



Mains Marathon
Compilation

11th to 16th September, 2023

Mains Marathon Compilation for the Month of September, (Second Week) 2023

- 1. Evaluate the potential economic benefits of the IMEE-EC for India. How can this initiative enhance India's trade connectivity with Europe and the Middle East, and how does it compare with China's BRI in terms of scope and objectives?**
- 2. Discuss the geopolitical implications of the African Union's inclusion as a permanent G20 member. How does this move position Africa in global politics, and what are its potential benefits for India?**
- 3. Explain how the movement of tectonic plates can lead to earthquakes. Use the Morocco earthquake as a case study. What lessons can India learn from this for its disaster management strategies?**
- 4. How crucial is the role of states in ensuring food security in India? Discuss with examples**
- 5. "Fraternity in India is often overshadowed by social and caste inequalities, making it a neglected constitutional value." Critically assess the statement, considering the role of political and social factors in promoting fraternity in India.**
- 6. The MoU between India and Saudi Arabia on renewable energy can be a game-changer for India's energy security." Discuss**
- 7. Critically analyze the role of the National Council for Teacher Education (NCTE) in maintaining the quality of teacher training in India.**
- 8. Discuss the role of climate change in increasing the frequency and intensity of floods in India. Elaborate on the need for a coherent framework integrating various laws for effective flood risk management.**
- 9. Discuss the significance of the Pradhan Mantri Matsya Sampada Yojana (PMMSY) in the context of India's Blue Economy. Analyze its impact on the fisheries sector and its potential to transform the livelihoods of the fishing community.**
- 10. Discuss the significance of carbon trading in the context of India's commitment to reducing greenhouse gas emissions. Analyze the potential challenges and benefits of establishing the Indian Carbon Market (ICM).**
- 11. Discuss the challenges faced in ensuring a consistent and quality water supply under the Jal Jeevan Mission. Suggest measures to address these challenges.**
- 12. Discuss the significance of genetically modified (GM) crops in achieving global food and nutritional security. Highlight the challenges and benefits associated with GM crops.**
- 13. Discuss the significance of scientific assessments in wildlife reintroduction projects, especially in the context of potential pathogen threats. How can such assessments ensure the long-term success of reintroduction efforts?**
- 14. Discuss the significance of breeding for disease resistance in crop varieties, especially in the context of Basmati rice. How do government policies with regard to exports impact Basmati rice farmers in India?**

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1. Evaluate the potential economic benefits of the IMEE-EC for India. How can this initiative enhance India's trade connectivity with Europe and the Middle East, and how does it compare with China's BRI in terms of scope and objectives?

Introduction: Give brief introduction of IMEE-EC.

Body: What are the potential economic benefits of the IMEE-EC for India?

Conclusion: Way forward.

The recently concluded G20 summit in India witnessed a historic moment when Prime Minister Narendra Modi announced the launching of a connectivity corridor spanning India to Europe via West Asia. Officially called the India-Middle East-Europe Economic Corridor, it is being positioned as a modern-day Spice Route, and more significantly, as a weighty ideological alternative to China's Belt and Road Initiative.

What are the potential economic benefits of the IMEE-EC for India?

- **Enhanced Trade Connectivity:** Initiatives like IMEE-EC can improve India's trade connectivity with Europe and the Middle East by developing better infrastructure, such as ports, roads, railways, and logistics hubs. This can lead to reduced transportation costs, faster transit times, and increased trade volumes.
- **Alternate transportation route:** By integrating India's hydrocarbon value chain and establishing an innovation corridor for green energy and innovative technology manufacturing value chains, this connectivity architecture could provide India with an alternative trans-regional commercial transportation route.
- **India-Arab-Mediterranean multi-modal corridor:** IMEE-EC could act as a bridge to connect important cities like Mumbai and the European mainland via the Greek transshipment port of Piraeus, the Israeli port of Haifa, and Dubai port, with a significant part of the route traversing through the Saudi Arabian mainland.
- **Boost to self-reliance:** To increase India's capacity and self-reliance, IMEE-EC would assist and improve the infrastructure in the logistics and transportation industry. It will help in achieving progress in initiatives such as Make in India, Sagarmala, and Atmanirbhar Bharat.

Comparison with China's BRI:

- **Nature & Scope:** BRI is a massive global infrastructure and economic development initiative spanning multiple continents, while IMEE-EC may focus on a specific region (Europe and the Middle East). IMEE-EC is jointly launched by the US and India and spans connectivity and infrastructure running through India, Saudi Arabia, the United Arab Emirates, Jordan, Israel, and the European Union while BRI is wholly a Chinese infrastructure project.
- **Geopolitical Implications:** BRI has faced criticism for its geopolitical implications, including concerns about debt dependency. IMEE-EC may have a different geopolitical dynamic, depending on the countries involved and their interests & ensuring sustainable development.
- **India's interest:** IMEE-EC will increase India's trade cooperation with countries of the Middle East & provide an alternate route to the busy Suez Canal. On the other hand, BRI entails a CPEC corridor that passes through PoK violating India's sovereignty.

