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CURRENT AFFAIRS

Argasia Education PVT. Ltd. (GST NO.-09AAPCAI478E1ZH)
Address: Basement C59 Noida, opposite to Priyagold Building gate, Sector 02,
Pocket I, Noida, Uttar Pradesh, 201301, CONTACT NO:-8448440231

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BIODIVERSITY TO BIOECONOMY

WHY IN THE NEWS?

The North Eastern Programme by the Department of Biotechnology is making headlines because it is driving a major transformation in India's North East Region (NER) by leveraging biotechnology for sustainable development. This initiative is not only preserving the region's rich biodiversity but also fostering economic growth through bio-entrepreneurship, resilient agriculture, and innovative research.

With a focus on medicinal plants, climate-resilient crops, and indigenous knowledge, the programme is positioning the NER as a hub of bioeconomic innovation. The recent attention highlights the significant impact of these efforts in enhancing livelihoods, promoting conservation, and integrating modern biotechnology with traditional wisdom.

WHAT IS THE NORTHEASTERN PROGRAMME?

The Government of India has launched several initiatives to promote the conservation of biodiversity and its transition into a bioeconomy in the Northeast. The Northeastern Programme is a collective effort by multiple government and non-government organizations to explore and sustainably utilize the region's biological

resources.

Some key initiatives under this programme include:

1. North East Rural Livelihood Project (NERLP): Aimed at improving sustainable livelihoods through resource-based industries like herbal medicine, bamboo crafts, and organic farming.

2. Bioresources and Sustainable Development (NER-BPMC): Launched by the Department of Biotechnology, this program promotes biotechnology-based entrepreneurship.

3. North East Centre for Technology Application and Reach (NECTAR): Supports research in biotechnology, agriculture, and medicinal plants to enhance the economic potential of local communities.

4. Mission Organic Value Chain Development for Northeastern Region (MOVCD-NER): Encourages organic farming and value addition to boost local economies.

OBJECTIVES OF PROMOTING BIODIVERSITY-BASED BIOECONOMY

The transition from biodiversity to bioeconomy in the Northeast has several objectives:

1. Conservation of Biodiversity: Sustainable management of biological resources while maintaining ecological balance.

2. Economic Growth: Promoting industries based on bioresources, such as herbal medicine, sustainable agriculture, and eco-tourism.

3. Employment Generation: Encouraging biotechnology and agribusiness startups to create job opportunities for local communities.

4. Sustainable Development: Reducing reliance on non-renewable resources by integrating biological solutions into industries.

5. Empowering Indigenous Communities: Utilizing traditional knowledge of local tribes in biodiversity conservation and sustainable resource management.

VARIOUS GOVERNMENT INITIATIVES TO EXPLORE THE POTENTIAL OF NORTHEASTERN INDIA

The Indian government has undertaken numerous initiatives to leverage the region's biodiversity for economic development. Some of these include:

1. National Mission on Biodiversity and Human Well-being: Aims to integrate biodiversity conservation with economic growth.

2. Biotechnology Industry Research Assistance Council (BIRAC): Funds startups in bio-based industries.

3. North East Special Infrastructure Development Scheme (NESIDS): Supports infrastructure in sectors such as biotechnology and organic farming.

4. National Bamboo Mission: Promotes bamboo-based industries, which is significant given the region's vast bamboo reserves.

5. Ayush Mission for Herbal Medicines: Supports research and commercial production of traditional herbal medicines, especially in Arunachal Pradesh and Assam.

6. NERAMAC (North Eastern Regional Agricultural Marketing Corporation): Helps in the marketing of agricultural and organic products from the Northeast.

