sector

Shift to Zero Tailpipe Emissions Mode: The **National Electric Mobility Mission Plan** (NEMMP) 2020 is a National Mission document providing the vision and the roadmap for the **faster adoption of electric vehicles** and their manufacturing in the country. As part of the NEMMP 2020, Department of Heavy Industry formulated the **Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India** (FAME India) Scheme in the year 2015. Its aim is to promote manufacturing of electric and hybrid vehicle technology and to ensure sustainable growth of the same.

The 1st Phase of FAME India Scheme was implemented through four focus areas namely: **(a)** Demand Creation, **(b)** Technology Platform, **(c)** Pilot Project and **(d)** Charging Infrastructure. Market creation through demand incentives was aimed at incentivizing **all vehicle segments** i.e.

2-Wheelers, 3-Wheelers Auto, Passenger 4-Wheeler vehicles, Light Commercial Vehicles and Buses.

The 2nd Phase (FAME II) is a 3-year subsidy programme. It aims at supporting the **electrification of public and shared transportation**. Since the launch of the the remodelled FAME Il in June 2021, the sales have increased rapidly e.g., sale of two-wheelers have jumped from 4,073 to 42,260 between June 2021-June 2022.

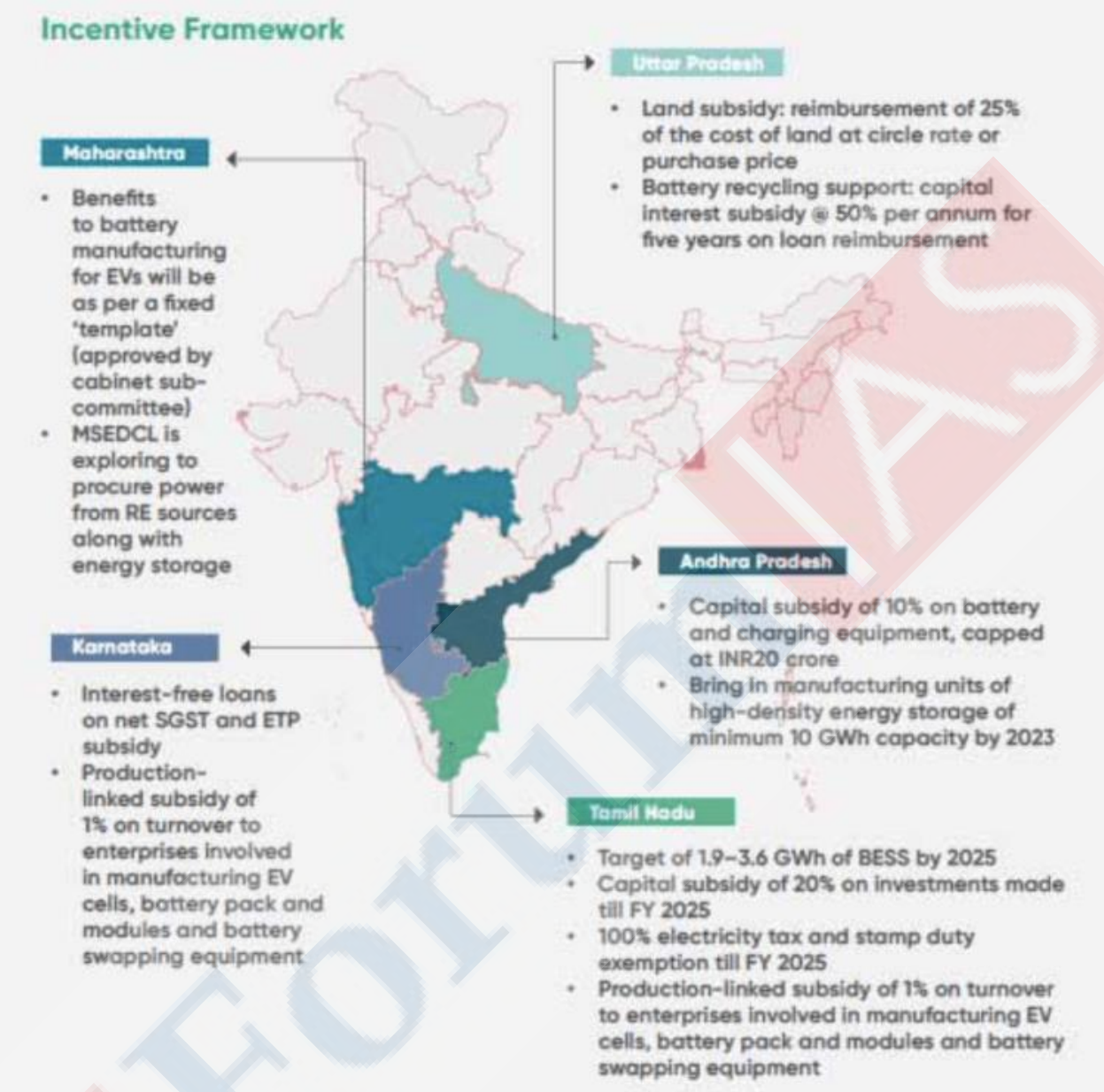
The Government has **nearly doubled the FAME 2 subsidy outlay** at INR 5,172 crore in the Union Budget 2023-24. This is 78% more than the INR 2,900 crore that it had earmarked in the Budget for FY2022-23.

EV Value Chain: The Government is trying to establish India as a leading producer across the full electric vehicle (EV) value chain. India has a chance also to become the global hub of manufacturing for the entire EV Value chain (except raw material mining). Therefore, billion-dollar incentive programs such as the **Advanced Chemistry Cell Program** with an outlay of US$ 2.5 billion over five years were rolled out and have received an overwhelming response from the industry.

Similarly, to promote manufacturing of EV auto components, **PLI for Advanced Auto Components** (US$ 3.5 billion) has been launched. This will pave the way for a smooth transition of existing auto parts manufacturing in India and produce global champions.

EV Policies: States have also provided several fiscal and non-fiscal supports, in addition to the incentives provided by the Union Government. More than 22 states have declared their EV policies. Several states have also rolled out the **incentives for battery manufacturing**.

Indian Railways have launched their EV policy. They not only want to phase out all ICE vehicles used by Indian railways in offices etc., but also to **put the charging stations at all electrified railway station parking spaces**. This will significantly **boost the charging infrastructure availability** and help railways achieve their net zero carbon emission by 2030.



Source: Kurukshetra February 2023

Promoting Environmentally Friendly Technology: India is focusing on catalyzing, growing and fuelling the entrepreneurs in the country to create businesses with clean technologies such as hydrogen, electric mobility, batteries, etc. Green technologies are driving sustainable development in India. Such technologies maximise energy efficiency and preserve the environment while saving money.

***Shoonya* – Zero Pollution Mobility**: It is a consumer and corporate-facing campaign hosted by NITI Aayog. The campaign aims to accelerate the transition of vehicles used for ride-hailing and deliveries into electric vehicles (EVs) by creating awareness and demand for zero-pollution rides and deliveries in Indian cities. The ecosystem it has created by bringing together a dedicated group of industry stakeholders, corporate partners, and consumers is being utilized to build awareness around EVs.

Challenges to Decarbonisation of Transport Sector

First, The initial purchase price of electric two-wheelers with fixed batteries is still greater than that of internal combustion engine vehicles. On a total cost of ownership basis, EVs are cheaper. However, high initial costs act as a deterrent to adoption.

Second, the 2-Wheeler EV segment is being driven by start-ups and new entrants. Established players in 2-wheeler segment seem to be reluctant to join the EV bandwagon. This can limit the scale-up and expansion of the segment.

Third, despite policy initiatives, there is **severe shortage of charging infrastructure**. Lack of charging infrastructure has limited adoption of EVs. The setting-up of charging infrastructure is not lucrative and appealing proposition as of now due to low market penetration of EVs. Hence, there seems to be catch-22 situation.

Fourth, Despite Government push, the adoption of public transport has been low.

Source: Kurukshetra February 2023

Fifth, the manufacturers have not yet focused on the commercial vehicle EV segment, which has a large share in the transport sector and remains a large emitter.

Way Forward for Decarbonisation of Transport Sector

First, to meet the needs of EVs, primarily four-wheelers, cargo three-wheelers, Light commercial vehicles (LCVs), and buses, there is a need to **develop fast charging technology**.

Second, Government-led firms like BHEL/BEL can work together to build a local supply chain for charger manufacturing. Further technical assistance can be obtained from research institutions such as IISc and labs such as CPRI/CSIR/ARCI.

Third, Opportunity charging and hybrid battery storage concepts (with fixed and switch battery) should be investigated for intercity transportation.

Fourth, Rural battery swap stations can alter the landscape of EV adoption and battery storage. It has the potential to increase electricity availability and quality in remote places. For example, in rural locations, the battery switch station might be powered by localised solar power (small setups). These switch stations can **function as micro power grids**, supplying extra power to the grid while also powering nearby villages/houses, in addition to functioning as **EV exchanges**. Suitable models should be developed to scale-up such swap stations.

Fifth, there is a need for developing a **mission plan for Advanced Chemistry Cell (i.e. battery) recycling**. This is especially significant since more than 95% of the original essential minerals in these ACC batteries may be **recovered and reused in cell production**. Many countries have already made the use of recycled materials in new ACC cells mandatory. India should adopt a similar approach.

Sixth, German commercial vehicle manufacturers have committed to launching light-duty and heavy-duty electric vehicles as well as developing a dedicated charging network in Germany. All large manufacturers (Traton Group, Daimler, and Volvo) are **cooperating with each other** and investing in zero-emission commercial vehicle charging infrastructure to **mitigate risks and boost asset utilisation**. A similar strategy can be adopted by Indian manufacturers.

Seventh, the **electric bicycles** need to be promoted. Although the prices of electric bikes are currently high, leasing companies, fleet operators, aggregators, financers, etc., can make it a viable option. e-Commerce and hyper-local delivery start-ups can utilise e-bikes to reduce their carbon footprint.

Eighth, Since EV is an evolving space, capacity building at all levels, along with upskilling and reskilling, is very important. It all starts with the government officials at the municipal level who interact for things like charging infra, incentives, etc. The sensitisation of the latest guidelines, rules, incentives, etc. should be **well communicated through regular training**.

Ninth, the decarbonisation of transport sector and transition to EVs will require creation of future ready workforce. NITI Aayog is working with IITs to nudge them to start EV-specific courses. More than 15 IITs have already started the courses at the PG level. This has to trickle down to diplomas and other technical and non-technical institutes.

Conclusion

The Government has laid an ambitious outline and policies to direct the country towards a cleaner, greener, and more connected world. The industry is also reciprocating the same, but the speed needs to pick up on all sides, including manufacturing and consumer acceptance. Decarbonisation of Transport sector is vital to achieve the Net Zero target. It would require close cooperation among all stakeholders; Government, Business and the citizens.

Syllabus: GS III, Conservation.

Source: Kurukshetra February 2023, **Economic Times**, **PIB**

Issues with Mental Health and Mental Healthcare in India – Explained, pointwise

Introduction

Mental disorders are now among the top leading causes of health burden worldwide, with no evidence of global reduction since 1990. Suicides rates in India are amongst the highest when compared to other countries at the same socio-economic level. The latest survey by India's National Institute of Mental Health and Neurosciences (NIMHANS) found that nearly 150 million Indians are in need of mental healthcare services, but fewer than 30 million are seeking care. This shows several issues with mental healthcare in India including access and social attitude to mental health. The Government has taken several initiatives to improve access to mental healthcare services in addition to gradually changing the discourse on mental health. However, as evident in the data, there is a need for further effort to address the issues.

What is the status of Mental Health in India?

The WHO defines Mental Health as, "*Mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community. It is an integral component of health and well-being that underpins our individual and collective abilities to make decisions, build relationships and shape the world we live in*".

The WHO calls Mental health as a basic human right. And it is crucial to personal, community and socio-economic development.

According to the WHO, mental illness makes about 15% of the total disease conditions around the world. In 2019, India's suicide rate was at 12.9 per 1,00,000 persons. This was higher than the regional average of 10.2 and the global average of 9.0. Suicide has become the leading cause of death among those aged 15–29 in India.

In 2017, an estimation of the burden of **mental health conditions** for the States across India revealed that as many as **197.3 million people (~14% of the population) required care for mental health conditions**. This included around 45.7 million people with **depressive disorders** and 44.9 million people with **anxiety disorders**.

According to the **National Mental Health Survey** conducted by NIMHANS in 12 States, the prevalence of mental morbidity is high in urban metropolitan areas. Nearly 1 in 20 persons suffer from depression. 0.9 % of the surveyed population were at high risk of suicide.

According to the NCRB data, 1,64,033 people committed suicide in 2021, a 6.2% rise in comparison to 2020.

What are the harmful effects of poor Mental Health?

Impact on Physical Health: A study found that positive psychological well-being can reduce the risks of heart attack and stroke. On the other hand, poor mental status can lead to **poor physical health** or harmful behaviour. Depression has been linked to many **chronic illnesses**. These illnesses include diabetes, asthma, cancer, cardiovascular disease, and arthritis.

Impact on Relationships: Mental-health conditions during adolescence and young adulthood can have a significantly negative impact on the development of safe and healthy relationships with peers, parents, teachers, colleagues and partners.

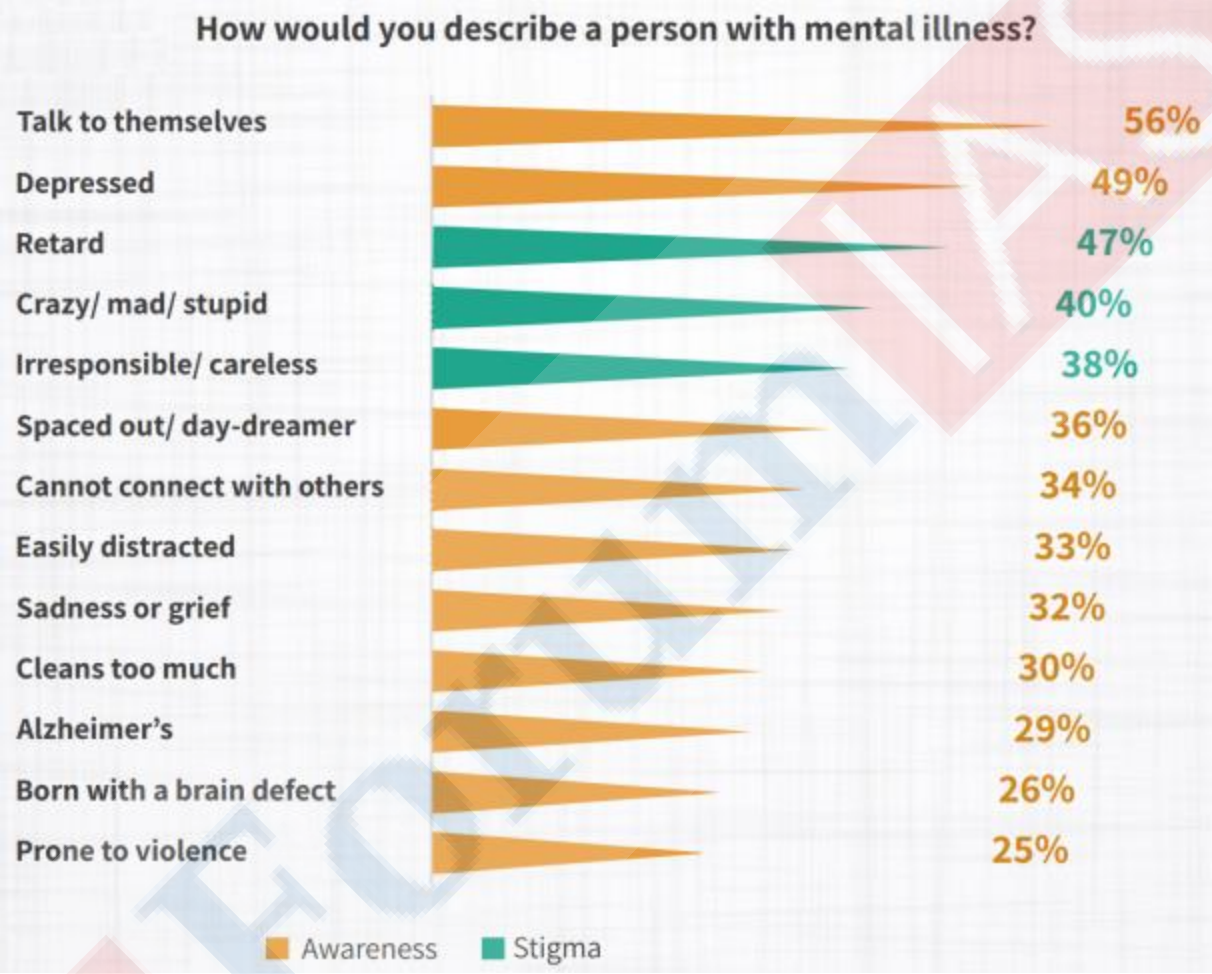
Impact on Productivity: It impacts a person's ability to concentrate and engage in productive activities.