Conclusion:

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The new route would be an alternative to China's BRI providing an alternate supply chain route that will encourage and provide impetus to economic development through enhanced connectivity and economic integration between Asia, West Asia/Middle East, and Europe.

2. Discuss the geopolitical implications of the African Union's inclusion as a permanent G20 member. How does this move position Africa in global politics, and what are its potential benefits for India?

Introduction: Give context of AU membership in G20.

Body: Highlight geopolitical implications of AU entry in G20 & potential benefits for India.

Conclusion: Way forward.

Recently, AU was included as a member of G20 this year. The AU is an intergovernmental organization of 55 member states located on the continent of Africa. Launched on July 9, 2002, the grouping is the successor of the Organisation of African Unity (OAU), which was formed in 1963. The AU seeks to build "an Integrated, Prosperous and Peaceful Africa, driven by its citizens". The AU's secretariat, the African Union Commission, is based in Addis Ababa.

What are the geopolitical implications of the African Union's inclusion as a permanent G20 member?

- **Greater influence of Africa:** The African Union may represent African interests in the G20 on a variety of problems, such as economic development, trade, investment, climate change, and peace and security. The inclusion of the African Union would provide the continent with a more significant voice in global economic and geopolitical discussions.
- **Redesign global order:** The inclusion of AU as a member would have significant implications on the changing global order which would be more inclusive & based on new rules regarding global trade, finance, and investment architecture.
- **Economic cooperation:** An increase in commerce and investment in Africa may result from membership in the G20. African states will collaborate with G20 members to promote business alliances and development projects.
- **Reform in Global Governance Institutions:** The inclusion of AU offers optimism to the "Global South" regarding reforms in Global governance institutions like IMF, World Bank & UNO. This will make them more inclusive and representative of emerging powers and regions.

How does this benefit India?

- **Development Cooperation:** India has been involved in various development projects in Africa, including capacity building, infrastructure development, solar power generation, and healthcare initiatives. AU's presence in the G20 could provide opportunities for India to collaborate on larger-scale development projects with African nations.
- **New areas of engagement:** India's engagement with AU has diversified to new areas like energy, and defense. This can be seen as India has emerged as a key defense supplier to Africa with Seychelles, Mauritius, and Mozambique emerging as top arms importers under the Made in India program.
- **Energy security:** Africa is a significant source of energy resources, including oil and natural gas. India's energy security could benefit from closer economic ties and energy partnerships with African nations, facilitated by the AU's presence in the G20.

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- **Strategic relations:** To counteract China's influence in the region, India has been working to deepen its economic and geopolitical ties with Africa. An opportunity to interact with African countries on a wider variety of issues may arise through closer cooperation inside the G20 framework.

Conclusion:

The inclusion of AU in G20 will transform the multilateral body towards a more representative, inclusive forum to address issues such as a turbulent global economy, the North-South divide, management of food, fuel, and fertilizers, and ensuring health, energy, and water security.

3. Explain how the movement of tectonic plates can lead to earthquakes. Use the Morocco earthquake as a case study. What lessons can India learn from this for its disaster management strategies?

Introduction: Give context of the question.

Body: How does tectonic plates affect the earthquakes? What lessons can India learn from disaster management strategies?

Conclusion: Way forward.

An earthquake of magnitude 6.8 struck Morocco with its epicentre located in the Al-Haouz province, in the Atlas Mountains of the historic city of Marrakech. Reports have pointed out that earthquake was a shallow-earthquakes which are generally more dangerous as they carry more energy when they emerge to the surface when compared to quakes that occur deeper underneath the surface. While deeper quakes do indeed spread farther as seismic waves move radially upwards to the surface, they lose energy while traveling greater distances.

How do tectonic plates lead to earthquakes?

- **Convergent boundaries:** Shallow quakes in Morocco occur due to the northward convergence of the African plate concerning the Eurasian plate along a complex plate boundary. The intense pressure and friction at subduction zones can cause rocks to deform and store energy.
- **Oblique-reverse faulting:** Shallow quakes also occur due to oblique-reverse faulting at shallow depths within the Moroccan High Atlas Mountain range. This type of faulting is common in areas like Morocco when one tectonic plate is converging into another.
- **Accumulation of Stress:** As tectonic plates interact at these boundaries, they may get stuck due to friction, irregularities in the fault plane, or other factors. This impedes their continuous movement, causing stress to accumulate along the faults.

What lessons can India learn from its disaster management strategies?

- **Seismic Assessment:** India must continue to invest in and update its seismic hazard assessment. Accurate and up-to-date information about the seismic risk in different regions is crucial for informed decision-making, building code updates, and disaster preparedness planning.
- **Early Warning Systems:** India should invest in early warning systems for earthquakes. These systems can provide valuable seconds to minutes of warning, allowing people to take cover and critical infrastructure to shut down, reducing casualties and damage.

