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THE FUTURE OF INDIAN BORDER INFRASTRUCTURE AND ITS PREPAREDNESS

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India shares its land and sea borders with several nations, including China, Pakistan, Nepal, Bangladesh, Myanmar, and Bhutan. These borders have often been witnesses to infiltration by elements inimical to national interests. Moreover, there has been a constant struggle to keep a check on contraband and weapons flowing into the country from across the border. Terrorism, transnational organised crime, narcotics trafficking, and piracy have all compromised India's national security, with illicit commerce in SALW playing a destructive role in all these.¹ In times of political turmoil in the neighbourhood, there is a need to keep a check on the massive influx of refugees. Confrontations across the border with hostile neighbours have resulted in the loss of precious lives and dented the country's economy. A holistic approach needs to be formulated to address the multifarious issues that are detrimental to the nation's overall security.

The approach hinges on the need to address the following major aspects:

1. Demarcation of the Border
2. Monitoring the Border
3. Ability to Thwart intrusions
4. Ability to punish aggressors.
5. Resolve border disputes through dialogue.

First and foremost is the requirement to demarcate the border. Engagement at the political level with the neighbouring country to resolve any dispute is therefore of utmost importance. India has been engaging with all its neighbours, and this has borne positive results with Bangladesh, Bhutan, Myanmar, and Nepal to quite an extent. As an example, India has excellent relations with Bhutan which are time-tested. In fact, for much of its defence against the bigger and more authoritarian China, India has seen a trusted ally who has come to its aid. Therefore, the Doklam incursion attempted by China in Bhutanese territory was taken head-on by India. Similarly, India has

¹ Strengthen UN instrument to check illegal movement of arms across Borders: India. Hindustan Times. (2018, March 21). Retrieved November 1, 2022, from <https://www.hindustantimes.com/india-news/strengthen-un-instrument-to-check-illegal-movement-of-arms-across-borders-india/story-hXJnaqrT7ELsOrWWwuRkqL.html>

excellent relations with Nepal based on the Treaty of Transit, Treaty of Trade and Agreement of Cooperation to control unauthorized trade.²

These have the impact of creating very friendly relations and providing access to these land-locked countries through India. In return, the most important benefit for India accrues from the buffer zone these two create between India and China.³ However, China and Pakistan remain a source of concern for planners. The only way out at this time is to maintain the status quo at the borders and resist firmly any attempt to unilaterally alter the border by either of these countries. This strategy has been manifested in the recent bold and effective counter that India has put up against China on the northern border. A similar resolute stand on the North-western border has kept Pakistan in check.

The second important requirement is to effectively monitor the border. India has worked on and evolved various methodologies during the course of several decades. Beginning with patrolling the disputed border, the country invested vast sums of money and resources in fencing almost the entire border with Pakistan.⁴ The fencing is being extended to the borders with Bangladesh and Myanmar also. As a further step, these fences are lit up during the night making the detection of intrusion easier for the defenders. These are being further improved through the use of technology. Technological border surveillance has been done through C.I.B.M.S (Comprehensive Integrated Border Management System). Sensors like thermal imagery, unattended ground sensors, fibre optical sensors, and radar are used in C.I.B.M.S. It had been implemented on a pilot basis in a

² Treaty of trade and transit - mea.gov.in. (n.d.). Retrieved October 31, 2022, from <https://mea.gov.in/bilateral-documents.htm?dtl%2F6379%2FTreaty+of+Trade+and+Transit=>

³ India, T. O. (2020, July 8). India-china lac row: Buffer zones to be set up at two friction points: India News - Times of India. The Times of India. Retrieved November 1, 2022, from <https://timesofindia.indiatimes.com/india/india-china-lac-row-buffer-zones-to-be-set-up-at-two-friction-points/articleshow/76843602.cms>

⁴ Ground reality: Life near indo-pak border - A BSF soldier patrols. The Economic Times. (n.d.). Retrieved November 1, 2022, from <https://economictimes.indiatimes.com/nation-world/ground-reality-life-near-indo-pak-border/a-farmer-near-second-defense-line-bunker-at-suchet-garh/slideshow/18019242.cms>

stretch of Jammu. Here, CIBMS nabbed several intruders with large consignments of heroin and fake currency.⁵ Some of the C.I.B.M.S. components had shown results on an individual basis like thermal imagery foiled an infiltration attempt by Pakistan's SSG.

The borders are also under the surveillance of drones and satellites to detect any build-up near the border in a timely manner.⁶ Another requirement is the availability of a fool-proof communication system that integrates with border fencing and sensors. The information gathered through various means needs to be reliably transmitted to the forces stationed to protect the border.

The third requirement is the ability to effectively thwart any intrusion that is detected. This requires a robust counter-insurgency grid to neutralise any inbound intruders. The access of the forces to the hinterland has to be quick, precise, and timely. This requires good road connectivity to the borders, an adequate number of resources in the vicinity, and the ability to move in additional forces, should the requirement arise. This also requires a robust intelligence network that pinpoints any intruders hiding in plain sight. This requires that the local population be aligned with the interests of the nation. Therefore, efforts to keep the border population engaged, adequately provisioned, and connected will have to take precedence. There is also the requirement for the ability to intercept communication channels. Technology, therefore, again plays an important role in picking up leads from any form of communication that the intruder resorts to.