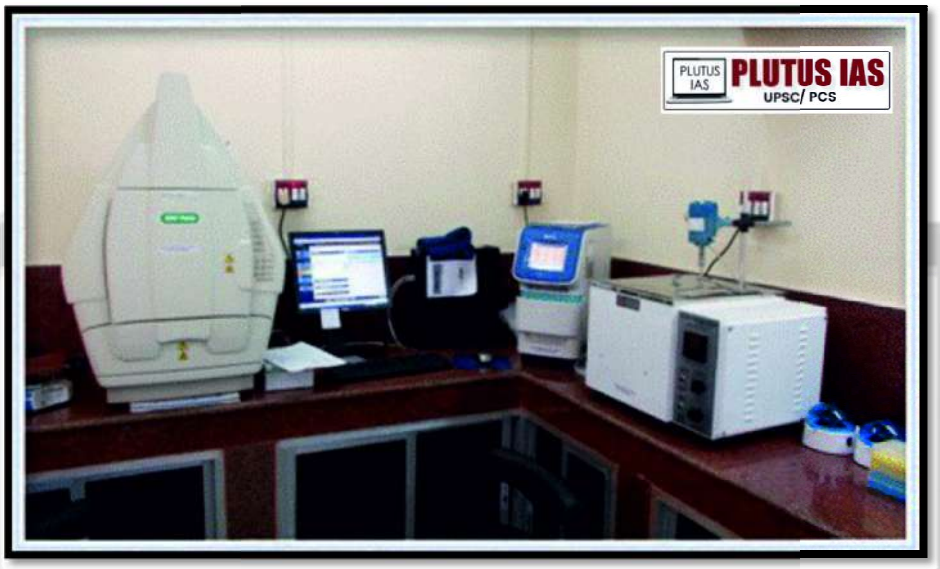
ROLE OF BIOTECHNOLOGY IN PRESERVING BIODIVERSITY

Biotechnology plays a crucial role in preserving biodiversity while fostering sustainable economic development. The application of biotechnological tools can help in:

1. Conservation of Endangered Species: DNA sequencing and genetic mapping help in protecting species like the Red Panda and One-Horned Rhino.

2. Sustainable Agriculture: Tissue culture technology is used to propagate medicinal and endangered plants.

3. Waste Management: Biodegradable plastics and biofuels reduce pollution, preserving the natural environment.
4. Biofertilizers & Biopesticides: Promote organic farming by replacing chemical-based fertilizers.
5. Medicinal Plant Research: Advances in biotechnology help extract high-value bioactive compounds from rare herbs.
6. Community-Based Biotechnological Initiatives: Projects like DBT's Biotech-KISAN Programme train farmers in biotech innovations to enhance productivity sustainably.



THREATS TO BIODIVERSITY IN NORTHEASTERN INDIA

Despite its vast ecological wealth, Northeastern India faces multiple threats to its biodiversity, including:
1. Deforestation & Habitat Loss: Expansion of agriculture, infrastructure projects, and illegal logging reduce forest cover.
2. Climate Change: Rising temperatures and erratic rainfall patterns impact sensitive ecosystems like the Eastern Himalayas.
3. Poaching & Illegal Wildlife Trade: Species like the Snow Leopard and Hoolock Gibbon are endangered due to poaching.
4. Invasive Species: The spread of invasive plant species like Mikania micrantha threatens native flora.
5. Pollution & Industrialization: Unregulated industrial activities and plastic waste pollution degrade ecosystems.
6. Overexploitation of Resources: Unsustainable harvesting of medicinal plants and non-timber forest products (NTFPs) leads to depletion of biodiversity.

WAY FORWARD: STRATEGIES FOR SUSTAINABLE DEVELOPMENT

To ensure a sustainable bioeconomy in the Northeast, a multi-pronged strategy is essential:
1. Strengthening Conservation Policies: Strict implementation of biodiversity protection laws and eco-sensitive zones.
2. Promoting Green Technologies: Encouraging bio-based industries like algae-based biofuels, biodegradable plastics, and organic farming.
3. Community Participation: Empowering local communities through eco-tourism, agroforestry, and sustainable harvesting of natural resources.

4. Integration of Traditional Knowledge & Science: Utilizing indigenous knowledge in modern conservation and bioeconomic models.
5. Encouraging Startups & Entrepreneurship: Providing financial incentives and incubation centers for biotech and bioresource-based startups.
6. Strengthening Research & Development: Investing in biotech research to explore the economic potential of native species.
7. Public Awareness & Education: Conducting workshops and campaigns on biodiversity conservation and sustainable development.

CONCLUSION

Northeastern India, with its rich biodiversity and traditional knowledge systems, has the potential to become a hub of bioeconomy-driven sustainable development. The government's initiatives, coupled with advancements in biotechnology, can play a pivotal role in conserving biodiversity while unlocking economic opportunities. However, success depends on a balanced approach—one that integrates conservation efforts, local community participation, innovative biotech solutions, and responsible policy-making. By harnessing the power of biodiversity in a sustainable manner, Northeastern India can set an example for the world in transitioning from a biodiversity-rich region to a thriving bioeconomy.