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- **Cooperation with other nations:** Earthquakes don't respect national borders. India can collaborate with neighbouring countries in the Himalayan region to share information and coordinate response efforts, especially for larger earthquakes that may affect multiple nations.
- **Post-disaster efforts:** Effective long-term recovery plans are essential for rebuilding communities and infrastructure. Collaborative efforts between government agencies and non-governmental organizations (NGOs) are critical for effective disaster management. NGOs often play a significant role in providing relief and support to affected communities.

Conclusion:

India must take note of such disasters in other parts of the world & must be better prepared to mitigate the impact of quakes. The Himalayan region of 2500-km stretch from the Hindu Kush mountains to the end of Arunachal Pradesh is one of the most dangerous seismic zones in the world which requires preparedness and resilience-building as top priority for India.

4. How crucial is the role of states in ensuring food security in India? Discuss with examples.

Introduction: Describe the food security concept in above context.

Body: What role does states play in ensuring food security in India?

Conclusion: Way forward.

The 'State of Food Security and Nutrition in the World' report of the Food and Agriculture Organization (FAO) estimated the proportion of the population across countries who are unable to afford a healthy diet. The figure for India in 2021 was estimated at 74% of the population which shows that continuing high food-price inflation could result in people facing hardship in consuming food of adequate nutritional value. The role of states in ensuring food security in India is crucial, as they play a pivotal role in the implementation of various policies, programs, and schemes related to food production, distribution, and access.

Role of states in food security in India:

- **Varied agriculture practices:** Agroclimatic conditions and farming activities vary between states. They must create and put into effect agricultural policies that are customized to their particular requirements and environmental conditions. States like Kerala and West Bengal place more emphasis on crops like rice, whilst states like Punjab and Haryana concentrate on the production of wheat and rice.
- **Distribution & Procurement of grains:** State governments are primarily responsible for buying food grains like rice and wheat from farmers and distributing them through the Public Distribution System (PDS). They are in charge of making sure that food grains get to the people who live in poverty. Innovative PDS models have been introduced in states like Tamil Nadu and Chhattisgarh to enhance food distribution.
- **Nutrition programs:** States are responsible for implementing nutrition-specific and nutrition-sensitive programs. These include programs aimed at improving the nutritional status of women and children, such as the Integrated Child Development Services (ICDS) and the National Health Mission (NHM). States like Odisha have initiated programs like the Mamata scheme to improve maternal and child nutrition.
- **Disaster Management:** In the event of a natural disaster, such as a drought or a flood, states must be ready to manage issues related to food security. By giving afflicted communities food and shelter, they play a crucial part in disaster relief. Eg,

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states like Maharashtra have created drought relief programs to provide food and job possibilities to affected farmers during droughts.

- **Targeted welfare programs:** States have the flexibility to design and implement targeted welfare programs to address specific food security challenges. For example, the Tamil Nadu government has implemented the Amma Unavagam scheme, which provides subsidized meals to urban residents, ensuring access to affordable food.

Conclusion:

Effective collaboration between the central government and state governments is essential to address India's complex food security issues and ensure that nutritious food reaches all citizens, especially the vulnerable and marginalized populations.

5. “Fraternity in India is often overshadowed by social and caste inequalities, making it a neglected constitutional value.” Critically assess the statement, considering the role of political and social factors in promoting fraternity in India.

Introduction: Describe fraternity as a concept.

Body: What role do political & social factors play in promoting fraternity in India?

Conclusion: Way forward.

Fraternity along with liberty & equality remains the most significant tenet of liberal political philosophy. Fraternity means a sense of common brotherhood of all Indians. It is the principle that gives unity and solidarity to social life. Without fraternity, equality, and liberty will not be very useful. Fraternity has been most forgotten in our Constitution and our electoral process. B.R. Ambedkar is often credited as the person who gave primacy to ideas of Liberty, Equality, and fraternity in the Indian constitution.

What role do political & social factors play in promoting fraternity in India?

- **Historical factors:** Liberty, Equality, and fraternity are core values enshrined in the preamble of the Indian constitution. India's caste system, colonial rule, and various stages in the independence struggle had a lasting impact on the social system in India. For eg, the 1931 “Fundamental Rights” resolution, Objectives Resolution, Annihilation of Caste, & finally Constitution have played a role in promoting fraternity in India.
- **Caste system:** The caste system in India is rife with historical marginalization and discrimination of some castes, as well as deep-seated inequality. Despite constitutional protections like reservation laws, caste-based prejudice continues to exist in many forms. When caste-based differences remain widespread, fraternity might be difficult to achieve.
- **Political factors:** The political landscape in India has often been influenced by identity politics, where politicians use caste and religion as tools to garner votes. This can perpetuate divisions rather than promote fraternity. Moreover, the failure of some political parties to address social and economic inequalities exacerbates the problem.
- **Affirmative action:** Reservation laws have been put in place to advance social justice and empower vulnerable communities, yet they occasionally cause animosity among other sections of society. When some persons believe their prospects are constrained by these regulations, this can impede the growth of brotherhood.
- **Social justice movements:** The Dalit rights movement and women's empowerment programs are just two examples of social movements in India that have sought to advance social justice and fraternity. Significant progress has been made by these movements in promoting change and increasing awareness.