The **WHO Report on Mental Health and Development** (2010) highlighted the risks of a **cyclical relationship between vulnerability and poor mental health**, in which people with such conditions are a vulnerable group subject to stigma, discrimination, violence, marginalization and other violations of their human rights.

What are the reasons for poor status of Mental Health in India?

Lack of Awareness and Sensitivity: In India, mental health issues are not considered as healthcare issues. Any person suffering from mental issues is considered weak. **Stigma and discrimination** often undermine social support structures. Persons suffering from such issues are often tagged as 'lunatics' by the society. This leads to a vicious cycle of shame, suffering and **isolation of the patients**.

A survey conducted in 2018 showed that while 87% of the respondents showed some awareness of mental illness, **71% also used terms associated with stigma**.



Source: WEF

Lack of Mental Healthcare Personnel: There is a severe shortage of mental healthcare workforce in India. According to the WHO, in 2011, there were **0.301 psychiatrists** and **0.047 psychologists** for every 100,000 patients suffering from a mental health disorder in India. In contrast, the ratio in most developed countries is in excess of 10.

Gap in Treatment: At present, only 20-30% of people with mental illnesses receive adequate treatment. One major reason for such a wide treatment gap is the problem of inadequate resources.

Low budget Allocation: Developed countries allocate 5-18% of their annual healthcare budget on mental healthcare, while India allocates roughly 0.05% (Organization for Economic Co-operation and Development, 2014) of its healthcare budget. This is the lowest among all G20 countries. Despite a rise in mental illness issues, the Union Ministry of Health allocated less than 1% of its budget to directly deal with psychological illnesses in 2022.

Changed Lifestyle: Increased use of certain kinds of social media is exacerbating stress and mental illness, especially among the young people. Social media **detracts from face-to-face relationships**, which are healthier, and reduces investment in meaningful activities. More importantly, it **erodes self-esteem** through unfavourable social comparison. In addition, some experts contend that the **shift to nuclear families** has reduced the avenues of relieving one's anxieties as family members are not emotionally available at most crucial times.

Income Inequalities: Mental issues are closely linked with poverty. People living in poverty are at greater risk of experiencing mental health conditions. On the other hand, people experiencing severe mental health conditions are more likely to fall into poverty through loss of employment and increased health expenditure.

What steps have been taken to improve Mental Health in India?

Legal Measures

The Mental Healthcare Act, 2017: The Act makes several provisions to improve the state of mental health in India. The Act rescinds the Mental Healthcare Act, 1987 which was criticised for failing to recognise the rights and agency of those with mental illness. The Act seeks to ensure rights of the person with mental illness to receive care and to **live a life with dignity**. It provides the **Right to Access to Healthcare**: Every person shall have a right to access mental health care

and treatment from mental health services run or funded by the appropriate Government. It also empowers person with mental illness to **make an advance directive** that states how he/she wants to be treated for the illness.

The **Act decriminalised suicide** stating that whoever attempts suicide will be **presumed to be under severe stress**, and shall not be punished for it.

Rights of Persons with Disabilities Act, 2017: The Act **acknowledges mental illness as a disability** and seeks to enhance the Rights and Entitlements of the Disabled and provide an effective mechanism for ensuring their empowerment and inclusion in society.

Schemes and Initiatives

National Mental Health Programme (NMHP): Keeping with the WHO's recommendations, the programme was introduced in 1982 to provide mental health services as part of the general healthcare system. The **District Mental Health Programme** (DMHP) component of the NMHP has been sanctioned for implementation in 704 districts for which support is provided to States/UTs through the National Health Mission.

Facilities made available under DMHP at the Community Health Centre (CHC) and Primary Health Centre (PHC) levels, include outpatient services, assessment, **counselling/ psycho-social interventions**, continuing care and **support to persons with severe mental disorders**, drugs, outreach services, ambulance services etc. In addition to above services there is a provision of 10 bedded in-patient facility at the District level.

Generating Awareness: To generate awareness among masses about mental illnesses **Information, Education and Communication (IEC) activities are an integral part of the NMHP**. At the District level, sufficient funds are provided to each District under the DMHP (under the Non-communicable Diseases flexi-pool of National Health Mission) for **IEC and awareness generation activities** in the community, schools, workplaces, with community involvement.

Under the DMHP various IEC activities such as awareness messages in local newspapers and radio, street plays, wall paintings are undertaken by the States/UTs.

National Tele Mental Health Programme: The Government has announced a National Tele Mental Health Programme in the Budget of 2022-23, to further improve access to quality mental health counselling and care services in the country.

Kiran: A 24/7 toll-free helpline called *Kiran* was established by the Ministry of Social Justice and Empowerment in 2020 to offer support to those dealing with anxiety, stress, depression, suicide thoughts, and other mental issues.

Manodarpan: Students will receive psychosocial help as part of an effort under the *Atmanirbhar Bharat Abhiyan*, with the goal of improving the students' mental health and overall well-being. Its components include **Advisory Guidelines** for students, teachers and faculty of School systems and Universities along with families; National level database and directory of counsellors; Toll-free helpline; Handbook on Psychosocial Support etc.

Issuance of Guidelines/Advisories: Guidelines/ advisories on management of mental illness have been issued by the Government. All the guidelines, advisories and advocacy material can be accessed on the website of the Union Ministry of Health and Family Welfare under 'Behavioural Health – Psychosocial Helpline'.

What steps can be taken further?

There is a need of an urgent and well-resourced 'whole-of-society' approach to protect, promote and care for the mental health of people. This should be based on the following pillars.

First, there is a need to **address the deep stigma s**urrounding such issues which prevents patients from seeking timely treatment and makes them feel shameful, isolated and weak.

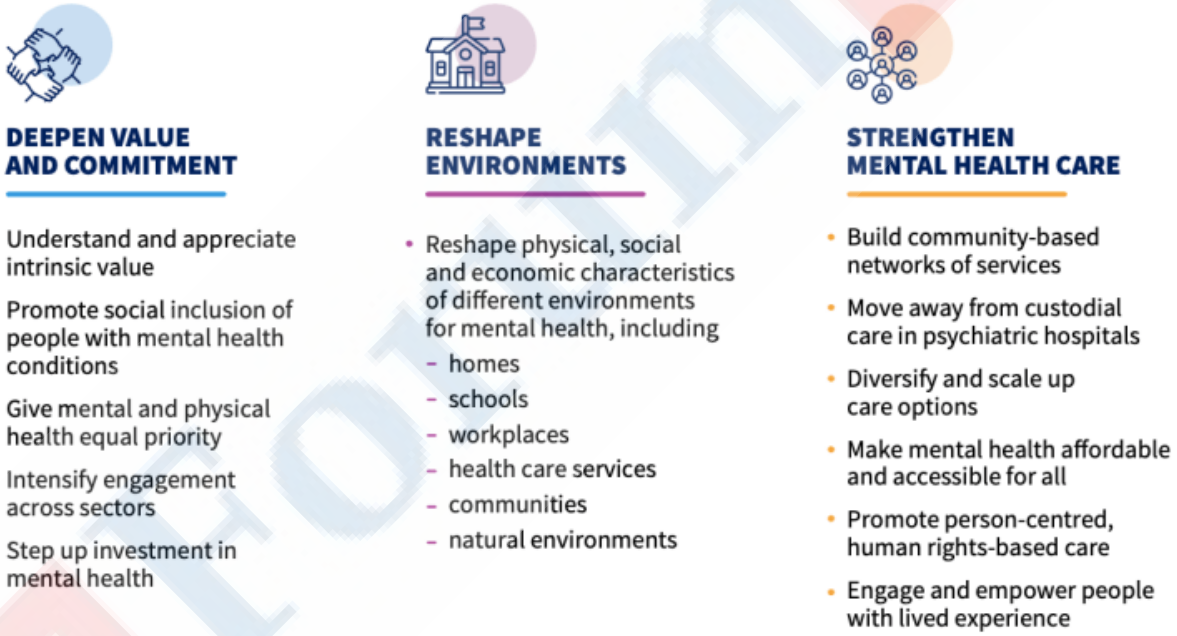
Second, mental health should be made an **integral part of the public health programme** to reduce stress, promote a healthy lifestyle, screen and identify high-risk groups and **strengthen interventions** like counselling services. Special emphasis should be given to schools. In addition, special focus should be on groups that are highly vulnerable to mental health issues such as victims of domestic or sexual violence, unemployed youth, marginal farmers, armed forces personnel and personnel working under difficult conditions.

Third, **Infrastructure should be improved** for mental health care and treatment. Innovative models are required to **deepen the penetration of services and staff**. ASHAs can be trained for this purpose. Community health workers (ASHAs) can not only **educate and sensitize women** and children about mental diseases but also guide them to reach the right expert in their locality.

Fourth, The above interventions will require **enhanced allocation to mental healthcare** in the Budget. Substantial investment will be needed to **address the wide treatment gap** in the health infrastructure and human resources.

Fifth, Careful mapping and research needs to be undertaken to **produce quality data**, that is essential to understand the size of the problem. This in turn should be utilised to implement a comprehensive approach, supported by heightened political commitment, scientific understanding and a citizen driven movement.

Sixth, the WHO has recommended Three Paths to transformation towards better Mental Health.



Source: WHO

Conclusion

The status with respect to mental issues has worsened since COVID-19 pandemic. The mental healthcare system in India is under-equipped to deal with the crisis. Urgent interventions, in terms of enhanced budget, increased workforce, and improved awareness are necessary to address the challenge.

Syllabus: GS II, Issues relating to development and management of Social Sector/Services relating to Health.

Source: Indian Express, Indian Express, Economic Times, PIB

[Yojana February 2023 Summary] Youth and Health – Explained, pointwise

Introduction

The youth constitute nearly half of India's population. Youth contribute to the economic growth of the country as it is the most productive age group being employed. Much of the economic growth potential of India is derived from the vibrant and highly skilled youth population in the country. Youth face a lot of health issues because of their physiological state, behaviours, diet, work and other factors, many of which are related to their behavioural habits.

Youth Health Issues

Mental Health: Clinical depression has been one of the leading causes of illness and disability among young adults and adolescents, followed by suicide. The reasons include poor scholastic or workplace performance, violence, poverty and unemployment, stigma, marginalisation and discrimination, peer pressure etc. Challenges like non-availability of mental health services as well as not recognising mental health issue as a reason to seek healthcare worsen the situation.

Alcohol and Drug Use: Alcohol and drug use is largely associated with various high risk behaviours that can cause communicable and non-communicable diseases like HIV/AIDS, hypertension, cardiovascular diseases and liver diseases, etc. Also, **mental health is compromised** in such individuals as well their family members due to financial burden that follows.

Tobacco Use: Majority of the individuals who use tobacco in any form (smoking or chewing) begin doing so in their adolescence. This is usually combined with alcohol dependence, increasing the risk of various illnesses significantly. Tobacco can cause cancer of oral cavity, throat, oesophagus and lungs and many other health issues. In addition, tobacco consumption increases the risk of hypertension, diabetes mellitus, heart diseases, stroke, vascular diseases etc.

Physical Inactivity: It has been estimated that **only 20% of the young adults are known to exercise adequately** or **be involved in sports activities** (longer than 30 minutes per day and 5 days a week). Less physical activity causes increase in risk factors and diseases including obesity, hypertension, diabetes mellitus, heart diseases and other chronic diseases. Physical inactivity can impact mental health adversely.

Diabetes and Hypertension: Diabetes is becoming potentially epidemic, with 1 in every 10 adult having diabetes. 1 in every 5 adults in India have hypertension. In both cases, majority are not aware that they have diabetes or hypertension. Recent years have seen more and more young people developing diabetes at earlier age. The major reasons for this is reduced physical activity and unhealthy diet.

Other Health Problems: These include injuries in the form of accidents, self-harm, workplace accidents etc. The violence in the form of interpersonal violence, domestic violence, workplace violence, bullying ragging, sexual violence can take place.

These health problems that have early onset during youth can have long bearing effects at older age, specially the chronic diseases. Early onset can reduce longevity, quality of life, increase expenses and can lead to early complications during older age.

Improving Health of the Youth

There are three secrets of healthy life: **Balanced Diet**, **Regular Physical Activity** and **Sufficient Sleep**. The youth often lack on one or more of these aspects. Though there has been a series of Government initiatives- from both health sector as well as other sectors, however, those are yet to catch the full attention of youth. The *Ayushman Bharat* programme with health and wellness

centre component has focus on ***nirogi*** or **preventing illness by adoption of healthier lifestyle**. '**FIT India**' initiative is aimed at increasing exercise habits of people including youth.

Initiatives by Government for Improving Health of the Youth

Sl. No	Programmes/Initiatives	Features
1.	**Rashtriya Kishor Swasthya Karyakram (RKSK)**	• The programme's main strength is its health promotion approach. • The focus of the programme is shifted from the clinic-based approach to prevention and promotion and reaching the adolescents in their own environment which includes their communities or families or schools.
2.	**Adolescent Friendly Health Clinics (AFHC)**	• It includes all health issues from sexual and reproductive health to injuries, violence, substance abuse, nutrition, NCDs, etc. • The components of AFHC are acceptable, equitable, accessible, appropriate, comprehensive.
3.	**Peer Education Programme**	• The selected peer educators have to ensure that the adolescents benefit from RKSK. • These peer educators are called 'Saathiya'. • Four peer educators (two boys and two girls) are selected per village/1000 population/ASHA habitation to reach out to adolescents.
4.	**Menstrual Hygiene Scheme**	MoHFW launched a scheme for promotion of menstrual hygiene in adolescents. It mainly focuses on increasing the awareness, increasing access and usage of sanitary napkins along with its safe disposal.
5.	**Health and Wellness Centres under Ayushman Bharat Programme**	The HWCs promote a comprehensive health approach by preventive and promotive interventions.
6.	**FIT India**	This initiative is aimed at adoption of healthier lifestyle in youth by getting involved in sports and other related activities.
7.	**Other Health Programmes**	Various health programmes like National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke. (NPCDCS), Reproductive, Maternal, Newborn, Child Plus Adolescent Health (RMNCH+A), National AIDS Control Programme (NACP), National Mental Health Programme (NMHP) and others also strive in improving youth health.

Source: Kurukshetra February 2023

Making Health of Youth a Mass Movement

This requires optimal utilisation of every possible avenue for improving health of this age group. It requires interventions at schools, colleges and workplaces amongst other. It demands that the **school health services are strengthened** and **work as early intervention centres** for dealing with the rising incidence of various disease. There is no structured and focused programme to promote health among college students. This is the age group which has queries and concerns mostly unanswered regarding the mental health, sexual health, drug as well as personal health concerns.

The **workplace health** has to be promoted by installing weighing scales in bathroom, exercise time and equipment in large offices as well as **encouraging healthy food** in cafeteria menu. The official policies on timely care seeking when not feeling well and **reducing stress in workplace** should be promoted. There is a need for **improving health seeking behaviour** of youth who

often resort to self-remedies. There is a need for **improving family and community participation** in improving health of youth in India.

Healthy Lifestyle

There is a lot of **stigma associated with mental health issues**. This is a reason people do not seek health care. However, mental illnesses are very similar to any physical illness. With right advice from trained doctors and with medications, both physical and mental illnesses can be treated. It is time to **start talking about mental health** issues. There is need to **destigmatise mental health**.

Regular physical activity is zero-cost effort, which one can do for good health. According to WHO and other health agencies, people should engage in at least **150 minutes of moderate intensity aerobic physical activity per week** or at least **75-150 minutes of vigorous-intensity aerobic physical activity**. India has been **ranked 8th among countries with the lowest physical activity globally**.

Reports have shown that **3 out of 4 adolescents and young people are not physically active** enough as per the given recommendations. A study showed that barriers to low physical activity are personal attributes, perceived negative consequences, sociocultural environment, lack of time etc. Identification of these barriers and steps to overcome these are required.

Regular and at least **six to eight hours of sleep boosts immunity**, reduces stress and keeps us away from many health Therefore, making one's sleep cycle regular and ensuring that enough sleep on daily as well as weekly basis has to be an approach of every person.

Sports, Health and Youth

The leading health body, the World Health Organization has established a Sports and Health programme to capitalise the potential of people to lead healthy lives through promoting participation in sports and working with the sports community. It has been established that physical activity through various sports can **boost confidence**, improve **social life**, lead to **psychosocial and personal development** and help in **prevention of substance abuse**.

