MAINS MATRIX

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Rethinking a Symbol of Environmental Responsibility

1. Introduction

As India accelerates industrial expansion, regulatory norms around mandatory green cover within industrial estates are being relaxed under the banner of "ease of doing business." This shift raises an important policy dilemma: **Are short-term compliance relaxations undermining long-term ecological resilience?**
A re-examination shows that on-site green belts, though useful, cannot substitute for broader landscape-level environmental stewardship.

2. The Problem: Misplaced Reliance on On-Site Green Belts

Industrial green belts traditionally serve as tools for local environmental regulation. Their functions include minor microclimate stabilisation, dust and noise mitigation, and visual softening of industrial structures. However, their ecological value remains limited because:

- They cannot offset ecosystem losses from deforestation, wetland destruction, or land-use conversion.
- They rarely support biodiversity due to mono-species plantations.
- Their narrow, fragmented structure fails to ensure habitat connectivity or carbon storage.
- Localised green belts do not address hydrological cycles, soil health, or landscape-scale ecological processes.

Thus, treating on-site green cover as a primary ecological safeguard is scientifically insufficient.

3. The Fallacy of Global Norm Comparisons

Several policy arguments for reducing mandatory green belts cite international practices. However, such comparisons lack validity without recognising India's distinct ecological and demographic realities:

- **High population density**, intensifying pressure on natural resources.

- **Unique ecological capacity**, especially in biodiversity hotspots and fragile landscapes.
- **Different economic structures**, where industrial siting often overlaps with environmentally vulnerable regions.

Environmental resilience cannot be benchmarked through simplistic comparisons detached from local context.

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4. Moving Beyond Compliance: A Two-Tiered Landscape Approach

A sustainable pathway lies not in eliminating green cover requirements but in **reshaping them** through a dual framework:

Tier 1: On-Site Green Cover (Calibrated Requirements)

- Flexible, realistic green belts within estates.
- Focus on functional planting rather than rigid area percentages.
- Better integration with industrial zoning and future expansion plans.

Tier 2: Off-Site Ecological Commitments (Mandatory)

- Compensatory landscape-level greening obligations.
- Institutionalised through measurable ecological restoration tasks.
- Ensures that industrial growth contributes to net positive environmental outcomes.

This integrated design shifts the purpose of green cover from symbolic compliance to **tangible ecosystem renewal**.

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5. Building the Off-Site Ecological Framework

Key components of the off-site strategy include:

1. **Regional or State-level Green Reserves**
   Planted or restored adjacent to industrial corridors to create ecological buffers.
2. **Restoration of Degraded Commons**
   Including catchments, riverbanks, scrublands, and mined lands.
3. **Integration with Green Credit and Carbon Markets**
   Ensuring accountability, verifiable metrics, and long-term stewardship.
4. **Connectivity-Oriented Planning**
   Linking fragmented habitats to promote biodiversity movement across industrial landscapes.

Such measures shift industry from isolated green patches to **landscape architects of ecological recovery**.

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6. Benefits of the Integrated Model

- **Promotes Ecological Stewardship:** Industries become co-creators of nature-based solutions rather than mere regulators' subjects.
- **Optimises Land Use:** Allows internal expansion without sacrificing green goals, reducing pressure to open new natural lands for industry.
- **Restores Natural Systems:** Enables reforestation, wetland rejuvenation, and revival of migratory corridors.
- **Enhances Climate and Biodiversity Outcomes:** Off-site greening supports carbon sequestration, watershed stability, and species protection.

This aligns with emerging global frameworks that prioritise **landscape-level restoration** over tokenistic local greening.

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7. A Useful Analogy: Short-Term vs Systemic Care

On-site green belts are akin to applying medicine to a wound—localised relief and stabilisation.
Off-site ecological restoration strengthens the body's immune system—long-term, systemic resilience.
Both are essential; one cannot compensate for the absence of the other.

