CURRENT AFFAIRS WEEKLY

WEEK: 2 AUGUST 2021

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— Disclaimer —

The current affairs articles are segregated from prelims and mains perspective, such separation is maintained in terms of structure of articles. Mains articles have more focus on analysis and prelims articles have more focus on facts.

However, this doesn't mean that Mains articles don't cover facts and PT articles can't have analysis. You are suggested to read all of them for all stages of examination.

CURRENT AFFAIRS ANALYST
WEEK- 2 (AUGUST, 2021)

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SECTION: A
(MAINS)

CURRENT AFFAIRS

THE RIPPLE EFFECT OF GENDER INCLUSIVITY ON INDIA'S ECONOMY

CONTEXT

Archaic age-old practices that promote Gender segregation at an early age make it increasingly difficult for women to enter the workforce.

Understanding inclusive growth and gender equality

- Inclusive growth means economic growth that creates jobs and helps reduce poverty.

- It means access to essential health and education services for the poor. It includes providing equal opportunities, empowering people through education and skills development.

- It also includes a process of growth that is environmentally friendly, aimed at good governance and helping to build a gender-responsive society.

- Gender equality will be achieved only when women and men enjoy the same opportunities, rights and obligations in all spheres of life. This means sharing equally, power and influence, and having equal opportunities in economic and social spheres. Equal claim on education and career prospects will enable women to realize their personal ambitions.

- Gender equality demands the empowerment of women, with a focus on identifying and redressing power imbalances and giving women more autonomy to manage their own lives.

- When women are empowered, the whole family benefit, thus benefiting the society as a whole and these benefits often have a ripple effect on future generations.

Findings of the survey

- **To study the impact of gender diversity on employee productivity**

  ➤ 30% of the employees did not interact with the opposite gender outside of their family, while in school.

  ➤ More than 30% of the surveyed call centre employees were from rural areas.

  ➤ It was not expensive for firms to integrate women into all-male workplaces.

  ➤ There is no negative impact on either productivity or the share of days worked during the study period, of being assigned to a mixed-gender team for male employees.

  ➤ Men with progressive gender attitudes assigned to mixed-gender teams had significantly higher productivity than those with regressive gender attitudes.

  ➤ The study also revealed that, for female employees, there was an increase in peer monitoring and comfort among those assigned to mixed-gender teams.

Why India is lagging behind?

- **Burden of traditional practice:** Women remain subject to traditional practices that define their primary role as home.

- **Lack of monetary support:** As a result, women often do not receive the money needed to start or grow a business, as well as the necessary training in today's labour market.

- **Lack of participation:** The main problem is participation. Currently, only a quarter of workers in India are women.

Obstacles:

- **Female presence:** There are significant barriers to developing a growing female presence in productive fields (19%), and increasing the number of hours spent by women (9%).

- **Unpaid care work:** Women are burdened with unpaid care work, which is ten times the rate for men. If the amount of unpaid work done by women is compensated for even less, India's economic output could rise by $ 300 billion.

- **Poor condition of existing legal infrastructure:** The legal protection afforded to women is another challenge, where the existing infrastructure is inadequate for sexual harassment and paid maternity leave, but the legal right to equal pay and parental leave is severely limited.

- **Unequal representation:** The lack of a legal framework can also be caused by another important challenge - the unequal representation of the law for women. Only 11% of India's lower house members are women.

- **Social and economic challenges:** Other challenges include important social and economic challenges such as selective abortions and violence against women.

How to bring women into the paid workforce?

- **Expanding reach of employment:** The **ministry of electronics and information technology**

(MEITY) and the **software technology parks of India (STPI)** are interested in expanding these call centres to smaller cities and villages, and providing special incentives to firms to hire women.

- ◉ **Boost to labour demand:** In a post-pandemic world, policymakers will need to provide fiscal stimulus to boost labour demand in India's economy.

- ◉ **Incentivizing firm to hire women:** Policies which incentivise firms to hire women can bring them into the paid workforce.

- ◉ **Progressive gender attitudes:** There is also a need for improving gender attitudes as a policy measure to increase hiring female workers.

Increasing Gender Parity in Future Work

- ◉ There is an increase in occupational gender segregation in the wake of COVID-19 pandemic.

- ◉ It is portrayed as a major challenge for gender parity as far as the future of jobs is concerned.

- ◉ The GGGR mentions, "Only two of the eight tracked "jobs of tomorrow" clusters (People & Culture and Content Production) have reached gender parity, while most show a severe under representation of women."

Way Ahead

- ◉ **Gender-positive recovery policies can help meet these challenges:**

- ➤ The investment should be increased in the care sector. The similar increase should be into equitable access to care leave for both genders.

- ➤ National government should come forward with policies that arrest occupational segregation by gender.

- ➤ To attain more gender-equal future of work, nations have to come up with effective mid-career reskilling policies, combined with managerial practices, which embed sound, unbiased hiring and promotion practices.

Conclusion

Bangladesh, with a lower per capita income than India, is doing significantly better in most indicators of gender equality including sex ratio at birth, female literacy rate, female labour force participation, and gender wage equality, earned income of women and political representation of women. Among other policies, Bangladesh has made this progress due to women empowerment initiatives geared towards strengthening social acceptance of women's work. Therefore, investments in workplace interventions involving gender equality training by firms in India might be beneficial in improving their productivity and profits.

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CABINET PASSES BILL RESTORING POWER OF STATES/UTS TO MAKE THEIR OWN OBC LISTS

CONTEXT

In a recent development, the Union Cabinet has cleared a Constitution amendment bill which seeks to give power to states and UTs to make their own OBC lists.

⊙ BACKGROUND

- ⊙ In May this year, the Supreme Court gave its landmark verdict which held that the **102nd Constitution amendment** took away states' power to declare **Socially and Educationally Backward Classes (SEBC)** for grant of quota in jobs and admissions.

- ⊙ The Centre sought review of the judgment which was later dismissed by the apex court.

- ⊙ This latest decision to bring the **127th Constitution Amendment Bill 2021** comes months before crucial polls in five states, including Uttar Pradesh, where other backward caste (OBC) groups hold sway.

- ⊙ The Union government also accepted a longstanding demand to introduce 27% reservation for OBC in medical and dental courses.

⊙ ANALYSIS

What is in the Bill?

- ⊙ The bill will be the **Constitutional 127th Amendment Bill.**

- ⊙ It will amend **Articles 342 A** and introduces clause **342 A (3)** that will specifically authorize states to maintain their **State List.**

  - ➤ **Seventh Schedule of Indian constitution:** There are three lists—Union, concurrent and state.

  - ➤ Respective state governments have exclusive power to legislate on matters relating to items listed in the State list.

- ⊙ Besides, there will be an amendment in

  - ➤ Article 366(26C)

  - ➤ Article 338B (9)

> **How a Constitutional amendment Bill is passed?**
>
> - A constitutional amendment Bill must be passed in each House by a **majority of the total membership** of that House and by a majority of not less than two-thirds of the members of that House present and voting.

Core objective of the Bill

- ⊙ After this Bill, States will be able to directly notify OBC and SEBCs without referring to the NCBC.

Need of the Bill

- ⊙ The bill will give clarity to the 102nd constitutional amendment that had created confusion in a state and Central list, and this clause will clarify it.

> **102nd Constitution Amendment Act**
>
> - The 102nd Constitution Amendment Act of 2018 inserted Articles 338B, which deals with the structure, duties and powers of the National Commission for Backward Classes, while 342A deals with powers of the President to notify a particular caste as SEBC and power of Parliament to change the list.

Will this Bill have any impact on the Maratha quota?

