



Green Elections in India

For Prelims: [Election Commission of India \(ECI\)](#), [Non-biodegradable materials](#), **Green elections**, [Carbon Footprint](#), [Single-use Plastic materials](#), [Biodegradable Materials](#)

For Mains: Significance of green elections and its utility regarding reducing India's Carbon Footprints.

Source: [TH](#)

Why in News?

Recently, the [Election Commission of India \(ECI\)](#) voiced its concern over the environmental risks associated with the use of [non-biodegradable materials](#) in elections.

- It has been urging parties and candidates to avoid the use of plastic/polythene for preparation of election material during an election campaign, since 1999.

Why is There a Need for a Shift Toward Green Elections?

- **Environmental Footprint of Traditional Elections:** Traditional election processes have significant environmental consequences due to various factors:
 - **Campaign Flights:** The emissions from campaign flights during elections contribute significantly to the overall carbon footprint.
 - **For example:** In the 2016 US presidential elections, the emissions from just one candidate's campaign flights were equivalent to the annual [carbon footprint](#) of 500 Americans.
 - **Deforestation and Other Issues :** Reliance on paper-based materials for ballots, campaign literature, and administrative documents leads to deforestation and energy-intensive production processes.
 - **Energy-Saving:** Large-scale election rallies with loudspeakers, lighting, and other energy-consuming equipment contribute to energy consumption and emissions.
 - **Waste Generation:** PVC flex banners, hoardings, and disposable items used during campaigns add to waste generation and environmental impact.

What is Carbon Footprint?

- As per the [World Health Organization \(WHO\)](#), a carbon footprint quantifies the influence of human activities on **carbon dioxide (CO₂) emissions** generated from burning **fossil fuels**, typically measured in **metric tons of CO₂ emissions**.
- It is gauged in terms of annual **CO₂ emissions**, a metric that may include additional greenhouse gasses such as methane, nitrous oxide, and other **CO₂-equivalent gasses**.
- It can be a broad measure or be applied to the actions of an individual, a family, an event, an organization, or even an entire nation.

What is the Concept of Green Elections?

- **Green Elections:** Green elections are practices that aim to reduce the environmental impact of electoral processes. They involve measures such as using recycled materials, promoting electronic voting, and encouraging candidates to adopt sustainable campaign practices.
- Green elections aim to minimize the environmental impact of electoral processes through:
 - **Eco-Friendly Campaign Materials:** Candidates and parties can adopt sustainable alternatives such as recycled paper, biodegradable banners, and reusable materials.
 - **Reducing Energy Consumption:** Opting for energy-efficient lighting, sound systems, and transportation during rallies can help reduce the carbon footprint.
 - **Promoting Digital Campaigns:** Leveraging digital platforms for campaigning (websites, social media, and email) reduces paper usage and energy consumption.

What are Successful Examples of Eco-friendly Electoral initiatives?

- **Example from India:**
 - **Kerala's Green Campaign:**
 - During the **2019** general election, the **Kerala State Election Commission** took a proactive step by urging political parties to avoid **single-use plastic materials** during their campaigns.
 - **Single-use plastic** is a disposable material that can be used only once before it is either thrown away or recycled, like plastic bags, water bottles, soda bottles, straws, plastic plates, cups, most food packaging and coffee stirrers are sources of single use plastic.
 - Subsequently, the **Kerala High Court** imposed a ban on **flex and non-biodegradable materials** in electioneering.
 - As an alternative, wall graffiti and paper posters emerged, promoting a more sustainable approach. Additionally, government bodies collaborated with the district administration in Thiruvananthapuram to ensure a green election, emphasizing eco-friendly practices. Training sessions were also conducted in villages for election workers to raise awareness and promote environmentally conscious behavior.
 - **Goa's Artisan-Crafted Eco-Friendly Booths**
 - In 2022, the **Goa State Biodiversity Board** took a significant step by introducing eco-friendly election booths for the Assembly elections.
 - These booths were constructed using **biodegradable materials** meticulously crafted by local traditional artisans from Sattari and Ponda.
 - Not only are these materials environmentally friendly, but they also support local artisans.
 - **Sri Lanka's Carbon-Sensitive Campaign**
 - In 2019, Sri Lanka's Podujana Peramuna (SLPP) party launched the world's first carbon-sensitive environmentally friendly election campaign.
 - They meticulously measured carbon emissions from campaign activities, including vehicles and electricity usage.
 - To offset these emissions, they engaged the public in tree planting initiatives across each district.
 - This innovative approach not only reduced the campaign's carbon footprint but also raised awareness about the importance of forest cover.
- **Overseas Example:**
 - **Estonia's Digital Voting Revolution**
 - Estonia laid the foundations for digital voting as an alternative to traditional paper-based methods.
 - Their approach encouraged voter participation while significantly reducing the environmental impact.
 - By implementing robust security measures, Estonia demonstrated that digital voting can be both eco-friendly and electorate-friendly. The success of this approach suggests that other democracies can follow suit.
- These examples demonstrate that prioritizing environmental considerations in electoral processes can set an example for other nations and contribute to a more sustainable future.

What are the Challenges in Adoption of Green Elections?

- **Access to New Technologies and Training for Officials:** Ensuring that all voters have fair access to new technologies is crucial. However, this requires substantial efforts in terms of training election officials and educating voters about the new systems. Some specific challenges include:
 - **Training and Familiarization:** Election officials need to be proficient in operating and troubleshooting the new technology. Adequate training programs are essential to bridge the knowledge gap.
 - **Equitable Access:** Ensuring that all voters, including those in remote or underserved areas, can access and use the technology is a challenge. Addressing disparities in internet connectivity and digital literacy is vital.
- **Financial Constraints and Upfront Costs:** Implementing eco-friendly materials and advanced technology often comes with significant upfront costs. Governments, especially those with limited budgets, may hesitate due to financial constraints.
 - **Budget Allocation:** Allocating funds for technology upgrades while balancing other essential services is a delicate task. Prioritizing modernization within budget limitations is challenging.
 - **Long-Term Savings:** Although initial costs may be high, emphasizing the long-term benefits (such as reduced paper usage and streamlined processes) can help justify the investment.
- **Cultural Inertia and Voter Behavior:** Traditionally, voting has been associated with physical presence at polling booths. Overcoming cultural inertia and changing voter behavior is essential for successful modernization:
 - **Perceived Importance of Physical Voting:** Many voters view physically going to the polls as a sacred civic duty. Convincing them that digital alternatives are equally valid can be challenging.
 - **Trust in New Systems:** Building trust in electronic voting systems is critical. Public skepticism about security, privacy, and potential manipulation must be addressed through transparency and robust safeguards.
- **Security Concerns and Compromises:** Introducing new approaches, such as online voting or blockchain-based systems, raises concerns about vote security:
 - **Cybersecurity Risks:** Ensuring that voting systems are secure from cyber threats is paramount. Any compromise could undermine public trust and the integrity of elections.
 - **Balancing Security and Accessibility:** Striking the right balance between robust security measures and user-friendly interfaces is a challenge. Rigorous security protocols should not hinder ease of use.

