

CURRENT AFFAIRS PROGRAM

PRE-CUM-MAINS 2024

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1) SOCIAL JUSTICE: THE QUESTION OF SAME SEX MARRIAGE

– Background:

» In Navtej Singh Johar case, Supreme Court decriminalized homosexuality. But gay marriages still **didn't have legal recognition** in India. In a landmark case, a group of 18 same-sex Indian couples had petitioned the country's Supreme Court to legalize same-sex marriage.

▫ **Key Demands:** The petitioners had sought a ruling by which the Special Marriage Act (SMA), 1954, which provides for a civil marriage for couples who can't marry under the personal law, should be interpreted as gender neutral, thus allowing the same sex marriage. The current interpretation of SMA, they argued violates Articles 14, 15, 19, 21 and 25 by not allowing marriage between same-sex, gender non-conforming, LGBTQIA+ couples, and sought the words "husband" and "wife" as well as any other gender-specific term to be substituted by the word "party" or "spouse".

▫ The petitions argued that marriage brings with it several rights, privileges, and obligations that are "bestowed and protected by law".

▫ The Delhi Commission for Protection of Child Rights (DCPCR) also advocated for recognition of marriage, filing an intervention application to assist the court on the impact of such marriages on children.

» Respondents Opposing the petition:

▫ The Central Government, the National Commission for the Protection of Child Rights, and a body of Islamic Scholars called the Jamiat-Ulama-i-Hind, opposed the petitions.

– Argument Supporting Same Sex Marriage

» Protecting the Fundamental Rights of Every Citizen:

▫ The right to marry for non-heterosexual couple is implicit in Article 14 (Equality), 15 (Non-Discrimination), 16 (Equality of Opportunities in public employment), 19 (Freedom of Speech), and 21 (Right to Life). This is specially true after the SC ruling in 'Navtej Singh Johar vs. Union of India' and 'KS Puttaswamy verdict'.

▫ In Navtej Singh Johar verdict, Justice Chandrachud held that members of LGBT community are entitled, as all citizens, to a full range of constitutional rights, including liberties protected by the Constitution.

» Ensuring other benefits of marriage to homosexuals:

▫ Being able to marry a partner would allow homosexuals to a host of rights currently reserved for heterosexual married couples - including right to jointly adopt children, own property together or nominate one another as a surrogate decision maker in a medical emergency, right to inheritance, maintenance and tax benefits.

- » Since Navtej Singh Johar Judgment, several high court verdicts have ruled in favor of same sex couples having the right to live together.
 - In **Madhu Bala vs State of Uttarakhand (2020)**, the high court of Uttarakhand held that right of a same sex couple to live together is a constitutional and human right.
 - In **Vanitaben Damjibhai Solanki vs State of Gujarat (2020)**, the Gujarat High Court ordered police protection for two women police constables in a relationship.
 - In **S Sushma v Commissioner of Police (2021)**, the court protects the couple in relationship and makes sure that both sets of parents are taken along in this journey.
- **Legal recognition of same sex marriage** will contribute to society's acceptance towards homosexuality.
- A study titled '***The Anticipated Impact of LGBTQIA+ Marriage Equality Legislation on Indian Society and Mental Health***' among Indians has found that legalization of such unions will have a "**positive impact on mental health of LGBTQIA+ individuals**".
- There are around 30 countries where same sex marriage is legalized. These countries have seen no harm to their culture and no deterioration of the legitimacy of traditional marriage in any place where same sex marriage is lawful.
- **Arguments of people opposing same sex marriage:**
 - They argue that same sex marriage is affront to Indian customs and is an urban elitist concept.
 - The government also argued that if Supreme court legalizes same sex marriage, it will mean a **virtual judicial rewriting of an entire branch of law** and court must refrain from passing such omnibus orders. Proper authority for this should be the legislature.
 - Some don't consider it as normal because they can't replicate babies.
- **Supreme Court Verdict: Supriyo a.k.a Supriya Chakroborty & Abhay Dang v. Union of India (Oct 2023)**
 - The Supreme Court declined to legalize same sex marriage, leaving it on the Parliament to legislate on the subject.
 - **In fact, all five judges agreed that there is no fundamental right to Marry** under this Indian Constitution.
- **Key highlights of the majority verdict (3:2):**
 - There is no fundamental right to marry in the Constitution, and the court can't intervene.
 - » "An institution can't be elevated to the realm of fundamental right based on the content accorded to it by law".
 - Legal recognition of the right to a Civil Union - akin to marriage or civil union - can **only be through enacted law**.
 - Courts can't enjoin or direct the creation of a legal or regulatory framework resulting in the conferment of legal status on same-sex couples, **nor the same sex couples be granted the right to adopt**.