- ⊙ This Bill is said to be in response to the dismissal of law on the Maratha quota by the SC.

- ⊙ In the Maratha reservation judgment, the apex court dismissed the Maratha Quota law by citing the 102nd amendment of the Constitution that had scrapped the power of the states to identify and notify socially and educationally backward classes.

Reservation in India

- ⊙ The current scenario of reservation in India:

- ⊙ Today 50% of seats in government-aided educational institutions and public jobs are reserved for the SC, ST and, OBCs.

- ⊙ The Central Government of India reserves 27% of higher education, and individual states may legislate further reservations.

- ⊙ The current scenario of Reservation in India is:

  - ➤ 15% seats are reserved for Scheduled Castes (SC)

  - ➤ 5% seats are reserved for Schedule tribes (ST)

  - ➤ 27% seats are reserved for other backward classes (OBC)

Total constitutional reservation percentage is 49.5% and the rest 50.5% seats are open to all i.e. general, SC, ST and OBC.

OBCs in India:

- OBC is an umbrella term used for a range of castes and communities that are socially and economically disadvantaged.

- Currently, there is **no updated census** on the population of OBCs. There is only a **caste data census (1931)** before independence as the basis of population share of the sub-castes within OBCs.

- The next census, in 2021, is slated to count OBCs for the first time in 90 years.

- Reservation for OBCs, unlike that for Scheduled Castes and Scheduled Tribes, was not initially guaranteed in the Constitution and extends only to jobs and education, not to elected representatives.

- It draws its roots from the **Mandal Commission**

  ➤ The Commission was set up in 1979.

  ➤ Its recommendation for 27% OBC quota accepted by the central government in 1990.

- In 2006, the reservation was extended to institutions of higher education.

Conclusion

The Bill is becomes an Act will restore the rights of states to identify the OBCs for the "state list" of castes eligible for **Mandal reservation** in education and employment under state governments.

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PREVENTIVE DETENTION: A NECESSARY EVIL?

CONTEXT

Recently a two judge bench of Supreme Court has quashed a preventive detention order which was earlier upheld by the High Court for the State of Telangana at Hyderabad.

⊙ BACKGROUND

- Under Section 151 of The Criminal Procedure Code, 1973 (CrPC) preventive detention is action taken on grounds of suspicion that some wrong actions may be done by the person concerned.

- A police officer can arrest an individual without orders from a Magistrate and without any warrant if he gets any information that such an individual can commit any offense.

- Article 22 of the Indian Constitution provides protection against arrest and detention in certain cases.

⊙ ANALYSIS

What is the difference between preventive detention and an arrest?

- An 'arrest' is done when a person is charged with a crime. An arrested person is produced before a magistrate within the next 24 hours.

- In case of preventive detention, a person is detained as he/she is simply restricted from doing something that might deteriorate the public order.

- In the case of **Union of India v. Paul Nanickan and Anr**, the Supreme Court stated that the purpose of the preventive detention isn't to punish any person for doing something but to obstruct him before he does it and deter him from doing so.

- The reasoning for such detention is based on suspicion or reasonable possibility and not a criminal conviction, which can be justified only by valid proof

Regulations in post independence India for Preventive Detention

- The first Preventive Detention Act was passed after independence in 1950. But this act was questioned on its validity in the case of **AK Gopalan v. the State of Madras** at the Supreme Court and with the exception of some provisions, the Supreme Court held the act constitutionally valid.

- Starting from pre-independence till now there have been several laws made in regard to preventive detention such as
  - Maintenance of Internal Security Act (MISA), 1971

- Foreign Exchange Conservation and Prevention of Smuggling Activities (COFEPOSA), 1974
- Terrorist and Disruptive Activities (Prevention) Act (TADA), 1985
- Prevention of Terrorist Activities Act (POTA), 2002
- Unlawful Activities (Prevention) Act, 2008

Judiciary in Preventive Detention Cases

- In the case of **Prem Narayan v. Union of India**, the Allahabad High Court stated that preventive detention is an infringement upon the personal freedom of an individual and it can't be infringed in an easy-going way

- In the case of **ShibbanLal v. State of Uttar Pradesh**, the Supreme Court of India stated that a courtroom isn't even competent to enquire into reality or in any case of the facts which are referenced as the grounds of detainment.

- In **Haradhan Saha case**, the Supreme Court held that if a person is liable to be tried for a criminal offence, but the ordinary criminal laws are not be able to deal with the situation, then, and only then, can the preventive detention law be taken recourse to.

- In the case of **Banka Sneha v. State of Telangana**, the Supreme Court held that Preventive Detention Order can only be passed against a Detenu if his activities adversely affect or are likely to adversely affect the maintenance of public order.

Why Preventive Detention laws should find no place in our statute books?

- There have been different circumstances of abuse of Preventive Detention powers for political advantages or to control free discourse and articulation.
  - **National Security Act** was utilized in Uttar Pradesh to ensure transparent and corruption-free examinations or captures were made for the issues rising up out of neighbourhood cricket disagreements.

- Unreasonable capacity to detain an individual without much checks and balances and the least legal impedance expands the chance of conceivable abuse of power to detain an individual.

- In the case of **Rekha v. State of Tamil Nadu**, the Supreme Court of India stated that Prevention detention is, ordinarily, repugnant to democratic ideas and abhorrent to the rule of law.

- No such law exists in the USA and in England (with the exception during wartime)

What needs to be done?

- It is clear that in certain cases the laws pertaining to colonial history now have to be modified or updated over time. Now there is a need for security and human rights to go hand in hand

- It now requires an evaluation of the laws and their regulation. The state must take the responsibility to compensate the acquitted detenu in the place of damages caused relating to life, health, income, etc.

- A proper system should be made which will make sure that the rights are being made available to the detenu during the detention period.

- If any accusations for coercive actions are made, it should be taken in a serious way and should be followed by a proper investigation by an appropriate authority.

Conclusion

The preventive detention laws are not completely just fair and reasonable and need some changes or alterations to fit in well within the scope of the Right to life and liberty.

A moral assessment must be taken because, at one end of the spectrum, the lives and personal freedom of vast areas of society must be respected and, at the other end, the life and personal freedom of the person detained must be taken care of.

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WILDFIRES: GOOD SERVANT BAD DISASTER

CONTEXT

At least eight people have been killed in wildfires that have ripped through southern Turkey, ravaging coastal resorts and forcing tourists to flee.

◉ BACKGROUND

- ◉ Forest fire is a major cause of injury and loss to forests, with the population increase, the frequency and subsequent damage due to forest fire is increasing day by day.

- ◉ Major forest fires recently witnessed were- Australia Bush Fire, Uttarakhand forest fire, Russian wildfires etc.

- ◉ Climate change, anthropogenic activities are seen as major cause of wildfires with increased frequency in recent past.

◉ ANALYSIS

Types of Forest Fire

- ◉ **Surface fires**: Surface fire is the most common forest fires that burn undergrowth and dead material along the floor of the forest. It is the type of fire that burns surface litter, other loose debris of the forest floor and small vegetation.

- ◉ **Underground fires**: The fires of low intensity, consuming the organic matter beneath and the surface litter of forest floor are sub-grouped as underground fire. In most of the dense forests a thick mantle of organic matter is found on top of the mineral soil. This fire spreads in by consuming such material.

- ◉ **Ground fires**: There is no clear distinction between underground and ground fires. The smoldering underground fire sometime changes into ground fire. This fire burns root and other material on or beneath the surface i.e. burns the herbaceous growth on forest floor together with the layer of organic matter in various stages of decay.

