

RECENT IMPROVEMENTS AND GAPS IN BORDER MANAGEMENT: REFORMS, MODERNIZATION, AND THE ROAD AHEAD

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Abstract

Border management is vital for protecting a nation's territorial integrity and maintaining internal security. In India, significant reforms have been introduced in recent years - particularly under the Modi government - to modernize and secure the country's vast and sensitive borders. These reforms include the development of physical infrastructure like roads and border outposts, the adoption of advanced technologies such as drones and smart fencing, and various policy-level changes aimed at improving efficiency and responsiveness. However, despite these advancements, challenges remain - especially in areas like personnel training, cyber security, and coordination between multiple security agencies. This paper explores both the progress made and the gaps that persist, ultimately recommending a holistic approach that integrates modern technology, skilled human resources, and effective governance to build a more robust and future-ready border management system.

Keywords: Border Management, Infrastructure, Cyber security, Training, Surveillance, Policy Reforms, India, Modi Government.

Introduction

Re-evaluating India's Border Management: New Dimensions and Strategic Reforms

1. The Evolving Scale of India's Frontiers

- **Land Border:** India shares a contiguous land border of approximately 15,106.7 kilometers with seven nations: Pakistan, China, Nepal, Bhutan, Bangladesh, and Myanmar.² The borders with China and Pakistan remain actively disputed and militarily volatile, demanding high-density force deployment.
- **Coastline Reassessment:** A significant recent development is the official revision of India's coastline length.³ Using modern high-resolution mapping techniques like Geographic Information Systems (GIS) and High-Water Line (HWL) data, the National Hydrographic Office (NHO) and Survey of India (SoI) have revised the total coastline, including island territories (Andaman & Nicobar Islands and Lakshadweep), from the traditional ⁴ 7,516.6 km to approximately ⁵11,098.81 kilometers as of late 2025.⁶ This nearly 47% increase highlights the true extent of the maritime domain requiring effective coastal security and naval surveillance, demanding a commensurate increase in resources for the three-tiered coastal security structure.⁷

2. Emerging and Persistent Security Challenges

The spectrum of threats is becoming increasingly complex, integrating both traditional and hybrid warfare elements:

- **Technology - Enabled Transnational Crime:** The border security calculus is being fundamentally altered by the use of drones/Unmanned Aerial Vehicles (UAVs) for airdropping narcotics, arms, and Fake Indian Currency Notes (FICN), particularly along the Western border (with Pakistan).⁸ This necessitates the urgent development and deployment of robust Anti-Drone Technology/Systems (ADS).⁹
- **Insurgency and Extremism:** The twin threats of Left-Wing Extremism (LWE), though significantly reduced, and cross-border terrorism, continue to strain internal security resources. The establishment of databases like the National Terror Database Fusion and Analysis Centre (NTDFAC) by the National Investigation Agency (NIA) is a policy response to enhance predictive policing and counter-terrorism coordination.¹⁰
- **Illegal Migration and Demographic Change:** Porous borders, especially with Bangladesh and Myanmar, facilitate illegal migration.¹¹ The Government's concern regarding demographic change in border districts is directly addressed in policy discourse, with initiatives like the Vibrant Villages Programme intended to retain and empower native populations.¹²

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- **Cyber Sabotage:** As border management becomes increasingly dependent on integrated technological networks (CIBMS), the threat of **cyber sabotage** targeting surveillance and communication infrastructure rises, necessitating the creation of dedicated **Cyber Command** capabilities.¹³

3. Comprehensive and Integrated Border Management Reforms

The core of the Modi administration's strategy is a paradigm shift from simple manning to "Smart" and Integrated Border Management, driven by technology and infrastructure.¹⁴