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8. Redefining the Role of Industry

India's industries have significant environmental footprints, but they also hold the resources and innovation capacities to enable ecological regeneration.
Reframing their role requires:

- **Calibrated on-site norms**
- **Mandatory off-site restoration responsibilities**
- **Community and citizen participation**

This shifts environmental governance from a compliance-centric model to one of **collaborative ecological responsibility**, essential for a sustainable industrial future.

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9. Conclusion

Industrial expansion and ecological regeneration need not be opposing goals. By adopting a landscape-level approach that integrates flexibility with firm ecological accountability, India can craft a model of industrialisation that is both economically dynamic and environmentally restorative.
This paradigm—anchored in **Nature-Based Solutions, shared responsibility, and long-term ecological vision**—offers a transformative path for Sustainable Industrial Growth in India.

HOW TO USE IT

The debate on industrial green cover represents a critical juncture in India's development path. It challenges the traditional **compliance-based**

environmental regulation and proposes a shift towards a **landscape-level, stewardship model** that integrates industrial growth with ecological restoration. This is essential for achieving the twin goals of **economic development and environmental sustainability**.

Primary Relevance: GS Paper III (Environment, Economy & Disaster Management)

1. Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment.

- **How to use:** This is the core of the topic. It critiques the current EIA process and proposes a more robust framework.
- **Key Points:**
    - **Limitations of Current EIA:** The article argues that the current focus on **on-site green belts** is a tick-box exercise within the EIA process. It is **scientifically insufficient** to offset larger ecosystem losses from deforestation, wetland destruction, and habitat fragmentation.
    - **Moving Beyond Tokenism:** The proposed **two-tiered landscape approach** is a fundamental reform of the mitigation hierarchy. It moves beyond mere **local compliance** to ensure **net-positive environmental impact** through off-site ecological commitments.
    - **Biodiversity and Climate Co-Benefits:** The off-site framework, focusing on **connectivity-oriented planning** and **restoration of degraded commons**, directly addresses national goals for **biodiversity conservation** (e.g., National Biodiversity Action Plan) and **carbon sequestration** (as part of India's NDCs under the Paris Agreement).

2. Indian Economy and Issues Relating to Planning, Mobilization of Resources, Growth, Development and Employment.

- **How to use:** Analyze the economic rationale behind the proposed model.
- **Key Points:**
    - **Ease of Doing Business vs. Ease of Living:** The article addresses the tension between relaxing norms for "ease of doing business" and the long-term costs of ecological degradation that impact

public health and quality of life ("ease of living").

- **Sustainable Resource Mobilization:** The model promotes **sustainable land use** by optimizing industrial land internally while compensating for ecological damage externally, reducing the pressure to convert more natural land for industry.
- **Green Economy and Markets:** Integrating off-site commitments with **Green Credit and Carbon Markets** creates a economic incentive for industries to invest in restoration, fostering a new green market ecosystem.

Linkages to Other GS Papers

GS Paper II (Governance)

- **Government Policies & Interventions:** Critically examine policies that are relaxing green norms and propose an alternative, more effective governance framework.
- **Regulatory Bodies:** The success of the off-site model would require strong regulatory institutions to monitor, verify, and enforce the **mandatory ecological commitments**, preventing greenwashing.

GS Paper IV (Ethics)

- **Environmental Ethics:** The article calls for a shift in the **ethical responsibility of corporations**from being mere rule-followers to becoming **"co-creators of nature-based solutions"** and **"landscape architects of ecological recovery."**
- **Accountability and Stewardship:** It emphasizes the ethical principle of **stewardship**—that industries, as major resource users, have a duty to leave the environment better than they found it.
- **Sustainable Development:** The entire piece is an argument for **inter-generational equity**, ensuring that our industrial growth does not compromise the ecological security of future generations.

