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1 – All About The IPCC Reports and Equity in Climate Change Mitigation:

GS III

Environmental Conservation

- **What are IPCC Assessment Reports?**

- **About:**

- The IPCC regularly releases comprehensive assessment reports that synthesise scientific literature on climate change.
- These reports encompass three working group assessments focusing on physical science, climate adaptation, and mitigation actions, along with a synthesis report consolidating their findings.

- **Assessment of Future Scenarios:**

- The IPCC uses ‘modelled pathways’ to estimate what it will take to limit the warming of the earth’s surface.
- These pathways are drawn using Integrated Assessment Models (IAMs) that describe human and earth systems.
- IAMs are complex models that examine possible futures of the energy and climate systems and economies.
- Its macroeconomic models can point to future growth levels in terms of GDP (Gross Domestic Product); its energy models can project future consumption; vegetation models can examine land-use changes; and earth-system models use the laws of physics to understand how climate evolves.
- With such integration across disciplines, IAMs are meant to provide policy-relevant guidelines on climate action.
- However, these models also have shortcomings. They prioritise least-cost assessments,
- For example, the absolute cost of setting up a solar plant or undertaking afforestation in India is lower than in the US.
- However, experts have suggested facilitating a scenario of enabling countries to equitably share the burden of Climate action, with wealthier nations taking on more immediate and comprehensive mitigation measures.

- **What are the Findings of the New Study?**

- Researchers analyzed 556 scenarios in the IPCC's AR6 report and found troubling projections. They predict that by 2050, regions encompassing 60% of the world's population, including Sub-

Saharan Africa and South, West, and East Asia (except China), will still have below the global average per-capita GDP.

- Similar disparities in consumption of goods, energy, and fossil fuels exist between the Global North and South.
- Moreover, these scenarios indicate that developing nations will shoulder a heavier burden in terms of carbon sequestration and Carbon Capture and Storage (CCS) technologies.
- This unfairly places the responsibility for mitigation and carbon dioxide removal on poorer countries.
- The researchers criticise the scenarios for ignoring the historical responsibility of wealthier nations and failing to address the energy needs of the Global South to achieve development goals.
- This highlights significant inequities within the projected pathways of climate action.

- **Why Does Equality Matters in Tackling Climate Change?**

- **Historical Responsibility:**

- Wealthier nations, particularly those in the Global North, have historically contributed the most to greenhouse gas emissions through industrialisation and economic development.
- These historical emissions have disproportionately contributed to climate change.
- Recognising this historical responsibility is essential in addressing climate change fairly.

- **Vulnerability of Developing Countries:**

- Developing countries, often the least responsible for greenhouse gas emissions, are the most vulnerable to the impacts of climate change. They often lack the resources and infrastructure to adapt to climate change-related challenges such as extreme weather events, sea-level rise, and changing agricultural conditions.
- Equity considerations are crucial in ensuring that vulnerable communities receive the necessary support and resources to adapt to climate change impacts.

- **Access to Resources:**

- Access to resources for mitigation and adaptation efforts is unequal between developed and developing countries.
- Wealthier nations generally have greater financial resources, technological capabilities, and infrastructure to invest in renewable energy, climate-resilient infrastructure, and adaptation measures.
- Equity ensures that developing countries have equitable access to Climate funding, technology transfer, and capacity-building support to address climate change effectively.

- **Social Justice:**

- Climate change exacerbates existing social inequalities and injustices. Vulnerable communities, including marginalised groups, indigenous peoples, and low-income populations, often bear the brunt of climate impacts.
- Equity in climate action involves addressing these social injustices and ensuring that climate policies and measures benefit all members of society, particularly those most affected by climate change.

- **Global Cooperation:**

- Achieving meaningful progress in addressing climate change requires global cooperation and solidarity.
- Equity principles, such as common but differentiated responsibilities, foster cooperation by acknowledging the varying capacities and responsibilities of countries in addressing climate change.
- Ensuring equity in climate action builds trust and fosters collaboration among nations to work towards shared climate goals.

Source → The Hindu

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2 - Challenges of Handling Nuclear Waste:

GS III

Internal Security

- **Prototype Fast Breeder Reactor (PFBR):**

- A breeder reactor is a nuclear reactor that generates more fissile material than it consumes by irradiation of fertile material, such as Uranium-238 or Thorium-232 that is loaded into the reactor along with fissile fuel.
- These are designed to extend the nuclear fuel supply for electric power generation.
- PFBR is a 500-megawatt electric (MWe) fast-breeder nuclear reactor presently being constructed at the Madras Atomic Power Station in Kalpakkam (Tamil Nadu).
- It is fuelled by Mixed Oxide (MOX) Fuel.