Conclusion:

Although fraternity remains one of the chief goals of India's parliamentary democracy and is the foundational political objective of its constitutional democracy, the current nature of India's fraternity is different from the political fraternity espoused in its Constitution. Addressing these issues requires a multi-faceted approach, including education, social awareness, and meaningful political reforms, to bridge the gaps and promote a stronger sense of fraternity among all citizens.

6. The MoU between India and Saudi Arabia on renewable energy can be a game-changer for India's energy security." Discuss

Introduction: Give brief context of MoU.

Body: How can this MoU be a game changer for India's energy security.

Conclusion: Way forward

India and Saudi Arabia signed a historic comprehensive cooperation agreement in the field of energy on the sidelines of the G20 summit. The MoU is expected to result in enhanced ties between India and Saudi Arabia in renewable energy, energy efficiency, hydrogen, electricity and grid interconnections, petroleum, natural gas, strategic petroleum reserves, and energy security.

How can this MoU be a game changer for energy security?

- **Renewable energy:** The MoU will give a great push to renewable energy transition in both nations. Saudi Arabia aims to increase its domestic renewable energy capacity to 50% of total energy by 2030. India on the other hand has set a target of doubling its renewable energy capacity of 175 GW in 2022 to 450 GW by 2030.
- **Diversification of energy resources:** India is heavily reliant on fossil fuels, particularly oil and natural gas, which are often imported from regions like the Middle East, including Saudi Arabia. Diversifying its energy sources to include renewables like solar and wind can reduce its vulnerability to fluctuations in global oil prices and supply disruptions, thereby enhancing energy security.
- **Reduce Import dependency:** India may lessen its reliance on energy imports, especially from countries that produce oil, by making investments in renewable energy. This might have important economic and geopolitical repercussions because it would lessen India's trade deficit and its vulnerability to global conflicts that could disrupt oil supplies.
- **Environment benefits:** Moving toward renewable energy is consistent with India's pledges to fight climate change. It lowers greenhouse gas emissions and works toward a more sustainable and clean energy future, both of which are essential for the environment and the well-being of its people.
- **Technology transfer:** Working together on renewable energy projects with Saudi Arabia may result in technology transfer and information exchange. This could hasten India's adoption and development of renewable energy technology, positioning it as a market leader for these sources of power.
- **Energy Access:** Renewable energy projects can also improve energy access in rural and remote areas of India, where conventional energy infrastructure is often lacking. This can help bridge the energy divide and promote social and economic development.

Conclusion:

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The success of the MoU rests on addressing challenges like regional differences in Renewable energy development policies in India and, the rising storage cost of renewables. However, success will depend on sustained commitment, investment, and effective implementation of renewable energy projects in both countries.

7. Critically analyze the role of the National Council for Teacher Education (NCTE) in maintaining the quality of teacher training in India.

Introduction: Describe NCTE.

Body: What role does the (NCTE) play in maintaining the quality of teacher training in India?

Conclusion: Way forward

The National Council for Teacher Education (NCTE) is a statutory body of the Indian government set up under the National Council for Teacher Education Act, 1993. It was set to formally oversee standards, procedures, and processes in the Indian education system. This council functions for the central as well as state governments on all matters with regards to Teacher Education and its Secretariat is located in the Department of Teacher Education and National Council of Educational Research and Training (NCERT).

What role does the (NCTE) play in maintaining the quality of teacher training in India?

- **Standardization of Teacher Education:** NCTE has established norms and standards for teacher education programs, including curriculum, infrastructure, and faculty qualifications. This has brought a degree of uniformity and quality assurance to teacher training institutions across the country.
- **Lack of Transparency:** There have been allegations of corruption and lack of transparency in the recognition and accreditation processes. Some institutions have obtained recognition through unethical means, undermining the credibility of NCTE.
- **Proliferation of Substandard Institutions:** One of the major criticisms of NCTE is its inability to effectively regulate and monitor the proliferation of substandard teacher education institutions. Many subpar institutions continue to operate, compromising the quality of teacher training in India
- **Outdated Curriculum:** The curriculum guidelines provided by NCTE can sometimes be outdated and disconnected from the changing needs of the education system. There is a need for more frequent updates to ensure that teacher education programs remain relevant.
- **Teacher Quality and Training:** While NCTE focuses on the quality of teacher education institutions, there is a need for a more comprehensive approach to improving the quality of teachers themselves. This includes ongoing professional development, which falls outside the purview of NCTE. The NCTE in recent years emphasized the need for the duration of courses by strengthening pedagogy and practice in taking programs with the incorporation of internships.
- **Inconsistent Implementation:** While NCTE sets standards and guidelines, their implementation varies widely across states and institutions. This inconsistency in implementation can lead to disparities in the quality of teacher education.
- **Research and Innovation:** NCTE promotes research and innovation in teacher education. It encourages institutions to develop innovative teaching methods and practices, which can ultimately benefit students and improve the overall quality of education.
- **Accreditation and Recognition:** NCTE is responsible for granting recognition and accreditation to teacher education institutions. This recognition helps maintain

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minimum standards and ensures that institutions offering teacher training adhere to certain quality benchmarks.