Overcoming India's Antimicrobial Resistance (AMR) Crisis: The Need for a New National Action Plan

1. Introduction

Antimicrobial Resistance (AMR) has emerged as one of India's most formidable public health challenges. The crisis now threatens not only human health but also food security, economic productivity, and environmental stability. India's high infectious disease

burden, combined with systemic weaknesses in antibiotic governance, makes the country a global hotspot for AMR. A renewed national strategy is imperative to prevent AMR from becoming the next silent pandemic.

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2. Scale and Severity of the Crisis

India's AMR burden is among the highest in the world.

- A **2023 WHO report** found that **one in three bacterial infections in India** are resistant to commonly-used antibiotics—almost **double the global average**.
- Critical pathogens such as **E. coli** and **Klebsiella pneumoniae** display alarming resistance to last-line antibiotics, undermining life-saving treatments.

The crisis is systemic: AMR spreads through humans, animals, food systems, aquaculture, agriculture, and contaminated soil and water. This entrenches AMR across the **entire ecosystem**, making it a classic **One Health** challenge.

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3. Drivers Behind India's AMR Burden

Several interconnected factors fuel the escalating AMR crisis:

a) High Infectious Disease Load

India continues to grapple with communicable diseases, leading to higher antibiotic consumption compared to many countries.

b) Antibiotic Misuse and Overuse

- Over-the-counter sales of antibiotics.
- Excessive use in hospitals without strict stewardship.
- Indiscriminate usage in livestock, poultry, aquaculture, and crop cultivation.

c) Weak Surveillance and Infrastructure

Limited laboratory capacity and fragmented data systems prevent real-time tracking of resistance patterns.

d) Environmental Contamination

Pharmaceutical effluents, agricultural runoff, and untreated waste allow resistant microbes to spread through soil, rivers, and food chains.

AMR, therefore, emerges from a nexus of **human, animal, and environmental factors**, demanding an integrated response.

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4. Review of National Action Plan Version 1: Gains and Gaps

India's first National Action Plan (NAP 2017–21) acknowledged AMR as a multi-sectoral challenge. However, implementation remained sluggish.

a) Limited Achievements

- Expansion of national AMR surveillance, supported

indirectly by COVID-era lab expansion.

- Ban on **Colistin** as a growth promoter in animal husbandry—an important milestone.

b) Major Shortcomings

- Failure to institutionalise strong State-level partnerships.
- Only **Kerala** successfully implemented a comprehensive State-level AMR policy, demonstrating noticeable progress.
- Weak enforcement, funding gaps, and lack of cross-sector integration limited national impact.

The first NAP therefore produced only **marginal improvements**, falling short of the systemic reform required.

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5. The Imperative for a New National Action Plan (Version 2)

The proposed Version 2 of the National Action Plan signals renewed attention to the AMR crisis. It is best seen as a much-needed "booster shot" that must correct previous shortcomings and embed long-term stewardship mechanisms.

For this plan to be transformative, it must move beyond symbolic commitments and become "the real deal"—comprehensive, coordinated, and outcome-driven.

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6. Strategic Priorities for a Strong NAP Version 2

To effectively reverse India's AMR trajectory, the new plan must prioritise the following:

a) Address All Drivers of AMR

A multidimensional strategy is needed to tackle:

- irrational antibiotic use in humans;
- non-therapeutic use in animals;
- environmental contamination;
- lack of surveillance and regulation.

b) Strengthen the One Health Framework

AMR solutions must integrate:

- public health systems;
- veterinary services;
- agriculture;
- food safety;
- environmental regulators.

Without cross-sector synergy, AMR cannot be contained.

c) Improve State-Level Coordination

AMR management ultimately depends on State-level legislation, enforcement, and surveillance.
The new NAP must:

- ensure financial and technical support for States;
- mandate State AMR action plans;

- institutionalise Centre–State cooperation.

d) Enhance Antibiotic Stewardship

A rigorous national stewardship programme is central to reducing misuse.
This includes:

- prescribing protocols;
- hospital antibiotic committees;
- digital surveillance tools;
- restrictions on non-essential antibiotic access.