Way Forward:

- This **green transition** must involve all stakeholders such as **political parties, Election Commissions, governments, voters**, the media and civil society.
- The success of integrating top-level directives with grassroots initiatives to foster a **green transition** is imperative.
- Political parties must take the lead. The journey can begin by enacting legislation mandating **eco-friendly electoral practices**, with the ECI incorporating them in the **Model Code of Conduct**.
- This involves campaigning through digital platforms or door-to-door campaigning (reducing energy-intensive public rallies) and encouraging the use of public transportation for election work.
- Incentivising the replacement of **plastic and paper-based materials** with sustainable local alternatives for polling booths, such as **natural fabrics, recycled paper** and **compostable plastics**, will aid waste management and support local artisans.
- The ECI can push for **digital voting** even though this necessitates the training and capacity building of officials.
- To ensure equal participation of all voters in the digital electoral process, the government must educate and support voters and ensure equitable access to digital technology.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q1. Consider the following statements: (2020)

1. According to the Constitution of India a person who is eligible to vote can be made a minister in a State for six months even if he/she is not a member of the Legislature of that State.
2. According to the Representation of People Act, 1951, a person convicted of a criminal offense and sentenced to imprisonment for five years is permanently disqualified from contesting an election even after his release from prison.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Answer: (d)

Q2. Consider the following statements: (2017)

1. The Election Commission of India is a five-member body.
2. The Union Ministry of Home Affairs decides the election schedule for the conduct of both general elections and bye-elections.
3. Election Commission resolves the disputes relating to splits/mergers of recognised political parties.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 only
- (c) 2 and 3 only
- (d) 3 only

Answer: (d)

Mains

Q.1 'Simultaneous election to the Lok Sabha and the State Assemblies will limit the amount of time and money spent in electioneering but it will reduce the government's accountability to the people' Discuss. (2017)

Using AI in Elections

For Prelims: [Generative Artificial Intelligence \(GAI\)](#), [Artificial General Intelligence \(AGI\)](#) Deep fake, [World Economic Forum's \(WEF's\)](#), Artificial General Intelligence (AGI).

For Mains: Concerns For Using AI for Elections, Generative AI – Benefits, Threats and Way Forward.

Source: [TH](#)

Why in News?

As AI evolves towards mimicking human capabilities evolving from [Generative Artificial Intelligence \(GAI\)](#) to [Artificial General Intelligence \(AGI\)](#), its impact on elections, exemplified by India's upcoming polls, underscores the **imperative of addressing its potential influence**.

- AGI refers to the hypothetical ability of an AI to understand, learn, and apply knowledge in a manner **similar to human intelligence across** a wide range of tasks and domains.
- AGI aims to **replicate the cognitive abilities of humans**, such as reasoning, problem-solving, perception, and understanding natural language.

How is AI Linked with the Electoral Landscape?

- **Campaign Strategy and Targeting:**
 - Political parties and candidates can use **AI algorithms to analyse vast amounts of data about voters**, including demographics, social media activity, and past voting behaviour, to tailor their campaign messages and target specific voter groups more effectively.
- **Predictive Analytics:**
 - AI-powered predictive analytics **can forecast election outcomes** by analysing various factors such as polling data, economic indicators, and sentiment analysis from social media.
 - This can help **parties allocate resources strategically** and focus on key battleground areas.
- **Voter Engagement:**
 - AI chatbots and virtual assistants can engage with voters on social media platforms, answering questions, providing information about candidates and policies, and even encouraging voter turnout.
 - This can enhance voter engagement and participation in the electoral process.
- **Security and Integrity:**
 - AI-powered tools can be employed to detect and prevent election fraud, including voter suppression, tampering with electronic voting systems, and the spread of disinformation. By analysing patterns and anomalies in data, AI algorithms can help ensure the integrity of the electoral process.
- **Regulation and Oversight:**
 - Governments and election authorities can use AI to monitor and regulate political advertising, identify violations of campaign finance laws, and ensure compliance with electoral regulations. AI-powered tools can help enforce transparency and accountability in the electoral process.
 - In 2021, the **Bihar Election Commission** tied up with AI firm **Staqu** to use **video analytics** with [optical character recognition \(OCR\)](#) to analyse CCTV footage from counting booths during the panchayat elections.
 - The system enabled the Bihar Election Commission to achieve **complete transparency and eliminate any chances** of manipulation.

What are the Concerns of Deploying AI for Electoral Purpose?

- **Manipulation of Electoral Behavior:**
 - AI models, particularly **Generative AI and AGI** can be used to **spread disinformation, create deep fake elections**, and inundate voters with highly personalised propaganda, leading to confusion and manipulation of democratic processes.
 - Using AI, Deepfake Videos of opponents **can be created to tarnish their image**.
 - The term "Deep Fake Elections" refers to the use of AI software to create convincing fake videos, audios, and other content that can deceive voters and influence their decisions.
 - This phenomenon poses a serious threat to the **integrity of elections and undermines public trust in the electoral process**.
 - One prominent example highlighting the potential dangers of **such manipulation is the**

Cambridge Analytica scandal.

- Cambridge Analytica, a now-defunct political consulting firm, notoriously **exploited Facebook data to create targeted political advertisements** and influence **voter behavior during the 2016 United States presidential election** and other campaigns globally.

▪ **Messaging and Propaganda:**

- AI tools can be **trained to translate in regional languages** which can be used by the candidates for Microtargeting in their campaign.
 - Microtargeting is a marketing strategy that uses recent technological developments and reaching out to specific segments of a larger audience based on **detailed demographic, psychographic, behavioral, or other data.**
- AI can also be used for the **customisation of political campaigns** based on the local dialect and demography of the voter base.