- ◉ **Crown fires**: Crown fire is the most unpredictable fires that burn the top of trees and spread rapidly by wind. In most of the cases these fires are invariably ignited by surface fires. Since it is over the heads of ground force it is uncontrollable until it again drops to the ground, and since it is usually fast moving, it poses grave danger to the fire fighters becoming trapped and burned.

Causes of Forest fire

More than ninety five percent forest fires are caused either by negligence or unknowingly by the human being. The rest of the fires are caused by natural reasons i.e. lightning, extreme rise in the temperature etc., which are very rare.

Natural Cause	Anthropogenic Cause	
	Deliberate	**Accidental**
Lighting	Shifting Cultivation	Collection of Non Timber Forest Produce
Friction of rolling stones	To flush growth of tendu leaves	Burning farm residues
Rubbing of dry bamboo clumps	To have good growth of grass and fodder	Driving away wild animals
Volcanic explosion	To settle score with forest department or personal rivalry	Throwing burning bidi/cigarettes
	To clear path by villagers	Camp fires by picnickers
	To encroach upon the forest land	Sparks from vehicle —exhaust
	For concealing illicit felling	Sparks from transformers
	Tribal traditions/ customs	Uncontrolled prescribed burning
		Resin tapping
		Making charcoal in forests
		Extracting wine in forest
		Sparks from cooking near the forest
		Heating coal tar for road construction in forest

Damage caused by Forest Fire

- ◉ **Loss of valuable timber resources**

  - ► Forest fires cause indispensable loss to timber and deteriorate its quality. Valuable timber

species like teak, sal, chir, deodar, sheesam, rosewood etc. are adversely affected by fire

- ◉ **Impact of forest fire on eco- system**
  - ➤ The most damaging impact of forest fire on ecosystem is very evident in the Himalayas, where hills existing between the heights of 1000 to 1800 meters are dominated by pine forests and seem to be more fire prone.
  - ➤ The uncontrolled fires in such areas help in spreading pine forest at the cost of indigenous oak forest, which is very serious threat to the ecological balance in the Himalayan region.

- ◉ **Degradation of water catchments areas resulting into loss of water**
  - ➤ After forest fire, soil moisture is decreased and litter decomposition becomes almost negligible, which creates a possibility of forest fire in future.

- ◉ **Loss of wildlife habitat and depletion of wildlife**
  - ➤ Forests are the habitat of many wild animals, when fire becomes uncontrolled, the problem of survival of animals and their habitat arises.
  - ➤ The forest fires in Sankhuwasabha and Ilam in Nepal claimed red pandas, leopards as well as monkeys, deer, bear and other species.

- ◉ **Global warming**
  - ➤ The immediate effect of vegetation burning is the production and release of gases including carbon dioxide, carbon monoxide, methane, non-methane hydrocarbons, nitric oxide, methyl chloride and various other gases, which are released and returned to the atmosphere.

- ◉ **Soil erosion**
  - ➤ The scientific studies indicate that erosion of the soil from the forest land depends on many factors i.e. the soil porosity, its mineral composition, the texture, the gradient of the land and length etc.
  - ➤ All these factors decide the ease with which the individual soil particles are detached

National Action Plan on Forest Fires, 2018

- One of the main objectives of the action plan is to reduce the incidences of fires by informing, enabling and empowering forest fringe communities and incentivizing them to work in tandem with the State Forest Departments (SFDs).

- The plan also aims to reduce the vulnerability of forests against fire hazards across the diverse forest ecosystems in the country, enhancing the capabilities of institutions in fighting fires, and accelerating the recovery after a fire incidence.

Conclusion

It is critical to monitor and understand such fires using satellite data so that we can successfully manage them in a warmer world.

Understanding both the immediate and long-term effects of fire requires long-term global datasets that follow fires from their detection and that accurately map the scale of the burned area.

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MORAL AND PHILOSOPHICAL IMPLICATIONS OF ARTIFICIAL WOMB

CONTEXT

Scientists have developed an artificial womb to incubate healthy baby lambs. However, this technology has also sparked fierce ethical-legal debate across the globe.

⊙ BACKGROUND

- The advanced technology may one day be used to save the lives of extremely premature human babies.

- **Aim:** The main aim of the researchers is to develop an effective treatment strategy for extremely preterm infants born at the border of viability (22-23 weeks).

- The gestation of the unborn infant outside of the body (known as ectogenesis), in artificial wombs, could truly shape the evolution of humanity.

- **1932-1955:** Without a doubt, an honourable mention must go to **Aldous Huxley**, who first came up with the concept of full ectogenesis and artificial wombs in his dystopian novel "Brave New World" published in 1932.

- **2017:** Major inroads in partial ectogenesis were made in 2017 with the most viable artificial womb system yet. Researchers at the Children's Hospital of Philadelphia (CHOP) successfully gestated fetal lambs in a plastic bag filled with synthetic amniotic fluid dubbed 'the bio-bag'.

- **Present-day:** The most recent ectogenetic projects include work researchers at Eindhoven University of Technology who've been developing an artificial womb since 2016. Their artificial womb and placenta aim to provide a natural environment for the baby to ease the transition to new-born life.

⊙ ANALYSIS

How artificial wombs can help?

- Future developments may allow better prediction of those infants who are destined for extreme premature delivery.

- Therefore, an option where high-risk pregnancies or live births before 37 weeks could be transferred to an environment where they could carry on gestating would obviously be advantageous.

- The primary purpose of the artificial womb is to support the gestation and organ development of an infant born prematurely before 37 weeks of age in an artificial liquid-based environment.

- This is highly preferable as opposed to a neonatal unit where there is still a high rate of morbidity.

- The latest incarnation of the artificial womb known as the Philadelphia biobag appears to have side stepped the complications experienced in neonatal care to successfully gestate fetuses ex utero that have been removed from their mother at 22–24 weeks gestation in human terms.

Ethical Consideration

- It starts to enter the fray when we consider social and economic disparities.

- There is much contention around the socio-ethical connotations of partial ectogenesis.

- It is likely to be expensive and restricted to highly equipped neonatal intensive care units.

- The inception of this science global disparity in health outcomes for pregnant people and infants are in danger of being increased, as is racial inequality within the wealthiest nations.

  ▶ For instance, 94 percent of all maternal deaths occur in low and lower-middle-income countries according to the WHO. So is it realistic to expect prospective parents in these regions to be offered partial ectogenesis?

  ▶ The answer to the preceding question is a resounding 'no' – surely this technology would mean universal coverage for reproductive, maternal, and new-born healthcare will finally be addressed.

  ▶ For this reason, equal care for all should be fundamental to the development of partial ectogenesis. Particularly in those regions suffering high maternal death rates and/or race-based discrepancies.

- A fetus would not have the advantage of antibodies transferred from its mother until it started breastfeeding. Also, vaginal flora likely contributes to the health of an infant. However, this is the same state of affairs for cesarean section and perhaps a necessary exchange where a pregnancy has been deemed dangerous.

The moral and philosophical implications of the artificial womb

- The development of the artificial womb raises a multitude of bioethical and legal considerations along with serious implications for the ongoing abortion debate.

- The legal definition of the termination of pregnancy may be redefined once the fetus is transferred from the host to an artificial womb.

- This increased window of viability, where the fetus can be transferred to an artificial womb at an earlier stage of development than the latest stage allowed for the termination of pregnancy, may also be deemed criminal depending on the abortion laws in the region.

- This increased window of viability in all likelihood will change abortion law, protecting the embryo and fetus at an even earlier stage of pregnancy.

- In that event, women could be required to provide legal justification for their decision to opt for artificial gestation.