- The Court cannot read words into the provisions of the SMA and provisions of other allied laws such as the Indian Succession Act and the Hindu Succession Act because that would amount to Judicial legislation.
 - » The **provisions and objectives of the SMA** clearly points to the circumstances that Parliament intended only one kind of couples, i.e., heterosexual couples belonging to different faiths, to be given the facility of civil marriage.
 - » The court in the exercise of power of judicial review **must steer clear of matters, particularly those impinging on policy, which fall in the legislative domain.**
 - Despite the above, **separate directions** have been issued to the Union of India for setting up a **high-level committee** (under the chairmanship of cabinet secretary) to help ameliorate the manifold difficulties (including discrimination) experienced by the same sex couples living together.
- The **minority opinion**, of CJI D.Y. Chandrachud and Justice Sanjay Kishan Kaul, said the LGBTQIA+ community had a fundamental right to form relationships and that the state was obligated to recognize and grant legal status to such unions, so that the same sex couple could avail the material benefits provided under the law and also could adopt kids. But **they also declined to read down the provisions of the SMA to that effect.**
- **Analysis: Positives of the Judgment:**
 - » **The verdict respects Constitutional Morality:** Separation of Power is one of the basic features of the constitution and judicial legislation would have violated it.
 - Under India's Constitution the power to make laws - including laws related to marriage - vest exclusively either with Parliament at the Centre or with a state legislature in a state - by reason for provisions contained in Article 245(1) and Article 246(2) of the Constitution read along with Item 5 in the Concurrent List.
 - » **To bestow legal recognition to homosexual marriages would need amendment to several laws**, which is the domain of people's elected representatives, not a few selected jurists.
- **Analysis: Limitations:**
 - » **Right to marry is a human right as per Universal Declaration of Human Rights (UDHR)** of which India is an original signatory.
 - **Article 16 of the UDHR, 1948** provides that, "Men and women of full age, without any limitations due to race, nationality, or religion, have the right to marry and to form a family."
 - Since Right to Marry is a human right, it should also be recognized as a fundamental right.
 - SC in the past have relied on UDHR to interpret provisions of Fundamental Rights in India.
 - For e.g., in the Maneka Gandhi case, the SC relied on Article 10 of the UDHR to read in principles of natural justice in the administrative process to state.
 - » The Constitution has given the **task of defending the fundamental rights of all citizens to the Supreme Court and Supreme court has in the past struck laws which are violative of fundamental rights.** If a law is providing legal protection to some citizens and not covering other

citizens, it is definitely violating Article 14 of the Constitution and it should be in the mandate of the Supreme Court to amend it.

- The judgement will prolong the long and arduous struggle to create the conditions where same sex couples could live a life without fear, in the sweet elixir of freedom and equality.

» **Social Morality/ Majoritarian Morality** has been given more importance than **Constitutional Morality.**

- In Navtej (2018), Justice Chandrachud had held that “the Court has to be guided by the conception of constitutional morality and not by the societal morality. In the garb of social morality, the members of the LGBT community must not be outlawed or given a step-motherly treatment of malefactor by the society”.

» **Negative social implications for LGBT community:** The unintended consequence of the judgement in the larger society is that the notion that the same sex couples are "not fit for marriage" will be perpetuated.

– **Way Forward:**

- **Consistent Efforts by LGBT community and other human rights group** to get legal recognition:
 - » Government was against same sex marriage in the SC and thus there are less chances that it would come up with amendments to recognize same sex marriage at its own.
 - » The LGBT community, and human rights group will have to work on several fronts to increase the social acceptance of the same sex marriage which would eventually make government bring changes.
- **Pressure on Legislature** may also come from the side of the opposition parties who may be sympathizing with the cause of homosexual couples.
- **Implementing SC verdict** regarding various protection being available for queer couples.
 - » This will require strong political will and strict judicial oversight as even during Navtej Singh Johar judgment, the SC had directed the state to ensure that the judgment is given wide publicity through media and government should initiate programs to reduce stigma associated with homosexuality. Five years later, almost nothing has been done in this regard.

– **Conclusion:**

- The LGBTQIA+ community was gazing upon the Supreme Court with a profound sense of optimism. Though they were relieved about the recognitions granted in the minority judgment, they have been left disheartened by the final verdict.

2) SOCIAL JUSTICE: DEMAND FOR MARATHA RESERVATION

- **Why in news?**
 - » Agitation by Maratha groups in Maharashtra over demand for reservation again took violent route with many cases of arson, loot and public property destruction (Oct-Nov 2023)
 - Maratha leader Manoj Jarange Patil ends fast, warns of 'choking Mumbai' if no quota is ensured by 2nd Jan 2024
- **Example Questions:**
 - » Examine the reasons for recent increase in demand for reservation among the dominant caste groups in India. What could be its impact on the social and political landscape of the country [15 marks, 250 words]
 - » Evaluate the role of reservation policies in achieving social justice and equality in a diverse country like India. [10 marks, 150 words]
- **Introduction**
 - » The last decade has seen various traditionally powerful and influential communities such as Jats in Haryana, Patidar in Gujarat, Kapu in Andhra Pradesh and Marathas in Maharashtra agitating and demanding for OBC Status. The recent protest in Maharashtra is a continuation of this trend.
- **Reasons for such demands/agitations**
 - » **Farming and Employment Crisis:**
 - Agriculture sector over the years have suffered due to land fragmentation, increased input cost, climate change, land degradation etc. It has impacted the income of landed groups and a lot of farmers have turned into small and marginal farmers or even agricultural laborers. These people don't have access to good quality education and skilling opportunities which impacts the jobs available for them.
 - » **Exploitation of vulnerable groups in private sector jobs** because of lack of job security, weakening of labor laws and excesses by the employer. This makes everyone look for limited number of government jobs and here reservation plays a crucial role.
 - » **Perception of Economic Marginalization:**
 - These groups perceive that in the era of globalization and industrialization, they have been left behind and see reservation as a mechanism to access higher education and stable government jobs.
 - » **Sub castes or Parallel castes which got reservation** (like Yadavas in Haryana, Jats in Rajasthan, Kunbis in Maharashtra) have shown an improvement in socio-economic conditions.
 - For e.g., Maratha families witnessed the dramatic rise of poorer-than-them families from society's lower strata. They attributed the rise of Dalits and OBCs to reservation.
 - » **Political Aspirations of the caste leaders:** Mobilizing the community for reservation gives an opportunity for the caste leaders to bring a name for themselves and thus achieve political goals.