▪ **Spreading Disinformation:**

- The [World Economic Forum's \(WEF's\) Global Risks Perception Survey](#), ranks misinformation and disinformation among the top 10 risks, with easy-to-use interfaces of large-scale AI models enabling a boom in false information and “synthetic” content - from sophisticated voice cloning to fake websites.
 - AI can be used to inundate voters with highly personalised propaganda on a scale that could make the Cambridge Analytica scandal appear microscopic, as the persuasive ability of AI models would be far superior to the bots and automated social media accounts that are now baseline tools for spreading disinformation.
 - The risks are compounded by social media companies such as Facebook and Twitter significantly cutting their fact-checking and election integrity teams.

▪ **Inaccuracies and Unreliability:**

- AI models, including AGI, are not infallible and can produce inaccuracies and inconsistencies.
- There has been public wrath worldwide over Google AI models, including in India, for their portrayal of persons and personalities in a malefic manner, mistakenly or otherwise. These reflect well **the dangers of ‘runaway’ AI.**
 - Inconsistencies and undependability stalk many AI models and pose inherent dangers to society. As its potential and usage increases in geometric proportion, threat levels are bound to go up.

▪ **Ethical Concerns:**

- The use of AI in elections raises ethical questions about privacy, transparency, and fairness.
- AI algorithms may inadvertently **perpetuate biases present in training data**, leading to unfair treatment or discrimination against certain groups of voters.
- Moreover, the lack of transparency in AI decision-making processes can **erode public trust and confidence in electoral outcomes.**
- Parties having better **resources can have better utilisation of AI** in comparison to the small and regional parties with lesser resources, which may disrupt the **level playing field in the elections.**

▪ **Regulatory Challenges:**

- Regulating the use of AI in electoral campaigns presents significant challenges due to the rapid pace of technological advancements and the global nature of online platforms.
- Governments and election authorities struggle to keep pace with evolving AI techniques and may lack the necessary expertise to effectively regulate AI-driven electoral activities.
- The primary statutes that could potentially trigger if fake news is spread using deepfakes are, The [India Penal Code, 1860](#) (or the Bharatiya Nyaya Sanhita, 2023 in due course) [Information Technology Act, 2000](#); and the [Information Technology \(Intermediary Guidelines and Digital Media Ethics Code\) Rules, 2021.](#)
 - However, there doesn't exist a specific law **that addresses just AI and deepfake technology** and targeting the individual who creates it.

How to Deal With the Impacts of AI on Elections?

▪ **Issuing MCC-like Guidelines to Address the Misuse of AI:**

- The menace of **misinformation has existed for a longer period**, and the advent of **AI**

technology has turbocharged the spread of fake news.

- In the context of Lok Sabha elections 2024, one possible solution to AI-fueled misinformation would be **guidelines issued by the [Election Commission of India](#)**.
- There is a need to Implement regulations that **require transparency in the use of AI algorithms** for political purposes.
 - This includes **disclosing sources of funding for political advertisements** and requiring platforms to disclose how algorithms determine the content users see.
- **Education and Media Literacy:**
 - Invest in educational programs to teach citizens how to **critically evaluate information online and identify disinformation** and deep fakes.
 - Promote media literacy to help **voters distinguish between credible and unreliable sources** of information.
- **Enhanced Fact-Checking:**
 - Establishing a **Rapid Response Team to address the dissemination** of fake news, deep fakes, and other forms of misinformation during elections is crucial.
 - While it's inevitable that fake videos and misinformation will arise, the key lies in swiftly addressing them before they **escalate and spread widely**.
 - Strengthen fact-checking efforts by providing resources to independent organisations and journalists to verify the accuracy of information circulating online.
 - Develop AI-powered tools to **identify and flag misleading content**.
- **Counter-Narratives and Debunking Campaigns:**
 - Launch public awareness campaigns that debunk false information and provide accurate counter-narratives.
 - Utilise AI to identify trending **misinformation and target counter-messages** effectively.
- **Ethical AI Development:**
 - Encourage the development of AI technologies with ethical considerations in mind, such as minimising bias, protecting privacy, and promoting transparency.
 - Establish standards and guidelines **for the responsible use of AI in political contexts**.
- **International Cooperation:**
 - Foster collaboration between governments, tech companies, and international organisations to address the global challenges posed by AI-driven disinformation campaigns. Share best practices and coordinate efforts to combat election interference across borders.

What are India's Initiatives Related to Artificial Intelligence?

- [INDIAai](#).
- [Global Partnership on Artificial Intelligence \(GPAI\)](#).
- [US India Artificial Intelligence Initiative](#).
- [Responsible Artificial Intelligence \(AI\) for Youth](#).
- [Artificial Intelligence Research, Analytics and Knowledge Assimilation Platform](#).
- [Artificial Intelligence Mission](#).

Conclusion

- Elections apart, **India being one of the most advanced countries** in the digital arena, again needs to treat AI as an unproven entity.
- While AI brings benefits, the nation and its **leaders should be fully aware of its disruptive potential**.
- This is especially true of AGI, and they should act with due caution. India's lead in digital public goods could be both a benefit as well as a bane, given that while AGI provides many benefits, it can be malefic as well.

Prelims:

Q. With the present state of development, Artificial Intelligence can effectively do which of the following? (2020)

1. Bring down electricity consumption in industrial units
2. Create meaningful short stories and songs
3. Disease diagnosis
4. Text-to-Speech Conversion
5. Wireless transmission of electrical energy

Select the correct answer using the code given below:

- (a) 1, 2, 3 and 5 only
(b) 1, 3 and 4 only
(c) 2, 4 and 5 only
(d) 1, 2, 3, 4 and 5

Ans: (b)

Mains:

Q. What are the main socio-economic implications arising out of the development of IT industries in major cities of India? (2021)

Climate Finance Road to COP29

For Prelims: [Loss and Damage Fund](#), [Conference of the Parties \(COP 28\)](#), **New Collective Quantitative Goal**, [Fossil Fuels](#)

For Mains: Climate Finance and its Significance, Environmental Pollution & Degradation

Source: [IE](#)

Why in News?

The [UN Climate Change Conference \(UNFCCC COP 27\)](#) convened in **Sharm El-Sheikh, Egypt** established a [Loss and Damage Fund](#) for **climate disaster recovery** in developing nations.

- The [2023 UNFCCC COP 28 \(Dubai\)](#) focused on transitioning from **fossil fuels**, pledging to **triple renewable energy capacity by 2030**.
- As preparations for COP29 in Baku intensify, attention now turns to finance discussions, particularly the **New Collective Quantitative Goal (NCQG)**.

What is the New Collective Quantitative Goal?

- The NCQG is a new annual **financial target that developed countries must meet from 2025** onward to provide climate finance to developing countries.
 - It will replace the previous commitment of [USD 100 billion per year](#) that developed

nations had pledged in 2009 but failed to deliver.