Stewardship must be made mandatory across both public and private sectors.

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7. Conclusion

India stands at a critical juncture in its fight against antimicrobial resistance. The AMR crisis is no longer a looming threat—it is a lived reality that weakens health systems, increases mortality, and burdens the economy. A robust, well-funded, and genuinely collaborative National Action Plan Version 2 is essential to safeguard the country's health security.

If India succeeds in building a comprehensive One Health-based AMR strategy, it can turn the tide against one of the most urgent global health threats of the 21st century.

HOW TO USE IT

AMR is not merely a health issue but a **complex socio-economic and environmental crisis** that threatens to reverse decades of developmental progress. It exemplifies a "**One Health**" challenge, where the health of humans, animals, and the environment is inextricably linked. Tackling it requires a fundamental shift from a siloed, curative approach to a **multi-sectoral, preventive, and stewardship-based model of governance**.

Primary Relevance: GS Paper II (Governance, Social Justice, Health)

1. Issues Relating to Development and Management of Social Sector/Services relating to Health:

- **How to use:** This is the core of the topic. AMR is a direct threat to the effectiveness of India's public health system.
- **Key Points:**
  - **Systemic Weaknesses:** The drivers of AMR, such as **irrational antibiotic use** and **weak surveillance**, highlight critical gaps in the regulation of healthcare services, both public and private.
  - **Threat to Medical Advancements:** AMR renders common infections untreatable, increasing mortality from routine surgeries, childbirth, and diseases like TB, thereby

undermining the entire healthcare infrastructure.

- **Policy Analysis:** The evolution from **NAP 1.0 to NAP 2.0** provides a perfect case study to analyze policy implementation gaps, the importance of funding, and the need for robust monitoring and evaluation frameworks in public health.

2. Important Aspects of Governance, Transparency and Accountability:

- **How to use:** Analyze the governance challenges in implementing a cross-sectoral plan.
- **Key Points:**
  - **Inter-Ministerial Coordination:** The success of the **"One Health"** approach depends on seamless coordination between the Ministry of Health, Ministry of Fisheries, Animal Husbandry & Dairying, Ministry of Agriculture, and Ministry of Environment—a major governance challenge.
  - **Centre-State Relations:** The article points out that only Kerala successfully implemented a state-level AMR policy. This highlights the critical role of **cooperative federalism** and the need to empower states with technical and financial resources.

Primary Relevance: GS Paper III (Environment, Disaster Management, S&T)

1. Conservation, Environmental Pollution and Degradation:

- **How to use:** Frame AMR as a consequence of environmental pollution.
- **Key Points:**
  - **Environmental Contamination:** The role of **pharmaceutical effluents** and **agricultural runoff** in spreading resistance genes through water and soil makes AMR a severe form of **chemical and biological pollution**.
  - **Ecosystem Approach:** The "One Health" framework is essentially an **ecosystem-based management** approach, recognizing that human health cannot be protected in isolation from the health of animals and the environment.

2. Disaster and Disaster Management:

- **How to use:** Position AMR as a **slow-onset public health disaster**.
- **Key Points:**
    - Unlike an earthquake or flood, AMR is a creeping crisis with a gradual but catastrophic impact. It requires a **disaster management strategy** focused on **prevention, preparedness, and mitigation**—exactly what a robust National Action Plan aims to be.

3. Science and Technology:

- **How to use:** Discuss the scientific and technological solutions.
- **Key Points:**
    - **Surveillance Technology:** The need for **digital surveillance tools** and advanced laboratory capacity to track resistance patterns is a key S&T intervention.
    - **Research & Development:** The fight against AMR hinges on R&D for new antibiotics, rapid diagnostics, and alternatives to antibiotics in agriculture.