PRELIMS QUESTIONS:

Q. Which government scheme focuses on promoting organic farming and value-chain development in Northeastern India?
a) National Bamboo Mission
b) Mission Organic Value Chain Development (MOVCD-NER)
c) North East Centre for Technology Application and Reach (NECTAR)
d) Biotechnology Industry Research Assistance Council (BIRAC)
Answer: B

MAINS QUESTIONS:

Q. Discuss the significance of biodiversity in Northeastern India and how it can be harnessed for economic development through a bioeconomy. What challenges must be addressed to ensure sustainability? (250 words, 15 marks)

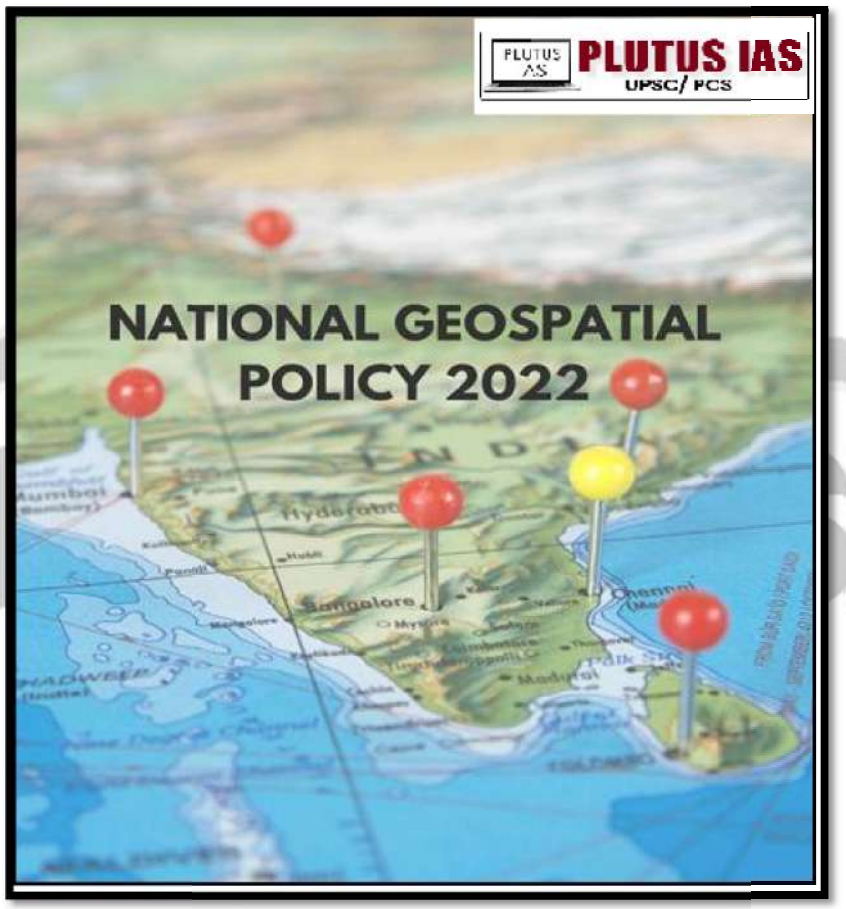
Nishant2356

NATIONAL GEOSPATIAL POLICY: POWERING INDIA'S VISION FOR VIKSIT BHARAT

WHY IN THE NEWS?

The National Geospatial Policy, 2022, launched by the Government of India, is in the news for its transformative approach to making India a global leader in geospatial technology. The policy focuses on liberalizing access to geospatial data, ensuring publicly funded datasets are openly available, and fostering

innovation across governance, businesses, and academia. Key goals include developing a high-resolution mapping system and a Digital Elevation Model (DEM) by 2030. The policy aims to strengthen institutional frameworks, enhance national coordination, and promote the reuse of geospatial data, paving the way for economic growth and technological advancement.



WHAT IS GEOSPATIAL DATA?

Geospatial data refers to information that describes objects, events, or features with a specific location on or near the Earth's surface. It combines location (coordinates), attributes (characteristics of the object), and temporal information (time or lifespan). Geospatial data can be static (e.g., a piece of equipment's location) or dynamic (e.g., the movement of a vehicle or the spread of disease). This data is gathered from diverse sources like satellite imagery, weather data, census data, social media, and more. It's most valuable when shared, analyzed, and combined with traditional data. Geospatial analytics enhances data by adding location and time, creating visualizations such as maps and graphs that reveal patterns and insights for better predictions. Geospatial Information Systems (GIS) visualize and map this data, enabling applications like overlaying hurricane data with lightning strike risk areas.

WHAT IS NATIONAL GEOSPATIAL POLICY?