- The final NCQG amount is expected to be a central point of negotiation at the **COP29 summit in Baku, Azerbaijan, in November 2024.**
 - The NCQG negotiations aim to set a higher collective amount that wealthy countries will need to mobilise annually for mitigation, adaptation, and other climate action efforts in poorer nations vulnerable to the impacts of climate change.
- Securing an adequate NCQG figure is extremely important for developing countries, as a **lack of sufficient climate finance has been a major** barrier to implementing effective climate plans and building resilience against global warming's effects.

CLIMATE FINANCE

Climate finance refers to local, national or transnational financing—drawn from public/ private/alternative sources of financing—to support mitigation and adaptation actions against climate change.

PRINCIPLES OF CLIMATE FINANCE

- Ⓣ Polluter Pays
- Ⓣ Common but Differentiated Responsibility and Respective Capability (CBDR-RC)

Multilateral Climate Funds Coordinated by UNFCCC

- Ⓣ **Global Environment Facility (GEF):** Operating entity of financial mechanism (1994)
- Ⓣ **Kyoto Protocol (2001):**
 - ▶ **Adaptation Fund (AF):** Gives developing countries full ownership of adaptation projects
 - ▶ **Clean Development Mechanism (CDM):** To carry out emission-reduction projects in developing nations
- Ⓣ **Green Climate Fund (GCF):** estd. - 2010 (COP 16)
 - ▶ Funds under it - **Least Developed Countries Fund (LDCF)** and **Special Climate Change Fund (SCCF)**
- Ⓣ **Long-Term Climate Finance:**
 - ▶ **Cancun Agreements (2010):** Mobilize and provide scaled-up funds in short and long term
 - ▶ **Paris Agreement (2015):** Developed nations agreed to establish new collective goal of at least \$100 billion/year by 2025
- Ⓣ **Loss and Damage Fund (2023) (COP27 & COP28):** Financial assistance to nations most vulnerable and impacted by effects of climate change

Climate Investment Funds (CIFs) under World Bank

- Ⓣ Clean Technology Fund
- Ⓣ Strategic Climate Fund

INDIA'S INITIATIVES REGARDING CLIMATE FINANCE

Fund	Objective
<ul style="list-style-type: none"> ■ National Adaptation Fund for Climate Change (NAFCC) (2015) ■ National Clean Energy Fund (2010-11) ■ National Adaptation Fund (2014) ■ Intended Nationally Determined Contributions (INDCs) (2015) ■ Climate Change Finance Unit (2011) 	<ul style="list-style-type: none"> ■ For vulnerable Indian states ■ Advancing clean energy (started with initial carbon tax on industrial coal use) ■ Bridging gap between required and available funds ■ Nationally binding targets adopted under UNFCCC ■ Leads on global climate finance issues

Challenges to Climate Finance

- Ⓣ Gap between national needs and climate finance under NDCs
- Ⓣ Least Developed Countries receive much less approved funding in per-capita terms from the multilateral climate funds
- Ⓣ Slow rate of approvals
- Ⓣ Failure in securing viability-gap funding



How Much Money is Needed for Effective Climate Action?

- Global climate action faces a significant hurdle due to inadequate financing, especially in developing countries.

- Annual climate finance flows fall far short of the promised USD 100 billion mobilisation by developed countries since 2020.
- Even if that amount were available, it would only be a small fraction of the money needed to keep the world on the **1.5°C** pathway until 2030.
- Current assessments suggest annual financial requirements amount to several trillions of dollars.
 - A 2021 report by UN Climate Change estimated that developing countries would need about **USD 6 trillion annually until 2030** to implement their climate action plans. Updated reports are expected to raise this figure substantially.
 - The final agreement at Sharm el-Sheikh outlined that transitioning to a low-carbon economy could require USD 4-6 trillion annually until 2050.
- Tripling renewable energy capacity, as agreed in Dubai, is estimated to cost USD 30 trillion by 2030 as per the **International Renewable Energy Association (IRENA)**.
- Combining these estimates suggests an annual requirement of USD 5-7 trillion, equivalent to about **5-7% of global GDP**, highlighting the escalating cost of inaction.

Prospects for a Realistic New Annual Climate Finance Target

- Exact amounts under discussion are undisclosed to the public at present. Given past performance, the expectation that developed nations commit to significantly higher amounts is deemed unrealistic.
- **India has called for the NCQG to be at least USD 1 trillion per year**, primarily in grants and concessional finance.
 - However, it is unlikely that developed countries will commit to an amount close to the assessed requirements, given their failure to mobilise even USD 100 billion annually.
- The UN Climate Change Executive Secretary has urged developed countries to make climate finance **"bigger and better," emphasising the need for "trillions, not billions"**.

What are the Challenges Regarding Climate Finance?

- **Insufficient Funds:**
 - There is a significant gap between the **funds needed to address climate change and the actual resources available** for climate-related projects and initiatives.
 - Many developing countries and vulnerable communities have limited access to climate finance, hindering their ability to implement adaptation and mitigation measures.
 - Many organisations like the **UNFCCC** are currently facing severe financial challenges with a budget that is less than half funded.
- **Lack of Ambition:**
 - Developed countries have been reluctant to commit to the scale of funding necessary to address the climate crisis, particularly in **providing grants and concessional finance to developing nations**.
- **Transparency and Accountability:**
 - There is a need for transparent and inclusive processes to **monitor and measure the delivery of climate finance commitments**, ensuring that funds are distributed equitably and used effectively.
- **Ensuring Equity and Justice:**
 - The distribution and utilisation of climate finance should prioritise equity and justice, taking into account the needs and priorities of the **most vulnerable communities and marginalised groups** who are disproportionately affected by climate change.
- **Mobilising Private Finance:**
 - While public finance from developed nations is crucial, mobilising private sector investment and leveraging innovative financial instruments remain challenges in scaling up climate finance.
- **Capacity Building and Technology Transfer:**
 - Climate finance **should not only focus on monetary support** but also on **capacity building and technology transfer** to enable developing countries to effectively implement climate action and transition to low-carbon economies.

▪ **Debt Burdens:**

- The climate finance requirements **add to the existing debt burdens of many developing nations**, raising concerns about their ability to access and repay loans for climate action.