- **Should these groups be given reservation?**
 - » The **national and state backward class commissions** have found that these communities are not socially and educationally backward and are adequately represented in the services. Therefore, their past requests for inclusion in OBC has been rejected.
 - **For e.g**
 - Marathas from 33% of Maharashtra's population, are among the strongest of all communities in the state.
 - 12/20 chief ministers of Maharashtra have been from Maratha community. Current CM and Deputy CM are from this community.
 - In education sector, most major private deemed to be universities in the state, like Bharti Vidyapeeth, DY Patil University are found and run by Marathas.
 - In fact, even when governments granted reservation to these groups, it was declared unconstitutional in Supreme Court verdicts (E.g. in May 2021, the SC struck down the quota for Marathas under the state's Socially and Educationally Backward Class (SEBC) Act, 2018)
 - » Since they are not meeting the objective criteria, they are resorting to an exercise of coercive power on governance. If government agrees to these demands, it will set a wrong precedent.
 - » **The Constitution** already provides for 10% reservation for the EWS category for people belonging to non-reserved class.
 - » Giving reservation to these "upper caste" group would go against the spirit of affirmative action that has guided the eligibility quotas in central and state lists.
 - » **Therefore, no, these groups should not be given reservation, but rather steps should be taken to relieve the above mentioned grievances.**
- **Way forwards**
 - » **Reforming Agriculture Sector:**
 - Since a large section of these dominant groups are dependent on agriculture, its very important to bring reforms in agriculture to increase agri-income. Various recent initiatives like PMKSY, PMFBY, e-NAM, Increased MSP are steps in this direction.
 - Government should also focus mechanisms to promote rural industries including in the Food Processing Sector to ensure economic opportunities for everyone.
 - » **Improving Quality of Higher Education in Private Institutions:**
 - The demand for reservation is strengthened by the fact that among HEIs, government colleges where the provision for reservations are implemented provide affordable good quality educations. Private colleges are not only expensive but lack good quality.
 - » **Focus on Skilling of the workforce** so that they can easily get jobs in the private sector.
 - » **Special focus on labor intensive manufacturing sectors** to ensure employment opportunities for the youth in the country.
 - » **Effective regulation of private sectors** to ensure good working conditions, dignity and stability for workers to ensure that the most vulnerable are spared the excess of market.
 - » **Review Reservation Policies:**
 - To make it more inclusive and exclude well to do section from it.
 - Strict implementation of Creamy layer provision among OBCs and introduction of creamy layer provisions for SCs/STs will go a long way in improving the inclusivity of the reservation provisions.

- » **Stop politicizing the issue:** The political class should desist from pandering into these demands and take an unequivocal stand that Socially Advanced Castes cannot be included in the list of Socially Backward Classes.

– **Conclusion:**

- » The demand for reservation will keep emerging among different sections of societies if economic distress increases and therefore government should focus on skill development, encourage entrepreneurship and enhance the overall economic opportunities in the country.

3) SOCIAL JUSTICE: MGNREGA

– **Why in news?**

- » Union Government SOP permits drone usage for investigating corruption complaints or other violations at MGNREGA worksites (Aug 2023)
- » Standing Committee on Rural Development & Panchayati Raj highlights various issues with MGREGA and gives recommendations (July 2023)

– **Example Questions**

- » Discuss the keyways in which MGNREGA has contributed in the socio-economic sphere of rural India. What are the key challenges being faced currently in the implementation of the program. [15 marks, 250 words]

– **Introduction**

- » Mahatma Gandhi National Rural Employment Guarantee Act 2005 is a statutory job guarantee scheme for rural India.
- » It's an initiative by **MoRD**, which was launched in 2006. It is **aimed at:**
 - Enhancing the livelihood security of people in rural areas by legally guaranteeing 100 days of wage-employment in a financial year to adult members of any household willing to do unskilled manual work related to public work at the statutory minimum wage.
 - Creating **durable assets** (such as roads, canals, ponds, wells)
- » The scheme also helps in protecting environment, empowering rural women, reducing rural urban migration, and fostering social equity, among others.

– **Other Key Features**

- » **Demand Driven Program:** Workers are provided work when they demand it and not when the government wants it.
- » Employment is to be provided **within 5 km** of an applicant's residence.
- » If work is not provided within 15 days of applying, applicants are eligible for an unemployment allowance.
- » **1/3rd** of the stipulated workforce should be women.
- » **Social audit** of the work done by Gram Sabha.

– **Steps taken to improve the functioning.**

- Management Information System** - digitization of all process in MGNREGA - available in public domain - promotes transparency.