  - Examples may include a dangerous pregnancy or severe injury risk during childbirth – although it is unlikely that the fetal transference would be legally sound based on a short-term health risk to a woman. Possibly meaning any long-term risks must be proven before the pregnancy is terminated and the fetus transferred to the artificial womb; this will not be an easy task.

- Another ethical dilemma posed by the ectogenetic future is a case scenario where fetuses aborted by mothers are then rescued and adopted. In that reality, some women might seek out dangerous backstreet abortions rather than using a legal transference to give their child up for adoption.

- Ectogenesis may also heighten economic inequality – where wealthy prospective parents may opt to pay for artificial wombs – while the less financially secure will rely on women to gestate their babies. Existing disparities in nutrition and exposure to pathogens between pregnancies across socio-economic divides may also be intensified – raising the issue of distribution of access.

- The potential for serious human rights breaches is once again regurgitated from the mouth of this purported liberating technology.

Conclusion

To conclude, full ectogenesis will likely not exist for decades, but artificial wombs (and partial ectogenesis) are coming up fast. We need to ensure that, when they do arrive, we're ready — and society values women for more than just their reproductive capacity. Moreover, authorities should ensure that this technology benefits people who can't get pregnant for biological rather than psycho-addictive reasons.

It is vital to consider its implications in advance of its development – this means broader social and policy considerations are needed for their use in non-emergency situations. Common sense dictates that it will be easier to defend using artificial wombs in emergencies, such as saving the lives of premature fetuses or, one would hope, the person who is pregnant.

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SECTION: B
(PRELIMS)

CURRENT AFFAIRS

ASI RESTORING THE 17TH-CENTURY DUTCH CEMETERY AT CHINSURAH

⊙ CONTEXT: **The Archeological Survey of India, Kolkata had started the restoration of the Dutch cemetery at Chinsurah.**

About the Dutch Cemetery

- The cemetery is situated more than 40 km upstream from Kolkata on the river Hooghly.

- The Chinsurah Dutch cemetery is probably the **biggest non-British European cemetery** in West Bengal.

- It is a protected monument remains and the most important proof of strong Dutch presence in the town.

- The Cemetery reminds of the golden days of the Dutch legacy in Chinsurah.

- The cemetery contains an assortment of 250 graves scattered under old trees and surrounded by a high wall.

- The cemetery has two segments, the older one having graves of Dutch nationals and the other is still used by the British and native Christians.

- The oldest identified tomb at the cemetery belongs to Sir Cornelius Jonge who died in Chinsurah in 1743.

  - ⊚ The other important graves at the cemetery include is of **Daniel Anthony Overbeck**, **Dutch Governor of Chinsurah**, who stayed in the town even after the British took over the town in 1825.

- The cemetery has mausoleums with an architectural style of the same period in south India.

- The southern part of the cemetery is home to 24 extant Dutch tombs, which are of three types, namely, pyramids, tomb boxes, and plain.

> **Dutch in India**
>
> - People of Holland (present Netherlands) are called the Dutch.
> - Dutch set their feet in India after Portuguese.
> - The United East India Company of the Netherlands was formed in 1602 to trade with East Indian nations.
> - The Dutch founded the first factory in Masaulipatam in Andhra Pradesh in 1605.
> - Dutch Suratte and Dutch Bengal were established in 1616 AD and 1627 AD respectively.
> - The Dutch conquered Ceylon in 1656 and Malabar Coast in 1671 AD.
> - The Dutch gradually became a potent force capturing Nagapatam near Madras (Chennai) from the Portuguese thereby establishing their foothold in South India.
> - They monopolized in black pepper and spices.
> - The major Indian commodities traded by the Dutch were cotton, indigo, silk, rice and opium.
>
> **Decline of Dutch Power**
>
> - Dutch presence lasted from 1605 AD to 1825 AD.
> - The rise of the British power posed serious challenge to the commercial interest of the Dutch leading to bloody warfare.

BRICS FINALIZED COUNTER-TERRORISM ACTION PLAN

⊙ **CONTEXT:**

The BRICS Counter-Terrorism Action Plan has been finalized at the sixth meeting of the BRICS Counter-Terrorism Working Group.

About the BRICS Counter-Terrorism Action Plan

- The planwill strengthen the counter-terror cooperation among members of the BRICS grouping.
- Action Plan will help in bringing "result-oriented cooperation" among the BRICS member states.
- The plan contains specific measures to implement BRICS Counter-Terrorism Strategy which was adopted by BRICS Leaders in 2020.
- The document will help to increase intra-BRICS collaboration for combating terrorism, radicalization, financing of terrorism and cyber-crime, etc.
- It will also help to curb the travel of terrorists, to strengthen border control, and protect soft targets.

A series of measures taken by India to fight against terrorism

- **Comprehensive Convention on International Terrorism (CCIT)**
  - This was proposed by India in 1996.
  - The ratification of the CCIT is pending due to opposition from the US and OIS countries
  - CCIT provides a legal framework to make it binding on all signatories to deny funds and safe havens to terrorist groups.

- This includesthe following major objectives:

- To have a universal definition for terrorism

- To ban all the terror groups and shutting down the terror camps

- To prosecute all the terrorists under special laws

- To make cross-border terrorism an extraditable offense worldwide

- **National Investigation Agency (NIA)**

  - This is India's counter-terrorist task force.

  - The agency is empowered to deal with the terror related crimes across states without any special permission from states.

  - NIA came into existence through the enactment of National Investigation Agency Act 2008, after the deadly 26/11 terror attack in Mumbai.

- **Financial Action Task Force (FATF)**

  - On June 25, 2010, India became the 34th country member of FATF.

International efforts to counter-terrorism

- **UN Resolution 1373 and 1535** – These resolutions were passed in 2001and 2004 respectively and were concerned with the formation of the counter-terrorism Committee.

- **United Nations Security Council resolution 1267**: This was in 1999. Through the resolution, the Council designated Osama Bin Laden and his associates as terrorists and established sanctions to cover individuals and entities associated with Al-Qaida, Osama bin Laden and the Taliban.

- **UN Convention on Counter-Terrorism (UNCCT):**This provides support to the Member States and regional organizations for the development of counter-terrorism strategies. The convention was supported by 'Bogota principles' that were developed in 2013 as part of one of the first UNCCT projects.

- **UN Global Counter-Terrorism Strategy**: The UN Global Counter-Terrorism Strategy is composed of 4 pillars, namely:

  ➤ To address the conditions which are conducive to the spread of terrorism

  ➤ Measures to prevent and combat terrorism

  ➤ Measures to build states' capacity for the prevention and combat terrorism, efforts to strengthen the role of the United Nations

  ➤ Measures to ensure respect for human rights

- **Financial Action Task Force (FATF):** The Financial Action Task Force (FATF) is an inter-governmental financial watchdog. It develops and promotes policies to combat money laundering and financing of terrorism. It is consisting of 39 countries with major financial centers in Europe, North and South America, and Asia and two international organizations have proposed a set of 40 recommendations to combat money laundering. FATF has developed the FATF Standards to ensure a coordinated global response to prevent organized crime, corruption, and terrorism.

INCORPORATION OF GILGIT-BALTISTAN, AS A PROVINCEIN PAKISTAN

⊙ **CONTEXT:** **Pakistan's Law and Justice Ministry has finalized the draft legislation to incorporate Gilgit-Baltistan, which was known before 2009 as Northern Areas, as a province of the country.**

About the Gilgit-Baltistan

- India asserts that Gilgit-Baltistan is an integral part of India "by virtue of the legal, complete and irrevocable accession of Jammu & Kashmir to the Union of India in 1947".
- The area's strategic importance has increased in light of the China-Pakistan Economic Corridor agreement.