Conclusion:

India has made considerable progress in school and college education since independence concerning overall literacy, infrastructure, and universal access and enrolment in schools. However, the quality of education in a nation not only depends on literacy, infrastructure, and universal access and enrolment in schools but also depends upon the competence, dedication, and quality of school teachers. The success of any educational program largely depends on the teachers, their competencies, and skills.

8. Discuss the role of climate change in increasing the frequency and intensity of floods in India. Elaborate on the need for a coherent framework integrating various laws for effective flood risk management.

Introduction: Give a brief description related to floods.

Body: What role does climate change play in increasing the frequency and intensity of floods?

Conclusion: Way forward

According to the World Health Organization, "Floods are increasing in frequency and intensity, and the frequency and intensity of extreme precipitation is expected to continue to increase due to climate change." Devastating effects of floods were witnessed in Pakistan, Uttarakhand, Kashmir Valley, Chennai, Gujarat & in several districts of Himachal Pradesh this year. As per the Geological Survey of India, over 40 million hectares, which is nearly 12% of the total land area of India, are prone to floods.

What role does climate change play in increasing the frequency and intensity of floods?

- **Melting of glaciers:** The Himalayan region, which feeds numerous important rivers in India, is witnessing rapid glacial melting as a result of rising temperatures. Rivers may expand and flood downstream areas when there is too much meltwater and a lot of monsoon rain.
- **Rising sea level:** As a result of global warming and rising sea levels, coastal areas may experience coastal flooding in states like Kerala, Tamil Nadu, and West Bengal due to seawater intrusion during storms and high tides.
- **Change in rainfall pattern:** With greater variability and intense occurrences, climate change affects rainfall patterns. The monsoon season in India is getting more unpredictable and has increasingly frequent, heavy downpours. Flooding may occur as a result of sudden, intense downpours that overwhelm drainage systems.
- **Urbanization & deforestation:** Deforestation and urbanization are accelerated by climate change, which worsens flooding. Deforestation lowers the capacity of trees and other natural vegetation, which are essential for absorbing surplus rainfall. As impermeable surfaces are built as a result of urbanization, natural drainage is reduced and the risk of localized flooding is increased.

Why there is a need for a coherent framework for flood risk management?

- **Early warning system:** Effective flood risk management requires accurate data and early warning systems. An integrated framework can establish mechanisms for data sharing and the development of advanced early warning systems to predict and respond to floods promptly.

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- **Climate Adaptation:** The framework should incorporate climate change adaptation strategies, such as resilient infrastructure, floodplain zoning, and reforestation, to mitigate the impact of climate change on flooding.
- **Resource Allocation:** It can help in the efficient allocation of resources for flood risk management, ensuring that funds are directed toward high-priority projects that address vulnerabilities.
- **Better coordination:** Flood risk management involves multiple stakeholders at the central, state, and local levels. A coherent framework can facilitate better coordination and collaboration among these entities, ensuring a more effective response during floods.

Conclusion:

Finally, there is a need to focus on floodplain restoration and water retention of water bodies as they are considered to be pillars against flooding. But all this would require strong political will and refrain from populist policies to save lives and livelihoods and safeguard infrastructure.

9. Discuss the significance of the Pradhan Mantri Matsya Sampada Yojana (PMMSY) in the context of India's Blue Economy. Analyze its impact on the fisheries sector and its potential to transform the livelihoods of the fishing community.

Introduction: Describe PMMSY.

Body: Significance & its impact on fisheries sector and livelihood of fishing community.

Conclusion: Way forward

PMMSY is a flagship scheme for focused and sustainable development of the fisheries sector in the country with an estimated investment of ₹20,050 crore for its implementation during 2020-21 to 2024-25 as part of the Aatmanirbhar Bharat package. The PMMSY aims at enhancing fish production by an additional 220 lakh tonne by 2024-25, increasing fisheries export earnings to ₹1 lakh crore by 2024-25. It aims to boost production and exports in the fisheries sector as part of the government's aim to double farmers' income.

Significance of PMMSY in India:

- **Neel Kranti Mission:** PMMSY is integral to the vision of the Blue Revolution mission to achieve economic prosperity for the country and the fishers and fish farmers as well as contribute towards food and nutritional security through full potential utilization of water resources for fisheries development in a sustainable manner, keeping in view the bio-security and environmental concerns.
- **Job generation:** PMMSY aims to bring about the 'Blue Revolution' through sustainable and responsible development of the fisheries sector in India. It aims to generate about 55 lakh direct and indirect employment opportunities in the fisheries sector over the next five years i.e. (2020-21 to 2024-25).
- **Women empowerment:** PMMSY recognizes the role of women in the fisheries sector and promotes their active participation. It provides opportunities for women to engage in various activities along the value chain, from fishing to processing and marketing, thereby empowering them economically.