- ii. **Mandatory expenditure on agriculture and allied sector:**
 - » As per the provision of the Act, the District Programme Coordinator is required to ensure that at least **60 per cent of the works to be taken up in a district** in terms of cost shall be **for the creation of productive assets directly linked to agriculture and allied activities** through development of land, water, and trees.
- iii. **Training and Skill Development of Workers:**
 - » **Training of MGNREGA workers** under initiatives like **Bare Foot Technicians (BFT)** to move than up the skilling ladder.
 - » **Similarly, project "UNNATI" focuses on upgrading the skill base of MGNREGA workers.**
- iv. **Other technology to Reduce Corruption and improve transparency:**
 - » **DBT through E-Payments** are used for payment of wages which is ensured fast payment and reduced siphoning of resources.
 - » **Geo-Tagging of assets** to reduce corruption.
 - Rolled out in 2017 and more than 5.2 crore assets (Jan 2023) have been geo-tagged and made available in public domain.
 - » **National Mobile Monitoring Software (NMMS)** App was launched in 2021 which permits taking real time attendance of workers in MGNREGA worksites with a geo-tagged photograph.
 - It is a big step toward step towards bringing transparency and proper monitoring of the schemes and will help in increasing oversight of the program.
 - » **According to a SOP** recently (Aug 2023) issued by MoRD, **drones** will be used for monitoring of MGNREGA work. It will be used in four types of monitoring: Surveying the ongoing works, inspecting the completed works, impact assessment, and special inspections in case of complains.
- v. **Regular verification of Job Cards (JC)** to weed out the bogus and duplicate JCs
- vi. **Efforts to cover all landless households:**
 - » As per the SECC 2011, there are 5.5 crore households in India which fall in the landless category. Government is taking measures to get all these households a Job Card and thus employment under MGNREGA.

– **Performance of the Scheme:**

i. **Positives/Achievements**

- » **Various Government Reports** have indicated that MGNREGA has led to:
 - **Reduction in Poverty:** The program reduced poverty by 32 percent and prevented 14 million people from falling into poverty.
 - **Raised Income level:** Although it fails to add to the number of days that Individual work, it attracted individuals who were previously employed in less productive work, thereby raising their income.
 - **Relief during distress situations**
 - During COVID-19 crisis it had emerged as a mechanism to ensure jobs for migrants returning back home and

- It serves as an important source of income during distress situations such as drought, famine etc. Additional employment opportunities is made available in these circumstances.
- **Upliftment of weaker sections** like women, SCs and STs through creation of livelihood opportunities.
 - Increase in women's control over resources: MGNREGs scheme may be the first opportunity for many women to earn cash income resulting in substantial increase in women's control over resources- including cash in hand and likelihood of having a bank account.
 - The % of SC workers in MGNREGA has been around 20% and ST workers around 17%.
- **Impact on Education of Children**: Higher level of educational attainment for children: MGNREGs households were likely to obtain higher level of educational attainment and were less likely to be working.
- **Rise in financial inclusion**: during this period, there has been a general increase in financial inclusion, reliance on moneylender has gone down and accessing of formal credit grew.
- **Development of Rural Assets**
 - Irrigation canals and roads have augmented rural infrastructure.
- **Mitigation of climate change** - through water conservation, drought prevention, reforestation and flood control activities.
- **International praises**
 - In World Development Report 2014, the world Bank termed it a "stellar example of rural development."

ii. Shortcomings/Limitations in implementation

- **Factors which adversely affect the implementation of MGNREGA**
 - » **Funds constrains.**
 - Parliamentary Standing Committee has also raised concerns about slashing of the budget for MGNREGs. In the FY 2023-24, the allocations for MGNREGs have been drastically slashed to Rs 60,000 crores for this financial year from a Rs 73,000 crore budgetary estimates for 2022-23.
 - This allocation is much lower than World Bank recommendations of Rs 1.7% for the optimal functioning of the program.
 - » **Disparity of wages across state and Wages less the minimum wages in many states:**
 - Parliamentary committee in a report in 2023 has highlighted that daily wage rates ranged from Rs 204 to Rs 331 in different states and UTs.
 - According to the new wage rate notified for FY2023-24, the lowest wage is in Chattisgarh and MP at Rs 221, while the highest is in Haryana at Rs 357.
 - » **Delays in wage payment sometimes discourages work under MGNREGA. It also increases the chance of corruption.**
 - » **Institutional Shortcomings:**

- **PRIs suffer from challenges like inadequate administrative and technical expertise:**

- This adversely affects proper planning, approval, monitoring and social audit of the scheme.
- Inadequate technical staff to help unskilled workforce.

» **Non-Appointment of Ombudsmen:**

- Under the act, there should be an ombudsperson for each district who will receive grievances, conduct enquiries, and pass awards.
- Standing committee in 2022 noted that out of 715 possible appointments, so far only 263 ombudsmen have been appointed which shows poor coordination between central and nodal agencies.

» **Quality of Assets** which are getting created have turned out to be of incomplete or of poor quality, requiring repairs every year.

» **Cases of corruption / lack of transparency**

- Social audit hasn't been very effective because of lack of cooperation from government officials. Further, non-compliance with transparency and accountability provisions and poor maintenance of records are impacting the implementation of the mega scheme.
- **Fabrication of jobs cards** and associated corruption.

» **Inadequate coverage of person with disabilities and women in many states** is impacting inclusive aspect of the scheme.

» **Some Issues specific to women:**

- Lack of childcare facilities and basic amenities at the site like clean drinking water, sanitation facilities impact health and safety of women.
- Lack of awareness about the process and entitlements available under the scheme.

– **Steps that need to be taken**

- More Funds:** MGNREGA has the potential to change the face of rural India and hence more funds should be allocated for the scheme.
- Minimum wage:** MGNREGA wages should be linked with Minimum wages act (Now The Code on Wages) and no state should be allowed to pay less than the statutory amount.
 - » Parliamentary Standing Committee has recommended that government should explore the possibility of making the wages paid under the scheme uniform across the country.
 - » Wages should also **be linked with CPI-R** rather than CPI-AL which is an outdated index.
- Capacity Building of PRIs** by empaneling institutions that can be training institutions for MGNREGA.
 - » **More technical human resource** needs to be provided at rural level to improve the quality of the assets which are getting created.
 - » **Better Planning** for **durable infrastructure** creation.