- **What is Nuclear Waste?**

- In a fission reactor, neutrons bombard the nuclei of atoms of certain elements. When one such nucleus absorbs a neutron, it destabilises and breaks up, yielding some energy and the nuclei of different elements.
- For example, when the uranium-235 (U-235) nucleus absorbs a neutron, it can fission to barium-144, krypton-89, and three neutrons. If the ‘debris’ (barium-144 and krypton-89) constitute elements that can’t undergo fission, they become nuclear waste.
- Fuel loaded into a nuclear reactor becomes irradiated and must eventually be removed, at which point it is known as spent fuel.
- Nuclear waste is highly radioactive and needs to be stored in facilities reinforced to prevent leakage into and/or contamination of the local environment.
- Fission is a process in which the nucleus of an atom splits into two or more smaller nuclei and some byproducts.
- When the nucleus splits, the kinetic energy of the fission fragments (primary nuclei) is transferred to other atoms in the fuel as heat energy, which is eventually used to produce steam to drive the turbines.
- Fusion is defined as the combining of several small nuclei into one large nucleus with the subsequent release of huge amounts of energy.
- Harnessing fusion, the process that powers the Sun could provide a limitless, clean energy source.
- In the sun, the extreme pressure produced by its immense gravity creates the conditions for fusion to happen.

- **How can Nuclear Waste be Managed Safely and Effectively?**

- The primary challenge is managing spent fuel, which is hot and radioactive. It must be submerged in water for several decades before it can be transferred to dry casks for long-term storage once it has cooled.
- All countries with longstanding nuclear power programmes have accumulated a considerable inventory of spent fuel.
- For example, the US had 69,682 tonnes (tn), Canada 54,000 tn, and Russia 21,362 tn.
- Depending on radioactivity levels, the storage period can run up to a few millennia (1000 years), as they have to be isolated from human contact for periods of time that are longer than anatomically modern Homo sapiens have been around on the planet.
- Nuclear power plants also have liquid waste treatment facilities.
- Japan is currently discharging, after treatment, such water from the Fukushima nuclear power plant into the Pacific Ocean.
- Other such waste, depending on their hazard, can be evaporated or “chemically precipitated” which means the sludgy substance can be managed by either being soaked up by solid materials or burned.

- Liquid high-level waste contains “almost all of the fission products produced in the fuel”. It is vitrified to form a storable glass.
 - Some experts advocate for geological disposal, where the waste is sealed in special containers and buried underground in granite or clay.
 - Another way to deal with the spent fuel is Reprocessing — which separates fissile from non-fissile material in spent fuel.
 - The material is chemically treated to separate fissile material left behind from the non-fissile material.
 - Because spent fuel is so hazardous, reprocessing facilities need specialised protections and personnel of their own.
 - Such facilities present the advantage of higher fuel efficiency but are also expensive.
 - Reprocessing also yields weapons-usable (different from weapons-grade) plutonium.
 - Weapons-grade plutonium is highly pure, ideal for efficient and compact nuclear weapons.
 - Weapons-usable plutonium, including reactor-grade or from dismantled weapons, may require more material or special designs, impacting efficiency and design options.
- **What are the Challenges in Managing Nuclear Waste?**
- Geological Disposal Leakage: The geological disposal of nuclear waste poses the risk of radioactive material being exposed to humans in the event that containers are disturbed, for instance, through nearby excavation activities.
 - Example: Waste Isolation Pilot Plant, US, has a licence to store waste for a few millennia. In 2014, an accident at the site released small quantities of radioactive materials into the environment, revealing serious failures in its maintenance.
 - Exclusion of Private Sector: Private sector involvement often drives innovation through competition and market incentives. Without private sector participation, there may be less incentive to develop new technologies and processes for more efficient and effective nuclear waste treatment.
 - Unutilized Fund: The US’s Nuclear Waste Policy Act of 1982 mandated that a portion of electricity generated from nuclear power be allocated to a 'Nuclear Waste Fund,' which would finance a geological disposal facility.
 - Despite amassing a corpus of USD 40 billion as of July 2018, the fund has faced criticism for remaining unutilized for its intended purpose.
 - Lack of International Cooperation: Stakeholders often lack cooperation, hindering effective management of nuclear waste. As nuclear waste is a global issue, international collaboration is essential to share knowledge, develop best practices, and ensure responsible management across all countries utilizing nuclear energy.
- **How does India handle nuclear waste?**
- According to a 2015 report from the International Panel on Fissile Materials (IPFM), India has reprocessing plants in Trombay, Tarapur, and Kalpakkam.