What is its impact on the fisheries sector & livelihoods of the fishing community?

- **Addressing critical issues in fisheries:** From fish production, productivity, and quality to technology, post-harvest infrastructure, and marketing, PMMSY began to

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address significant gaps in the fisheries value chain. The following were listed as important strategic priority areas: marine fisheries, inland fisheries, fishermen's welfare, infrastructure, and post-harvest management; cold water fisheries; ornamental fisheries; aquatic health management; and seaweed culture.

- **Aquapreneur culture:** PMMSY has infused new energy in the fisheries sector by infusing new talent, and young minds with technological spirit by implementing new methods of fish rearing. Fisheries have been expanded to non-traditional areas like Rajasthan & Haryana where farmers are successfully converting their saline wastelands into wealth lands through aquaculture.
- **Alternate livelihood for rural Indians:** PMMSY has empowered fisherwomen to explore remunerative options and alternative livelihoods, such as ornamental fisheries, pearl culture, and seaweed cultivation. E.g. of Kashmir women young women are efficiently rearing cold water rainbow trout using a recirculatory aquaculture system.
- **Enhanced production:** India is currently ranked among the top three nations in the world for fish and aquaculture production, and it exports more shrimp than any other country. This leap in production is on account of several steps like recently launched ₹127-crore Seaweed Park in Tamil Nadu, 900 fish feed plants, and 755 hatcheries have been set up under PMMSY which is supporting research and genetic improvement of Indian White Shrimp at Chennai, development of specific pathogen-free brood stock, and domestication of tiger shrimp in the Andaman Islands.

Conclusion:

Pradhan Mantri Matsya Sampada Yojana is a crucial step in harnessing India's Blue Economy potential by promoting sustainable growth in the fisheries and aquaculture sector.

10. Discuss the significance of carbon trading in the context of India's commitment to reducing greenhouse gas emissions. Analyze the potential challenges and benefits of establishing the Indian Carbon Market (ICM).

Introduction: Describe carbon trading.

Body: Significance of carbon trading & benefits, challenges of ICM.

Conclusion: Way forward.

Carbon trading is the buying and selling of credits that permit a company or other entity to emit a certain amount of carbon dioxide or other greenhouse gases. It is authorized by the government to gradually reduce overall carbon emissions and mitigate their contribution to climate change. Indian Carbon Market (ICM) aims to decarbonize the Indian economy by pricing the Green House Gas (GHG) emissions through the trading of Carbon Credit Certificates.

What is its significance in reducing GHG emissions in India?

- **Incentivizes emission reduction:** Businesses and industries are given financial incentives to lower their greenhouse gas emissions because of carbon trading. Companies are allotted a fixed number of emissions allowances, and those who can lower their emissions below their allotted level can sell their extra credits to others who exceed their limit.
- **Achieve international commitments:** India is a signatory to international climate agreements like the Paris Agreement, along with many other nations. These

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agreements bind nations to particular emission reduction goals & give flexibility in how to achieve these goals.

What are the challenges of establishing ICM?

- **Price fluctuations:** Carbon markets can experience price volatility, which can impact the profitability of emission reduction projects and the overall stability of the market. India would need mechanisms to mitigate such volatility.
- **Data and Monitoring:** Establishing an effective carbon market requires robust systems for data collection, monitoring, and verification of emissions reductions. India may face challenges in setting up and maintaining these systems, especially in rural areas.

What are the benefits of ICM?

- **Transition to low carbon economy:** ICM will enable the creation of a competitive market that can provide incentives to climate actors to adopt low-cost options by attracting technology and finance towards sustainable projects that generate carbon credits. It can be a vehicle for mobilizing a significant portion of investments required by the Indian economy to transition toward low-carbon pathways.
- **Cost-effective mitigation:** The ICM will mobilize new mitigation opportunities through demand for emission credits by private and public entities. A well-designed, competitive carbon market mechanism would enable the reduction of GHG emissions at the least cost, both at the level of entity, as well as the overall sector, and drive faster adoption of clean technologies, in a growing economy like India.

Conclusion:

As the nation moves towards achieving its ambitious target of turning net zero by 2070, initiatives like carbon trading & carbon market can help in carbon management solutions and clean energy transition towards maintaining the delicate balance between economic needs and environmental concerns.

11. Discuss the challenges faced in ensuring a consistent and quality water supply under the Jal Jeevan Mission. Suggest measures to address these challenges.

Introduction: Describe Jal Jeevan Mission.

Body: Address challenges & measures associated with the scheme.

Conclusion: Way forward.

Jal Jeevan Mission is the flagship scheme launched by the Ministry of Jal Shakti in 2019. It envisioned providing safe and adequate drinking water through individual household tap connections by 2024 to all households in rural India. It is based on a community approach to water and will include extensive Information, Education, and communication as a key component of the mission.

What are the challenges faced in ensuring quality water supply under the scheme?