History of the region

- Gilgit was the part of princely state of Jammu & Kashmir, but was ruled by the British, who took it on lease from Hari Singh, the Hindu ruler of the Muslim-majority state.
- When Hari Singh acceded to India on October 26, 1947, the Gilgit Scouts rose in rebellion, led by British commander Major William Alexander Brown.
- The Gilgit Scouts also moved to take over Baltistanand captured Skardu, Kargil and Dras. In battles, Indian forces retook Kargil and Dras in August 1948.
- On November 1, 1947, a political outfit called the Revolutionary Council of Gilgit-Baltistan had proclaimed the independent state of Gilgit-Baltistan.
- On November 15, it declared it was acceding to Pakistan, which accepted the accession only to the extent of full administrative control, choosing to govern it directly under the Frontier Crimes Regulation, a law devised by the British to keep control of the restive tribal areas of the northwest.
- In 1949, Pakistan entered into an agreement with the "provisional government" of "Azad Jammu & Kashmir" to take over its defence and foreign affairs. Under this agreement, the "AJK" government also ceded administration of the Gilgit-Baltistan to Pakistan.


Why Pakistan is announcing it a province?

- The change in status will meet a long-standing demand of the 1.5 million people of Gilgit-Baltistan.
- Another suggested reasons is that Pakistan's decision is under pressure from China, wary that Gilgit-Baltistan's ambiguous status might undermine the legality of its projects there.

China-Pakistan Economic Corridor (CPEC)

- CPEC is a flagship project under the Belt and Road Initiative's (BRI) and most ambitious in any single country.
- CPEC is intended to upgrade Pakistan's required infrastructure and strengthen its economy by construction of modern transportation networks, numerous energy projects, and the special economic zones.
- It was launched in 2015.
- The Government of India objects to the CPEC project as upgrade works to Karakoram Highway are taking place in the Gilgit-Baltistan territory that India claims as its own.
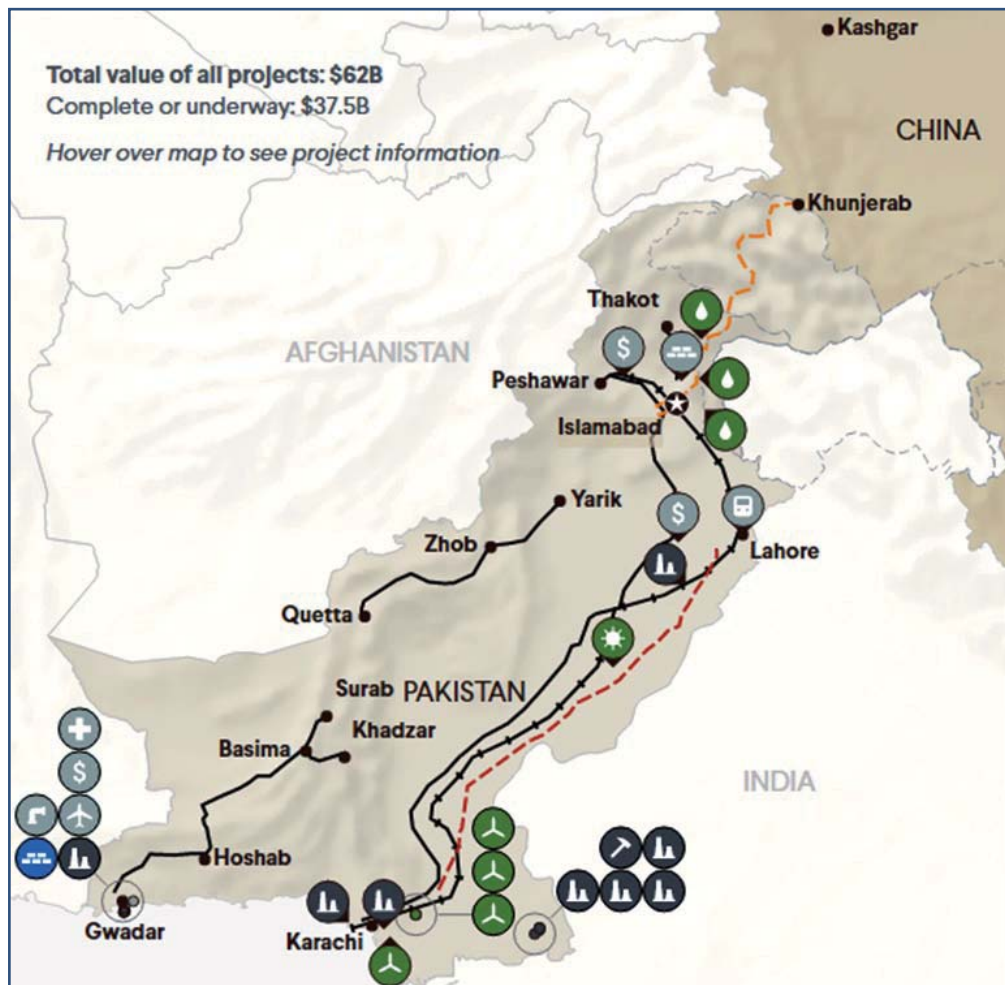
SAMAGRA SHIKSHA SCHEME FOR SCHOOL EDUCATION TO BE CONTINUED FROM 2021 TO 2026

⊙ **CONTEXT:** The Cabinet Committee on Economic Affairs approved the continuation of the revised Samagra Shiksha Scheme for a period of five years i.e., from 2021-22 to 2025-26.

About the scheme

- The Samagra Shiksha scheme is an integrated scheme for school education which covers education from pre-school to class XII.

- **Launched by:** Department of School Education and Literacy, Ministry of Education.

- Launched in 2018, it subsumed the Centrally Sponsored Schemes of Sarva Shiksha Abhiyan (SSA), Rashtriya Madhyamik Shiksha Abhiyan (RMSA), and Teacher Education (TE).

- The scheme treats school education by **Sustainable Development Goal for Education (SDG-4).**

- The scheme supports the implementation of the RTE Act and is aligned with the recommendations of NEP 2020.

- The scheme covers 1.16 million schools, over 156 million students, and 5.7 million Teachers of Govt. and Aided schools (from pre-primary to senior secondary level).

Implementation of the Scheme

- **State level:** It is implemented as a Centrally Sponsored Scheme through a single **State Implementation Society (SIS)** at the State level.
- **National level:** At the National level, there is a Governing Council/Body headed by the Minister of Education and a Project Approval Board (PAB) headed by the Secretary, Department of School Education and Literacy.
- The scheme ensures that all children have **access to quality education.**

Major interventions under the scheme

- **Major Interventions:** The major interventions proposed under the scheme are:
  - Universal Access including Infrastructure Development and Retention
  - Foundational Literacy and Numeracy
  - Gender and Equity
  - Inclusive Education
  - Quality and Innovation
  - Financial support for Teacher Salary
  - Digital initiatives
  - RTE Entitlements including uniforms, textbooks, etc.
  - Support for ECCE
  - Vocational Education
  - Sports and Physical Education
  - Strengthening of Teacher Education and Training
  - Monitoring
  - Program Management
  - National Component

	Top Five and Bottom Five States/UT's by Literacy Rate: 2011					
Rank	**Persons**		**Males**		**Females**	
	Name of State/UT	**Literacy Rate**	**Name of State/UT**	**Literacy Rate**	**Name of State/UT**	**Literacy Rate**
Top Five States/UTs						
	India	74.0	India	82.1	India	65.5
1	Kerala	93.9	Kerala	96.1	Kerala	92.0
2	Lakshadweep	92.3	Lakshadweep	96.0	Lakshadweep	89.4
3	Mizoram	91.6	Mizoram	93.7	Mizoram	88.2
4	Tripura	87.8	Tripura	92.8	Tripura	83.1
5	Goa	87.4	Goa	92.2	Goa	81.8
Bottom Five States/UTs						
	India	74.0	India	82.1	India	65.5
1	Bihar	63.8	Bihar	73.4	Bihar	52.7
2	Arunachal Pradesh	67.0	Arunachal Pradesh	73.7	Arunachal Pradesh	53.3
3	Rajasthan	67.1	Rajasthan	75.6	Rajasthan	56.2
4	Jharkhand	67.6	Jharkhand	77.2	Jharkhand	58.0
5	Andhra Pradesh	67.7	Andhra Pradesh	78.3	Andhra Pradesh	59.3

Literacy in India

- According to the 2011 Census, any person aged seven and above and who has the ability to read and write is considered literate.