The National Geospatial Policy 2022 is a strategic framework introduced by the Government of India on December 28, 2022, aimed at leveraging geospatial technologies to promote national development, economic growth, and global leadership in the geospatial sector. This policy envisions India as a global leader

in geospatial data usage and technology by creating an enabling environment for its widespread adoption across various sectors such as governance, business, academia, and citizen services.

GOALS OF THE NATIONAL GEOSPATIAL POLICY(NGP)

1. By 2025

Establish an enabling policy and legal framework to support the liberalization of the geospatial sector and democratization of data.

Enhance availability and accessibility of high-quality location data across sectors to drive innovation and enterprise.

Develop a unified digital interface for accessing geospatial data collected through public funds.

Redefine the National Geodetic Framework using modern positioning technologies with online accessibility.

Create a high-accuracy geoid model for the entire country.

Strengthen national and sub-national geospatial governance by fostering collaboration between the government, private sector, academia, and civil society.

2. By 2030

Conduct high-resolution topographical surveys (5–10 cm for urban/rural areas and 50–100 cm for forests/wastelands).

Develop a high-accuracy Digital Elevation Model (DEM) (25 cm for plains, 1–3 m for hilly/mountainous areas).

Establish a Geospatial Knowledge Infrastructure (GKI) underpinned by an Integrated Data and Information Framework.

Enhance geospatial skills, capabilities, and awareness to meet future technological and economic demands.

3. By 2035

Generate high-resolution bathymetric geospatial data for inland waters and deep-sea topography to support the Blue Economy.

Survey and map sub-surface infrastructure in major cities and towns.

Develop a National Digital Twin for major urban centres, creating digital replicas to improve urban planning and management.

KEY FOCUS AREAS OF THE NATIONAL GEOSPATIAL POLICY

1. Geospatial for Transformation & SDGs: The policy positions geospatial technology and data as key drivers for achieving Sustainable Development Goals (SDGs), enhancing efficiency across sectors, and ensuring transparency in governance.

2. Atmanirbhar Bharat & Self-Reliance: Recognizing the need for locally relevant geospatial data, the policy aims to foster a self-reliant geospatial ecosystem, empowering Indian companies to compete globally and reduce dependency on foreign providers.

3. Global Best Practices & IGIF: Adopting international frameworks like the Integrated Geospatial Information Framework (IGIF) under UN-GGIM, the policy strengthens India's national spatial information management.

4. Robust Geospatial & ICT Infrastructure: Establishing a well-defined data custodianship model to ensure the collection, management, and real-time accessibility of high-quality geospatial data for cross-sector collaboration.

5. Fostering Innovation & Startups: Encouraging startups, R&D, and emerging technologies, the policy promotes regulatory modernization and bridges the geospatial digital divide.

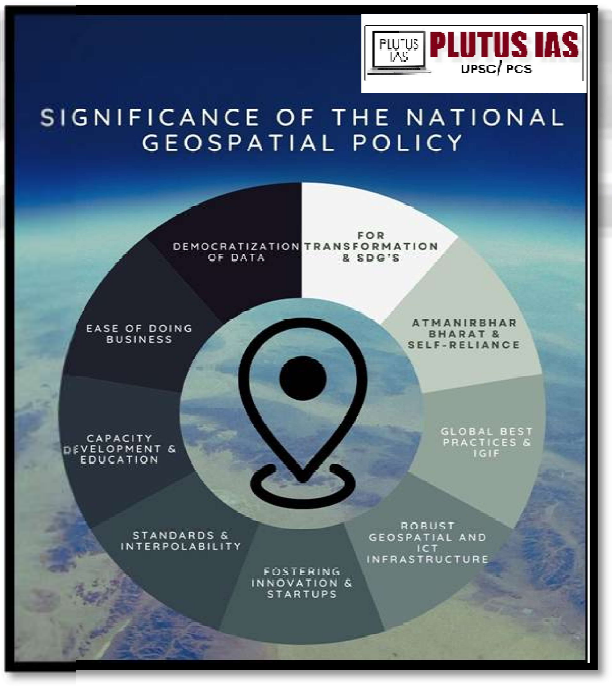
6. Standards & Interoperability: Advocating open standards, open data, and compliance frameworks, the policy ensures seamless integration and interoperability of geospatial information.

7. Capacity Development & Education: Promoting geospatial education from school levels alongside standardized certifications and skill development programs to sustain long-term industry growth.
8. Ease of Doing Business: Continued policy liberalization to attract investment, facilitate business-friendly regulations, and support geospatial enterprises.
9. Democratization of Data: Survey of India (SoI) and other publicly funded geospatial data will be treated as a public good, ensuring easy access and utilization for all stakeholders.