Conclusion

Youth constitute around half of India's population and are the foundation of country's economic growth and development. Though, otherwise healthy population, the youth face a host of problems due to their age, behaviour and other factors which can have long-term effect during old age. Prevention of ill health effects in youth can have long-term benefits individually, at family level and at national level. The policies aimed at youth should be targeted at healthier lifestyle, adoption of regular physical activity and health prevention and promotion measures. Healthy youth today will make healthy nation tomorrow.

Source: Yojana February 2023

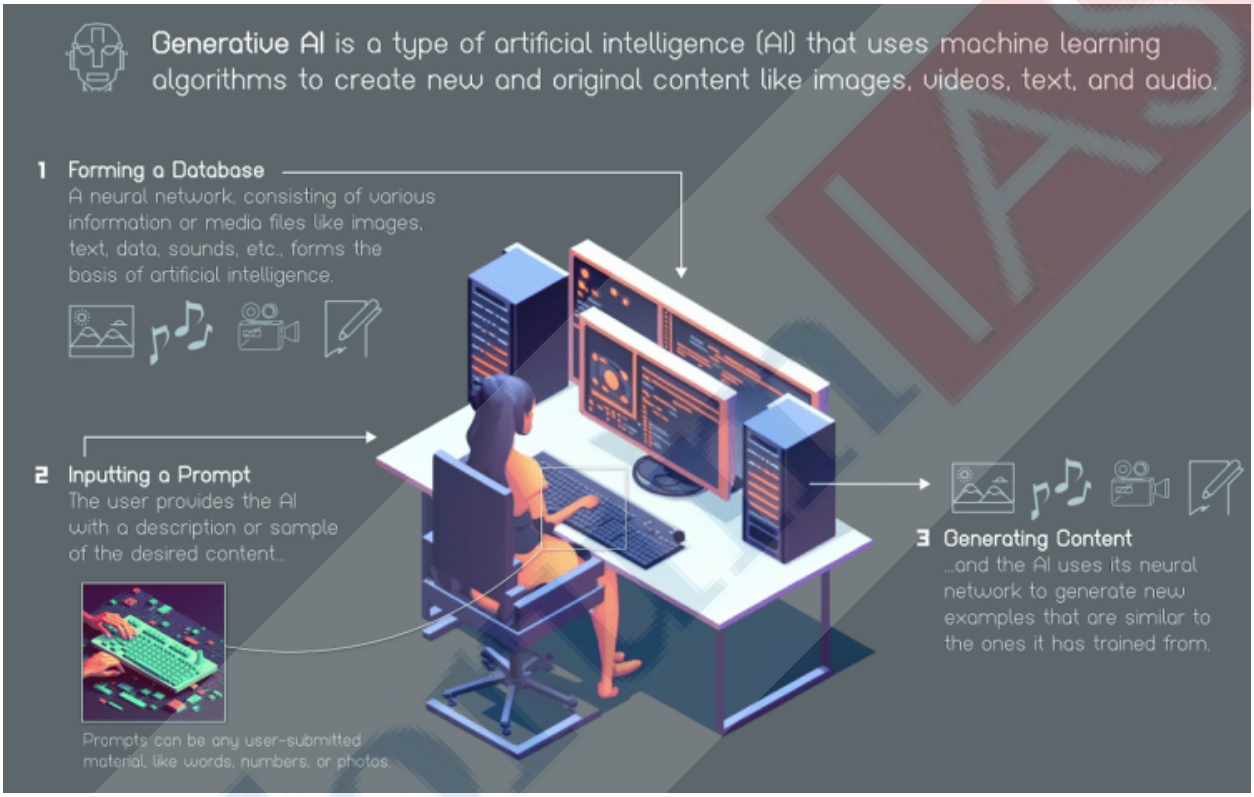
Generative AI (Artificial Intelligence): Benefits and Challenges – Explained, pointwise

Introduction

Since its release, ChatGPT has received a lot of attention. While, the users are marvelling at its 'human-like' responses, technology experts are debating the potential applications and concerns associated with Generative AI (Artificial IntelIgence). Generative AI has the potential to revolutionise almost every field of human activity. However, the possibility of misuse of the technology and loss of skilled and semi-skilled jobs has prompted calls for more cautious approach in the development of the Generative AI.

What is Generative AI?

Generative AI uses **Artificial Intelligence and Machine Learning algorithms** to enable machines to **generate new content** (machine generated). Systems use previously created content, such as text, audio, video, images, and code. The term 'Generative' refers to the ability of the models to learn how to **create new data rather than simply recognising it**. For example, a generative model may learn how to generate images that resemble faces given a set of parameters (such as the eyes, hair, or skin colour etc.). The content (text, image etc.) generated by AI is so 'authentic', that it is difficult to distinguish whether the content has been generated by human or computer.



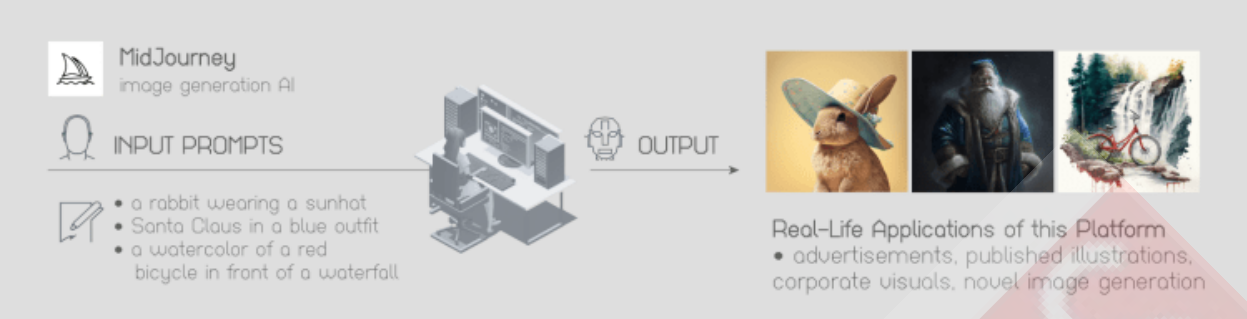
Source: WEF. The above image has been created by Generative Artificial Intelligence developed by Midjourney Labs. The text prompt to generate the image was 'A technical illustration of a woman sitting behind a desktop computer on a long table, isometric view, 3D rendering, realistic...'

What are the applications of Generative AI?

The applications of Generative AI are wide and still evolving.

Motion Picture Industry: Applications of Generative Artificial Intelligence in the movie industry is wide. It can utilized to alter the background/landscape according to the need (rather than wait for required conditions to exist e.g., a movie scene requiring cloudy weather can be shot under any weather conditions, and the background can be altered later on using AI). Images or videos of Actors at various ages are also possible with Generative AI technology. By using **face synthesis** and **voice cloning**, artist's/actor's original voice can be matched with a lip-sync. This will also help in archiving artefacts after restoration for future references.

Search Engine Services: Generative Artificial Intelligence has the capability to take search engine services to the next level, e.g., Text to Image translation may be utilized to provide search results. It can also be used to produce **realistic photographs from textual descriptions of objects** like birds and flowers.



Source: WEF. Images created by Midjourney through Generative Artificial Intelligence using Text Prompt.

Security Services: Generative Artificial Intelligence can create front-on photos from photos taken at different angles and vice versa for face verification or face identification systems. Such systems can be deployed at airports, international border check-points etc.

Healthcare: Semantic-Image-to-Photo Translation can convert inputs that are semantic images or sketches to photo-realistic images e.g., if X-ray or any CT scan images can be converted to real images, **diagnosis can be much more accurate**.

Advertising: Generative AI can create new advertisements based on existing ones, making it easier for companies to reach new audiences.

Location Services: This involves converting satellite images to map views. This can be a huge step towards venturing into unexplored geographic locations.

The possible applications of Generative AI are still being explored and can expand considerably as the technology evolves further. It can expand to fields like education, content creation, banking among others.

What are the benefits of Generative AI?

Increased Efficiency: Generative Artificial Intelligence can be used to automate tasks that would otherwise require manual labor. This can **help businesses save time and money**, as well as increase efficiency e.g., it can be used to generate images and videos quickly and accurately, which can be used in marketing campaigns or other projects.

Improved Quality: Generative Artificial Intelligence can help improve the quality of content generated. It can be used to create high-quality images and videos that are **more visually appealing** than those created manually. Additionally, it can be used to generate text that is **more accurate and relevant** than text created by humans.

Faster Results: Generative Artificial Intelligence can help businesses get results faster than they would with manual labor. It can create images and videos in a fraction of the time it would take a human to do the same task. This can help businesses get their projects done at a much faster rate.

Cost Savings: By automating tasks, businesses can reduce their labor costs and save money. Additionally, it can help businesses reduce costs associated with creating content, such as images and videos.

Improved Decision Making: By using Generative AI, businesses can generate data that can be used to make better decisions e.g., it can be used to generate data that can be used to make decisions about marketing campaigns or product development. Applications in the medical field can help in better diagnosis.

Increased Creativity: Businesses can generate new ideas and concepts that can be used to create new products or services.

Improved Customer Experience: Businesses can generate content that is **more accurate and relevant** to their customers. This can help businesses create a better customer experience and increase customer satisfaction.

What are the concerns associated with Generative AI?

Accuracy: Despite the advancements, the Generative AI technology is not fool proof and produce erroneous content. The Machine Learning Algorithms depend on the quality of the input data. Erroneous or inaccurate data can generate inaccurate results.

Increase Biases: Generative Artificial Intelligence systems can **perpetuate and amplify existing biases**. If the models are trained on biased, non-inclusive data, they will generate biased outputs, such as offensive or discriminatory language, demeaning and degrading imagery, and prejudicial content. A rights-group in the US pointed out the example of an AI-based generative imagery programme showing images of only white men for the prompt 'CEO'.

Malicious Purposes: Generative AI systems can create content for malicious purposes, such as **deepfakes**, disinformation, and propaganda. It can also generate offensive or inappropriate content. Nefarious actors may use AI-generated media to **manipulate people and influence public opinion**. It can be misused by enemy States, or non-State actors to destabilise domestic peace by spreading misinformation.

Read More: Take a Step to Regulate Deepfakes, Threat of Deepfakes in India

Low Quality Output: It may also produce low-quality and less accurate information, specifically in the context of complex engineering and medical diagnosis.

Concern over Data Privacy: Data privacy issues can arise from using generative AI in different industries, such as healthcare, since it involves collecting private information about individuals.

Limitations in Creativity: AI uses past data as a template for future work. It means that the output produced by Generative AI is usually based on something that has already happened rather than anything genuinely creative. In short, AI systems lack creativity, originality and human ingenuity. AI Systems cannot generate new ideas by themselves, they can only make associations based on the data fed into them by humans.

Issues Related to Copyright: It can be challenging to determine who is **responsible for the content generated by a Generative AI system**. The acquisition and consent model around the training data and intellectual property issues make it difficult to hold anyone accountable for any harm resulting from its use. In addition, there are concerns related to **use of copyrighted content to train AI systems**. The work derived from such content can have copyright implications. Getty Images has sued Stable Diffusion in the London High Court, accusing them of using its images illegally.

Risk of Unemployment: Although it is too early to make certain judgements, there is a risk that generative AI could contribute to unemployment in certain fields. This could happen if generative AI automates tasks or processes previously performed by humans, leading to the displacement of human workers.

Environmental Concerns: AI systems require a lot of computing power. This has implications for environments, in terms of energy consumed in operating AI systems. An analyst pointed out that training a transformer model just once with 213 million parameters can emit carbon emissions equivalent to 125 air-flights between New York and Beijing. GPT3 has 175 billion parameters, so its emissions would have been much larger.

What should be done going ahead?

First, To address bias and fairness, researchers can use techniques such as de-biasing and **fair representation learning**, which can help to remove biases present in the training data.

Second, Researchers can also use techniques such as counterfactual data generation, which can help to generate more diverse and representative training

Third, There is need to add rigour and responsibility to developing AI technology, **develop and enforce ethical guidelines**, conduct regular audits for fairness, identify and address biases, and protect privacy and security.

Fourth, There is need to add **adequate policy, regulation, awareness, and education guardrails** to develop and use Generative AI services ethically and responsibly. China has proposed a policy for the same. Some measures include requirement for the users of Generative AI to ensure that **any doctored content using the technology is explicitly labelled** and can be traced back to its source. The regulation also mandates people using the technology to edit someone's image or voice, **to notify and take the consent of the person** in question.

Fifth, Intellectual property law must find a way to protect artists from copies that erode the value of their original work, but at the same time encourage them to continue to be inspired by others. The US Copyright Office has already declared that AI generated art is not entitled to intellectual property protection as it lacks the 'nexus between the human mind and creative expression', which is necessary to invoke copyright protection.

Conclusion

The Generative AI is a revolutionary technological development. However, as is the case with every new technology, it has several associated concerns. A pragmatic approach is necessary that can minimize the negative impacts of technology. A cooperation at a global level will be required to establish the norms and standards, as well as checking misuse of the technology that can transcend national boundaries.

Syllabus: GS III, Awareness in the fields of IT and Computers

Source: Mint, Mint, The Hindu, WEF

Lithium Reserves in India: Strategic Significance and Concerns – Explained, pointwise

Introduction

The Union Ministry of Mines recently announced the major discovery of **lithium reserves in India in Jammu and Kashmir**. The Geological Survey of India (GSI) has established 5.9 million tonnes of **inferred lithium resources** in the Salal-Haimana area of Reasi District in Jammu and Kashmir. Lithium is considered a strategic element because of its use on batteries used in Electric Vehicles (EVs). The finding of the reserves is being considered as a game-changer in India's transition towards green mobility.

Types of Reserves and Resources (United Nations Framework Classification (UNFC) System)

Mineral Reserve: *Economically mineable* part of *measured* and/or *indicated mineral resource.*

Probable Mineral Reserves: *Economically mineable* part of *indicated* or in some cases, a *measured mineral resource.*

Proven Mineral Reserves: *Economically mineable* part of *measured mineral resource.*

Mineral Resource: A Mineral Resource (Remaining or Additional Resource) is the balance of the Total Mineral Resources that *have not been identified as Mineral Reserve.*

Measured Mineral Resource: That part of mineral resource for which tonnage, density, shape, physical characteristics, grade and mineral content can be estimated with a *high level of confidence*, i.e., based on detailed exploration.

Indicated Mineral Resource: The tonnage, density, shape, physical characteristics grade and mineral content can be *estimated with reasonable level of confidence* based on exploration, sampling and testing information, location of borehole, pits, etc.
Inferred Mineral Resource: Tonnage, grade and mineral content can be estimated with *low level of confidence inferred from geological evidence.*
Note: Resource is a broader and more general term than Reserve. Resource includes identified material that may be less well characterized, possibly of lower grade and less certain to be economically recoverable. Resources can be converted to Reserves by additional drilling or changes in economic factors, such as price or technology.
At present, the GSI has established '**Inferred Resources**' of Lithium. Thus, in pure technical terms, the deposits found in J&K are **not Reserves but Resources**, although in common parlance they are being referred as Reserves. GSI will undertake further research to establish the economic viability of mining Lithium. Actual Reserves may turn out to be less than 5.9 million tonnes of Inferred Resources.

About Lithium and Its Uses

Lithium is a soft, shiny grey metal found in the earth's crust. It is a highly reactive and alkaline metal.

Lithium is a key element for new technologies and finds its use in ceramics, glass, telecommunication and aerospace industries. The well-known uses of Lithium are in **Lithium ion batteries**, lubricating grease, high energy additive to **rocket propellants**, optical modulators for mobile phones and as convertor to tritium used as a raw material for **thermonuclear reactions** (fusion).

It is also used to make alloys with aluminium and magnesium, improving their strength and making them lighter e.g., Magnesium-lithium alloy – for armour plating, Aluminium-lithium alloys – in aircraft, bicycle frames and high-speed trains.

Due to its utility in diverse applications, it also referred as 'White Gold'.

What is the current status of Lithium reserves and extraction?

A World Bank study suggests that the demand for critical metals such as lithium (Li) and cobalt is expected to rise by nearly 500% by 2050.