- The average literacy rate in India stands at 74.04%.

- While Kerala has the highest literacy rate in India at 93.91%, Bihar has the least literacy rate in India of 63.82%.

- The **Ministry Of Home Affairs** conducts a census every 10 years in India.

- The Mid Day Meal Scheme, SamagraShikshaProgramme, Awareness campaigns and RTE Act are some of the measures of Indian Government to improve education.

RESTORATION OF POWER OF STATES/UTS TO MAKE THEIR OWN OBC LISTS

⊙ **CONTEXT:**

Union Cabinet has cleared the Constitutional 127th Amendment Bill to give power to states and UTs to make their own OBC lists that will be put in Parliament.

About the newly cleared bill

- The **Constitutional 127th Amendment Bill** will amend **Articles 342 A** and introduce **clause 342 A (3)** that will specifically authorize states to maintain their **State List.**

- There will be an amendment in **Articles 366(26C) and 338B (9).**

- States will be able to directly notify OBC and SEBCs without referring to the NCBC.

Constitutional Amendment Bill

A Constitutional Amendment Bill must be passed in each House by a majority of the **total membership of that House** and by a **majority of not less than two-thirds** of the members of that House present and voting.

Why the bill is needed?

- **Clarity:** The bill will give clarity to the **102nd constitutional amendment** that had created confusion in a state and Central list, and this clause will clarify it.

- The bill is expected to come to Parliament in response to the dismissal of law on the **Maratha quota** by the Supreme Court.

  ◉ In the Maratha reservation judgment, SC dismissed the **Maratha Quota law** by citing the **102nd amendment** of the Constitution that had scrapped the power of the states to identify and notify socially and educationally backward classes.

102nd Constitution Amendment Act of 2018

- This inserted Articles **338B** that deals with the structure, duties, and powers of the **National Commission for Backward Classes (NCBC)**, and **342A** which deals with powers of the **President** to notify a particular caste as SEBC, and the **power of Parliament to change the list.**

- If the state list was abolished, around 671 OBC communities would be affected regarding the reservation in educational institutions and appointments.

National Commission for Backward Classes (NCBC)

- It was initially constituted by The National Commission for Backward Classes Act, 1993 and so far the Commission was reconstituted 7 times up to 2016.

- The government had repealed The National Commission for Backward Classes Act, 1993 in 2018.

- The present Commission, the 8th commission has been accorded Constitutional Status through "The Constitution (One Hundred and Second Amendment) Act, 2018".

- For this, **Article 338B** has been inserted to forming a Commission for the socially and educationally backward classes which is to be known as NCBC.

- The Commission consists of a Chairperson, Vice-Chairperson, and three other Members in the rank & pay of Secretary to the Govt of India.

RESTRUCTURING OF NATIONAL MINERAL EXPLORATION TRUST (NMET) AS AUTONOMOUS BODY

⊙ **CONTEXT:**   **Union Minister of Coal, Mines and Parliamentary Affairs urged the officials of the Ministry of Mines to restructure   the National Mineral Exploration Trust (NMET) as an autonomous body.**

About the National Mineral Exploration Trust (NMET)

- The National Mineral Exploration Trust (NMET) was in 2015.

- The trust was formed under the **Mines and Minerals (Development and Regulation) Act, 1957.**

- The body is working for realization of mineral potential of the country in terms of mining activity.

- NMET has a two-tier structure.

  ⊙ **The apex body** which is the Governing Body is chaired by the Minister of Mines. It holds the overall control of the Trust.

  ⊙ **The Executive Committee** which is chaired by the Secretary, Ministry of Mines, administers and manages its activities.

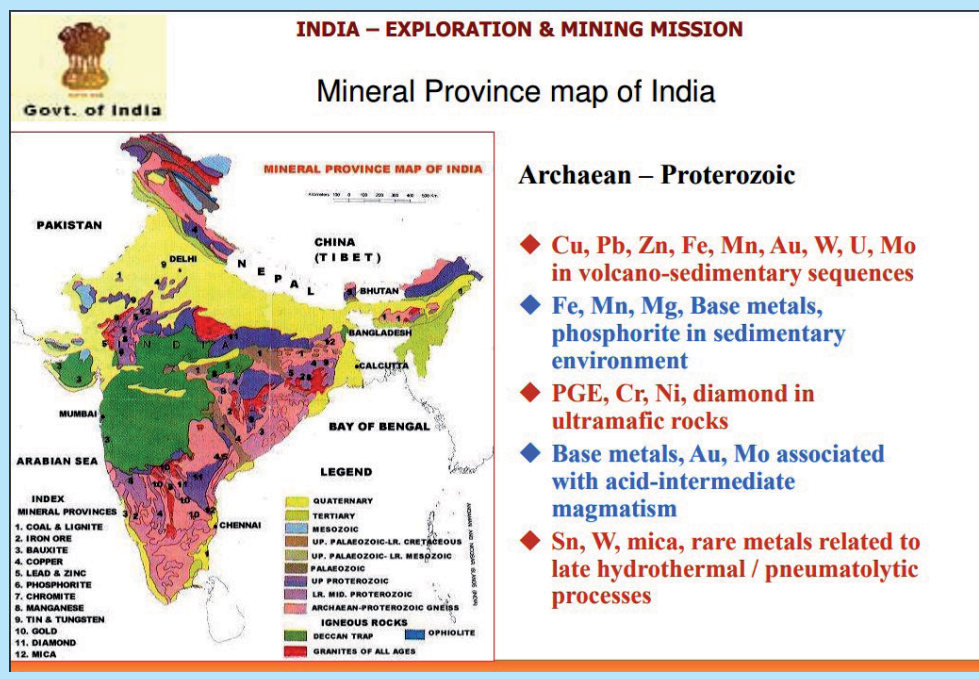- To implement its activities an NMET Fund has been established.

NMET Fund

- The NMET fund is utilized to

  ➤ undertake studies for mineral development

  ➤ regional and detailed exploration of strategic and critical minerals

  ➤ an aerial geophysical survey of obvious geological potential (OGP) and adjoining areas of India, sustainable mining with advanced scientific and technological practices, and mineral extraction metallurgy.

- It also facilitates exploration activities by the provisions of the Act.

- The holders of the Mining Lease and Prospecting Licence-cum-Mining Lease make payments which are equivalent to 2% of royalty, for minerals under the second schedule of the Act.

- The Trust supports the regional and detailed mineral exploration in the country.

Need for the autonomy

- There is a need to focus on the exploration of gold and rare earth along with other segments of India's mineral exploration efforts.

- To streamline the system of extending financial assistance to statesfor enhanced exploration.
- It will create an atmosphere of competition among states to step up exploration.
- This will encourage mining exploration to be more frequent and result-oriented.