NATIONAL GEOSPATIAL POLICY IN ACTION:

1. PM Gati Shakti: Integrates geospatial data for efficient infrastructure development across multiple sectors, enhancing coordination between ministries and improving project planning.
2. National Geospatial Data Repository: A centralized platform for seamless sharing and access to high-quality geospatial data across sectors, supporting better governance and business decisions.
3. Operation Dronagiri: A pilot project that demonstrates the practical use of geospatial technologies in urban planning, disaster management, and governance. It includes an Integrated Geospatial Data Sharing Interface for better cross-sector collaboration.
4. Survey of India (SoI): The establishment of the CORS network for high-accuracy location data and the SVAMITVA Scheme, which uses drone technology to map villages and streamline land records.
5. Innovation and Startups: Encourages the development of geospatial technology parks, incubation centres, and partnerships with academia and the private sector for research and product development.
6. Education and Capacity Building: Promotes geospatial training programs and skill development to support the growing industry.
7. Private Sector Engagement: Promotes open data access and business-friendly regulations to drive innovation and private sector growth in the geospatial sector.
8. Sustainable Development Goals (SDGs): Leverages geospatial data for efficient planning in sectors like agriculture, urban development, and environmental conservation, contributing to India's SDGs.

SIGINIFNACE OF NATIONAL GEOSPATIAL POLICY



CHALLENGES IN NATIONAL GEOSPATIAL POLICY IMPLEMENTATION:

1. Data Privacy and Security: Open access to geospatial data raises concerns about national security and citizen privacy.

2. Data Quality and Standardization: Ensuring consistent, high-quality, and standardized geospatial data across sectors is challenging.

3. Infrastructure and Technology Gaps: Lack of infrastructure and technological limitations, especially in remote areas, hinder data collection and sharing.

4. Skill Shortages: There's a shortage of trained professionals in geospatial technologies and insufficient educational integration.

5. Financial Constraints: Limited funding for infrastructure development, surveys, and long-term projects.

6. Regulatory and Policy Hurdles: Regulatory resistance and unclear policies may slow liberalization and private sector involvement.

7. PPP Challenges: Private sector reluctance due to data security concerns and unclear profit models.

8. Inclusion and Equity: Unequal access to technology, especially in remote areas, may hinder inclusive development.

9. Environmental and Social Concerns: Large-scale data collection raises environmental and social issues, including land rights and surveillance concerns.

WAY FORWARD

1. Enhance Data Quality and Standardization: Ensure consistent, accurate, and high-quality geospatial data across all sectors through standardized protocols and frameworks.

2. Strengthen Infrastructure: Develop robust technological infrastructure, especially in remote and rural areas, to enable better data collection, sharing, and access.

3. Build a Skilled Workforce: Invest in education and training programs to develop a workforce proficient in geospatial technologies, supporting industry growth and innovation.

4. Promote Public-Private Partnerships (PPP): Encourage private sector involvement through clear regulatory frameworks, incentives, and collaboration to drive innovation and investment in geospatial technologies.

5. Ensure Data Privacy and Security: Address concerns over data privacy by implementing secure systems for data sharing and access, balancing transparency with national security.

6. Foster Inclusive Development: Ensure equitable access to geospatial technologies and data, bridging the digital divide and empowering remote and underserved regions.

CONCLUSION

The National Geospatial Policy 2022 is a transformative step towards unlocking the potential of geospatial data for national development. By addressing challenges in data access, quality, and infrastructure, India can leverage geospatial technology to drive growth, innovation, and sustainable development across various sectors. The policy's focus on liberalizing data access, fostering public-private partnerships, and enhancing skill development will play a crucial role in accelerating the adoption of geospatial technologies across governance, businesses, and academia.

PRELIMS QUESTIONS:

Q. With reference to the National Geospatial Policy 2022, which of the following statements is/are correct?

1. The policy aims to make all geospatial data generated with public funds freely accessible to citizens.
2. The policy envisions the creation of a National Digital Twin for major urban centres by 2035.

Select the correct answer using the code given below:
A. 1 only
B. 2 only
C. Both 1 and 2
D. Neither 1 nor 2
Answer: C

MAINS QUESTIONS:

Q. Discuss the role of public-private partnerships (PPP) in the implementation of the National Geospatial Policy 2022. What are the potential challenges and solutions in fostering effective collaboration? (250 words, 15 marks)

Ritik singh