- **Technological Integration (CIBMS):** The **Comprehensive Integrated Border Management System (CIBMS)** is the flagship technological reform.¹⁵ It integrates various cutting-edge surveillance and communication tools across vulnerable stretches where physical fencing is difficult.¹⁶ Key components include:
 - **Advanced Surveillance:** Deployment of sophisticated thermal imagers, night-vision devices, High-powered telescopes, surveillance radars, and Unattended Ground Sensors (UGS).¹⁷
 - **Smart Fencing:** Implementation of laser walls and fiber-optic sensors along riverine and physically challenging sectors of the Indo-Pakistan and Indo-Bangladesh borders, ensuring gap-agnostic electronic surveillance.¹⁸

- **Infrastructure Augmentation:** Strategic infrastructure development has been significantly accelerated to improve troop mobility and logistical supply in contested and high-altitude areas:¹⁹
 - **Border Roads:** Projects under the **Border Roads Organisation (BRO)**, such as the construction of strategic roads, tunnels (e.g., Sela Tunnel), and bridges, have been fast-tracked along the Line of Actual Control (LAC) with China.²⁰
 - **Integrated Check Posts (ICPs):** Expansion of ICPs at major land borders (e.g., Attari, Petrapole) to streamline the movement of people and goods, thereby promoting trade while maintaining security.
- **Community - Centric Development (Vibrant Villages Programme - VVP):** Launched with a substantial budget, VVP focuses on comprehensive development of border villages along the northern frontier.²¹ This aims to:
 - **Reduce Alienation:** Provide better infrastructure, connectivity, and essential services to discourage out-migration.
 - **Improve Intelligence:** Foster a stronger national identity and cooperation among the local populace, who serve as the "eyes and ears" of the security forces.

4. Areas Requiring Urgent Attention

Despite these advancements, the paper identifies critical gaps requiring immediate policy intervention:

Area of Concern	Specific Challenge/Requirement
Coordination	Lack of a single, unified National Border Management Authority (NBMA), leading to command and control issues among multiple Central Armed Police Forces (CAPFs) like BSF, ITBP, and SSB, which currently report to the Ministry of Home Affairs (MHA).
Technological Gap	Rapid deployment of CIBMS 2.0 and next-generation technologies (AI/Data Analytics for patrol optimization, widespread satellite surveillance) to cover remaining unfenced and technologically-blind spots.
Legal Framework	Need to update archaic laws to address modern threats, particularly in the realm of cyber warfare, drone proliferation, and cross-border environmental crimes.
Human Resources	Addressing the significant vacancies in CAPFs and the need for continuous, specialized training for personnel in operating high-tech equipment and managing counter-hybrid warfare scenarios.

In conclusion, India's border management is in a phase of strategic transformation, moving from traditional containment to a modern, integrated, and technology-driven security ecosystem. While the policy vision, underpinned by the CIBMS and VVP, is robust, the ultimate success of these reforms hinges on seamless inter-agency coordination,

sustained funding, and the rapid closure of residual security and infrastructure gaps, particularly in the context of persistent threats from state and non-state actors.

Objectives of the Study

- **To analyze recent reforms and modernization initiatives** in border management undertaken by national agencies, including policy, infrastructure, and technological advancements.
- **To identify and evaluate existing gaps and challenges** in the current border management framework—spanning operational, administrative, technological, and human resource dimensions.
- **To assess the impact of reforms** on national security, cross-border trade, migration control, and local communities living in border areas.
- **To examine best practices and comparative models** from other countries or regions to draw insights for more effective border governance.
- **To recommend a strategic roadmap** for integrated, technology-driven, and people-sensitive border management in the future.