Mining in India

- Mining is regulated in India under the Mines and Minerals (Development and Regulation) Act 1957 (MMDR Act).
- The MMDR Act was amended in 2015 with the intention of removing discretion and introducing more transparency in the allocation process.
- A National Mineral Exploration Policy (NMEP) was brought out by the Government in 2016 followed by the National Mineral Policy 2019.
  - ➤ The policy supported the encouragement of the private sector to take up exploration and that "exploration should be incentivized to attract private investments as well as state-of-the-art technology, within the ambit of the auction regime, through Right of First Refusal at the time of auction.

INDIA – EXPLORATION & MINING MISSION

Mineral Province map of India

Govt. of India

Archaean – Proterozoic

- ◆ Cu, Pb, Zn, Fe, Mn, Au, W, U, Mo in volcano-sedimentary sequences
- ◆ Fe, Mn, Mg, Base metals, phosphorite in sedimentary environment
- ◆ PGE, Cr, Ni, diamond in ultramafic rocks
- ◆ Base metals, Au, Mo associated with acid-intermediate magmatism
- ◆ Sn, W, mica, rare metals related to late hydrothermal / pneumatolytic processes

"E-RUPI", AN ELECTRONIC VOUCHER-BASED DIGITAL PAYMENT SYSTEM, IS LAUNCHED

⊙ **CONTEXT:** An electronic voucher-based digital payment system "e-RUPI" will be launched to take steps towards having a digital currency in the country.

What is e-RUPI?

- e-RUPI is a cashless and contactless mode of digital payments medium, which will be delivered to beneficiaries' mobile phones in form of an SMSstring or a QR code.
- This has been developed by the National Payments Corporation of India (NPCI), the Department of Financial Services, the Ministry of Health and Family Welfare, and the National Health Authority.

- The payment system will be a person-specific and purpose-specific system.

- This will be like a prepaid giftvoucher that will be redeemable without any credit or debit card, a mobile app, or internet banking at specific accepting centers.

- The system is built by NPCI on its UPI platform and has onboarded banks which will be the issuing entities.

- Any corporate or government agency will approach the partner banks, either private or public-sector lenders, with the details of specific persons and the purpose for which payments have to be made.

- The beneficiaries will be identified by their mobile number and a voucher will be allocated by a bank to the service provider.

Significance of e-RUPI

- The launch of e-RUPI could potentially highlight the existing gaps in digital payments infrastructure which isnecessary for the success of the future digital currency.

- e-RUPI is still backed by the existing Indian rupee as an underlying asset and the specificity of the purpose makes it different from a virtual currency and makes it closer to a voucher-based payment system.

Digital Payment Methods

- The Digital India programmeenvisions for transforming India into a digitally empowered society and knowledge economy.

- "Faceless, Paperless, Cashless" is one of professed role of Digital India.

- As part of promoting cashless transactions and to convert India into less-cash society, various modes of digital payments are available.

These mode are:

- Banking cards, Unstructured Supplementary Service Data (USSD) , Aadhaar Enabled Payment System (AEPS), Unified Payments Interface (UPI), Mobile Wallets, Banks Pre-paid Cards, Point of sale, Internet banking (NEFT, RTGS or IMPS), Mobile banking and Micro ATMs etc.

'NET ZERO' CARBON TARGETS TO TACKLE CLIMATE CHANGE

⊙ **CONTEXT:**   Oxfam in new report titled "Tightening the Net" stated that 'net zero' carbon targets may be a "dangerous distraction" from the priority of cutting carbon emissions.

What does Net-zero mean?

- Also referred to as **carbon-neutrality**, net-zero does not mean that a country would bring down the emissions to zero.

- The emission would be **gross-zero**, which means reaching a state where there will be no emissions at all.

- Therefore, in a **net-zero state**, a country's emissions are compensated by the absorption and removal of greenhouse gases from the atmosphere.

- The carbon can be absorbed is by creating carbon sinks such as a forest.

- A country can have even negative emissions if the absorption and removal exceed the actual emissions.

- **For example**-Bhutan has negative emissions as it absorbs more than it emits.

Key findings of report

- The 'net zero' schemes are a **Land-hungry scheme** as it would require land resources for achieving the net-zero targets.

- For tackling the challenge by planting more treesthen about 1.6 billion hectares of new forests would be required to remove the world's excess carbon emissions by the year 2050.

  - It could result in an 80 percent rise in global food prices and more hunger while allowing rich nations and corporates to continue "dirty business-as-usual".

- To limit global warming below 1.5°C and to the prevention of irreversible damage from climate change, the world needs to aim to cut emissions by 45 percent by 2030 from 2010 levels.

- Currently, countries' plans to cut emissions will result in a reduction of only one percent by the year 2030.

> **Countries with net-zero targets**
>
> - **New Zealand:** The New Zealand government passed the **Zero Carbon Act in 2019**, which committed the country to zero carbon emissions by 2050 or earlier, as part of the country's attempts to meet its Paris climate accord commitments.
> - **United Kingdom:** The UK's parliament passed legislation to reduce the UK's net emissions of greenhouse gases by 100 % relative to 1990 levels by the year 2050.
> - **United States:** US president Joe Biden said that the country will cut its greenhouse gas emissions by at least 50 percent below 2005 levels by 2030.
>   - In the US, a bipartisan organization called **World War Zero** was also launched in 2019 to bring together unlikely allies on climate change and to reach net-zero carbon emissions in the country by 2050.
> - **European Union:** The European Union announced the plan "**Fit for 55**", which is to cut emissions by 55 percent below 1990 levels by 2030.
> - **China:** China also announced that it would be a **net-zero emitter** by the year 2060 and would not allow emissions to peak beyond what they are in 2030.

India's objections

- India is the only country opposing this target because it is likely to be the most impacted by it.

- Over the next two to three decades, India's emission is likely to grow at the fastest pace in the world, as it moves for higher growth to pull hundreds of millions of people out of the poverty.

- No amount of afforestation or reforestation will be able to compensate for the increased emissions.

- Most of the carbon removal technologies available now are either unreliable or very expensive.

- According to India, the net-zero goal does not figure in the 2015 Paris Agreement. India is arguing that instead of opening up a parallel discussion on net-zero targets outside the Paris Agreement framework, countries must focus on delivering on what they have already promised.

- It is well on its way to achieving its three targets of the Paris Agreement.

OBJECTIONS TO THE MANDATORY FORTIFICATION OF FOOD ITEMS

⊙ **CONTEXT:** **A group of scientists and the activists have warned to Food Safety and Standards Authority of India (FSSAI) by writing regarding the adverse impacts on health and livelihoods and oppose the central government's plan against mandatory fortification of food items.**

What are Fortified foods?

- These are those that have nutrients added to them that don't naturally occur in the food.

- These foods are meant to improve nutrition and add health benefits.