▪ **Economic Impacts:**

- The **global economic slowdown and competing priorities** may make it challenging for developed nations to allocate significant resources towards climate finance.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims:

Q. With reference to the Agreement at the UNFCCC Meeting in Paris in 2015, which of the following statements is/are correct? (2016)

1. The Agreement was signed by all the member countries of the UN, and it will go into effect in 2017.
2. The Agreement aims to limit the greenhouse gas emissions so that the rise in average global temperature by the end of this century does not exceed 2°C or even 1.5°C above pre-industrial levels.
3. Developed countries acknowledged their historical responsibility in global warming and committed to donate \$ 1000 billion a year from 2020 to help developing countries to cope with climate change.

Select the correct answer using the code given below:

- (a) 1 and 3 only
- (b) 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

Ans: B

Mains:

Q. Describe the major outcomes of the 26th session of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC). What are the commitments made by India in this conference? **(2021)**

Q. Explain the purpose of the Green Grid Initiative launched at the World Leaders Summit of the COP26 UN Climate Change Conference in Glasgow in November 2021. When was this idea first floated in the International Solar Alliance (ISA)? **(2021)**

India Leads Global Arms Imports Amid Shifting Dynamics

For Prelims: [Stockholm International Peace Research Institute](#), [India's Arms Import Dynamics](#), [Positive Indigenisation Lists](#), [Defence Industrial Corridors](#), [Innovations for Defence Excellence](#).

For Mains: Recent Indian Government Initiatives Related to the Arms Industry

[Source: TH](#)

Why in News?

The latest data on international arms transfers from [Stockholm International Peace Research Institute \(SIPRI\)](#), India emerged as the **leading arms importer globally during the period from 2019 to 2023**.

- During this timeframe, India's imports increased by 4.7% when compared to the period from 2014 to 2018.

What are the Key Highlights of Recent SIPRI Data?

- **Arms Importers:** Nine of the 10 biggest arms importers in 2019-23, including the top 3 of **India, Saudi Arabia and Qatar**, were in Asia and Oceania or the Middle East.
 - Notably, Ukraine also rose as the **4th-largest arms importer** globally during this period.
- **Arms Exporters:** The **United States**, the largest arms supplier globally, witnessed a 17% growth in arms exports between the periods 2014 -18 and 2019-23.
 - Concurrently, France ascended to become the **world's second-largest arms supplier**.
 - Europe accounted for a third of global arms exports, with a strong military-industrial capacity.
 - In contrast, Russia experienced a significant decline of more than half, with a decrease of **-53%**
- **India's Arms Import Dynamics:** Although Russia remained India's primary arms supplier, accounting for **36% of its arms imports**, this marked the first five-year period since 1960-64 where Russian deliveries made up less than half of India's total arms imports.
 - India is now increasingly turning to Western countries like **France and the USA**, as well as boosting its domestic arms industry, to meet its growing defence needs.

What is SIPRI?

- It is an independent international institute dedicated to research into conflict, armaments, arms control and disarmament.
- It was established in **1966 in Stockholm (Sweden)**.
- It provides data, analysis and recommendations, based on open sources, to policymakers, researchers, media and the interested public.

What are the Recent Indian Government Initiatives to Reduce Arms Imports?

- **About:** The [Indian Defence sector](#), the second largest armed force is at the cusp of revolution.
 - In the [Interim Budget 2024-25](#), the Defense Ministry received a total allocation of ₹6.2 lakh crore.
 - Within this allocation, ₹1.72 lakh crore was designated for capital expenditure, specifically for new procurements.
 - This capital allocation reflected a **5.78% increase** compared to the Budget Estimates from 2023-24.
- **Initiatives:**
 - **Positive Indigenisation Lists:** The government releases [Positive Indigenisation Lists](#) to identify specific components and subsystems that must be manufactured domestically.
 - The Department of Military Affairs has recently released the **5th Positive Indigenisation List**, which includes 98 items, further bolstering indigenous manufacturing in the defence sector.
 - **Increased FDI Limits in the Defence Sector:** It has been increased in 2020 to **74%** through

- the Automatic Route and up to **100%** via the Government Route.
- **Defence Industrial Corridors:** Two dedicated [Defence Industrial Corridors](#) have been established in Tamil Nadu and Uttar Pradesh to boost defence manufacturing.
 - The Uttar Pradesh corridor encompasses nodes in Agra, Aligarh, Chitrakoot, Jhansi, Kanpur, and Lucknow.
 - The Tamil Nadu corridor includes nodes in Chennai, Coimbatore, Hosur, Salem, and Tiruchirappalli.
 - **Innovations for Defence Excellence (idEX):** idEX aims to create an ecosystem for innovation and technology development in Defence and Aerospace.
 - It engages various stakeholders such as industries, MSMEs, startups, innovators, R&D institutes, and academia, providing them grants, funding, and support for R&D with potential for **Indian defence and aerospace needs**.
 - The initiative is funded and managed by the **Defence Innovation Organization (DIO)**, established as a not-for-profit company under the Companies Act 2013.
 - **SRIJAN Portal:** It is a one-stop shop for vendors to find opportunities to manufacture defence equipment that was previously imported.
 - Defence Public Sector Undertakings (DPSUs) and other government agencies can use SRIJAN to post details about specific items they want indigenized.
 - This allows Indian companies to express their interest and collaborate on production.

Way Forward

- **Defence Innovation Zones:** Designating specific geographical areas as **defence innovation zones**, offering infrastructure support, and regulatory flexibility to attract defence startups and high-tech companies.
- **Streamlined Procurement Process:** Simplifying and expediting the procurement process for indigenous defence products to encourage domestic production.
 - Implementing **transparent and efficient procurement policies** that prioritise locally manufactured goods.
- **Incentivize Indigenous Production:** Providing **financial incentives, tax benefits, and subsidies** for companies engaged in indigenous defence manufacturing. Create a conducive ecosystem for defence startups and small-scale enterprises to thrive.
- **Boosting Exports:** Building a strong defence export industry that can generate revenue to support further R&D and reduce reliance on solely domestic budgets, similar to Israel's model.

Hepatitis B: A Public Health Concern In India

[Source: DTE](#)

Why in News?