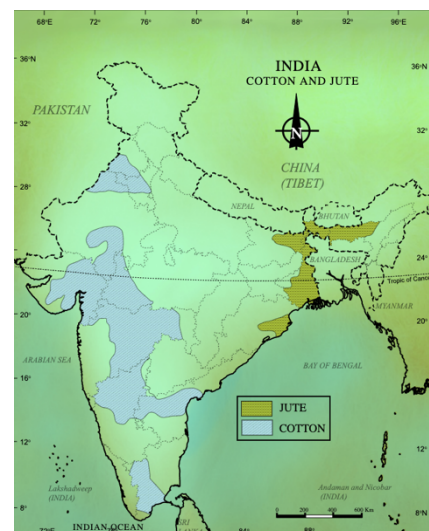
- iv. **Appoint Ombudsperson** in all districts on high priority to ensure simple and effective grievance redressal.
- v. **Monitoring** of the projects needs to improve.
 - » Strengthening Social Audit: CAG should develop mechanism in consultation with other stakeholders to handhold Gram Sabhas to ensure regular social audits of all projects under MGNREGA.
 - » Civil Society can also monitor the Information Management system to ensure that the program is properly implemented.
- vi. **Promoting the use of Adhaar based biometric verification** to prevent fake job cards etc.
- vii. **Improved facilities at workplace** specially for women laborers. (E.g., Clean Sanitation facilities, child care facilities etc.)

– **Conclusion**

- » Since, MGNREGA has proved its socio-economic advantages for rural areas, the program should be continued in full throttle. But, at the same time it is important that the work being done under it is producing something concrete & sustainable and that there is a transparent grievance redressal mechanism for the unskilled work force which has worked under MGNREGA or is seeking work under MGNREGA.

1) AGRICULTURE: COTTON

- **Example Questions**
 - » What are the key climatic requirements of Cotton cultivation. How is cultivation of cotton distributed geographically in the country? [10 marks, 150 words]
- Cotton is one of the principal commercial crops of India and it provides livelihood to about 6.0 million cotton farmers.
 - » **India is the largest producer and consumer of Cotton** in the world. Adoption of Bt Cotton in 2000s enabled significant increase in cotton production from **10 million bales in 2001-02 to 34.3 million bales in 2022-23**.
 - » It is an indigenous crop which is sown as Kharif Crop in semi-arid region of the country. It takes 6-8 months to mature.
- **Suitable Climate Condition for Cotton**
 - » Cotton is a crop of tropical and subtropical areas and requires uniformly high temperatures between 21 degrees and 30 degrees C. The growth is negatively impacted if the temperature falls below 20 degree C. **Frost** is harmful for the crop.
 - » The crop has **modest water requirement** (average annual rainfall of **50-100 cm**) and can be grown in areas with lower rainfall with the help of irrigation.
 - » **Good sunshine** is a must at the time of flowering and moist weather or heavy rainfall at the time of ball opening and picking are detrimental to the crop.
- **Other requirements**
 - » Cheap and skilled labor force at the time of picking of cotton. Normally the picking season is spread over a period of 3 month.
- **Traditionally**, it is cultivated on the **lava plateau of Deccan** and therefore the soil here is called the **Black Cotton soil**.
- **In Tamil Nadu**, it can be grown both in Kharif and Rabi season as there is **no threat of frost** which is dangerous for the cotton production.
- **Total Production and Distribution of Cotton Cultivation in India:**
 - » India has the world's highest area under cotton cultivation which accounts for around **6% of the net sown area**. India produces **6 million tonnes** of Cotton every year, which is **about 23% of the world cotton**.
 - » India also produces 51% of the total organic cotton production of the world, which demonstrates India's effort towards sustainability.
 - » There are **three major cotton producing regions in India**:
 - i. Southeast Punjab, Western Haryana, and Northern Rajasthan



- ii. Gujarat, Maharashtra and neighboring Southern Rajasthan in Western India
- iii. North Karnataka, Andhra Pradesh and Tamil Nadu

– **Initiatives:**

» **Budget 2023-24:**

- To enhance productivity of extra-long staple cotton, we will adopt **a cluster based and value chain approach through Public Private Partnerships (PPP).**

This will mean collaboration between farmers, state and industry for input supplies, extension services, and market linkages.

- **Various types of cotton grown in India:** Three broad types of cotton are generally recognized on the basis of length, strength, and structure of the fiber.

a. **Long Staple Cotton**

- Cotton with longest fiber (24 to 27 mm)
- Fine and shining quality, used for superior quality of clothes.
- About 50% of the cotton produced in the country is long stable type.

b. **Medium Staple Cotton**

- Length of the fiber (20 to 24 mm)

c. **Short staple cotton**

- Inferior cotton with less than 20 mm length. Used for making inferior cloth and fetches less price.

– **Conclusion**

- Cotton cultivation, together with cotton textile industry employs millions of people in India and therefore can play a very important role in improving the employment situation in the country.

A) PINK BOLL WORM (PBW) RESISTANCE AGAINST BT COTTON AND CHALLENGE TO SUSTENANCE OF BT COTTON

- **Background:** Indian farmers have faced consistent loss of Bt Cotton crops due to pink bollworm attacks since the mid-2000s, when scientists found that the insect had became resistant to the genetically modified variety of cotton.