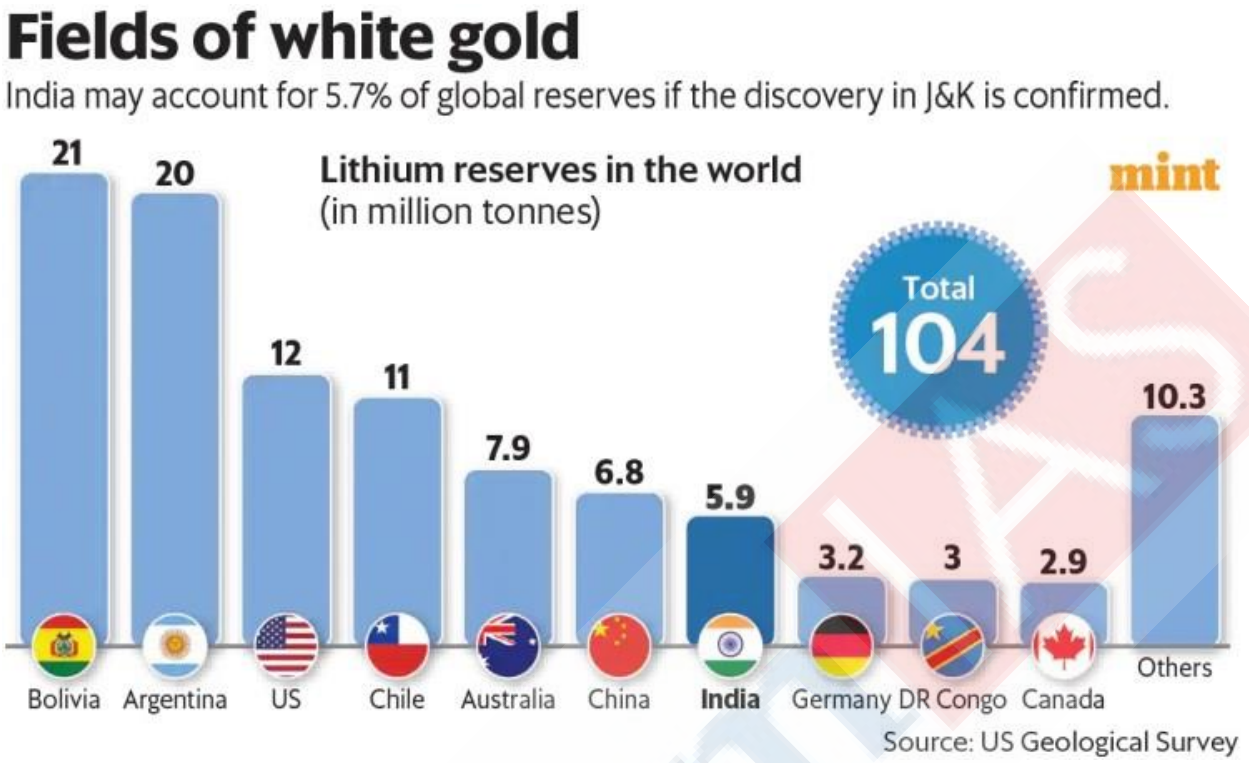
The global electric vehicle market is projected to reach US$ 823.75 billion by 2030, registering a Compounded Annual Growth Rate (CAGR) of 18.2% from 2021 to 2030, India's market is projected to register a CAGR of 23.76% by 2028. India is seeking to secure its critical mineral supplies and build self-sufficiency in this sector.

India's Lithium Reserves

The discovery of 5.9 million metric tonnes of lithium has been made in J&K. This is the first major lithium reserve that has been found in India. Earlier, a survey led by the Atomic Minerals Directorate for Exploration and Research showed the presence of 1,600 tonnes (inferred category) of lithium resources in the Marlagalla area of Karnataka's Mandya district.

Global Lithium Reserves

South America is a particularly rich supply of the metal, the three nations of Bolivia, Chile, and Argentina are collectively referred to as the 'Lithium Triangle'. China currently controls 77% of the global lithium-ion battery manufacturing capacity and is home to 6 of the world's 10 manufacturing companies.



Source: Mint

What steps have been taken by the Government to Explore Lithium Reserves in India?

The Atomic Energy Act, 1962 permits **Atomic Minerals Directorate** (a constituent unit of Department of Atomic Energy) for exploration of Lithium in various geological domains of the country. For the first time, the National Mineral Exploration Policy of 2016 recognised the need to explore these minerals.

Every year, as per approved annual **Field Season Programme** (FSP), the Geological Survey of India (GSI, an attached office of Ministry of Mines) takes up different stages of mineral exploration viz. **reconnaissance surveys** (G4), **preliminary exploration** (G3) and **general exploration** (G2) following the guidelines of **United Nations Framework Classification** (UNFC) and **Mineral Evidence and Mineral Content Rules** (MEMC-2015) for augmenting mineral resource for various mineral commodities including lithium.

What is the Significance of Lithium Reserves for India?

Reducing Dependence on Imports: In FY2020-2021, India imported lithium and lithium ion worth INR 173 crore and INR 8,811 crore respectively. The demand is likely to rise multifold in the future. The finding of lithium reserves in India will reduce dependence on imports.

Affordable Transition: : The discovery of domestic deposits of lithium will help the expanding the EV ecosystem at reasonable and affordable costs, and make the transition to green mobility more economical.

Meet Government Objectives: This will also help advance the Government's ambitious plan of 30% EV penetration in private cars, 70% for commercial vehicles, and 80% for two and three-wheelers by 2030 for the automobile industry.

Potential to become Major Producer: The majority of the global reserves are located in regions with severe water stress limiting their ability to scale-up production. India has a potential to replace global lithium supply chains.

Li-ion Battery Ecosystem

ISRO's Vikram Sarabhai Space Centre has developed and qualified lithium ion cells of capacities ranging from 1.5Ah to 100Ah for use in satellites and launch vehicles. Following the successful deployment of indigenous Lithium-ion batteries (LiBs) in various missions ISRO has decided to transfer the technology to manufacturers to set up facilities for producing lithium ion cells in the country. The Government wants EVs to make up at least 30% of new automobile registrations by 2030 and has focused on developing the value chain for batteries.

Looking to encourage local manufacturing of lithium-ion cells, the Union Government doubled the import duty on lithium-ion cells to 10% in April 2021 and later announced a performance-linked incentive (PLI)) for advanced chemistry cell (ACC) batteries.

What are the challenges in extraction of Lithium?

Geological Stability: According to the seismic zonation map of India, the whole of Jammu and Kashmir, comes under seismologically active Zones IV and V and is also ecologically sensitive. Mining in geologically unstable region will be a major challenge.

Environmental Consequences: Extracting Li from hard rock mines, similar to what has already been proposed in J&K, entails **open-pit-mining** followed by roasting the ore using fossil fuels. Open-pit-mining, refining, and waste disposal from these processes substantially degrades the environment, including **depletion and contamination of waterways and groundwater**, diminishing of **biodiversity**, and considerable air pollution.

Environmental Justice: According to a 2018 study that examined the socio-environmental implications of lithium mineral extraction, lithium mining has produced environmental justice challenges. It is claimed that over the last four decades, sufficient research has not been performed to address the sustainability difficulties posed by lithium mining and processing, particularly the question of its impacts on local populations.

Mining Policy: The absence of an **integrated mining policy for strategic metals and minerals**, and poor domestic capabilities could hinder exploitation of the recently discovered reserves.

Security Threat: Certain terror groups have threatened against mining of lithium reserves. Security concerns can hamper development of mining industry, especially in attracting labor.

Availability of Technology: India lacks technology to extract lithium and purify it. Lithium is mixed with rocks and other minerals. It would require breaking the rocks, removing volatile chemicals with evaporation and magnetic impurities with magnets besides other chemicals and processing. There is no prior experience in extracting Lithium, nor tested domestic technology. There is lack of established Lithium extraction industry.

What should be done going ahead?

First, The Government can explore technology transfers and tie ups with the lithium metal extraction industry from abroad in the short term, while simultaneously developing domestic technical expertise and know-how.

Second, the Confederation of Indian Industry (CII) has urged the Government to establish '**India Rare Earths Mission**' to reduce reliance on China. It has urged the Government to **encourage private sector mining** in the sector and diversify sources of supply for these strategic raw minerals.

Third, CII has also recommended that the public sector firm Indian Rare Earths Limited (IREL), administered by the Department of Atomic Energy, should be **split into two entities**. While IREL should primarily focus on Thorium mining (for Nuclear Power generation), the second entity should pursue other minerals including Rare Earths and Lithium.

Fourth, the Government can make rare earth minerals a part of the 'Make In India' campaign, similar to China's 'Made in China 2025' initiative that focuses on new materials, including permanent magnets that are made using rare earth minerals.

Read More: Rare Earth Elements: Strategic Importance and Reducing Import Dependence – Explained, pointwise

Conclusion

The finding of Lithium Reserves in India has great strategic importance. It can reduce India's dependence on Imports and make India self-reliant as it transitions to Green Mobility. It can ensure that India's story of dependence on imports of fossil fuels is not repeated as the economy enters a new green energy era. However, the Government must proactively address the potential challenges in extraction of Lithium and quickly scale-up domestic Lithium production.

Syllabus: GS I, Distribution of key natural resources across the world; GS III, Infrastructure: Energy; GS III, Conservation.

Source: **The Hindu**, **Times of India**, **Mint**, **Business Standard**, **Indian Bureau of Mines**

Global Sea Level Rise: WMO Report – Explained, pointwise

Introduction

The World Meteorological Organization (WMO) has released a Fact Sheet, 'Global Sea Level Rise and Implications'. The fact sheet has made some alarming observations. It notes that the sea level has risen at the rate of 4.5mm per year during 2013-22. The rise has been linked to climate change. Even in the low greenhouse gas emission scenario, the sea level rise of 0.6 metre is expected by 2100. A rise of this magnitude can have disastrous consequences for Island States as well as coastal cities. WMO has termed the sea-level rise a '**major economic, social and humanitarian challenge**'.

What are the key highlights of WMO Report on Sea Level Rise?

First, Sea-level rise threatens several low-lying small islands and high-population coastal cities.

Second, The impacts of average sea-level rise is further exacerbated by storm surges and tidal variations.

Third, **Human influence** was very likely **the main driver of these Sea-level increases** since at least 1971.

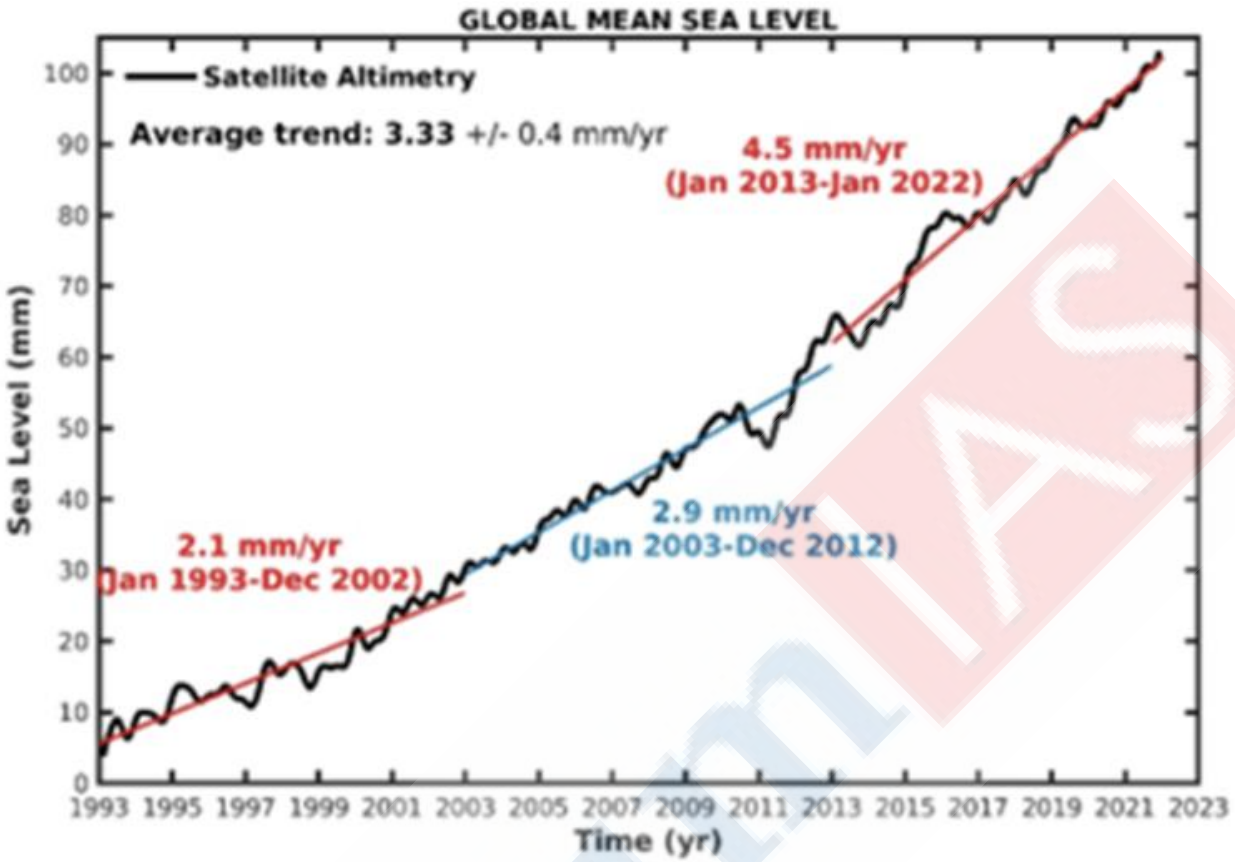
Fourth, The global ocean has **warmed faster over the past century** than since the end of the last deglacial transition (around 11,000 years ago).

Fifth, **Thermal expansion** explained 50% of sea-level rise during 1971–2018. Among other factors, **Ice loss from glaciers** contributed 22%, **ice sheets** 20% and **changes in land-water storage** 8%. The rate of ice-sheet loss increased by a factor of four between 1992–1999 and 2010–2019.

Sixth, Sea-level rise is not globally uniform and varies regionally.

Seventh, Over the next 2000 years, global mean sea-level will rise by about 2-3 m if warming is limited to 1.5°C, 2-6 m if limited to 2°C and 19-22 m with 5°C of warming.

Eighth, Continued sea-level rise will increase **risks to food security** in vulnerable regions between 1.5°C and 2°C Global warming level. Sea-level rise poses a distinctive and **severe adaptation challenge** as it implies dealing with slow onset changes. Increased frequency and magnitude of extreme sea-level events which will escalate in the coming decades. There are significant impacts and challenges to those populations faced with sea-level rise living in coastal urban areas in least developed and low-middle income countries.



Sea-level rise since 1993 based on satellite measurements (WMO State of the Global Climate Report).

Source: *Sea Level Rise, WMO Fact Sheet. The trend indicates that the rate of sea-level rise is increasing. The rate was 2.1mm/year between 1993-2002, 2.9mm/year between 2003-2012, and 4.5mm/year between 2013-2023. The sea level has risen by ~100mm since 1993.*

What are the reasons for Sea Level Rise?

Ocean Thermal Expansion: Instrumental records reveal that the world's oceans have warmed since 1955, accounting for more than **80% changes in the energy content of the Earth's climate system** during this period. During the period 1961 to 2003, the 0-3000 m ocean layer has absorbed up to 14.1 × 10^22 Joules, equivalent to an **average heating rate of 0.2 Watts/m2** (per unit area of the Earth's surface). Warming of ocean water leads to expansion contributing to rising oceans. WMO estimates that thermal expansion contributed ~50% of the observed rise in water levels (i.e., contributing ~2.3mm/year rise between 2013-2023. It contributed to a rise of ~1.6mm/year between 1993-2002).