Linkages to GS Paper IV (Ethics)

- **Ethical Governance:** The crisis raises questions about the **ethical responsibility** of pharmaceutical companies (controlling effluent discharge), doctors (irrational prescribing), and policymakers (ensuring equitable access to effective antibiotics).
- **Stewardship as an Ethical Duty:** The concept of **Antibiotic Stewardship** is rooted in the ethical principle of preserving a finite, shared resource for future generations (**inter-generational equity**).

The New Direction for India Should Be Toward Asia

1. Context

- Recent diplomatic images at SCO 2025 (Putin–Modi–Xi) and G2 Summit (Trump–Xi) indicate a **global power shift toward Asia**.
- U.S. acknowledges that the **21st century will be written in Asia**.
- India is at a **foreign policy inflection point** as it becomes one of the world's largest economies.

2. Why India Needs a New Direction

a) Strategic realities

- U.S. is **reducing its strategic presence** in Asia but increasing pressure on India (e.g., Russia oil imports, CAATSA threats).
- China's rise continues; Russia remains important for defence.

b) India cannot be pushed into bipolar choices

- India's position is **not binary**: → Not choosing the U.S. over China, nor China over the U.S.
- India seeks **autonomous strategic space**.

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3. India's Core Foreign Policy Shift

a) Asia as the central theatre

- Asia holds **two-thirds of global population**,
- Largest share of global growth, **self-sustaining economic expansion**, and technological capacity.
- India's interests lie in:
  - Multilateralism
  - Regional trade
  - Supply-chain networks
  - Reducing Western dominance in global rules

b) India's Unique Developmental Model

- Largest labour pool & high domestic consumption → attraction for global producers.
- India's needs and priorities are **closer to other developing Asian and African nations** than to the West.

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4. Strategic Autonomy and 'Partnership' Model

- India's development strategy should be based on **linking value chains with friendly countries**.
- A shift from club-based Western institutions (G7) to:
  - **BRICS**,
  - **SCO**,
  - **Asian Infrastructure mechanisms**,
  - **Regional Comprehensive Economic Partnership (with modifications)**.
- India must decide how to balance **trade with China** while maintaining political caution.

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5. Key Elements of the New Asian Strategy

a) National Data and Technological Sovereignty

- No compromise on:
  - National data ownership
  - Indigenous tech innovation

- Local production
- Reduced import-dependence

b) Defence & National Power

- India's security doctrine must reflect a changing neighbourhood:
  - China–Pakistan axis evolving
  - U.S. seeking presence in Afghanistan again
  - Middle East realignments (Saudi-U.S. defence pacts)
  - Sanctions on Chabahar → India gets entry into **Iran–Afghanistan–Russia** corridor.

c) Reorientation of Defence Allocations

- Need for:
  - Cutting down foreign platform imports
  - Boosting **AI, drones, missiles, indigenous platforms**
  - Strengthening self-reliance with "spin-off" benefits for economy

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6. Economic Dimension

- India must integrate more deeply with **Asian supply chains**.
- India's high labour pool + large internal market = natural Asian advantage.
- Regional trade (RCEP-like frameworks) can reduce Western dependency.
- India's developmental goals align with **Global South priorities**.

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7. The Need for an AI-Future

- AI crucial for achieving double-digit growth.
- Bernstein report questions India's slow progress in AI mission.
- High-end computational resources, AI talent and indigenous models essential.
- Parliamentary committee calls for:
  - Domestic AI ecosystem
  - Improved sovereign computing capability
  - Funding boost
  - Coordination via PMO

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8. Conclusion

India's foreign policy must be rooted in:

- **Strategic autonomy**,
- **Asian alignment**,
- **Technological sovereignty**, and

- **Indigenous military-economic capability**.

Asia will be the world's centre of growth, and India must position itself at its core rather than remain tied to Western geopolitical agendas.