» **About PBW:**

- PBW is a worm that destroys parts of the developing cotton fruit, such as the square (flower bud) and the boll (rounded sac of seeds with cotton fibres).
- Adult worms are thin grey moths that lay eggs on buds, flowers, and bolls. The larvae hatch from the eggs and burrow into the bolls to feed on the seeds. It cuts through the lint and stains it in the process, resulting in a loss of quality

- » Bt Cotton was encoded with Cry1Ac toxin which protected it from all three species of bollworms (American, spotted, and pink bollworm)

- Later, Cry2Ab gene was also added in Bt Cotton to improve protection against the American Bollworm.

- » But, in 2008, scientists in India found unusual survival of Pink bollworm in Amreli district of Gujarat, indicating of Pest's resistant to Bt cotton.

- By 2014, it was clear that Pink Bollworm had become resistant to both Cry1Ac toxin as well as Cry2Ab toxin.
 - **PBW** is more dangerous than American Bollworm as it feeds from inside the bolls and thus remains elusive in the initial stages and is seen in harvest stages when the damage is already done. As it feeds from inside, no amount of pesticide help control it.
- **How was resistance developed by PBW: Key Factors:**
- » **Early Sowing and Late Sowing:** The ideal time for sowing cotton is April 15 to May 15. But many farmers in the northern belt of Haryana, Rajasthan and Punjab have started sowing from March end or the first week of April and extend it up to June end, which is an increase from 45 days to 80 days.
 - The early sowing season coincide with the time the PBW comes out of hibernation or the diapause stage in the winter months. The pest survives in this stage between two cotton seeds or cotton crop residue.
 - The cotton plants are at bud or flowering stage, during which the PBW searches for food and begins feeding on bolls during the larval stage, which continues for 14-17 days. It eventually starts laying eggs.
 - The issue worsens for farmers who sow late. The process enables worms to access food for longer periods and increasing generations.
 - » The **longer duration of cotton varieties** in the south and central India, which lasted upto 150-160 days, helped the pest develop resistance to the genetically modified varieties.
 - » **Not Planting other varieties against Advice:** Farmers were repeatedly advised to plant indigenous, hybrid varieties of cotton alongside Bt to prevent developing resistant. "The crossbreeding of pests from different varieties of plants would have prevented developing tolerance for longer years". But farmers haven't followed the advice.
- **Cotton Crops across the North-Indian States**, Punjab, Haryana, and Rajasthan are reporting a severe pink bollworm attack and even Bt-Cotton is falling prey to the pest it was created to resist. (Oct 2023)
- **Impact:**
- » **Damage to crops:** Damage in 2023, is the highest since 2001 - both according to government and farmers.
 - **Note:** Before 2001, the American bollworm created havoc and ruined lives of farmers.
 - » **Difficult to find laborers:** As laborers refuse to pick leftover crop as yield is too low
 - » **Difficult to find buyers** as traders refuse to buy citing poor quality.
 - » **Farmer Suicide:** In Sep 2023, Sri Ganganagar district saw first farmer suicide in over a decade. It was due to the fact that farmer had a lot of debt accumulated due to loss of cotton crop consecutively for 3 years.
 - » **Farmers giving up cotton cultivation** in the northern belt (for e.g. the production of cotton in Punjab has almost halved in the past decade).
- **Way Forward:**
- Effective monitoring and timely adoption of a crop-window based integrated pest management (IPM) is the immediate solution.
 - Scientists are also experimenting with a technology that has proven successful in the USA. This is called **PBKnot** or **PB Rope L**.

- It involves using a 20 cm polyethylene hollow rope that is impregnated with pheromone gossyplure - chemical emitted by female moths - to attract male moth. This confuses the male moth and prevents them from reaching the actual female moth. This thus disrupts the mating process and reproductive cycle.

– **Conclusion:**

- While promoting Crop-Window Integrated Pest Management, the GoI also needs to promote PBKnot a biotechnology tool and implement it in all cotton-producing states.

2) S&T: CAR-T CELL THERAPY: NEXCAR19 – INDIA’S FIRST INDIGENOUSLY DEVELOPED CAR-T CELL THERAPY

– **Why in news?**

- The CDSCO has granted market authorization for NexCAR19, India’s first indigenously developed CAR-T cell therapy, to ImmunoACT (Nov 2023)

– **Practice Questions:**

- Explain the mechanisms of CAR-T Cell therapy? Discuss the key advantages of NexCAR19 over other foreign CAR-T cell therapies [15 marks, 250 words]

– **Background: How Cancer has been treated before CAR T-Cell Therapy:**

- **Surgery** (removing the cancer)
- **Radiotherapy** (delivering ionizing radiation to the tumour)
- **Systematic Therapy** (administering medicines that act on tumour)
 - » The earliest form of systematic therapy was chemotherapy. It preferentially acts on cancer cells because of the latter’s rapid, unregulated growth and poor healing mechanisms. These drugs have modest response rate and significant side effects as they affect numerous cell types in the body.
 - » The next stage in its evolution was targeted agents a.k.a. immunotherapy: The drugs bind to specific target on the cancer or in the immune cells that help the tumour grow or spread. This method often has less side effects as the impact on non-tumour cells is limited. However, it is effective only against tumours that express these targets.

– **CAR-T Cell Therapy** has emerged as a new development in this front.

- It is a revolutionary therapy that modifies immune cells, specifically T-Cells, by turning them into potent cancer fighters known as CAR-T Cells.
- **How it works?**
 - » In CAR T-cell therapy, the patient’s blood is drawn to harvest T-cells – immune cells that play a major role in destroying tumour cells.
 - » **Researchers modify these cells** in the laboratory so that they express specific proteins on their surface, known as chimeric antigen receptors (CAR): they have an affinity for proteins

on the surface of tumour cells. This modification in the cellular structure allows CAR T-cells to effectively bind to the tumour and destroy it.