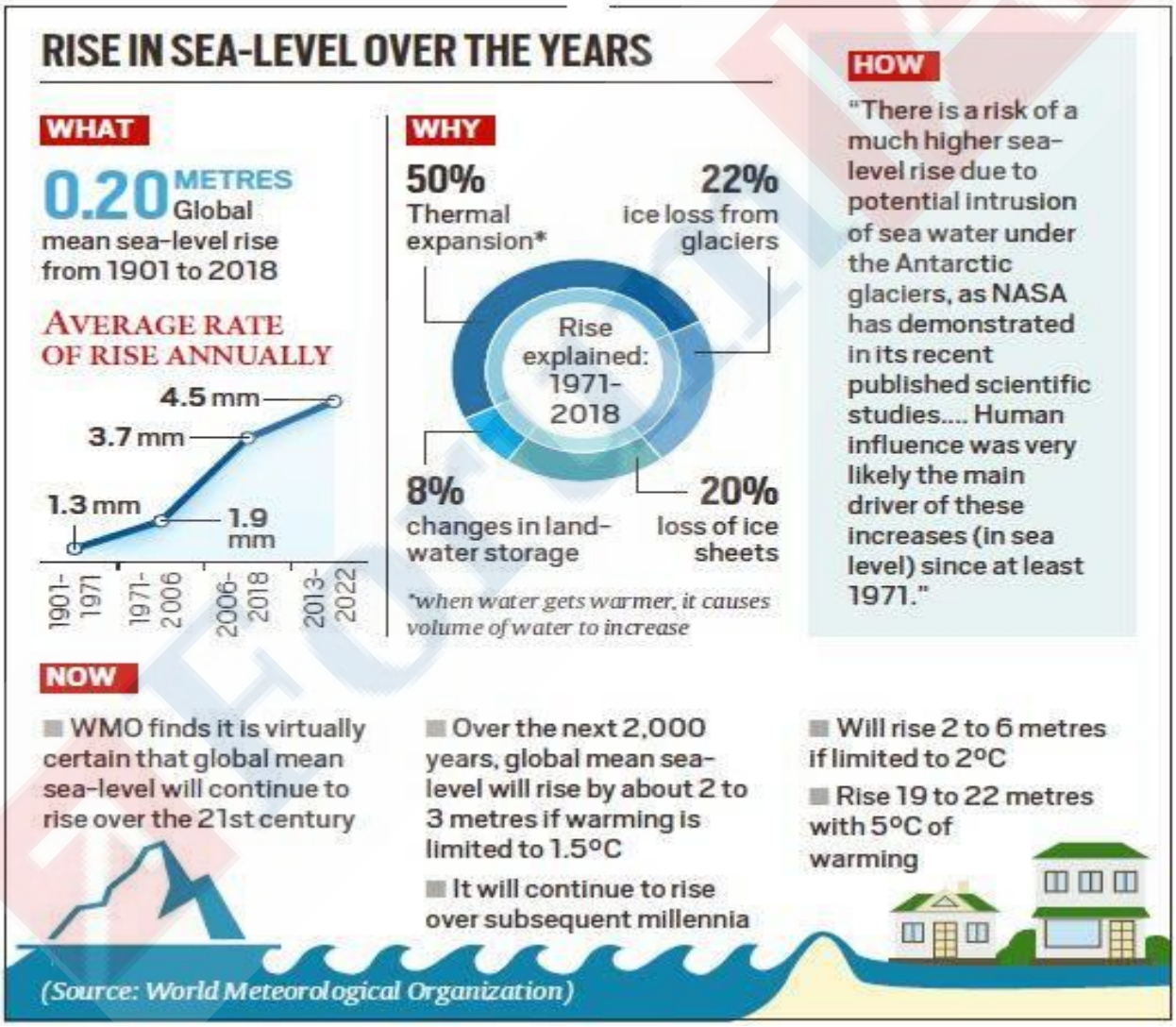
Glacial Melt from Greenland and Antarctica: According to the IPCC AR4 (Assessment Report), it is very likely (> 90% probability) that the Greenland Ice Sheet (GIS) shrunk from 1993 to 2003. An assessment of the data suggests shrinking of Greenland Ice Sheet (~50-100 Gigatons/year) contributing to **rising global sea levels of 0.14 to 0.28 mm/yr from 1993 to 2003**. There is a risk of a much higher sea-level rise due to potential intrusion of **sea water under the Antarctic glaciers**, as NASA has demonstrated in its recent published scientific studies.

Loss of Snow on Land: Snow cover has decreased in most regions, especially in spring as confirmed by Satellite observations. This means less water trapped in snow and more water in the oceans, leading to rise in water levels.

Permafrost: Permafrost and seasonally frozen ground in most regions have displayed large changes in recent decades. Temperature increases at the top of the permafrost layer of up to 3°C since the 1980s have been reported. Permafrost warming has also been observed with variable magnitudes in the Canadian Arctic, Siberia, the Tibetan Plateau and Europe.

All the above reasons are attributable to global warming caused by accumulation of Greenhouse Gases generated by anthropogenic activities.

Relative Sea Level Changes Due to Vertical Land Motions: At the local scale, vertical land motions such as uplift or subsidence of the ground due to tectonic and volcanic activity, sediment loading, groundwater pumping, and oil and gas extraction can produce sea level variations relative to the seafloor.



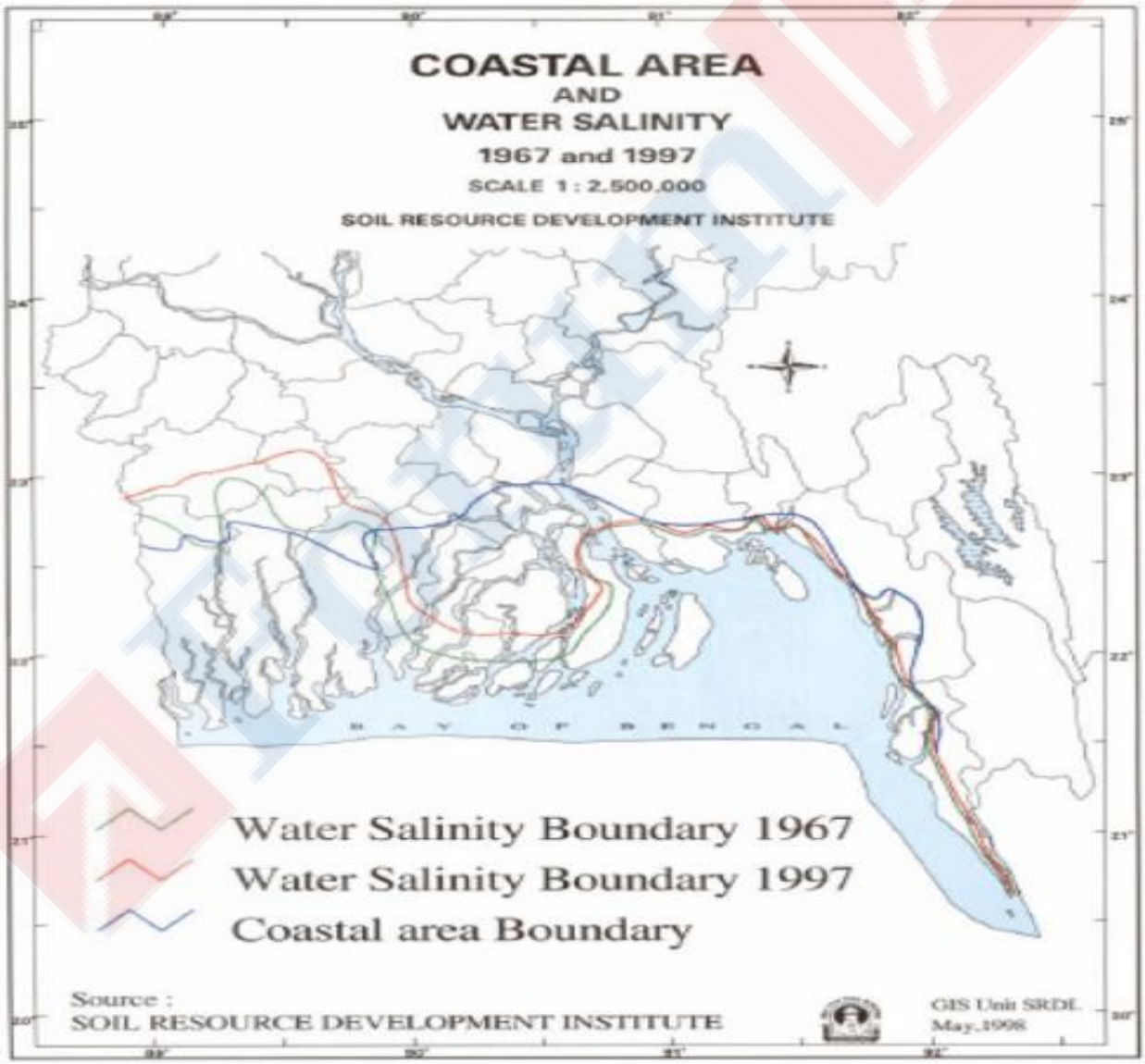
Source: Indian Express

What are the harmful impacts of Sea Level Rise?

Impact on Island States and Coastal Cities: **(a)** Large coastal urban centers located on low-lying coastal areas will become prone to **flooding**. Initially, the coast may suffer **episodic**

inundation, but later this may become permanent; **(b) High and low tide lines will advance landward**, part of the present intertidal zone will become permanently submerged and, consequently, significant land loss is likely to occur; **(c)** It will cause **extensive submergence of low-lying deltaic plains**. Large coastal urban centres like Mumbai, Chennai, Kolkata, New York, London, Shanghai, Dhaka, Bangkok, Jakarta, Lagos, Cairo, Copenhagen, Los Angeles, Buenos Aires and Santiago etc. are vulnerable. This may lead to large scale displacement of population; **(d) Storm Surges can become more destructive** as was evident during landfall of hurricane Sandy in New York and Cyclone Idai in Mozambique; **(e)** Small Island States with low elevation like Kirbati, Maldives, Solomon Islands, Micronesia, Tuvalu, Palau etc. face **threat of complete submergence** with rise in sea levels. This will lead to large scale **climate-induced migration**.

Impact on Freshwater: Freshwater in coastal delta and estuaries will get contaminated by salt sea-water. Water and soil salinity along the coast will increase with the rise in sea levels, destroying normal characteristics of coastal soil and water. This is already happening in Sunderbans delta in West Bengal and Bangladesh.



Landward movement of Water Salinity Boundary in Sunderbans, Bangladesh

Impact on Coastal Ecosystems: The Sundarbans are the largest mangrove forest in the world, covering 6,500 sq. km. The Sundarbans will be completely lost with 1m rise in ocean levels (World Bank, 2000). This will be a great loss of heritage, biodiversity, fishery resources, life and livelihoods. Salinity intrusion has led to 'top-dying' disease in Sundari trees. A 2018 report has pointed out that in the last 30 years, 1.44 million cubic meters of Sundari trees, have been lost to 'top-dying' disease.

Impact on Fisheries and Aquaculture: The rise in sea level will have a significant impact on fish habitat and their breeding ground. Rise in water levels will change the location of river estuaries. This will have significant impact on fisheries, aquaculture and consequently on the livelihoods of coastal population.

Coastal Erosion: Sea level rise will cause increased coastal erosion as water will wash out top soil of the coast. In addition to this, the **backwater effect** is accelerated by sea level rise that will also cause erosion. The forecasted land erosion will lead to displacement of coastal population.

Impact on Agriculture: The landward shift of water salinity boundary will cause **salinity intrusion** in land which will **decrease agricultural production** in coastal areas. It will also cause soil degradation. Salinity also diminishes the germination rate of some plants. A World Bank (2000) study suggested that increased salinity alone from a 0.3 metre sea level rise will cause a net reduction of 0.5 million metric tonnes of rice production. Salinity intrusion degrades soil quality which in turn inhibits rice production.

Impact on Health: Reduction of freshwater in coastal regions can cause water-related diseases like diarrhoea. Decrease in food production can contribute to malnutrition among coastal population. Flooding in coastal areas can increase outbreaks of water-borne diseases like cholera.

Extreme Events: Coastal countries will face extreme events. Cyclones are already intensifying rapidly **due to more moisture and heat** from warming of oceans. Cyclones are bringing more rain than earlier e.g., Super Cyclone Amphan (2020) caused large-scale flooding and inundated tens of kms inland with saline water.

Cascading and Compounding Impacts: Sea-level rise will bring cascading and compounding impacts. Losses of coastal ecosystems and ecosystem services, groundwater salinization, flooding and damage to coastal infrastructure will cascade into **risks to livelihoods**, **settlements** (causing displacement), **health**, **well-being**, **food security**, **water security**, and **cultural values** in the near to long-term.

What should be done going ahead?

Reduce Carbon Footprint: Greenhouse gases are a key cause of sea-level rise. It will be beneficial to minimise sea level rise by reducing the amount of greenhouse gases emitted each year and developing containment mechanisms. The **transition to green energy** must be expedited.

Climate Action Plan: Many cities and Nations do not have plans to address climate change. Hence, preparing a climate action plan from individual cities to international level will synchronize the efforts to tackle the sea level rise. There is also a need for an international alliance and agreement, similar to the Paris Climate Agreement, that is explicitly dedicated to looking into the issue of sea level rise. Developed countries must step-up climate finance and technology transfer to the developing counties to enhance their capacity for adaptation and mitigation.

Ecosystem-based Solutions: Coastal wetlands, marshes, and mangrove swamps can hold sediments and expand vertically at rates equal to or greater than the mean rate of sea level rise. These habitats can **absorb carbon 40 times faster per hectare** than tropical forests, making them extremely beneficial for reducing climate change. Wetlands provide **natural buffers** for

coastal communities during rainstorms and hurricanes. They soak up rain and storm surge water.

Conclusion

WMO Fact sheet on Sea Level Rise has indicated that the rate of water-level rise in oceans is increasing rapidly. Major urban centres and island Nations are vulnerable to the rising water levels. This will have widespread economic, social and humanitarian impacts. There is a need for coordinated action at the global level to address the challenge. Else the consequences can be disastrous.

Syllabus: GS I, Changes in critical geographical features; GS III, Conservation, Environmental pollution and degradation.

Source: **WMO**, **WMO**, **Indian Express**, **World Bank Environment Department**, **Institute for Social and Economic Change**

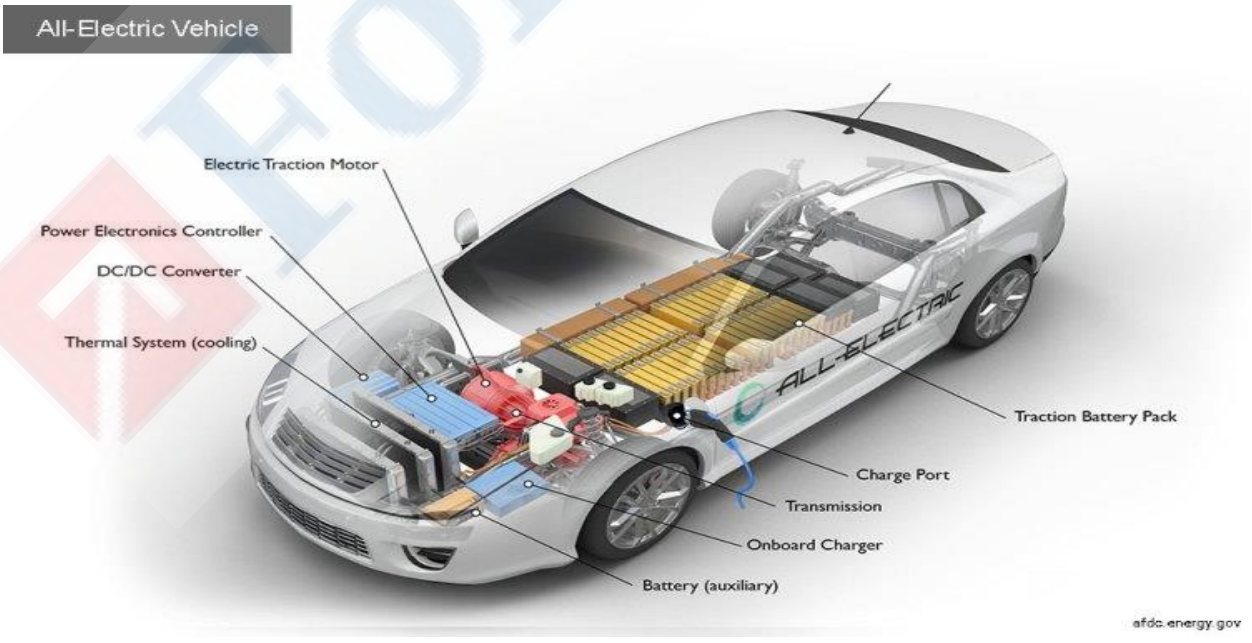
Adoption of EVs: Challenges and Solutions – Explained, pointwise

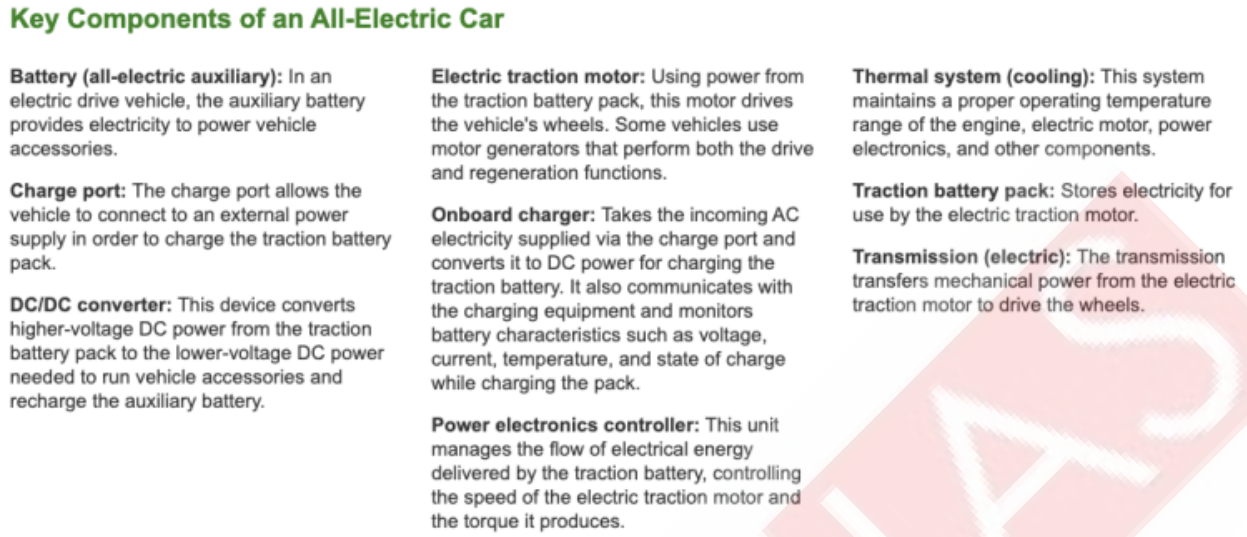
Introduction

The Government is pushing hard for transition to Green Economy. One vital aspect of this transition is transition to Green Mobility. Enhancing the share of Electric Vehicles in transportation is necessary to ensure green mobility. The finding of Lithium deposits in J&K and possibility of developing domestic battery manufacturing ecosystem in India has led to new excitement about EVs. However, the adoption of EVs still faces several hurdles. Addressing these challenges is necessary to ensure greening and decarbonisation of the transportation sector.