Research Methodology

The current study will employ a Qualitative Synthesis methodology based exclusively on the Secondary Data Analysis of existing policy, strategic, and academic literature pertaining to India's border management reforms. The approach is a Thematic Content Analysis that critically examines the efficacy and impact of the reforms outlined in the study - specifically the Comprehensive Integrated Border Management System (CIBMS), strategic infrastructure projects under BRO/Bharatmala, and the Vibrant Villages Programme (VVP) - against documented persistent gaps and challenges. The secondary data sources, drawn from official publications (Ministry of Home Affairs, PIB, Union Budget documents), scholarly reports (IDSAs, BRO), and specialized media analysis, will be systematically coded to generate three core analytical themes:

- (1) **Policy-Technology Alignment:** Evaluating the gap between the rapid deployment of high-tech surveillance systems (drones, AI, sensors) and the capacity for personnel training and system maintenance;
- (2) **Structural and Operational Deficits:** Analyzing the consequences of the lack of a unified command structure (NBMA) and the issues of funding imbalance and delayed implementation in challenging terrains; and
- (3) **Socio-Strategic Impact:** Assessing the reported effects of reforms on national security metrics (infiltration, trade volume via ICPs), and the engagement/welfare of border area communities.

This comparative synthesis will facilitate a robust Gap Analysis, enabling the formulation of data-

driven recommendations that address the identified deficiencies in India's border governance framework.

Recent Improvements in Border Management Technological Advancements

The deployment of Unmanned Aerial Vehicles (UAVs), thermal imaging, motion sensors, and satellite surveillance is transforming traditional patrolling methods. The launch of the Comprehensive Integrated Border Management System (CIBMS) was a milestone project designed to ensure real-time, technology-enabled border monitoring (Ministry of Home Affairs [MHA], 2023).

Infrastructure Development

Under the Bharatmala and BADP initiatives, road and fencing infrastructure near the Line of Actual Control (LAC) and international borders have been prioritized. Over 4,096 km of fencing along the India-Bangladesh border and strategic road projects in Arunachal Pradesh and Ladakh have been fast-tracked to improve troop mobility and surveillance (Press Information Bureau [PIB], 2023).

Policy Reforms and Coordination

Border guarding forces such as BSF, ITBP, SSB, and Assam Rifles have received clearer operational mandates and are now linked via real-time communication platforms for joint operations. Standard Operating Procedures (SOPs) for managing infiltration, drone sightings, and cross-border firings have been revised post-2019.

Data and Analytics Integration

Real-time data analysis through AI-powered control rooms is being piloted in Punjab and Jammu. These help in pattern recognition of smuggling routes and early detection of suspicious movement using machine learning algorithms (Reddy, 2022).

Role of The Modi Government

Since assuming office in 2014, the Modi government has made national security and border development a core priority. Several flagship reforms were introduced under its leadership, such as-

- **India-Bangladesh Border Fencing:** Completion of the Smart Fence project (CIBMS Phase-I) covering key infiltration-prone areas in Assam and West Bengal. This project was personally reviewed by Home Minister Amit Shah and fast-tracked post-2019.
- **India-China Infrastructure Race:** In response to the 2020 Galwan Valley clash, India accelerated the Border Roads Organisation (BRO)'s construction of roads, bridges, and airstrips along the LAC.

The Atal Tunnel, completed in record time, now enables year-round connectivity to Ladakh (BRO, 2022).

- **Political Focus and Budget Allocation:** Budget allocations for border infrastructure have increased consistently. From ₹9,435 crores in 2014–15, the allocation increased to ₹13,700 crores in 2023–24 (Union Budget, 2023). The Modi government also emphasized local recruitment and development in border villages to act as "eyes and ears" of the forces.

These reforms reflect the government's focus on self-reliance (Atmanirbhar Bharat), emphasizing indigenous technology and strategic preparedness.

Persistent Gaps and Challenges

Inadequate Training and Capacity Building:

Although India has made significant investments in advanced surveillance technologies - such as drones, AI-based analytics, and digital fencing - many personnel on the ground lack the technical training needed to operate and maintain these systems effectively. For example, deploying drone surveillance is not effective if operators aren't trained in remote piloting or interpreting drone feeds. Similarly, without knowledge of cybersecurity protocols, personnel cannot safeguard sensitive systems from cyber threats. Capacity-building initiatives (such as workshops, certifications, and simulations) have not kept pace with the rapid deployment of high-tech hardware, leading to underutilization of equipment and reduced operational efficiency.