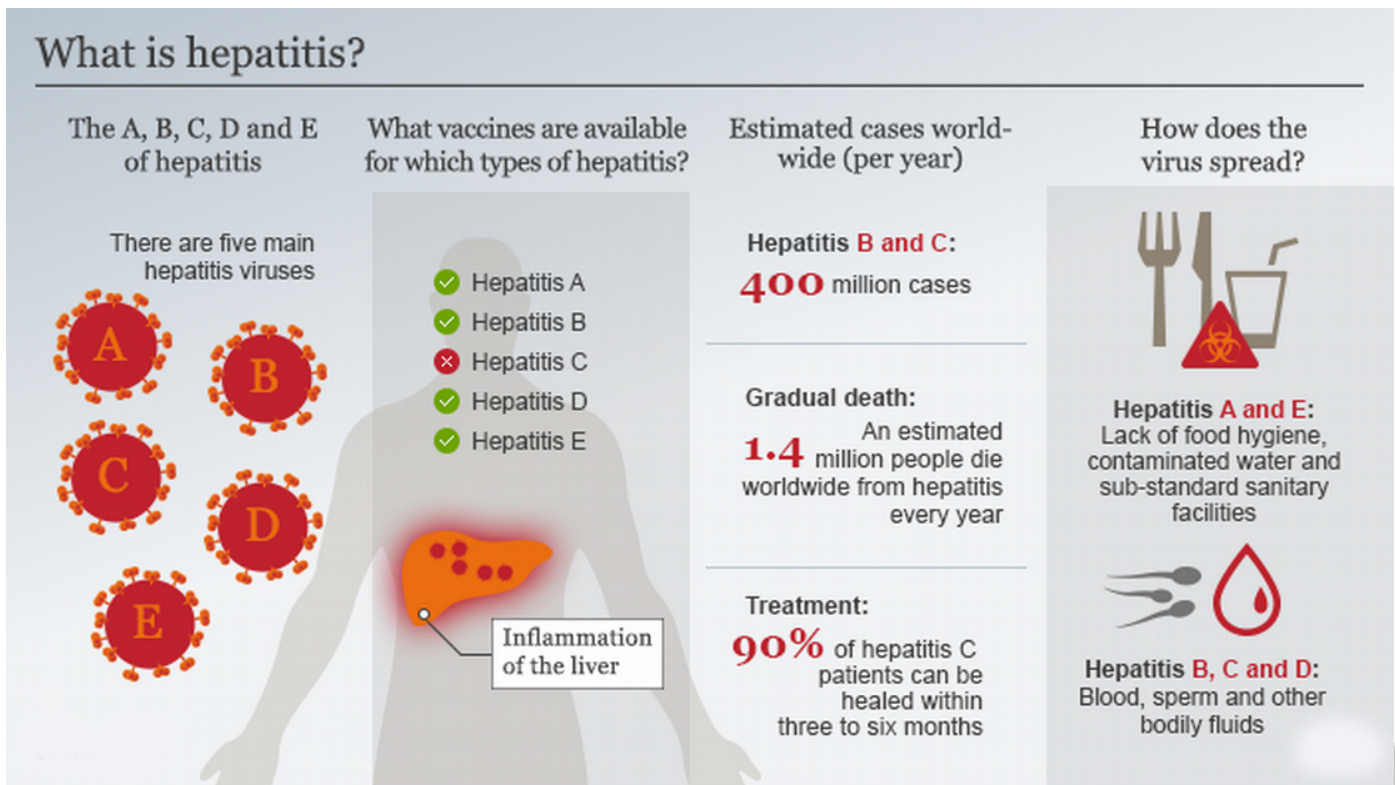
A recent study by Sir Ganga Ram Hospital, New Delhi, indicates that public awareness and knowledge regarding Hepatitis B, a potentially fatal disease leading to liver cirrhosis and cancer, is insufficient in India.

What is Hepatitis?

- **About:**
 - **Hepatitis** is the **inflammation** of the **liver**, characterised by irritation or swelling of the liver cells due to various causes.
 - Liver inflammation can manifest as either acute, characterised by symptoms like **jaundice**,

fever, and vomiting, or chronic, lasting over six months with no apparent symptoms.

What is hepatitis?



▪ Symptoms:

- Some individuals infected with hepatitis **may not exhibit symptoms**, but common ones include fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, clay-coloured bowel movements, joint pain, and jaundice.

▪ Causes:

- Hepatitis is typically caused by hepatotropic viruses, including A, B, C, D, and E, although other viruses like the **varicella virus** can also lead to the disease.
 - **SARS-CoV-2**, the virus causing **Covid-19** may injure the liver too.
- Additional causes encompass **drug and alcohol** misuse, liver fat accumulation (**fatty liver** hepatitis), or an autoimmune response where the body produces antibodies targeting the liver (autoimmune hepatitis).

▪ Types of Hepatitis:

◦ Hepatitis A virus (HAV):

- Hepatitis A is a liver inflammation that ranges from mild to severe, transmitted through contaminated food or water, direct contact with an infected person, and **can be prevented** with a vaccine, with most people recovering fully and gaining lifelong immunity.

◦ Hepatitis B virus (HBV):

- Hepatitis B is a **viral infection** that can cause acute or chronic liver disease, often transmitted from mother to child, through early childhood contact, or via sex or unsafe injections, but **can be prevented** by vaccines.
 - Hepatitis B vaccines are **highly efficacious** in preventing HBV infection when administered **before exposure** to HBV.

◦ Hepatitis C virus (HCV):

- Hepatitis C is a **bloodborne virus** causing both acute and chronic hepatitis, with severity ranging from mild to serious, including liver cirrhosis and cancer, primarily transmitted through unsafe health care, blood transfusions, injection drug use, and sexual practices.
- The cure rates exceeds 95% using Direct-acting antiviral medicines (DAAs), yet access to diagnosis and treatment is limited, and **no effective vaccine exists**.

◦ Hepatitis D virus (HDV):

- Hepatitis D, a virus dependent on hepatitis B virus (HBV) for replication, affects approximately 5% of individuals with chronic HBV infection worldwide, with co-

infection or super-infection more prevalent among indigenous populations, dialysis patients, and drug users, posing a severe risk to liver health including the potential for cancer or fatality.

- Its **prevention is possible** through hepatitis B immunization, treatment efficacy remains limited.
- **Hepatitis E virus (HEV):**
 - Hepatitis E, caused by **HEV infection**, is globally prevalent, particularly in **East and South Asia**, transmitted through contaminated water, with a licensed vaccine in China and some other countries and ongoing research for additional vaccines worldwide.