- The Trombay facility reprocesses 50 tonnes of heavy metal per year (tHM/y) as spent fuel from two research reactors to produce plutonium for stage II reactors as well as nuclear weapons.
- Of the two in Tarapur, one used to reprocess 100 tHM/y of fuel from some pressurised heavy water reactors (stage I) and the other, commissioned in 2011, has a capacity of 100 tHM/y.
- The third facility in Kalpakkam processes 100 tHM/y.
- The report also suggested the Tarapur and Kalpakkam facilities operate with a combined average capacity factor of around 15%.
- **Way Forward:**
 - **Reprocessing:** It involves separating usable materials from spent nuclear fuel. Reprocessing allows for the recycling of valuable elements like plutonium and uranium, reducing the volume of high-level waste that requires long-term storage.
 - **Vitrification:** The process involves encasing radioactive waste in glass, which immobilises the hazardous components and prevents leaching into the environment.
 - It is used for high-level radioactive waste and helps ensure long-term stability.
 - **Research and Development:** Need to invest in research to explore alternative disposal methods and innovative technologies for nuclear waste management.
 - This includes investigating advanced materials for containment, exploring geological disposal options, and developing more efficient waste treatment processes.

Source → *The Hindu*

3 – All About the High-Level Committee Report on Simultaneous Elections:

GS II

Election related issues

- **What are the Recommendations of the High-level Committee on Simultaneous Elections?**
- **Transition to Simultaneous Elections:**
- **Amendment to Article 82A:**
 - The Committee suggests amending Article 82A of the Constitution to empower the President to designate an "Appointed Date" for the commencement of simultaneous elections to the House of the People and Legislative Assemblies.

- State assemblies going to poll after this date would synchronize their terms with the Parliament, facilitating simultaneous elections.
 - If the recommendations are accepted and implemented after the 2024 Lok Sabha polls, the first simultaneous elections could potentially be held in 2029.
 - Alternatively, if targeting the 2034 polls, the appointed date would be identified after the 2029 Lok Sabha polls.
 - States with elections due between June 2024 and May 2029 would see their terms expire alongside the 18th Lok Sabha, even if it results in some state assemblies having terms of less than five years as a one-time measure.
 - States like West Bengal, Tamil Nadu (2026), Punjab, Uttarakhand, Uttar Pradesh (2027), and Karnataka, Chhattisgarh, Telangana (2028) would synchronise their election cycles.
 - The government elected after the 2024 polls would decide on the starting point for implementing simultaneous elections, either targeting 2029 or 2034 based on their preference.
 - To maintain synchronicity in case of premature dissolution of Parliament or a state assembly, the committee recommended conducting fresh elections only for the remaining term, or the "unexpired term" until the next cycle of simultaneous polls.
 - This measure ensures that any hung House or no-confidence motion does not affect the overall timeline for simultaneous elections.
- **Synchronisation of Local Body Elections:**
 - Parliament is advised to enact legislation, possibly through the introduction of Article 324A, to ensure the synchronization of Municipalities and Panchayats elections with General Elections.
 - This legislation would determine the terms of local bodies and align their election schedules with national electoral timelines.
- **Electoral Roll Preparation and Management:**
 - The Committee suggests amending Article 325 of the Constitution to enable the Election Commission of India (ECI) to prepare a single electoral roll and Elector's Photo Identity Card (EPIC) applicable to all tiers of government in consultation with State Election Commissions.
 - The electoral rolls for Lok Sabha are prepared and maintained by the ECI, while the electoral rolls for local bodies are prepared by the SEC.
 - The Committee emphasises the importance of harmonisation between the ECI and State Election Commissions (SECs) to prevent duplication and safeguard voter rights.
- **Logistical Arrangements and Expenditure Estimation:**
 - The Committee calls for the ECI to submit detailed requirements and expenditure estimates for simultaneous elections.
 - To ensure seamless logistical arrangements, the Committee urges the ECI and SECs to develop comprehensive plans and estimates.