Delayed Implementation in Tough Terrain: In high-altitude and difficult terrains - like Arunachal Pradesh, Sikkim, and parts of Ladakh - border infrastructure projects often suffer from long delays. Key reasons include:

- Harsh weather and unstable terrain, which hinder road and fence construction.
- Resistance from local communities concerned about displacement or ecological damage.
- Stringent environmental clearance procedures required in eco-sensitive zones.

As noted by IDSA (2023), this slows down the deployment of vital infrastructure such as border outposts, roads, and communication towers, thereby leaving critical areas vulnerable to infiltration and surveillance gaps.

Cyber Security Risks: The increasing digitization of border control - using smart sensors, networked cameras and drones - has made the system more vulnerable to cyber attacks. Threats such as hacking, GPS spoofing, and data breaches could disrupt

surveillance operations or leak sensitive information to hostile actors. Despite these risks, India does not yet have a dedicated cyber security unit within its border forces (like BSF or ITBP), which leaves a critical gap in preparedness. These threats are particularly concerning given the interest of adversaries in compromising surveillance infrastructure for strategic and subversive objectives.

Funding Imbalance: Although government spending on border security has increased in recent years, the allocation remains uneven:

- Land borders, especially those with Pakistan and China, receive the lion's share of funding.
- Coastal borders and remote tribal belts (e.g., parts of Odisha, Andaman & Nicobar Islands) often suffer from inadequate funds, limiting their ability to deploy modern infrastructure and equipment.

This imbalance neglects the growing threat of maritime terrorism, human trafficking, and illegal trade via sea routes, despite their proven strategic vulnerabilities (e.g., the 2008 Mumbai attacks).

Lack of Unified Command: Multiple agencies - BSF, ITBP, Assam Rifles, Indian Navy, Coast Guard, State Police, and Intelligence services - operate in border areas, often under different ministries with overlapping responsibilities. This leads to:

- Confusion in jurisdiction,
- Duplication of efforts,
- Slower decision-making during crises.

Without a unified command structure or national coordination agency, intelligence sharing, rapid response, and resource optimization are often hindered. A centralized command could help streamline operations, reduce turf conflicts, and ensure coordinated action during emergencies.

Assessing the Impact of Border Management Reforms on National Security, Cross-Border Trade, Migration Control, and Border Communities in India

Border management reforms in India have significantly evolved over the past decade, focusing on enhancing national security, boosting legitimate trade, managing migration, and improving the lives of people in border regions. The impact of these reforms can be observed across multiple dimensions.

- **National Security:** Reforms such as the Comprehensive Integrated Border Management System (CIBMS) and the use of smart surveillance technologies (drones,

sensors, CCTV, and thermal imagers) along the India-Pakistan and India-Bangladesh borders have enhanced real-time monitoring and reduced infiltration. For instance, in 2023, the BSF reported a substantial drop in cross-border smuggling activities in Punjab and Jammu sectors following the deployment of AI-enabled surveillance towers and anti-drone systems. These tech-driven interventions have strengthened India's capability to detect and prevent terrorism, arms trafficking, and drug smuggling.