HOW TO USE IT

India is at a strategic inflection point, moving from a period of **non-alignment to multi-alignment**, and now towards a more focused **"Asia-centric" foreign policy**. This shift is driven by the recognition that Asia is the new epicenter of global economic growth and geopolitical competition. The core objective is to leverage India's unique position to achieve **strategic autonomy**, deepen regional integration, and build indigenous capabilities to navigate the complex US-China rivalry.

Primary Relevance: GS Paper II (International Relations)

1. India and its neighborhood-relations.

- **How to use:** This is the foundational level. An Asia-centric policy fundamentally redefines India's engagement with its immediate and extended neighborhood.
- **Key Points:**
    - **From South Asia to the Indo-Pacific:** The policy expands the traditional neighborhood focus to include the entire **Indo-Pacific region**, recognizing the strategic and economic linkages.
    - **Managing China:** The article highlights the central challenge: "how to balance trade with China while maintaining political caution." This involves engaging economically while securing borders and countering influence in the Indian Ocean (e.g., through partnerships like Quad).
    - **Engaging with Regional Institutions:** The pivot towards **BRICS, SCO, and Asian infrastructure mechanisms** signifies a deliberate move to participate in and shape non-Western, Asian-centric multilateral forums.

2. Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

- **How to use:** Analyze the specific forums mentioned as instruments of India's new strategy.
- **Key Points:**
    - **SCO (Shanghai Cooperation Organisation):** Provides a

platform to engage with both Russia and China, manage Central Asian interests, and discuss regional security.

- **BRICS:** Positions India as a leader of the **Global South** and offers an alternative to Western-dominated financial institutions.
- **RCEP (Regional Comprehensive Economic Partnership):** The article's mention of RCEP "with modifications" reflects India's ongoing dilemma: the need to integrate with Asian supply chains while protecting its domestic industry. This is a key debate in India's trade policy.

3. Effect of policies and politics of developed and developing countries on India's interests.

- **How to use:** Contextualize India's shift as a response to the policies of other major powers.
- **Key Points:**
  - **U.S. Policy:** The U.S. reducing its strategic presence while pressuring India on issues like **Russian oil imports and CAATSA** creates uncertainty, pushing India to diversify its partnerships and assert its strategic autonomy.
  - **China's Rise:** China's assertive Belt and Road Initiative (BRI) and its nexus with Pakistan are primary drivers for India to build its own economic and security networks in Asia.
  - **Middle East Realignments:** Shifts like the Saudi-U.S. defense pacts and India's entry into the Iran-Afghanistan-Russia corridor via Chabahar are examples of India nimbly navigating a changing geopolitical landscape to secure its energy and connectivity interests.

Linkages to GS Paper III (Security, Economy, Technology)

1. Security:

- **How to use:** Link the foreign policy shift to national security imperatives.
- **Key Points:**
  - **Indigenous Defence:** The call to cut foreign imports and boost AI, drones, and indigenous platforms aligns with the **Atmanirbhar Bharat**

(Self-reliant India) in defence, crucial for long-term strategic autonomy.

- **Changing Security Dynamics:** The evolving China-Pakistan axis and the U.S. withdrawal from Afghanistan are direct security challenges that an Asia-focused strategy must address.

2. Economy:

- **How to use:** Position economic integration as a goal of foreign policy.
- **Key Points:**
  - **Supply Chain Integration:** Deepening integration with Asian supply chains is essential for India to become a manufacturing hub and leverage its demographic dividend.
  - **Economic Decoupling from the West:** While not severing ties, reducing over-dependency on Western markets by strengthening trade within Asia and the Global South is a key economic dimension of this strategy.

3. Science and Technology:

- **How to use:** Highlight technology as a new frontier of sovereignty and competition.
- **Key Points:**
  - **Technological Sovereignty:** The emphasis on **national data ownership, indigenous AI, and sovereign computing capability** reflects the understanding that future economic and military power will be dictated by technological leadership.