Types of Hepatitis

	TRANSMISSION	PREVENTION	TREATMENT
Hepatitis A	Eating contaminated food or drinking contaminated water	<ul style="list-style-type: none"> • Practicing good hygiene • Vaccine 	No treatment
Hepatitis B	Through contact with the blood or bodily fluids of an infected person	<ul style="list-style-type: none"> • Practicing good hygiene • Vaccine • Blood screening 	<ul style="list-style-type: none"> • Alpha interferon • Peginterferon
Hepatitis C	Blood-to-blood contact	<ul style="list-style-type: none"> • Practicing good hygiene • Avoid sharing needles, toothbrushes, razors or nail scissors 	Direct-acting antiviral drugs
Hepatitis D	Contact with infected blood (only occurs in people already infected with hepatitis B)	<ul style="list-style-type: none"> • Hepatitis B vaccine • Avoid sharing needles, toothbrushes, razors or nail scissors 	Interferon
Hepatitis E	Eating contaminated food or drinking contaminated water	<ul style="list-style-type: none"> • Practicing good hygiene • Avoid drinking water that has come from a potentially unsafe source 	No treatment

▪ Government Initiatives to Tackle Hepatitis:

- **National Viral Hepatitis Control Program:** The National Viral Hepatitis Control Program aims to eliminate viral hepatitis as a public health threat in the country **by 2030**.
- **India's Universal Immunization Programme (UIP):** India's Universal Immunization Programme (UIP) offers free vaccination against **eleven vaccine-preventable diseases**, including Hepatitis B, **Tuberculosis**, Diphtheria, Pertussis, Tetanus, Polio, Pneumonia, Meningitis due to Haemophilus Influenzae type b (Hib), Measles, Rubella, Japanese Encephalitis (JE), and Rotavirus diarrhoea.

- **Global Initiatives:**
 - WHO's global hepatitis strategy
 - Coalition for Global Hepatitis Elimination (CGHE)
 - Global Hepatitis Programme

What are the Recommendations Made by the Survey?

- As per the survey, only 22.7% of participants had completed the full Hepatitis B vaccination course.
 - Therefore it recommends, ensuring **accessibility** and reaching all segments of the population, especially those at high risk, is crucial for effective vaccination against HBV, alongside increasing overall vaccination efforts.
- The survey finds that **only a quarter** of those surveyed had sufficient understanding of the disease, encompassing its transmission, impact on the liver, and the crucial role of vaccination.
 - Therefore to deal with widespread misconceptions and insufficient education on Hepatitis B the need for **targeted information campaigns** to address knowledge gaps is the way out.
 - For this, people should be educated on the necessity of **completing the entire vaccination** regimen for optimal effectiveness, as it is not uncommon for individuals to miss the final dose after receiving one or two doses.
- **It recommends educational campaigns** should target the general public, especially **women**, older individuals, those with lower education levels, and rural residents, who showed lower knowledge scores and vaccination rates in the study.
- It concludes that comprehensive strategies, which integrate **health literacy and vaccination coverage**, are crucial for achieving national and global HBV control targets.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q. Which one of the following statements is not correct? (2019)

- (a) Hepatitis B virus is transmitted much like HIV.
- (b) Hepatitis B unlike Hepatitis C, does not have a vaccine.
- (c) Globally, the number of people infected with Hepatitis B and C viruses are several times more than those infected with HIV.
- (d) Some of those infected with Hepatitis B and C viruses do not show the symptoms for many years

Ans: (b)

Q. Which of the following diseases can be transmitted from one person to another through tattooing? (2013)

1. Chikungunya
2. Hepatitis B
3. HIV-AIDS

Select the correct answer using the codes given below:

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Bone Grafting Technology

[Source: HT](#)

Why in News?

Recently, the **Indian Institute of Technology (IIT) Kanpur** signed a **Memorandum of Understanding (MoU)** with **Canada based biotechnology company (Conlis Global)** for licensing of an innovative and indigenously developed technology that promotes **bone healing and regeneration**.

What are Nano Hydroxyapatite-based Porous Composite Scaffolds?

▪ About:

- The **Nano Hydroxyapatite-based Porous Composite Scaffolds** are biodegradable and have **osteoinductive** and **osteopromotive** properties for bone regeneration.
- It is highly biocompatible ensuring good cell material interaction with **osteoblast cells** exhibiting a high mechanical strength and interaction between the polymer network and the solvent.

▪ Characteristics:

- It has **osteoinductive** and **osteopromotive** properties due to which it has **bone healing** and **bone growth** characteristics.
- They are highly biocompatible, resulting in good cell material interaction with **osteoblast cells** exhibiting a high mechanical strength and interaction between the polymer network and the solvent.
 - Osteoblast cells are responsible for **mineralisation of bone** during **bone formation** and **bone remodelling**.

▪ Applications:

- It is commonly used in **orthopaedic and dental implants, bone graft substitutes, coatings for prosthetic devices, and tissue engineering scaffolds**.
- Functionalized scaffolds can be used as fillers in **large-size bone defects**, without compromising the **connectivity** and **structural defects, oxygen, and blood circulation**.
- It enhances **tissue formation, mineralization, and rapid defect healing**.

What is Bone Grafting?

▪ About:

- **Bone grafting** involves a **surgical technique** where transplanted bone is utilised to **repair** and **reconstruct bones** affected by **disease** or **injury**.
- This procedure is applicable for **repairing bones** throughout the body.
- Surgeons may harvest bone from various sources such as the **hips, legs, or ribs** for grafting purposes.

▪ Objective:

- The primary objective of the invention is to **overcome the drawbacks** of the existing remedies.
 - Other alternatives have been associated with **infection** and **immune** related complications.
- This technology provides the delivery of **bone active molecules, antibiotics** or any other drug for combating bone pathologies, reconstruction of irregular bone defects and for dental applications as well.

▪ **Functions:**

- The technology facilitates bone regeneration in a biocompatible manner by acting as a carrier for **bone- active biomolecules**, delivering them directly to the site of an implant.
- The material is a promising approach for reconstructing and repairing bone defects while addressing the drawbacks and complications associated with technologies that are available in the market at present.
- The functionalized scaffolds can be used as fillers in large size bone defects, without compromising the connectivity and structural defects, oxygen and blood circulation thereby enhancing tissue formation, mineralisation, and rapid defect healing.
- It can also be used as a **bone substitute**, overcoming autograft limitations.