- **COVID Pandemic:** The pace of the scheme was slowed due to the pandemic which affected the progress of the scheme including the availability of necessary materials like pipes and other construction resources resulting in delays.
- **Inadequate infrastructure:** One of the primary challenges is the inadequate infrastructure for water supply in rural areas. Many villages lack the necessary pipelines, storage tanks, and treatment facilities.

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- **Poor water quality:** States like Kerala, and Bengal face issues with water contamination, posing obstacles in ensuring access to safe drinking water. Climate change, over-extraction, and contamination of water sources can threaten the long-term viability of water sources.
- **Geographical Diversity:** India's rural areas are diverse in terms of geography and terrain, which can make it challenging to implement uniform water supply solutions. Eg, Mahoba in UP relies on lakes and ponds for irrigation, but the region's rocky sub-surface means that perennial sources of groundwater are few leading to poor implementation of the scheme.

What measures are necessary to address challenges?

- **Training & capacity building:** The need is to provide training and capacity-building programs for local community members to operate and maintain water supply infrastructure. This will address the issue of shortage of skilled workers in water management areas.
- **Monitoring & Evaluation:** Delivering safe drinking water can be ensured by putting in place effective water quality monitoring systems and countermeasures, such as routine testing and treatment.
- **Behavioral change:** Changing traditional water-use habits and promoting responsible water use by launching public awareness campaigns and community education programs.
- **Water Security for Development:** India should work on groundwater replenishing methods without polluting the sources. Further, village communities and users/owners should start water budgeting to understand and improve water-use efficiency by changing water usage patterns, shifting to less water-consuming crops, and/ or switching to micro-irrigation, i.e., drip and sprinkler systems.

Conclusion:

The successful implementation of JJM ensures that India achieves its desired SDG 6 by 2030 to achieve universal and equitable access to safe and affordable drinking water for all.

12. Discuss the significance of genetically modified (GM) crops in achieving global food and nutritional security. Highlight the challenges and benefits associated with GM crops.

GM crops are created by altering their DNA through genetic engineering techniques to impart specific traits, such as resistance to pests, tolerance to herbicides, or improved nutritional content. These crops have played a significant role in the quest for global food and nutritional security.

What is the significance of GM crops in food & nutrition security?

- **High Crop Yield:** GM crops often have higher yields due to traits like pest resistance and drought tolerance. This increased productivity helps meet the growing demand for food in a world with a rising population.
- **Enhanced nutrition value:** Genetic modification can be used to enhance the nutritional content of crops. For example, biofortified GM crops like Golden Rice are engineered to contain higher levels of essential nutrients, addressing malnutrition in many developing countries.

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- **More crops under GM:** The pool of GM crops has been widened by the addition of new crops like potato, and sugarbeet in addition to maize, soybean, cotton, and canola which has improved traits such as insect and herbicide resistance, climate resilience, and nutritional quality improvement in crops.

What are the challenges associated with GM crops?

- **Environment:** GMO breeding with the other crops in the natural ecosystem can result in genetic contamination. GM technology could also allow the transfer of genes from one crop to another, creating "superweeds", which might be immune to common control methods.
- **Corporate control:** A few large biotech companies dominate the GM seed market, through the use of IPR which raises concerns about corporate control of agriculture & food supply.
- **Health issues:** Some critics argue that GM crops could have long-term health effects, through the use of chemicals & antibiotics rendering antibiotic medications less effective over some time, leading to superbug threats.

What are the benefits associated with GM crops?

- **Farmers' income:** GM crops can save farmers' income, reduce pesticide load on the environment, and provide pesticide- and insect-free crops to consumers while also boosting soil conservation efforts.
- **Sustainability:** Drought-tolerant and disease-resistant GM crops can promote sustainable agriculture by reducing water consumption and minimizing the environmental impact of farming.
- **Nutritional Enhancement:** Biofortified GM crops can combat micronutrient deficiencies, improving public health and nutrition. Crops can even be engineered to be more nutritious, providing critical vitamins to populations that struggle to get specific nutrients needed for healthy living.

Conclusion:

India could meet its edible oil demand through the use of GM Mustard after the release of DMH 11 for cultivation. Cultivation of these GM mustard hybrids developed indigenously could help enhance farmers' income, reduce the oil-import burden, and help achieve much-needed self-reliance in edible oil production. This will help boost the vibrant genetic engineering research sector in the country and enable the generation of new crop varieties with improved traits.

13. Discuss the significance of scientific assessments in wildlife reintroduction projects, especially in the context of potential pathogen threats. How can such assessments ensure the long-term success of reintroduction efforts?

Introduction: Briefly explain the context.

Body: Significance of scientific assessments & how do they ensure success of **reintroduction** efforts.

Conclusion: Way forward.

Scientific assessments play a crucial role in wildlife reintroduction projects in India, particularly when considering potential pathogen threats. These assessments are essential for ensuring the long-term success of reintroduction efforts.

What is the significance of scientific assessments in wildlife reintroduction projects?