- These plans should encompass equipment needs, personnel deployment, and security measures.
- **Impact on Governance and Development:**
 - The Committee underscores the importance of certainty in governance for effective decision-making and sustained development.
 - It highlights the role of synchronized elections in averting policy paralysis and fostering a conducive environment for progress.
- **What are the Debates Regarding Simultaneous Elections?**
- **Arguments in Favour:**
- **Cost Efficiency:**
 - Holding simultaneous elections reduces the substantial recurring expenditure incurred by both the State and Central governments.
 - Consolidating elections into one event minimises the costs associated with voter registration, polling stations, election staff, security deployment, and other logistical requirements.
 - With a single electoral roll for all elections, administrative resources such as security forces and civilian officials are utilised more efficiently, saving public funds that can be redirected to other public causes.
- **Enhanced Governance and Administration:**
 - Simultaneous elections streamline the electoral process, reducing the strain on governance and administration caused by frequent elections.
 - Prolonged deployment of security and police forces during separate elections can strain national security and law enforcement efforts, which can be alleviated by holding elections simultaneously.
 - The mass-scale transfers of officials and the disruption caused by the code of conduct during separate elections can impede the smooth functioning of government machinery, which can be mitigated through synchronised polls.
- **Reduced Influence of Money in Politics:**
 - Holding simultaneous elections can lessen the role of money in politics by reducing the frequency of election campaigns and associated expenses.
 - Campaign finance regulations can be more effectively enforced by the ECI at a national level, ensuring a level playing field for all parties and candidates.

- **Mitigation of Divisive Politics:**

- The 'one nation-one election' concept aims to reduce the divisive impact of regionalism, casteism, and communalism in mobilising voters.
- By focusing on national issues and promoting a unified electoral agenda, simultaneous elections can help transcend narrow interests and foster a sense of national unity.

- **Enhanced Voter Engagement:**

- Voter fatigue, resulting from frequent elections at different levels, can be alleviated by consolidating polls into a single event.
- Simultaneous elections can potentially increase voter turnout at the national level by reducing voter apathy and increasing the significance of each electoral exercise.

- **Arguments Against Simultaneous Elections:**

- **Federalism and Regional Representation:**

- Simultaneous elections may undermine the principles of federalism by centralising the electoral process and potentially overshadowing regional and local issues with national issues.
- Constituent States, especially those governed by non-dominant parties at the national level, may feel marginalised or inadequately represented in a synchronised election scenario.
- National parties could gain an undue advantage over regional parties, undermining the federal spirit enshrined in the Constitution.

- **Cost Implications:**

- The implementation of simultaneous elections would require a significant investment in procuring additional Electronic Voting Machines (EVMs) and Voter Verifiable Paper Audit Trail Machines (VVPATs), adding to the financial burden.
- Biennial elections to Legislative councils/Rajya Sabha and by-elections would still necessitate separate polling events, contributing to ongoing costs despite synchronised elections.

- **Impact on Accountability and Representation:**

- Frequent elections at different levels of government help maintain accountability among elected representatives and ensure regular opportunities for voters to express their preferences.
- Synchronising elections may reduce the frequency of electoral accountability checks and limit the responsiveness of elected officials to the evolving needs of their constituents.

- **Required Constitutional Amendments:**

- India's parliamentary democracy allows for the dissolution of Lok Sabha and State assemblies before the completion of their five-year terms.
- Fixed tenure of five years for all houses necessitates constitutional amendments to Articles 83, 85, 172, and 174, dealing with duration and dissolution.
- Amendments to Article 356, governing the imposition of President's rule in States, would also be required to accommodate simultaneous elections.

- **Security Implications:**

- During simultaneous elections, deploying large security forces for election duty could potentially weaken national security, as it diverts them from border protection.