UPSC Civil Services Examination Previous Year Question (PYQ)

Q. Which of the following diseases can be transmitted from one person to another through tattooing? (2013)

1. Chikungunya
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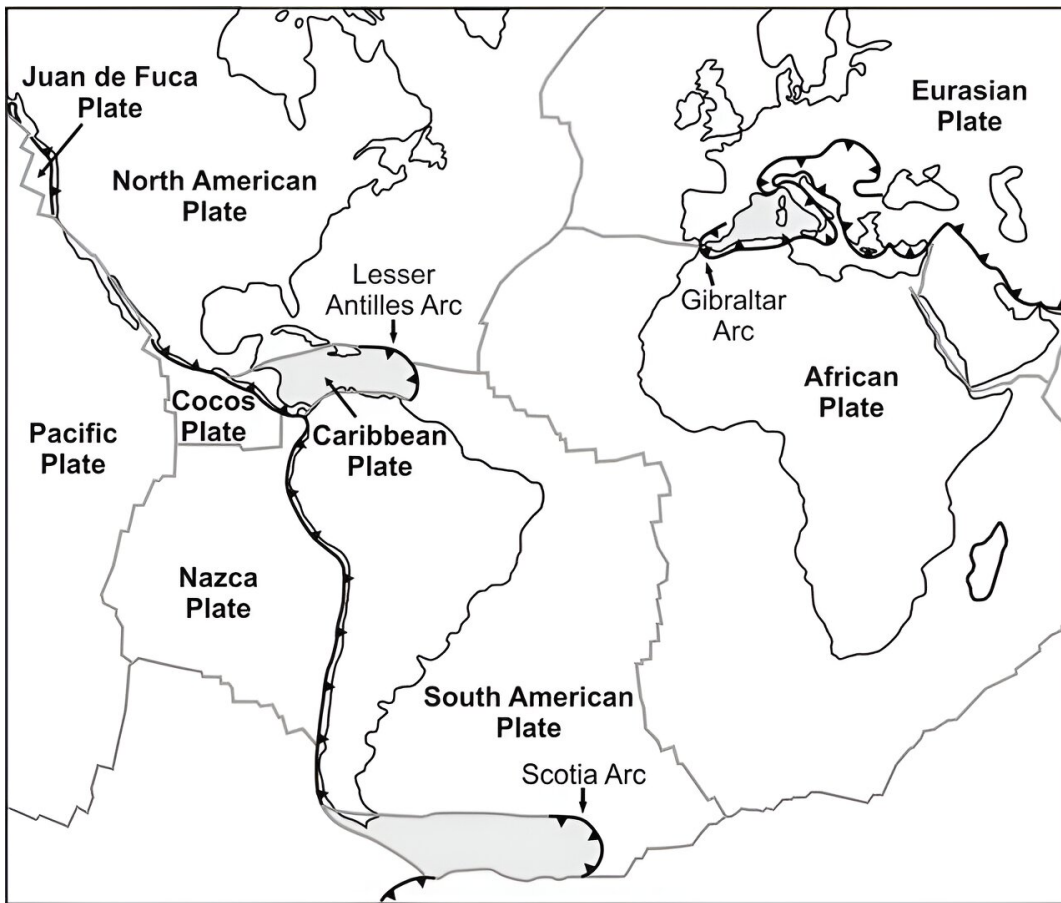
Ans: (b)

Concern Over Gibraltar Strait Subduction Zone

Source: TOI

Recently, Scientists raised concerns about the future of the **Atlantic Ocean**. They have identified a **subduction zone** beneath the **Gibraltar Strait**, situated between **Spain and Morocco**.

- It is a narrow gap separating **Europe** and **Africa**. It marks the meeting point of the **Eurasian Plate** and the **African Plate**.
- **The Ring of Fire:** Similar to the **Pacific Ocean's Ring of Fire**, where subduction zones encircle the **Pacific Ocean**, the **Atlantic Ocean** may witness the formation of a new subduction system.
- **Subduction Process:** Subduction zones occur where tectonic plates interact, with one plate diving below another. In this case, the **African Plate** is subducting beneath the **Eurasian Plate**, leading to seismic activity and earthquake risks.
 - Scientists predict that this subduction zone will expand westwards over the next 20 million years.
- **Ocean Basin Shrinking:** The subduction process could lead to the **shrinking of the ocean basin**, ultimately closing off the **Atlantic Ocean**.
- **Subduction Invasion:** Despite its current relatively small size (about 125 miles in length), projections suggest that the **subduction zone could expand to approximately 500 miles** within the next two decades.
 - This phenomenon is known as **"subduction invasion."**



Read More: [Pacific Ring of Fire](#), [Mid Oceanic Ridge](#), [Seafloor Spreading](#), [Tectonic Plates](#), [Tectonic Evolution of Greater Maldive Ridge](#)

Nimmu-Padam-Darcha Road in Ladakh

Source: [PIB](#)

Recently, The [Border Roads Organisation \(BRO\)](#) has achieved a significant milestone by connecting the strategic **Nimmu-Padam-Darcha road in Ladakh**.

- This road serves as a **crucial link between Manali and Leh**, passing through **Darcha** and **Nimmu** along the **Kargil-Leh highway**.
- It now stands as the **third axis** connecting **Ladakh to the hinterland**, alongside the existing [Manali-Leh](#) and [Srinagar-Leh routes](#).
- The road holds **strategic importance due to its shorter distance** compared to other routes. It will **provide all-weather connectivity** to the Ladakh region.
- It crosses only one pass i.e. [Shinkun La](#) at an elevation of **16,558 feet** where tunnel work is about to commence under the BRO's supervision.
- The road's completion will not only strengthen defence preparedness but also contribute to economic development in the [Zaskar Valley](#).
- **BRO** was conceived and raised in **1960** by **Pandit Jawaharlal Nehru** to coordinate the speedy development of a network of roads in the **North** and the **North Eastern border regions** of the country.
 - It works under the administrative control of the **Ministry of Defence**.



Read more: [Vibrant Villages Programme](#), [BRO Opens Rohtang Pass](#), [Zoji La](#), [Importance of Ladakh](#).

UN General Assembly Adopts Landmark AI Resolution

Source: [UN](#)

The [UN General Assembly](#) has taken a historic step by adopting a landmark resolution focused on promoting the **safe, secure, and trustworthy use of artificial intelligence (AI) systems**, aligning with the goals of sustainable development.

- This adoption marks the first time the Assembly has addressed regulation in the rapidly evolving field of AI, signalling a significant milestone in global governance.
- The resolution recognises AI's potential to accelerate progress towards the **17 Sustainable Development Goals** and calls for cooperation among states, private sectors, civil society, and other stakeholders to develop regulatory frameworks and governance approaches for safe AI usage.
- Additionally, the Assembly stresses the importance of **bridging the digital divide by supporting developing countries** in gaining inclusive access to AI technologies and enhancing digital literacy, ensuring that technological advancement benefits everyone equally.

- While **General Assembly resolutions are not legally binding**, they serve as a crucial indicator of global opinion.

Read more: [Fostering Ethical AI](#)

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