- » These modified cells are then infused back into the patient's blood stream after conditioning them to multiply more effectively.
- » The cells are even more specific than targeted agents and directly activate the patient's immune system against cancer, making the treatment more clinically effective. This is why they are called '**living drugs**'.

▫ **Advantages of CAR-T Cell therapy over other Cancer fighting methods:**

- » It is very accurate and only targets cancer cells.
- » It makes the **treatment easier** with onetime therapy (unlike several sessions of chemotherapy)
- » It can also fight non-responsive cancer patients.
- » It is designed to cure and provide lifelong benefits.

- **CAR T-Cell Therapy in India:**

- The first major clinical trial showing they were effective was published almost a decade ago. The first indigenously developed therapy in India was successfully performed only in 2021.

- **In Oct 2023, the Central Drugs Standard Control Organization (CDSCO) granted market authorization for NexCAR19, India's first indigenously developed CAR-T cell therapy, to ImmunoAct, a company incubated by IIT Bombay. This paves the way for commercial launch of this therapy in India.**

- It is designed to target cancer cells that carry the CD19 protein. This protein acts like a flag on cancer cells, which allows CAR-T cells to recognize and attach themselves to the cancer cells and start process of elimination.
- **Who can get the NexCAR19 therapy?**
 - » The therapy is for people with B-Cell lymphomas who didn't respond to standard treatments like chemotherapy, leading to relapse or reoccurrence of the cancer.
 - » **B-Cell leukaemia is most common among children. Are they also eligible?**
 - For now, therapy's approval is only for patients aged 15 years and above.
 - The pediatric trial phase is currently underway at the **Tata Memorial Hospital**, in collaboration with IIT-Bombay.

▫ **Significance:**

- » India is **one of the first developing country** to have its own Car-T therapy. Even some developed nations don't have their own CAR-T therapies and they import from USA or Europe.
- » This reduces the cost of treatment to about **1/10th of the cost abroad** and has the potential of boosting medical tourism in India. It costs around Rs 3.3 crores abroad while in India it will cost somewhere between 30-40 lakh rupee.
- » Lab and animal studies have shown that **NexCAR19** lead to significantly lower drug-related toxicities. For e.g., it causes minimal damage to neurons and the central nervous system, a condition known as neurotoxicity. The therapy also leads to minimal Cytokine Storm

Syndrome (CRS), which is characterized by inflammation and hyperinflammation in the body due to the death of a significant number of tumour cells, as CAR-T cells are designed to target and eliminate cancer cells.

Levelup IAS

3. PRELIMS FACTS:

1) PLACES IN NEWS: AMAZON RIVER

Amazon River:

- Amazon river is the river with largest drainage system in the world in terms of volume of its flow and the area of its basin.
 - It is estimated that about 1/5th of all water that runs off Earth's surface is carried by Amazon. The immense amount of freshwater flowing into Atlantic dilutes the ocean's saltiness for more than 160 kms from shore.
- **Length:** The total length of the river - as measured from the headwaters of Ucayali-Apurimac river system in the southern Peru is atleast **6400 km** which makes it slightly shorter than Nile river.
- **Source:** The source of the river is in Andes mountains and the mouth is in Atlantic Ocean.
- **Controversy:** Both length and source of the river have been debated and some claim that the river is longer than Nile.
- **Drainage Basin:** The entire area that Amazon river drains is the largest river basin in the world. It drains part of Brazil, Peru, Ecuador, Columbia, Bolivia and a small part of Venezuela, Guyana and Suriname.



- **Amazon river is not building Delta:** Most of the estimated 1.3 million tons of sediments that the amazon pours daily into the sea is transported north by coastal currents to be deposited along the coasts of Brazil and French Guiana.
- **Affects sea level in Caribbean Sea:** The Amazon river releases so much fresh water into the Atlantic sea, it alters the sea level in the Caribbean. The amazon water get picked up by Caribbean current, which carries the water to Caribbean island.

B) AMAZON BASIN FACING WORST DROUGHT IN 122 YEARS (OCT 2023: DTE)

- The Amazon river is currently experiencing a severe drought, which has caused the region's waterways to reach their lowest levels since the early 20th century.
- **Reasons:** Climate Change and El Nino are likely factors.
- **Impact:**
 - **Increasing wildfires** -> devastating effects on region's air quality.
 - **Biodiversity Loss:**
 - » E.g. Abnormally hot water temperatures, combined with diseases, pollution and low water levels, resulted in death of at least 100 Amazon River Dolphins (Inia geoffrensis), a species listed as EN by the IUCN.

- » Similarly, the regions caiman species (the black caiman, spectacled caiman, Cuvier's caiman and the smooth-fronted caiman) are also likely to be adversely impacted.
- » **Food shortage** because of reduced production of fruits, vegetables etc is becoming a reality.
- **Increased human animal conflict:**
 - » E.g. increased human-caiman conflicts are already occurring i.e. there is increasing alligator attacks on humans.