- **Cross-Border Trade:** Infrastructure development under the Bharatmala Pariyojana and initiatives like the Integrated Check Posts (ICPs) have streamlined legal trade across borders. The Petrapole ICP on the India-Bangladesh border, for example, has significantly reduced cargo clearance time, promoting trade efficiency. In 2022–23, bilateral trade with Bangladesh reached over \$18 billion, a portion of which is attributed to smoother logistics and improved border infrastructure. Digitization of customs processes and better road and rail connectivity have also made cross-border trade more secure and efficient.
- **Migration Control:** Reforms have led to improved mechanisms to manage illegal migration and human trafficking. The fencing and surveillance on the India-Bangladesh border have helped control undocumented migration. The National Register of Citizens (NRC) exercise in Assam, though controversial, was aimed at identifying illegal migrants. While its socio-political implications remain debated, it reflects the state's intent to systematize migration control.
- **Border Area Communities:** The Government of India has launched the Border Area Development Programme (BADP), which focuses on improving infrastructure, connectivity, and livelihood opportunities in remote border villages. In Arunachal Pradesh, the Vibrant Villages Programme launched in 2023 aims to populate and develop strategically located hamlets near the LAC with China. This not only boosts local economies but also serves a strategic purpose by maintaining a human presence in sensitive areas.

Conclusion

India's border management strategy has evolved significantly in the last decade. The Modi government's emphasis on strategic infrastructure, indigenous technology, and digital monitoring has

propelled much-needed reforms. Yet, operational challenges and human resource deficiencies continue to undermine overall effectiveness. A resilient border management framework must integrate modern technology with skilled human capital, coordinated governance, and long-term investment to truly secure the nation's frontiers.

Recommendations

1. Set up dedicated border force academies with simulation-based training: Effective border management requires specialized skills beyond conventional military training. Establishing dedicated training academies for border forces such as BSF, ITBP, and SSB can help personnel learn how to operate in diverse terrains, handle high-tech surveillance equipment, and respond to hybrid threats like cyber intrusions or drone attacks. Simulation-based training will allow them to rehearse real-life scenarios, such as cross-border incursions, smuggling operations, and mass migration events, in a controlled environment. Cyber labs will ensure forces are trained to detect and respond to threats against digital infrastructure, which is increasingly being targeted by hostile actors.

2. Establish a cyber defense command to protect surveillance infrastructure: With the increasing deployment of digital technologies (e.g., sensors, CCTVs, drones) along India's borders, these systems are vulnerable to hacking, jamming, or sabotage by foreign adversaries or organized crime groups. A dedicated Cyber Defense Command comprising personnel from BSF, DRDO, NTRO, and CERT-In can act as a centralized unit to secure all digital and communication systems used in border surveillance. This unit can also monitor dark web activities related to arms, drugs, and human trafficking that affect border regions.

3. Policy rationalization which create a unified command structure to minimize inter-force conflict and duplication: Currently, different agencies (BSF, ITBP, Assam Rifles, Indian Navy, Coast Guard, Customs) operate under various ministries with overlapping mandates, which can lead to confusion, delays, and operational inefficiencies. A unified command structure under a single coordinating body or ministry would help ensure smoother coordination, faster decision-making, and clear accountability. Joint command centers at strategic points can facilitate real-time coordination and intelligence sharing among all forces operating on the ground.

4. Funding equity that ensure balanced resource allocation between land and maritime borders: Historically, India's land borders have received more attention and funding than its coastal and

maritime borders, even though the latter are equally vulnerable (e.g., 2008 Mumbai attacks). This imbalance leaves gaps in coastal security infrastructure, training, and surveillance. Equitable funding will allow maritime forces like the Indian Coast Guard and coastal police to modernize their assets, improve radar and satellite tracking, and strengthen port and island security.

5. Leverage Public-Private Partnerships (PPP) where private sector expertise in drone tech, AI surveillance, and cyber security: India's fast-growing tech industry offers advanced solutions in AI, drone surveillance, geospatial mapping, and cyber security. Collaborating with private firms through PPP models can speed up the deployment of modern tools and reduce costs. For example, private drone companies can supply customized UAVs for terrain-specific patrols, while AI firms can develop software to analyze surveillance footage and flag suspicious activities automatically. Private sector involvement also brings innovation and rapid upgrades, which are often hard to achieve within traditional government procurement systems.

Conflict of Interest

There is no conflict of interest by the author in this manuscript.

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