What are EVs and their benefits?

Electric Vehicles (EVs) have an electric motor instead of an Internal Combustion Engine (ICE). ICE-based vehicles work on fossil fuels. EVs use a **large traction battery pack** to **power the electric motor**. The power to run the vehicle is provided by the motor (instead of fuel-engine in ICE vehicles). Because an EV runs on electricity, the vehicle emits **no exhaust from a tailpipe**. An EV does not contain the typical liquid fuel components, such as a fuel pump, fuel line, or fuel tank.





Source: Department of Energy, US

Benefits of EVs

Lower running costs: The running cost of an electric vehicle is much lower than an equivalent ICE vehicle. Electric vehicles use electricity to charge their batteries instead of using fossil fuels like petrol or diesel. **EVs are more efficient**, according to one estimate, EVs can convert ~60% of the electrical energy from the grid to power the wheels, but petrol or diesel cars can only convert 17%-21% of the energy stored in the fuel to the wheels. The efficiency combined with the electricity cost means that charging an EV is is cheaper than fuel based vehicles.

Low Maintenance Cost: EVs have very low maintenance costs because they have lesser moving components compared to ICE vehicles (e.g., Electric vehicles don't have gears and there are no complicated controls). The **servicing requirements for EVs are lesser** than the conventional petrol or diesel vehicles. Therefore, the yearly cost of running an electric vehicle is significantly low.

Zero Tailpipe Emissions: EVs can help **reduce carbon footprint** because they have zero tailpipe emissions (carbon-dioxide emissions through combustion of fossil fuels). This can **reduce air pollution** as well as slow down the pace of global warming. EVs are thus essential for greening of transportation sector. Even if emissions from the production of electricity (like thermal power plant) are taken into account, petrol or diesel vehicles emit almost 3 times more carbon dioxide than the average EV.

Noise Pollution: Electric Motors function silently, and produce much less noise compared to IC Engines. This can address noise pollution in urban areas or near highways.

What are the challenges to adoption of EVs?

Lack of Infrastructure: At present, charging stations comprising of both slow and fast charging capabilities are available for all kinds of vehicles in the market. However, the **number of the charging stations is inadequate**. This implies their availability is restricted and even the ones that are deployed do not function optimally. Hence, the lack of charging infrastructure is a major hindrance to the adoption of EVs at scale.

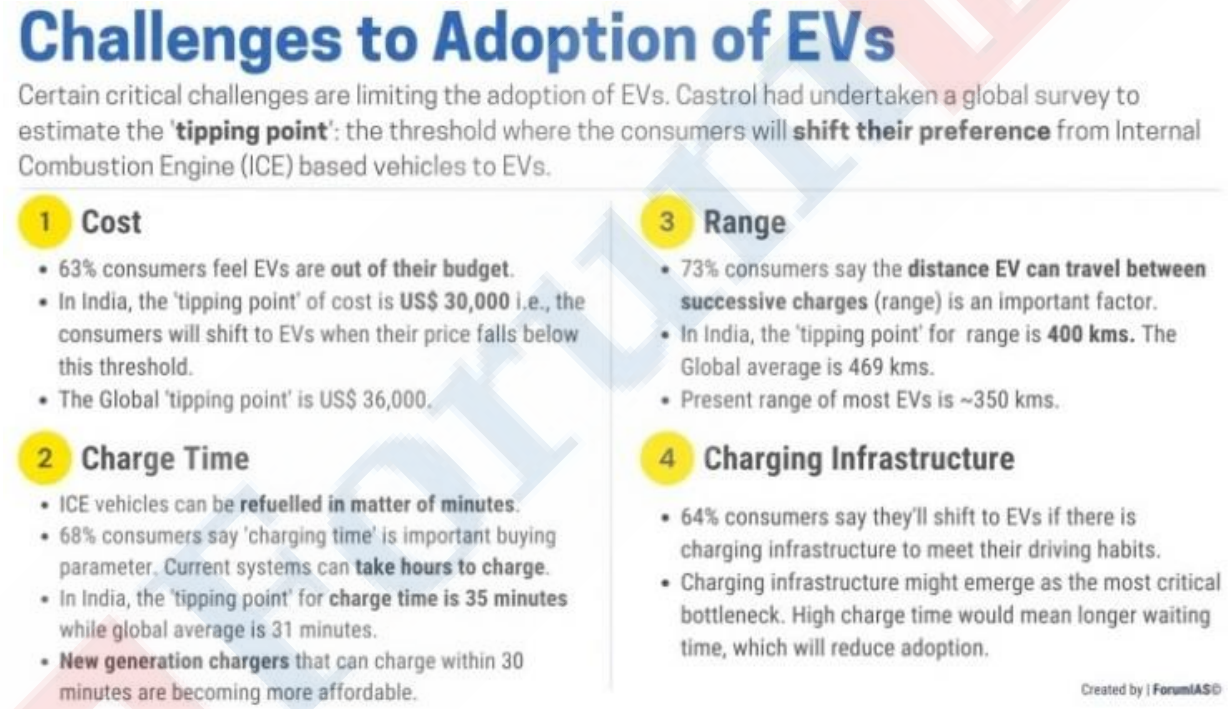
Performance: The EV manufacturers have been unable to implement the practicality of EVs being 'value for money' for consumers. The original equipment manufacturer (OEMs) are not developing EVSE (Electric Vehicle Supply Equipment). As a result, the companies that are into EVSE are unsure about the types of EVs , charging technology and its time of launch. This uncertainty does not allow the EVSE OEMs to do long term planning.

Range Anxiety: It refers to an EV owner's fear that the vehicle's battery does not have sufficient charge for it to reach the destination. It is linked to how far the EV can travel on a single battery charge and the availability of charging points. This is a consequence of limited infrastructure and duration of battery charge.

Long time for Charging Batteries: The battery charging time is much longer than the time taken for refuelling the ICE vehicles. Fast charging can result in overheating of batteries, hence it is avoided. This reduces the acceptability of EVs.

Financial Constraints: The initial cost of owning an electric car is currently higher than that of ICE vehicles mainly due to the cost of the battery. Manufacturers anticipate cost parity by 2025 – if not sooner.They are collaborating with the electric car battery production supply chain to lower costs and improve overall efficiency. Apart from this, limited credit options and high EMI make it tough for the EV Sector to operate.

Battery Technology: One of the most significant barriers to EV adoption is the battery manufacturing process and supply chain. To enable EVs, new mining and supply networks are required. The lithium-ion battery is the most common and frequently utilised EV energy source. India has no manufacturing capacity for Lithium-ion cells and relies completely on imports of EV batteries. This also increases costs.



What are the possible solutions to increase adoption of EVs?

First, the range anxiety problem can be addressed by **increased battery efficiency** and **expansion of charging points**. Battery efficiency can be improved by further research, and expansion of charging points need greater investments.

Second, Battery swapping can also tackle range anxiety. And it could be very efficient, especially for certain types of EVs and in certain geographies. In battery swapping, the discharged battery can be replaced by a charged battery. This will cut down the waiting time required in charging the battery.

Read More: Battery Swapping Policy: Provisions, Benefits and Challenges – Explained, pointwise

Third, Because of the lengthy charging time, chargers must be placed in regions where people may leave their automobiles for extended periods of time. This needs a reconsideration of the charging geography. **Setting up charging stations nearer to offices**, **commercial complexes** can play a key role.

Fourth, To raise the overall reliability and quality of their products, there is a need to prioritise the domestic production of key components for batteries. The country's reliance on imports of these components may have an impact on India's international trade policies or EV objectives.

Fifth, The Government must **promote private investment in battery manufacturing** plants and achieve economies of scale, while also focusing on the newer technologies.

Sixth, Stabilizing the policy environment by focusing on tax breaks and non-fiscal incentives might assist to alleviate demand uncertainty, allowing the business to reach economies of scale

Seventh, Using renewable energy sources can make the use of electric vehicles more eco-friendly. The electricity cost can be reduced further if charging is done with the help of renewable energy sources installed at home, such as solar panels.

Syllabus: GS III, Environment, Conservation.

Source: Mint, WEF, NITI Aayog, Business Standard

Domestic Manufacturing of APIs (Active Pharmaceutical Ingredients): Status, Challenges and Solutions – Explained, pointwise

Introduction

Officials from the Union Ministry of Health recently noted that India has started making 29 out of 43 **'critical' Active Pharmaceutical Ingredients** (APIs) that were imported earlier. This will go a long way in reducing dependence on China. This is the outcome of the Product-Linked Incentive (PLI) scheme for pharmaceutical goods launched by the Department of Pharmaceuticals in 2021. Achieving self-sufficiency in domestic manufacturing of APIs will help India become the global hub of pharmaceutical industry.

What are the APIs?

The Active Pharmaceutical Ingredient (API) is the **biologically active component of a drug product** (tablet, capsule, cream, or injectable) that **produces the intended health effects**. An example of an API is the acetaminophen contained in a pain relief tablet. The active ingredient in a biological drug is called a **Bulk Process Intermediate** (BPI). An example of a BPI is the insulin in medicine to treat diabetes. Combination therapies have more than one active ingredient, each of which may act differently or treat different symptoms. APIs find application in high-quality drugs that are used to treat different diseases.

What is the current status of APIs manufacturing in India?

The global pharmaceutical market is ~ US$ 1.2 trillion with API market of ~US$ 182.2 billion and is estimated to reach US$ 245.2 billion by 2024. The pharmaceutical industry in India is **3rd largest in the world** (in terms of volume) and **14th largest in terms of value**. The Indian industry has a strong network of 3,000 drug companies and about 10,500 manufacturing units.

The India active pharmaceutical ingredients market is estimated to be valued at US$ 19.9 billion in 2021 and is expected to exhibit a growth rate of 8.3% between 2021-2028. At present, API contributes ~25% to the Indian pharmaceutical market and the rest is contributed by formulations. The API industry in India is **highly fragmented** with about 1,500 units.

The Indian pharmaceutical industry is having distinct advantage due to the following factors: **(a)** Low Manpower cost (Even lesser than that of China); **(b)** Huge domestic market, high economic growth rate, penetration of health insurance schemes; **(c)** Availability of large pool of skilled

manpower including Scientists, Researchers (PhDs), Biotechnologists, Pharmacists (B Pharm, M Pharm), Lab Technicians, Microbiologists etc.; **(d)** Favorable policy support of 100% FDI under automatic route for Greenfield pharma. 100% FDI is also allowed in Brownfield pharma; wherein 74% is allowed under the automatic route and thereafter through government approval route.

What are the challenges faced in manufacturing APIs in India?

External Dependence: **(a) Key Starting Materials** (KSMs) are the building blocks for intermediate chemicals and the final synthesis of API. Raw materials for most of the API intermediates are currently not produced in India; **(b) Solvents**: Most of the API synthesis involves **use of solvents**. At present, India has huge dependence on China for the solvents. India is importing most common solvents such as methanol, IPA etc. from China; **(c)** API synthesis requires chemicals other than KSM and solvents. These can be acid, base, reaction promoter, catalyst, surfactant etc. India currently depends on China for these chemicals as well. India lacks domestic capabilities in **fermentation processes** to manufacture key intermediates/ KSMs for steroidal APIs and China dominates; **(d)** APIs are other components are primarily imported from China, US, Italy among others. The overdependence makes domestic industry vulnerable to disruptions in supply chain and fluctuations in prices. China's earlier crackdown on polluting industries, primarily pharmaceutical and chemical industries, had led to a sudden hike in the prices of APIs by 25%-30%, thereby reducing margins for Indian drug makers.

Technology Readiness & Associated Issues: Many of the fermentation-based APIs have ceased manufacturing in India due to **large installed capacities and economy of scale available in China** and high domestic infrastructure and utilities cost. Strain improvement and other process improvements are required for manufacturing APIs, which have not taken place in India. As each APIs have specific strain and process requirements, **readymade technologies are not available in India** for many of the APIs. However, the technological and scientific base to develop the strains and processes is available in India. In case of chemical APIs, technologies are available for some and the rest could be developed in India with some R&D.

High Comparative Cost: **(a) Scale of Manufacturing**: Indian APIs are on an average 20% more expensive than those manufactured in China. Augmenting production of APIs to match the scale generated by Chinese companies is possible, but it would result in increased production cost and thus could hamper the profitability of pharmaceutical exports; **(b) Availability and Cost of Land**: MSMEs face challenges in terms of **affordability and availability of land**; **(c) High Infrastructure Cost**: Average size of a SEZ in China is 10-15 times bigger than in India, with subsidized land, common waste treatment and utilities, reducing the physical infrastructure costs.

Inadequate Financial Support: The cost and availability of finance in India is extremely high. This is compounded by restrictive banking practices, such as insistence on collateral to extent of 100% of the borrowed funds. Government support is not enough. The Government grant of funds is also extremely slow and long, making the project non-viable. Government funding is focused on 'innovative products and ideas', whereas much of the API and intermediates business is generic in nature, which is not supported by the government funding schemes. According to a study conducted by the Indian Pharmaceutical Alliance, the cost of finance in China is about 5% – 7% compared to 11% -14% in India.

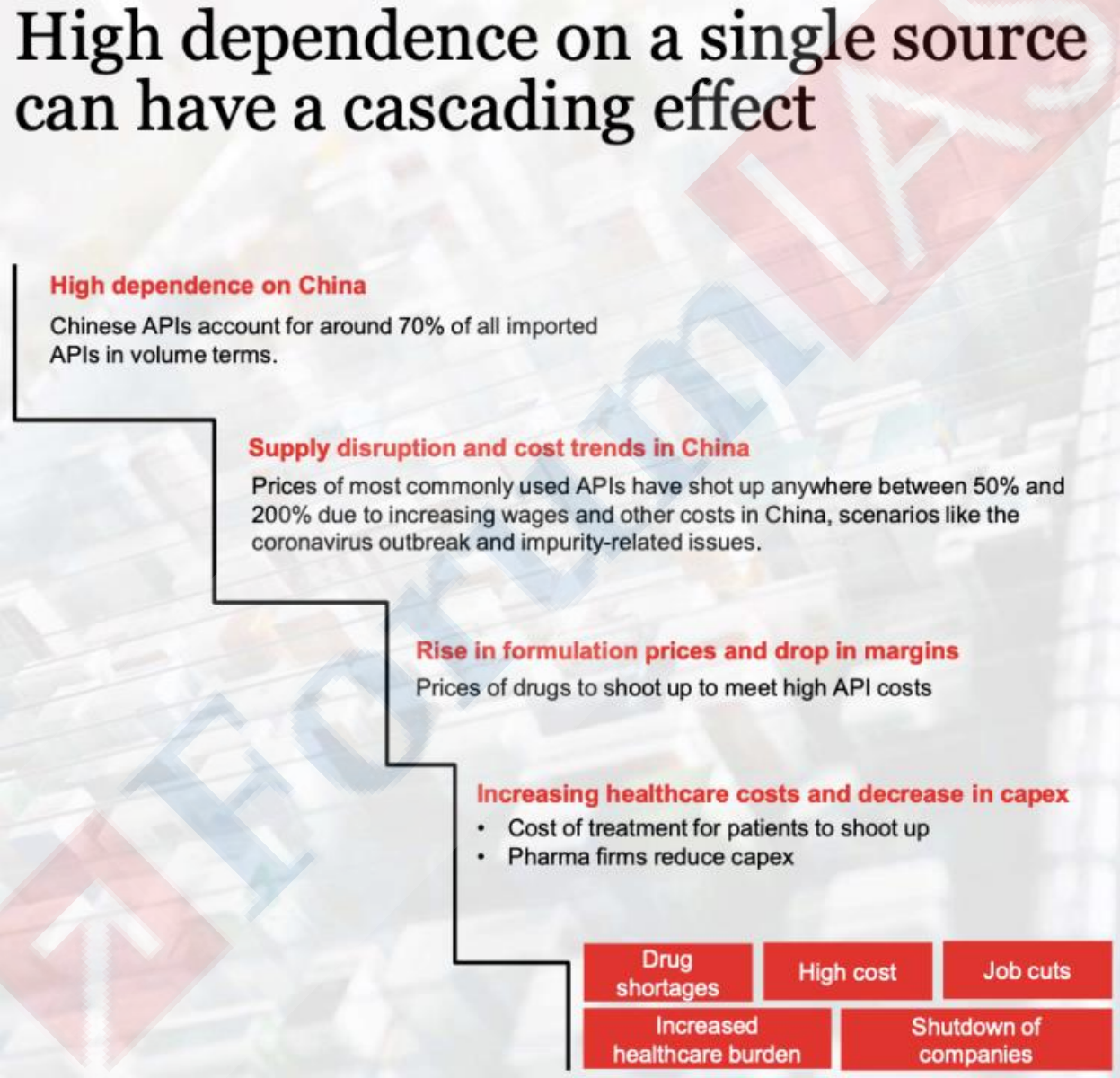
Low Profit Margins: Profits margins are higher for Finished Formulations (FPPs) compared to APIs. Hence, pharma companies focus more on FPPs.