Food item	Nutrient	Level of fortification	Source nutrients
Salt	Iodine (manufacturer level)	Not less than 30 ppm on dry weight	Potassium iodate
	Iodine (distribution channel)	Not <15 ppm on dry weight	Potassium iodate
	Iron	850-1100 ppm	Ferrous sulphate or ferrous fumarate
Oil	Vitamin A	25 UI/mg	Retinyl acetate, retinyl palmitate, and retinyl propionate
	Vitamin D	4.5 IU/mg	Cholecalciferol and ergocalciferol
Vanaspati	Synthetic Vitamin A	Not <25 IU per g	Retinyl acetate and retinyl palmitate
Atta	Iron	20 mg	Sodium iron (III) ethylene diamine tetra acetate, trihydrate (sodium federate-Na Fe EDTA)
	Folic acid	1300 µg	Folic acid
	Vitamin B12	10 µg	Cyanocobalamin and hydroxycobalamin
Maida	Iron	60 mg	Ferrous citrate, ferrous lactate, ferrous sulphate, ferrous pyrophosphate, electrolytic iron, and ferrous fumarate. Sodium iron (III) ethylene diamine tetra acetate, trihydrate (sodium federate-Na Fe EDTA)
	Folic acid	1300 µg	Folic acid
	Vitamin B12	10 µg	Cyanocobalamin and hydroxycobalamin
Rice	Iron	20 mg	Ferric pyrophosphate, Sodium Iron (III) ethylene diamine tetra acetate, trihydrate (sodium federate-Na Fe EDTA)

	Folic acid	1300 µg	Folic acid
	Vitamin B12	10 µg	Cyanocobalamin and hydroxycobalamin
EDTA: Ethylenediaminetetra acetic acid			

- Fortification adds the key vitamins and minerals such as Iron, Iodine, Zinc, Vitamins A & D to the staple foods such as rice, wheat, oil, milk, and salt to improve their nutritional content.

Why the fortification is required for India?

- India has a very high burden of micronutrient deficiencies of Vitamin A, Iodine, Iron, and Folic Acid that leads to Night Blindness, Goitre, Anaemia and various birth defects. According to the National Family Health Survey (NFHS-4)

- 4 % of children (6-59 months) are anemic

- 1 %of women in the reproductive age group are anemic

- 7 % of children under 5 are underweight

Concerns about the food fortification

- Mandatory fortification can lead to hypervitaminosis

- Nutrients don't work in isolation but need each other for optimal absorption

- This will lead to monotonous cereal-based diets with low consumption of vegetables and animal protein

- To promote fortification FSSAI relies on food companies who would benefit from it, leading to conflicts of interest.

- Mandatory fortification would harm a vast informal economy of Indian farmers and instead benefit a small group of multinational corporations

Regulation of food fortification in India

- In October 2016, FSSAI operationalized Food Safety and Standards (Fortification of Foods) Regulations, 2016 to fortify staples, to reduce the high burden of micronutrient malnutrition, namely

  ➤ Wheat Flour and Rice (by Iron, Vitamin B12, and Folic Acid)

  ➤ Milk and Edible Oil (by Vitamins A and D)

  ➤ Double Fortified Salt (through Iodine and Iron)

  ➤ The '+F' logo has been notified for the identification of fortified foods.

- Food Safety and Standards (Fortification of Foods) Regulations, 2018 and amended regulations were released to regulate fortification.

PRIVATIZATION OF GAMMA-IRRADIATION TECHNOLOGY

⊙ **CONTEXT:**   **Gamma irradiation technology for food preservation is operational in the country in private, semi-government and government sector for irradiation of various products with private players and presently 26 Gamma Radiation Processing Plants are running in India.**

- The setting of food irradiation facilities in the Public-Private mode mitigates the huge quantum of post-harvest and storage losses of agricultural produce and food. This will

result in national savings.

What is Gamma irradiation technology for food preservation?

- Gamma irradiation technology is used for the preservation or **shelf life extension** by **applying pre-determined radiation doses.**
- This technology is used to inhibit-
  - sprouting in bulbs and tubers
  - insect disinfestation of cereals, pulses, and grains
  - microbial decontamination (hyalinization) of dry spices etc.
- **Factors impacting the result of technology:** post-irradiation storage, the time-lapse between irradiation and distribution to users, and the total quantity of irradiated food products.

Sources of food irradiation
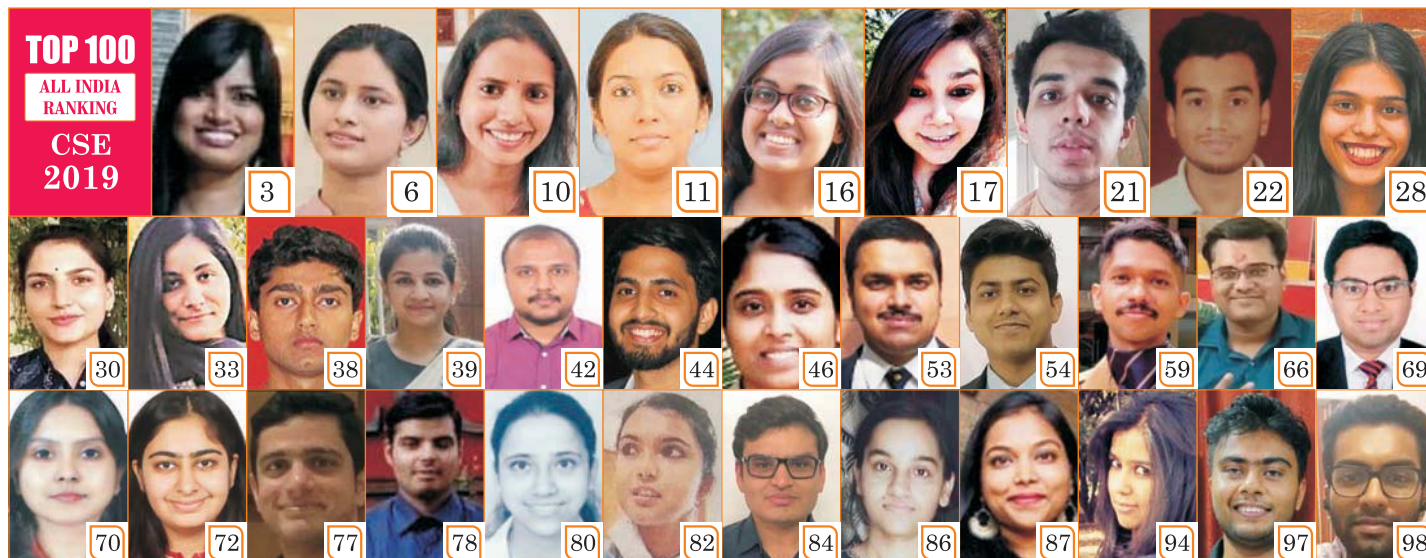
- Gamma Rays: Cobalt 60
- Electronic Beam
- X-Ray

Advantages and Disadvantages of food irradiation

- **Advantages**
  - **Terminal Processing:** Due to the penetration depth of the ionizing radiation, the products can be processed in fully sealed, final packaging. This limits risk of contamination after the sterilization.
  - **Cold Method/Temperature Independence:** Radiation sterilization has no heat dependence and is efficient at ambient temperature and sub-zero temperatures also. It is also compatible with temperature-sensitive materials, such as pharmaceuticals and the biological samples.
  - **Chemical Independence:** No volatile and toxic chemicals are needed for radiation. In the case of X-ray or e-beam irradiation, no end products which require disposal are generated during the procedure.
  - **No residue:** Radiation does not leave residue on the sterilized product.
  - **Flexibility:** Radiation can sterilize the products of any phase (gaseous, liquid, or solid materials).
  - **Time efficiency:** The E-beam sterilization can be completed in seconds to minutes.
  - **Sterility assurance level (SAL):** Radiation treatment yields a high SAL of 10^{-6} or better, which ensures that less than one out of a million microorganisms survive the sterilization procedure.
- **Disadvantages**
  - **Instrumentation:** The capital costs are high and specialization facilities are often needed. Gamma radiation requires a nuclear reactor; E-beam/X-ray radiation is generated by using electron beam accelerators.
  - **Product Degradation:** Radiation-based methods are not compatible with all the packaging materials and can cause its breakdown.
  - **Radioactive material:** Radiation sterilization requires handling and disposal of the radioactive material.

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