Source → The Hindu



4 – All about Unauthorised Immigration: [®]

GS III

Internal Security

- **The International Organisation for Migration: What is it?**

- **About:**

- Following the upheavals of World War II, the Provisional Intergovernmental Committee for the Movement of Migrants from Europe (PICMME) gave rise to the International Organisation for Migration in 1951.
- To symbolise its transformation into a migration agency, it changed its name from PICMME to the Intergovernmental Committee for European Migration (ICEM) in 1952, then to the Intergovernmental Committee for Migration (ICM) in 1980, and eventually to the International Organisation for Migration in 1989.
- IOM became a connected organisation in 2016 after entering into an agreement with the UN.
- Members: As of right now, 175 states are members, while 8 states are observers.
- India joined the IOM as a member state on June 18, 2008.
- Crisis Management: In its long history, IOM has responded to numerous crises, including those that arose in Hungary in 1956, Czechoslovakia in 1968, Chile in 1973, Vietnam Boat People in

1975, Kuwait in 1990, Kosovo and Timor in 1999, the Asian tsunami, and the earthquake and tsunami that struck Pakistan in 2004/2005.

- **How does global migration stand right now?**

- About: Migration is the term used to describe the movement of individuals from one location to another, usually entailing a move.
- This movement can occur between nations (international migration) or within a nation (internal migration).
- It can be either permanent or transitory, according on the goals and circumstances of the individual.
- The International Organisation for Migration estimates that 3.6% of the world's population is currently made up of migrants.

- **Principal Causes:**

- Economic Reasons: People frequently relocate in quest of greater employment prospects, increased pay, higher living standards, and easier access to necessities like healthcare and education.
- Conflict and War: People may be forced to escape their homes in search of safety in other nations or regions as a result of armed conflicts, civil wars, and political unrest.
- Environmental Factors: Population displacement brought on by natural disasters including floods, droughts, hurricanes, earthquakes, and the effects of climate change can result in migration.
- Social and Political Factors: People may be forced to apply for asylum or relocate to a country with better conditions due to discrimination, persecution, human rights violations, a lack of freedom, and political tyranny.
- Urbanisation and Rural-Urban Migration: Rural populations may migrate to urban regions in pursuit of better living conditions, work opportunities, and access to healthcare and education. This migration contributes to the trends of urbanisation.

- **The Principal Obstacles Illegal Migrants Face:**

- Physical Risks and Dangers: Throughout their journey, illegal migrants—including those who choose to flee on donkeys—face a number of physical risks. These include dangerous terrains like the Darién Gap, a lack of clean water, wild animals, and the possibility of violence from criminal groups.
- This may result in diseases, accidents, or even fatalities while travelling.
- Legal Status and Rights: People who are undocumented migrants or who have irregular immigration status frequently face legal obstacles, are deprived of basic rights and services, and constantly fear being deported, placed in detention, or exploited.
- Discrimination and Xenophobia: Because of their nationality, race, religion, language, or cultural heritage, migrants may encounter prejudice, hostility, and discrimination. This can result in social exclusion, marginalisation, and unfair treatment.

- Human trafficking, exploitation, abuse, and forced labour are risks that migrants, particularly those from vulnerable groups like women and children, face, especially in informal or precarious work environments.
- **Donkey takeoff:**
 - Donkey flight is a term used to describe an illegal immigration technique employed by people seeking unauthorised entry into countries like the United States, Canada, the United Kingdom, and Australia.
 - According to the US Customs and Border Protection (USCBP), Indians are the 5th largest source of illegal migrants entering the US from the southwest border.
 - 96,917 Indians were caught illegally crossing borders into the US between October 2022 and September 2023.
- **Darién Gap:**
 - A geographic region in the Isthmus of Darién or Isthmus of Panama connecting the American continents within Central America, consisting of a large watershed, forest, and mountains in Panama's Darién Province and the northern portion of Colombia's Chocó Department.
- **The Way Ahead:**
 - Global Compact for Safe, Orderly, and Regular Migration (GCM): Implementing the objectives and commitments outlined in the GCM, a UN-led framework for addressing migration challenges through a cooperative, people-centred approach involving governments, civil society, and other stakeholders.
 - Widening Legal and Safe Pathways: Enhancing legal and safe pathways for migration, including resettlement programs for refugees, family reunification mechanisms, labour migration schemes, and humanitarian visas.
 - This can reduce the reliance on dangerous and illegal routes like the Donkey Flights.
 - Combating Human Trafficking: Strengthening law enforcement and international cooperation to combat human trafficking and smuggling networks that exploit migrants.
 - Regional Cooperation: Fostering regional cooperation among countries of origin, transit, and destination to develop joint strategies for migration management, information sharing, and capacity building.
 - Provide Assistance to Returnees: Support programs that assist returning migrants with reintegration into their communities, including access to education, vocational training, healthcare, and psychosocial support.

Source → The Hindu