Why are the reasons for China's Competitiveness in Manufacturing of APIs?

The relative advantages of Chinese pharmaceutical companies, in comparison to other countries including India are: **(a)** Economies of scale of manufacturing plants, Lower capex requirements due to large Special Economic Zones (10-15x the size of Indian SEZs); **(b)** Easier availability and

low capital cost; **(c)** Ease in obtaining regulatory and statutory permissions; **(d)** Availability of physical infrastructure such as roads, water supply etc.; **(e)** Availability of land at comparatively economical rate; **(f)** Fiscal incentives; **(g)** Government support for manufacturing; **(h)** Industry-academia collaboration; **(i)** Overall business environment and speed of execution; **(j)** Flexible labor policy; **(k)** Availability of patented process leading to KSM/APIs; **(l)** Lower logistics costs owing to predictable inland transportation and well-developed transport infrastructure; **(m)** Robust R&D sector, China is world leader in Chemical R&D.

The imports from China works out to be cheaper and cost effective for the pharmaceutical companies.



Source: PwC. High Dependence can have a cascading impact including drug shortages, increased healthcare burden, shutdown of firms and loss of employment.

What steps have been taken by Government to promote manufacturing of APIs in India?

Draft Pharmaceutical Policy 2017: The Draft Pharmaceutical Policy 2017 prepared by the Department of Pharmaceuticals aims to provide a comprehensive policy to 'guide and nurture

pharmaceutical industry of India to enable it to maintain and enhance its global competitive edge in **quality and prices**'. The Policy envisages making **essential medicines affordable to common people**, making the industry self-reliant by **promoting indigenous production of drugs**, encourage research and development and **ensure quality of medicines** which are exported as well as consumed domestically. Strategies for realising these goals consist of a variety of mechanisms such as pricing mechanism, compulsory license and FDI.

Umbrella Scheme – Development of Pharmaceutical Industry: The Department had launched an umbrella scheme namely 'Scheme for Development of Pharmaceutical Industry' during 2017-18, with an objective to increase the efficiency and competitiveness of domestic pharmaceutical industry; so as to enable them to play a lead role in the global market and to ensure accessibility, availability and affordability of quality pharmaceuticals for mass consumption.

This scheme is a **Central Sector Scheme** (CS) with a total financial outlay of INR 480 crore for a 3-year period till 2019-20 and comprises of five sub-schemes namely: **(a)** Assistance to Bulk Drug Industry for Common Facility Centre; **(b)** Assistance to Medical Device Industry for Common Facility Centre; **(c)** Assistance for Cluster Development; **(d)** Pharmaceutical Promotion and Development Scheme (PPDS): **(e)** Pharmaceutical Technology Upgradation Assistance Scheme (PTUAS).

Scheme on Promotion of Bulk Drug Parks: The Government, in March 2020, approved a scheme on Promotion of Bulk Drug Parks for **financing Common Infrastructure Facilities** in 3 mega Bulk Drug Parks, in partnership with States. The scheme has financial implication of INR 3,000 crore for next five years. The Government of India is providing Grants-in-Aid to the States with a maximum limit of INR 1000 crore per bulk drug park. Parks will have common facilities such as solvent recovery plant, distillation plant, power & steam units, common effluent treatment plant etc. The scheme is expected to reduce manufacturing cost of bulk drugs in the country and dependency on other countries for bulk drugs.

Production Linked Incentive (PLI) Scheme: It was approved in March 2020. It aims for promotion of domestic manufacturing of critical KSMs, Drug Intermediates and APIs in the country with financial implications of INR 6940 crore for next 8 years. The scheme aims to boost domestic manufacturing of APIs by **attracting large investments** in the sector to ensure their sustainable domestic supply. It will lead to incremental sales to the tune of INR 46,400 crore and also significant additional employment generation over next 8 years.

In 2021, the Department of Pharmaceuticals had launched a product-linked incentive (PLI) scheme for pharmaceutical goods and in-vitro diagnostic medical The financial outlay under this scheme is INR 15,000 crore over a period of 6 years.

Champion Sector: In May 2020, the Government, identified Pharmaceuticals as 'Champion Sector' along with leather, gems and jewellery, renewable energy, textiles etc. to provide hand-holding for investors with a focus on improving India's manufacturing capabilities.

High-Level Committee of Experts: A high-level committee of experts has been formed by the Government in May 2020, to **recommend reforms in India's drug regulatory system** so that approval processes can be fast-tracked. The committee would study the current drug regulatory system and submit recommendations for reforms to bring the system in line with global standards and make it more efficient.

What should be done going ahead?

Scale and Process: In order to manufacture economically viable APIs, the engineering and scale aspect of technology development should be focused. Creation of **mega drug manufacturing clusters** with **common infrastructure** such as effluent treatment plants, steam boilers, power back-up etc. should be the top priority. Additionally, investment in fermentation sector is needed.

Products: Along with production of various catalysts, solvents, reagents and KSMs, recovery and reuse of solvents is also an important aspect to be looked into specially from downstream processing. India should focus on manufacturing antibiotics, amino acids, vitamins, and sartans.

Coordination and Collaboration: Government should encourage Indian companies working in these segments to collaborate for technology development or quick technology transfer. Option of international collaboration can also be explored. **Academia-Industry collaborations** for innovation need to be strengthened.

Policy Interventions: **(a)** Towards API security in the country and ensuring uninterrupted supply, national stockpile needs to be built up for generic medicines of critical illness; **(b)** A National Authority can be constituted for advanced research in chemical drug development and biotechnology based products; **(c)** Contract Manufacturing Organizations (CMOs) for APIs can be developed in association with academic labs; **(d)** Early stage Government R&D support should be provided to academia for pilot development of APIs, for establishing viability; **(e)** Creation of new **Centers of Excellence** for API development region wise; **(f)** Drugs manufactured through indigenously produced API and intermediates shall be given **preference in Government procurement**; **(g)** Customs duty structure for imported APIs should be relooked to facilitate indigenous production; **(h)** Issues relating to land acquisition, ease of doing business, environmental clearances, taxation, etc need to be smoothened and brought at par with best global practices; **(i)** Single window clearance system and priority license renewal system should be established for companies manufacturing APIs; **(j)** Adequate investments to be provisioned for manufacturing next generation APIs; **(k)** Alternate locations (such as Vietnam, Indonesia, etc.) shall be explored for sourcing KSMs/DIs/APIs till developing indigenous capabilities.

Conclusion

India is already one of the largest manufacturer of pharmaceuticals in the world. However, the sector is vulnerable to external shocks due to high import dependence, especially on China, for APIs. The Government should focus on achieving self-reliance in this strategic sector, just like its focus on semiconductor industry. A focused approach with targeted interventions can enable a quick turnaround as domestic industry already possesses expertise on many aspects. Removing import dependence for APIs is necessary to achieve the vision of *Atma Nirbhar Bharat*.

Syllabus: GS III, Changes in industrial policy and their effects on industrial growth.

Source: The Times of India, TIFAC, PwC

[Kurukshetra February 2023 Summary] Powering Growth in Agriculture Sector – Explained, pointwise

Introduction

Agriculture is the mainstay of Indian economy, despite the rise of manufacturing and services sectors. The sector contributes 15% to the GDP and provides livelihood to almost two-thirds of the total working population in the country. Agriculture is also the key source of raw materials for textile, sugar, food, medicine (primarily Ayurveda), and new age health and fitness products. Like other industries agriculture, especially irrigation, requires substantial energy inputs. According to estimates, agriculture uses 20% of electricity consumed at national level. Farmers have installed nine million diesel pump sets for groundwater irrigation. The high consumption of power in the agriculture sector is concerning especially in context of India's climate goals. The Government has set a target to eliminate the use of diesel in the sector by 2024, thus making the agriculture power sector green. Renewable energy (RE) has emerged as the most viable and

sustainable option to address the environment concerns. It can also boost farmer income and conserve natural resources. The Government has taken several steps to empower farmers with RE Systems to make them energy self-sufficient. The Union Ministry of New and Renewable Energy (MNRE) administers several Central Government-sponsored initiatives and facilitates associated research, design, development, and manufacturing to promote RE systems/devices in agriculture.

Renewable Sources to Power Agriculture Sector

Biogas

Biogas is one of the most popular and versatile form of RE deployed extensively in rural India to serve many purposes. At present, over **five million biogas plants of various capacities are operational** in the country. Biogas plants generate the high calorific value (5,000 kcal per cu.m.) gas by **decomposition of organic materials** such as cattle dung, agricultural wastes, poultry droppings, night soil and municipal wastes.

Biogas is used as **clean fuel** for cooking, lighting, motive power etc. It is also used in diesel engines to substitute diesel up to 80%, however, 100% replacement of diesel may be achieved by using **Biogas Engines**. The digested slurry from biogas plants, a by-product, is used as a **nutrient enriched organic manure for improving crop yield** and also **maintain soil health**.

Biogas plants help with **waste management**, **reduce energy costs**, **improve soil fertility** and **curb carbon emissions**. Proper waste management on farms leads to better cleanliness and hygiene which improves the living conditions and health of the community. The biogas sector has helped **generate employment** for both skilled and unskilled rural people.

Government of India is promoting installation of biogas plants by providing subsidy through two major schemes: **(a) New National Biogas and Organic Manure Programme** (NNBOMP) for biogas plants in size range of 1 cu.m. to 25 cu.m. per day; **(b) Biogas Power Generation (off-grid) and Thermal Energy Application Programme** (BPGTP) for setting up biogas plants in the size range of 30 cu.m. to 2500 cu.m. per day. This corresponds to power generation capacity range of 3 kW to 250 kW for thermal energy/cooling applications.

GOBARdhan: The Government of India has launched a dedicated GOBARdhan (Galvanising Organic Bio-Agro Resources Dhan) scheme (Swachh Bharat Mission Grameen Phase-2) with twin objectives: **(a)** To make the villages clean; **(b)** Generate clean power from organic wastes. The scheme also aims to **increase income of farmers** by converting biodegradable waste into **compressed biogas** (CBG). Technical and financial assistance under the scheme is attracting entrepreneurs for establishing **community based CBG plants** in rural areas. CBG is a purified form of biogas (98% purity of methane content) which makes it suitable for use as **green and clean fuel** for transportation or filling in cylinders at high pressure (250 bar). Scheme is also promoting rural employment and income generation opportunities for rural youth and others.

Recently, Asia's largest CBG plant was inaugurated at Sangrur, Punjab with an FDI investment of INR 220 crores. CBG plant offers a much needed **substitute for burning crop stubbles**. The Sangrur plant can consume 300 tonnes of paddy straw every day. It is claimed that this plant will reduce the burning of stubble on 40,000-45,000 acres of fields, resulting in an annual reduction of 150,000 tonnes of carbon dioxide emissions. This will help India meet its CoP-26 climate change targets of reducing carbon emissions.

Read More: Biogas: Advantages and Challenges – Explained, pointwise

Biomass

Biomass is another potential source of RE in rural India that provides power for household needs and irrigation. Biomass materials used for power generation primarily include bagasse, rice husk, straw, crop waste and agricultural residues. A study estimated surplus biomass

availability at about 230 million metric tones per annum covering agricultural residues corresponding to a power potential of 28GW.

MNRE has been implementing **biomass power/cogeneration programs** since mid-90s. Over 800 biomass power and bagasse/ non-bagasse cogeneration projects aggregating to over 10,206 MW capacity have been installed with central financial assistance from the Government of India.

Power from biomass is generated by installing **biomass gasifiers** in proximity to the source of raw materials to reduce costs. In Bihar, a gasifier based business model for power generation and distribution uses rice-husk as source material. A series of more than 80 biomass gasifier plants supplies power to nearly 300 villages and hamlets on payment basis. People generally use electricity for household, business lighting, charging of mobile phones and operation of irrigation pumpsets. Irrigation pumps powered by rice-husk electricity are cheaper, long lasting and more eco-friendly than diesel powered pumps. Irrigation facility at low cost allows farmers to increase crop intensity and also improves crop yield. It can help reduce the emission intensity of power use in agriculture sector.

Solar

Government of India has made a strong commitment to explore and tap the vast potential of solar energy for driving the development of various economic sectors vis-à-vis meeting the targets of COP-26. Addressing the energy concerns in agriculture sector, a large number of solar devices/ equipments have been developed and deployed that include solar water pumps, solar dryers, solar dusters etc.

PM-KUSUM

PM-KUSUM (*Pradhan Mantri Kisan Urja Surkasha Evan Utthaan Mahaabhiyan*) scheme, launched in 2019, has emerged as a real game changer for energy security of farming community and greening the power use in agriculture sector. It is one of the largest initiatives of the world to provide clean energy to more than 35 lakh farmers and enhance their income. The scheme is being implemented through its three components with specific objectives.

Component A: Decentralised Grid Connected Solar Power Plants (Target – 10,000 MW): This component intends to make farmers '*Urja Data*' by installing small solar power plant (up to 2 MW capacity) on **barren, fallow, pasture or marshy land**, and selling the generated power to electricity Distribution Companies (DISCOMS) on a pre-determined rate. In case of cultivated lands, solar panels may be set up in such a manner that chosen crops may grow under the panels. In addition to individual farmers, cooperatives, panchayats, and Farmer Producer Organisations (FPOs) can also be beneficiary under the scheme.

A farmer may earn up to INR 25,000 per acre per year if the plant is installed by a developer; and up to INR 65,000 if the plant is installed individually through loan. The RBI has notified this component under **priority sector lending** that allows competitive rates and soft terms. The Union Government provides financial incentive to DISCOMS for purchase of power from such solar plants. About 73.45 MW cumulative capacity of small solar plants have been installed under this component so far, out of which 48.2 MW has been added during 2022.

Component B: Installation of Standalone Solar Powered Agriculture Pumps (Target – 20 lakh): Under this component, individual farmers can replace their existing diesel pumps with solar pumps through Central Financial Assistance (30% of the benchmark cost) and State Government's subsidy (30%). The remaining 40% will be borne by the farmer, but bank finance for 30% is available, so farmer will have to initially pay only 10% of the cost.

Groups of farmers, water user associations and community/ cluster-based irrigation systems are also eligible for financial assistance. All solar pumps installed under the scheme will be

equipped with **remote monitoring systems** to facilitate their monitoring on a real time basis. Solar pumps will reduce the irrigation costs of about INR 50,000 per year for a 5 HP pump.

Component C: Solarisation of existing Grid-connected agriculture pumps (Target – 15 lakh): Under this component, **exclusive power feeders** for agricultural purposes will be solarised by installing solar power plants of required capacity. The farmer will get **day time reliable power for irrigation free of cost** or at a tariff as fixed by their respective States.

In addition to day time reliable power and increase in farmer's income, the scheme also has direct employment generation potential. According to estimates, each solar installation creates ~ 25 job years per MW. After complete implementation, the scheme will lead to an annual reduction of 1.38 billion litres in diesel consumption per year, thus, reducing the import bill on account of petroleum products. The scheme will also lead to reducing carbon emissions by as much as 32 million tones per annum.

Solar PV (Photo Voltaic) Pumping Systems

Among many solar devices/equipments developed so far, **solar water pumps** are the most popular ones with wide scale adoption across the country. Technically called Solar PV (Photo Voltaic) pumping systems, these are of great utility specifically in low head situations like water lifting from canals, shallow wells and dug wells, farm ponds etc. Solar PV systems can be best used with pressurized systems. Large size solar pumps in a canal command area to irrigate crops with sprinklers.