2) S&T: BIOLOGY: CHONDROCYTES PRODUCING HAEMOGLOBIN

- **Why in news?**
 - » Haemoglobin isn't used only in blood, scientists find in major discovery (Nov 2023: Source: TH)
- **About Haemoglobin and its functions**
 - » **Haemoglobin (Hb)** is a protein found in the red blood cells that carries oxygen from the lungs to the body's tissues and returns carbondioxide from the tissues back to the lungs.
 - » It is made up of four protein molecules (globulin chains) that are connected together. Each globulin chain contains an iron containing compound termed heme. Embedded within the iron compound is an iron atom which is vital for transporting oxygen and carbondioxide in our blood. This iron contained in the haemoglobin is also responsible for the red color of the blood.
 - » **Normal haemoglobin levels:**
 - The normal range of haemoglobin depend on the age and, beginning in adolescence, the gender of the person.
 - **Adult male:** 14 to 18 gm/dL
 - **Adult female:** 12 to 16 gm/dL
- **Recent Updates (Nov 2023)**
 - » In a study published in **Nature**, scientists have reported that cells that make cartilage, (the connecting tissue between bones) also make haemoglobin.
 - **Note:** The primary cells that makes cartilage is the Chondrocyte.
 - » **Scientists** at Beijing Institute of Biotechnology the chondrocytes within the growth plates of new-born mice were not only producing large amount of haemoglobin, but also that it was coalescing and forming large blobs without a membrane. The scientists called these blobs haemoglobin bodies or **Hedy**.
 - » **Are these haemoglobin bodies (Hedy) functional?**
 - Scientists found that removing the gene that made haemoglobin specifically in the cartilage tissue resulted in cell deaths among the chondrocytes. It was clear that Hedy was essential for chondrocytes to live.

- » **Does haemoglobin also carries oxygen in chondrocytes?**
 - Scientists found that cartilage tissue synthesized a large amount of haemoglobin to cope with hypoxic conditions.
 - They found that cartilage that didn't contain haemoglobin showed signs of **hypoxic stress**.

3) EB&CC: UNEP'S CHAMPION OF THE EARTH AWARD

- **About the Award**
 - » Instituted in 2005, it is the **highest environmental honour of the UN**, which is given **annually** and recognizes outstanding figures from the government, civil society and private sector whose actions have had a transformative, positive impact on environment.
 - » The award is given in **different categories** including Policy Leadership, Science and Innovation, Entrepreneurial Vision, Inspiration and Action, lifetime achievement etc.
- **In Oct 2023**, awards were given to:
 - » **Josefina Belmonte**, Mayor of Quezon City in the Philippines (Policy Leadership), the UK based Ellen MacArthur Foundation (Inspiration and Action), China's Blue Circle (Entrepreneurial Vision), Jose Manuel Moller of Chile (Entrepreneurial Vision) and Council for Scientific and Industrial Research (CSIR) (Science and Innovation) were declared winners "for the innovative solutions and transformative actions to tackle plastic pollution.
 - » **Belmonte** is driving environmental and social change through a raft of policies to combat climate crisis, end plastic pollution and green Quezon city.
 - » **The MacArthur Foundation** has played a leading role in mainstreaming a lifecycle approach, including for plastics.
 - » **Blue Circle** is China's largest marine plastic waste program. It uses blockchain and IoT to track and monitor the full lifecycle of plastic pollution - from collection to regeneration, remanufacturing and resale.
 - » **Jose Manuel Moller** is the founder of Algramo, a social enterprise dedicated to providing refill services that reduce plastic pollution and lower cost of everyday essentials.
 - » **South Africa's CSIR** uses cutting edge technology and multidisciplinary research to develop innovations to tackle plastic pollutions and other issues.
- **Award to PM Modi in 2019**
 - » He was selected in **leadership category**.
 - » For his championing of International Solar alliance, a global partnership that aims to scale up solar energy in 'solar-resource' rich countries and for his leadership in the fight against plastic pollution.

4) EB&CC: MOTHS

- **Why in news?**
 - » Study identifies 37 rare moth species in Kerala, three first time in India: ZSI (Nov 2023)

About Moths:

- Moths are group of insects that include all members of the order Lepidoptera that are not butterflies.
- **Kingdom: Animalia; Phylum: Arthropoda; Class: Insecta; Order: Lepidoptera**
- **Note:** Lepidoptera is an order of insects that includes butterflies and moths.
- While butterflies are pollinators, moths are largely considered crop pests. Though some moths pollinate the flowers that bloom at night.

Significance of Moths:

- They perform some **essential ecosystem services**, including pollination, nutrient cycling and providing prey to birds and bats.
- Moths are nocturnal and potential indicators of ecosystem health and changes. Therefore, in agro-ecosystem, moth abundance is positively related to abundance of crops.

Problems caused by Moths:

- Several moths are considered pests.



Important Moths:

- **Silkworm moth**, (*Bombyx mori*) in its caterpillar stage is used for silk production (sericulture) for thousands of years. The species has undergone complete domestication with the species no longer being found in the wild.

About the Zoological Survey of India's study on Moths in Kerala:

- The study was conducted through a two - year long survey from 2018.
- **Key Findings:**
 - » The study identified 37 new moth species including 3 new species discovered first time in India. These were Aeolarcha eaphthalma, Pharambara micacealis, and Tirathaba leucotehars.
 - » There has been a decline in the diversity due to excessive use of pesticides, radiation and air pollution.

5) EB&CC: BIODIVERISTY: CANDOLLEOMYCES ALBOSQUAMOSUS: NEW MUSHROOM SPECIES FROM WESTERN GHATS (OCT 2023: TH)

The mushroom sports a honey-yellow cap, white stem, and grows to 58 cm.

Its habitat includes dead logs or bamboo culms in the natural forest.

Significance: The discovery of the new species of genus Candolleomyces in India is special given that there are only 35 species in this genus worldwide.