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- **Assessment of Disease risk:** One of the primary functions of scientific assessments in wildlife reintroduction projects is to evaluate the risk of disease transmission between reintroduced animals and existing populations or other wildlife species. By conducting disease risk assessments, scientists can identify potential pathogens, assess their prevalence, and determine the likelihood of transmission. This information helps develop strategies to mitigate disease risks. These critical assessments are especially necessary as seen from the recent death of cheetahs in India.
- **Research and Data Collection:** Scientific assessments provide valuable data that contribute to a deeper understanding of the ecology and biology of the reintroduced species. This research informs not only the reintroduction process but also broader conservation efforts.
- **Ecological Impact Assessment:** Scientific assessments go beyond disease concerns to evaluate the broader ecological impact of reintroduction. Researchers examine how reintroduced species interact with their environment and other wildlife, including potential competitors and predators.

How can such assessments ensure the long-term success of reintroduction efforts?

- **Adaptive Management:** Scientific assessments are integral to adaptive management strategies. In the face of changing environmental conditions, emerging diseases, or unexpected challenges, ongoing assessments provide the information needed to adjust reintroduction plans, such as altering release sites, population sizes, or disease management protocols.
- **Public and Stakeholder Engagement:** Scientific assessments also play a role in engaging the public and stakeholders in the reintroduction process. By sharing research findings and emphasizing the importance of disease risk assessment and monitoring, conservation organizations can build support and understanding among local communities, governments, and NGOs.
- **Monitoring and Surveillance:** Once animals are reintroduced, ongoing scientific assessments involve monitoring the health and behaviour of the reintroduced population and the resident wildlife. Regular health checks and disease surveillance help detect and respond to emerging disease threats promptly. This adaptive management approach allows for adjustments to be made if disease risks evolve over time.

Conclusion:

Finally, there should be active engagement with scientists and conservationists who have decades of experience working with wildlife reintroduction projects to incorporate the best available scientific knowledge in the planning, implementation and monitoring of a project.

14. Discuss the significance of breeding for disease resistance in crop varieties, especially in the context of Basmati rice. How do government policies with regard to exports impact Basmati rice farmers in India?

Introduction: Briefly describe Basmati rice.

Body: Significance of breeding in crop varieties and government policies impact on farmers cultivating Basmati rice.

Conclusion: Way forward.

Basmati rice is a premium variety of rice cultivated in the Himalayan foothills of the Indian subcontinent known for its long grain size, fluffy texture and unique inherent aroma and

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flavour. It is cultivated in Himachal Pradesh, Punjab, Haryana, Delhi, Uttarakhand, Madhya Pradesh, UT of Jammu and Kashmir and western Uttar Pradesh. Breeding for disease resistance in crop varieties, including Basmati rice, holds significant importance for agricultural sustainability and food security.

What is significance of breeding for disease resistance in Basmati rice?

- **Disease Resistance:** Disease-resistant crop varieties help protect agricultural yields and reduce the need for costly chemical pesticides. Protecting Basmati rice crop against diseases is crucial for maintaining its quality and market competitiveness.
- **Food Security:** Disease-resistant varieties of Basmati rice ensure a stable supply of this important food source. Reduced crop losses due to diseases help maintain food security, especially in regions where Basmati rice is a dietary staple.
- **Increase Exports:** Basmati rice is a valuable export commodity that generates substantial revenue for Indian farmers and the country's economy. Disease-resistant varieties can increase yield and quality, resulting in higher profits for farmers and greater income for the nation through exports.
- **Environmental Sustainability:** Disease-resistant varieties can contribute to sustainable agriculture by reducing the use of chemical pesticides. This, in turn, helps mitigate the environmental impact of agriculture, such as soil and water pollution.

What is the Impact of Government Export Policies on Basmati Rice Farmers in India?

- **Support and subsidies:** Government policies may provide support, subsidies, or incentives to encourage Basmati rice cultivation and export. These measures can benefit farmers by reducing production costs and increasing profitability.
- **Market Access:** Government policies play a crucial role in facilitating or hindering the export of Basmati rice. Favourable policies that promote access to international markets can significantly benefit Basmati rice farmers by increasing demand and prices for their produce.
- **Quality Standards:** Export policies often include quality standards and regulations that Basmati rice must meet to access foreign markets. These standards are meant to ensure that Indian Basmati rice maintains a high reputation for quality. Farmers must adhere to these standards, which can impact their practices and investments in disease-resistant varieties and farming techniques.
- **Price Stability:** Government interventions in the form of export bans or restrictions can affect Basmati rice prices. While such measures may be imposed to safeguard domestic availability, they can also disrupt farmers' income if they result in price fluctuations or reduced market access.

Conclusion:

The success of Basmati rice can be seen from reports showing annual exports from India have soared, from 0.3-0.35 million tonnes (mt) valued at \$200-250 million to 4.5-4.6 mt worth \$4.7-4.8 billion, in the past three decades. Efforts like Minimising the spraying of crop protection chemical also helps protect the premium value of Indian basmati in the global market. There is need to put safeguards in place to minimize risks faced by farmers who are exposed to the vagaries of the market and government policy with regard to exports.