Solar Powered Irrigation

Success Story

- Availability of quality water had always been an issue in Gosaba island of Sunderban region in West Bengal. Farmers were unable to grow Rabi crops. Farm ponds, which harvest rainwater during monsoon, were the only source of water for irrigation in the post-monsoon period. As a solution, solar-powered drip irrigation system was installed in the island. Solar panels were installed near the pond and a nano pump (0.1 HP) was used for lifting water from the pond to a tank (1,000 litre) placed at 2.5 meter height on a platform. During day-time, water get lifted to the tank and the stored water is applied to high-value vegetable crops through drip irrigation by gravity method. The farmer, in whose farm the drip irrigation system was installed, is now able to grow vegetables round the year. There was 20 per cent to 30 per cent more yield; saving of 40 per cent to 60 per cent water; 40 per cent saving of labour; and an increase in the cropping intensity by up to 300 per cent as compared to traditional practices. The economics of the cultivation under solar drip system for an area of 725 sq.m. indicated that the system is quite profitable in terms of gross return, net return and output – input ratio.
- Farmers at Chakhaji Village in Pusa Block, Samastipur, Bihar are reaping benefits of solar-powered irrigation through a successful business model. Solar panels have heralded a new era of improved irrigation, carbon-free air, and increased income for farmers. An entrepreneur at the village has 20 solar panels and irrigates 30 acres for 110 farmers at a charge fixed for hourly supply. A solar powered 5-HP submersible pump provides approximately one lakh litres of water per day on a sunny day, enough to irrigate 20-25 acres of land. Another entrepreneur supplies irrigation water to 50 acres for 100 farmers. In addition to seasonal vegetables, farmers now cultivate high value fruits as well. Solar-powered water is available for eight hours a day, but most farmers make do with just 2-4 hours. Farmers' income has increased substantially.

Source: Kurukshetra February 2023

Conclusion

Renewable Energy can play a vital role in providing power to agriculture sector. Due to immense potential and scope of renewable energy in agriculture sector, Government is focusing on decentralised RE systems and products. MNRE has recently released a framework (2022) to promote RE based applications that are used for earning livelihoods. A special focus on engaging all stakeholders, skill development and capacity building would scale up RE-based livelihood applications. However, financing for the end-users and enterprises would be critical to enable the adoption of solutions and scale-up of the sector. There has been a visible impact of renewable energy in the Indian agriculture during the last few years. RE based decentralised and distributed applications have benefitted millions of farmers in villages by meeting their energy needs in an environment friendly manner.

Syllabus: GS III, Infrastructure: Energy; GS III, Conservation.

Source: Kurukshetra February 2023

Winter Heatwaves – Explained, pointwise

Introduction

In March of last year (2022), meteorologists in India issued the first heat wave warning of the year. They were anticipating an exceptionally early summer with some of India's highest temperatures ever recorded.

But, **this year**, India Meteorological Agency issued the year's **first heat wave advisory in February**. It stated that regions of India's western region could reach temperatures of 98.6 degrees Fahrenheit or higher (37C). Some parts of India, on the other hand, are experiencing **temperatures that are exceptional for mid-March and are at least 9 degrees above average**. Experts are concerned about the exceptionally high temperatures.

Similarly, several parts of Europe witnessed an unprecedented winter heat wave at the beginning of 2023. The Washington Post report called it an **"extreme event"**. Experts said that temperatures increased 10 to 20 degrees Celsius above normal.

According to the report, at least seven countries recorded their hottest January weather ever. These included Poland, Denmark, the Czech Republic, the Netherlands, Belarus, Lithuania, and Latvia.

Therefore, it becomes important to understand the reason behind the winter heat wave that has become a global phenomenon this year.

What are the factors causing winter heat waves?

In India

- **Weak Western Disturbances**: Western disturbance is the factor that keeps the temperature in control during Feb and march. However, this year, western disturbances have been weak due to which wind is lacking moisture for adequate rainfall. It is causing dry spells over the plains and subdued rainfall or snowfall over hills
- **Climate change:** In terms of climate change, the Middle East is warming faster than other regions near the equator, and it is acting as a source of warm air that blows toward India.
- **Anti-cyclone formation:** The anticyclone is forming over the northeastern part of the Arabian Sea, which has now moved over southwest Rajasthan. Due to this anticyclone, hot and dry winds from Balochistan, South Sindh, and Thar Desert are reaching northwest India as well as Gujarat, Maharashtra, and Karnataka.

- **Possibility of El Nino Year:** The last three years have been La Nia years. Scientists have predicted a high likelihood that this year will be an El Nino year. It has a significant impact on weather and climate patterns and is linked to drought and poor monsoons in India. This may also contribute to a winter heat wave in India.

In Europe

- **Heat dome:** According to the Washington Post, the European continent is experiencing an unusually warm spell due to the creation of a heat dome over the region.

Other General Factors

- **Air flowing in from the northwest** rolls in over the mountains of Afghanistan and Pakistan, so some of the compression also happens on the leeward side of these mountains, entering India with a bristling warmth.
- **Lapse rate** – the rate at which temperatures cool from the surface to the upper atmosphere – is declining under global warming. In other words, global warming tends to warm the upper atmosphere faster than the air near the surface. This in turn means that the sinking air is warmer due to global warming, and thus produces heat waves as it sinks and compresses.

What are heat waves?

Qualitatively, heat wave is a condition of air temperature which becomes fatal to the human body when exposed. Quantitatively, it is defined based on the temperature thresholds over a region in terms of actual temperature or its departure from normal. In certain countries, it is defined in terms of the heat index based on temperature and humidity or based on the extreme percentile of the temperatures.

How heat waves are different from Heat domes?

While both are connected, they are not the same. Weather patterns with a high-pressure system aloft and sinking air at the surface are called heat domes. Whereas A heat wave is a lengthy period of extremely hot weather that can be generated by a variety of weather patterns, including heat domes, as well as other factors such as a strong ridge of high pressure or a lack of cloud cover.

What are the Implications of heat waves?

Reduced agricultural productivity: Crops, like human bodies, thrive within a fairly narrow range of temperatures. While a small temperature increase can lead some plants to produce more, heat over 90 degrees Fahrenheit leads to a sharp drop in yields for grains like wheat, chickpeas, and mustard seeds. Last year's (2022) heat brought wheat production down by roughly 10 percent or almost 11 million metric tons. This year has already seen not just issues with wheat production, but also with chickpeas and mustard seeds — crucial Indian crops.

Low rainfall: A lack of moisture in the winds restricts the amount of winter rain and snow in certain Himalayan cities, resulting in record-breaking temperatures.

Economic consequences: Employees are less productive during hot weather, even if they work inside, while children struggle to learn in extreme heat, resulting in lower lifetime earnings which in turn hurts future economic growth. A 2018 study found that the economies of US states tend to grow at a slower pace during hot summers. "The data shows that annual growth falls 0.15 to 0.25 percentage points for every 1 degree Fahrenheit that a state's average summer temperature was above normal."

Energy crisis: Moreover, a coal shortage last year (2021-2022) led to a fuel crisis in India's thermal power plants, as electricity demand for air conditioners and fans shot up alongside a recovering post-pandemic economy. One study anticipates that by 2100, greater use of air conditioning could increase residential energy consumption by 83% globally.

Health impacts: That health can suffer greatly without spring during the transition from winter to summer. The heat index, a combination of heat and humidity, is often used to convey this danger by indicating what the temperature will feel like to most people. The high humidity also reduces the amount of cooling at night. Warm nights can leave people without air conditioners unable to cool off, which increases the risk of heat illnesses and deaths. With global warming, temperatures are already higher.

Equity and justice: Not everyone experiences heat waves in the same ways and the ill effects of heat impact most heavily those in already-**disadvantaged groups**.

What are the strategies to deal with heat waves?

Global

- The United Farm Workers are doing everything they can to get a new national heat regulating measure passed.
- Climate activists are continuing their campaigns for the requirements of a Green New Deal, including the need that public housing be environmentally friendly, and are also continuing their efforts to halt the development of fossil fuel

India

Prior to 2015

- Prior to 2015, there was no comprehensive national strategy to combat heat waves.
- According to the NDMA, before 2015, it was mostly up to the state governments to deal with disaster risk
- Heat waves have been declared a local disaster in Chhattisgarh, Odisha, Kerala, Rajasthan, Andhra Pradesh, Maharashtra, and
- Under the rules for disaster relief in place at the national level, heat waves were not considered to be a disaster. But, state governments were authorized to spend up to 10 percent of funds under certain heads for the heat wave

After 2015

- After 2015, the natural disaster started figuring in the priority list of topmost officials in the country including the Prime Minister as chairman of the
- Following this in 2016, the NDMA drew up the first national guidelines for heat waves titled '**Preparation of Action Plan–Prevention and Management of Heat Wave**'.
- The guidelines were twice revised, first in 2017 and then in 2019. They were enriched with recommendations for more specific actions, based on scientific inputs derived from various research papers, reports, and best practices in heat wave assessment and mapping
- Ward-level Heat Action Plans have improved cities' and states' capacity to manage heat stress and respond to heat wave-related
- The revisions in 2019 included a new section, 'Built Environment'; the revisions focused on short-term, medium-term, and long-term measures for heat wave risk
- Fixing responsibility: The National Guidelines on Heat Wave spell out in a matrix format the roles and responsibilities of central and state government agencies, district administrations, local self-governments, NGOs, civil society organizations, and other stakeholders.

What should be done going ahead?

Over the years, the NDMA has also taken a host of measures that include **rescheduling of working hours** for outdoor workers, the creation of drinking water kiosks, the supply of water through tankers, the erection of special shelter homes, an increase in health facilities, the stocking of ORS packets at health centers and the nearest anganwadi centers, the placement of

cooling systems, and construction of gaushalas with fodder banks, etc. However, there are more steps that can be take:

1. States need to compare mortality numbers to previous years to ascertain heat-related deaths, a data set that is underdeveloped in the country.
2. Awareness should be created of the symptoms of heat stroke and its consequences as also the precautions that should be taken.
3. The Medical and Health department should keep stock of ORS, IV fluids, glucose, Pot Chlor (Potassium Chloride), derma allergic creams, and other essentials in adequate quantities while it should ensure uninterrupted telephone link to all its facilities (institutions) so that people in distress could make emergency contact with them.
4. The village secretaries and other officials concerned should conduct gram sabhas and publicize the do's and don'ts besides ensuring dependable water
5. Persons hailing from the weaker sections who suffer heat strokes should be given free treatment at government hospitals while effort should be made to rope in NGOs and other voluntary bodies to run water and butter milk supply centres.
6. The Labour department on its part should sensitise and encourage employers to shift outdoor workers' schedules away from peak afternoon hours during heat alert.
7. Effort should be made to ensure all amenities to children appearing for examinations in addition to prioritising maintenance of power to all critical facilities like hospitals and drinking water supply
8. District collectors should prepare their district specific heat wave action
9. Fast-tracking the switch to clean energy sources is vital to dealing with the issue of the heat wave.
10. There is a need to adapt their buildings, infrastructure, and working hours to higher temperatures.
11. There are also benefits to so-called 'urban greening', where more trees and other vegetation can help to cool down cities and towns.

The Issue of Menstrual Leaves – Explained, pointwise

Introduction

Recently, the issue of menstrual leave came to highlight when Spain became the first European Union country to introduce paid menstrual leaves. In India, a student filed a petition in the Supreme Court, seeking direction for the government for the implementation of the menstrual leaves policy. However, the SC declined to consider the petition, stating that the issue falls within the purview of executive policy.

As per a few sources, menstruating women were given leave from paid labour in Soviet Russia in the 1920s. A historian even claims that a school in Kerala granted period leave as early as 1912.

What is the meaning of Menstrual Leaves?

Menstrual leave or period leave refers to all policies that allow female employees or students to take time off when they are experiencing menstrual pain or discomfort. This mechanism not only increases women's performance after menstruation, but also comforts their overall well-being, which is a double win for everyone involved. In the context of the workplace, it refers to policies that allow for both paid or unpaid leave, or time for rest during the menstruating period.

What is the need for implementing a Menstrual Leaves system?

- **Mental and physical impacts:** Menstrual pain hinders the day-to-day working of a woman. It affects not only their physical health but their mental health as well, reducing their capacity to perform during that period.
- **Increasing Women's representation in the labour force**: Historically, the struggle for women was concentrated on the taboos associated with menstruation; now, as women's involvement in the labour force grows, the landscape has switched to menstruation.
- **Increase in productivity:** Providing proper rest to women during menstruation is likely to increase their productivity post-menstruation.
- **Special Provisions for Women**: Article 14 of the Constitution provides for the protective discrimination principle. Furthermore, Article 15(3) specifically states that nothing in Article 15 shall prevent the state from making special provisions for women and children.
- **Overcoming the Stigma**: Official recognition of the menstrual leaves will remove the stigma around the discussion on this key element of women's health. Historically, the discussion around menstruation has been stigmatised; which made it difficult for women to communicate about their experiences and needs.
- **Maternity Benefit Act of 1961:** There are provisions in the Act to care for women during difficult stages of their maternity. However, the inclusion of the menstrual period within the purview of the act has been largely ignored by society and the legislature.
- **Reducing female Drop-outs**: This will also help reduce the drop-out rates of female students from government schools in rural India caused by the lack of clean toilets, running water, sanitary pads, etc.

What are the challenges of implementing the Menstrual Leaves system?

- **Glass ceiling**: It is believed that promoting menstrual leave will **strengthen gender stereotypes** about 'weakness' of females. It will strengthen the glass ceiling around women's promotion prospects across the board due to potential beliefs that women will end up becoming liabilities to the organization.
- **Lack of legislative will**: The petition in the SC also highlighted that in 2018, an MP had introduced the **Women's Sexual, Reproductive, and Menstrual Rights Bill** which proposed that sanitary pads should be made freely available for women by public authorities on their premises. Similarly, Menstruation Benefits Bill, 2017 was presented in 2022 in the Arunachal Pradesh Legislative Assembly (Private Member's Bill, an MP from Arunachal Pradesh had first presented it in the Lok Sabha in 2017). But the Legislative Assembly disregarded it as it was an 'unclean' topic. As per the petition, this portrays a lack of legislative will to move forward with the concept of menstrual pain leave.
- **Employment for women:** If one compels employers to provide paid menstrual leave to women employees, it may impact their business or serve as a disincentive for employing females. Therefore, Employers might avoid taking in a large number of women employees.

What are the Global practices on Menstrual Leaves?

- **Spain** became the first European country to grant paid menstrual leave to workers, among a host of other sexual health rights. Workers now have the right to three days of menstrual leave— expandable to five days— a month.
- **Japan** introduced menstrual leave as part of labour law in 1947, after the idea became popular with labour unions in the 1920s.
- **Indonesia** introduced a policy in 1948, amended in 2003, saying that workers experiencing menstrual pain are not obliged to work on the first two days of their cycle.

- In the **Philippines**, workers are permitted two days of menstrual leave a month.
- **South Korea** takes a slightly different route, allowing for monthly physiologic leave under their labour law, allowing all female workers to get a day off every month.
- **Vietnam's** labour law stipulates a 30-minute break for women every day of their period cycle. However, in 2020, a three-day leave per month was added, and those who didn't take the leave needed to be paid extra.
- Among the **African nations,** Zambia introduced one day of leave a month without needing a reason or a medical certificate, calling it Mother's Day.
- Companies across nations, such **as Nike and Coexist,** have introduced menstrual leave as an internal policy.

What are the initiative taken in India on Menstrual Leaves?

- The **Bihar government** introduced its menstrual leave policy in 1992, allowing employees two days of paid menstrual leave every month.
- In January 2023, the **Kerala government** issued an order granting menstrual leave for students in all State-run higher education institutions.
- In 2017, two Mumbai-based companies – Gozoop and Culture Machine – became the first private companies to introduce period leave in India.
- In 2020, Zomato introduced menstrual leave for up to ten days a year for its women and transgender employees. Since then, other private companies like Swiggy and Byju's have also introduced similar policies.

What should be done going ahead?

- There are additional issues that need to be addressed, such as the lack of sanitary facilities in schools and workplaces, particularly in the informal sector.
- Till a policy framework is devised, employers should take a more **women-centric approach** by allowing employees to work from home on those days, providing menstrual hygiene products in office spaces, and not treating the subject of menstruation as taboo.
- It is also necessary for **period education** to be delivered throughout organisations and **awareness** to be spread among the masses regarding the incidence and effects of menstruation, and for all to understand that menstruation is neither too insignificant to be completely ignored, nor too unique to become a source of discrimination.
- Such change must begin at the grassroots level of society, with men, children, and coworkers demonstrating a willingness to be engaged in the dialogue in a both personal and professional capacity.
- Men must first normalize this extremely common occurrence of menstruation and recognize it in a personal capacity-after all, policy improvements and pro-leave legislation, while useful in their own right, can only do so much to combat discrimination and insensitivity towards menstruation.