The fourth requirement is the ability to employ punitive measures against the aggressors in case they manage to escape back into neighbouring countries. This has been witnessed during the country's response through the surgical strikes in Myanmar and Pakistan in response to the terrorist

⁵ Singh, N. D. (2021, February 12). *Strong border infrastructure and bolder strategic policy*. ORF. Retrieved November 4, 2022, from <https://www.orfonline.org/expert-speak/strong-border-infrastructure-and-bolder-strategic-policy/>

⁶ Border surveillance – can technology help? USI. (n.d.). Retrieved November 1, 2022, from <https://usiofindia.org/publication/usi-journal/border-surveillance-can-technology-help/>

activities carried out in India.⁷ A similar response was seen during the Balakot air strike against terrorist camps.⁸ These are complex missions and require high-end systems to coordinate and monitor the targeted area. Often, satellites and drones are vital to information gathering.

The fifth is the requirement to keep pushing for a comprehensive dialogue to resolve border disputes. However, if these efforts fail, it is necessary to build an international opinion. This has been the stance that India has adopted in the recent past. A lot of effort has been put into amicably settling long-standing issues. The border re-alignment with Bangladesh is an exercise in the right direction that has proved mutually beneficial to both countries.

“History is made as the Instruments of Ratifications of the Land Boundary Agreement (LBA) are exchanged”, Modi tweeted.⁹ The exchange of documents prepared the ground for the implementation of the 1947 India-Bangladesh LBA, which calls for the exchange of 161 enclaves between the two nations. A total of 111 border enclaves will be ceded to Bangladesh in return for 51 that will become part of India. The inhabitants of the 111 enclaves were given a choice to become citizens of Bangladesh or move to the Indian side of the border and vice-versa, inhabitants of 51 enclaves were given a choice to become citizens of India or move to the Bangladesh side of the border.¹⁰

⁷ Surgical strike day: Here's how the 2016 operation was carried out. Hindustan Times. (2021, September 29). Retrieved November 1, 2022, from <https://www.hindustantimes.com/india-news/surgical-strike-day-here-s-how-the-2016-operation-was-carried-out-101632882272993.html>

⁸ BBC. (2019, February 26). Balakot: Indian air strikes target militants in Pakistan. BBC News. Retrieved November 1, 2022, from <https://www.bbc.com/news/world-asia-47366718>

⁹ PMO India,[@PMOIndia].(2015, June 6). History is made as the Instruments of Radifications of the Land Boundary Agreement (LBA) are exchanged. Twitter. <https://twitter.com/pmoindia/status/607130920638816257?lang=en>

¹⁰ 06, A. D. J., & Agencies. (2021, December 4). India, Bangladesh make history with Land Swap. Return to frontpage. Retrieved November 1, 2022, from <https://www.thehindu.com/news/national/Prime-Minister-Narendra-Modis-two-day-Bangladesh-visit/article60327486.ece>

Moreover, it would aid in improving security and combating trafficking, drug smuggling, and counterfeit note smuggling. As I have stated, a demarcated boundary would offer clarity and discipline, as well as aid in increasing connectedness. Following the independence of Bangladesh, India and Bangladesh signed the 1974 Land Border Agreement. However, the same could not be ratified by India and therefore, the exchange envisaged under the agreement could not proceed. This was affected by the 100th Amendment to the Constitution in 2015.¹¹ Therefore, the tweet by the Prime Minister of India on the Instrument of Ratification is a bold move because it would resolve the citizenship issue for over 50,000 people as India would have a huge advantage of 500 acres and 10,000 acres would go to Bangladesh.¹²

However, Pakistan has not shown any inclination to settle long-pending disputes. This has led India to aggressively build up world opinion against unwarranted interference in the country's internal matters. After the Pulwama attack on the CRPF personnel, India went ahead to apprise the international community of the involvement of Pakistan in the dastardly attack. Foreign Secretary Vijay Gokhale met with envoys from the five permanent members of the UN Security Council (P5)- the United States, China, Russia, the United Kingdom, and France- as well as significant European and Asian countries. The meeting was part of the government's diplomatic outreach to strive for Pakistan's "total isolation", as characterised by the administration. Jaitley further stated that the government would take "all possible diplomatic steps to ensure the complete isolation from an international community of Pakistan". According to the minister, there is undeniable proof

¹¹ Sreeparna Banerjee and Anasua Basu Ray Chaudhury and Ambalika Guha. (2018, May 29). The 2015 India-Bangladesh Land Boundary Agreement: Identifying constraints and exploring possibilities in Cooch behar. ORF. Retrieved November 4, 2022, from <https://www.orfonline.org/research/the-2015-india-bangladesh-land-boundary-agreement-identifying-constraints-and-exploring-possibilities-in-cooch-behar/>

¹² 06, A. D. J., & Agencies. (2021, December 4). India, Bangladesh make history with Land Swap. Return to frontpage. Retrieved November 4, 2022, from <https://www.thehindu.com/news/national/Prime-Minister-Narendra-Modis-two-day-Bangladesh-visit/article60327486.ece#:~:text=%E2%80%9CHistory%20is%20made%20as%20the,enclaves%20between%20the%20two%20countries>

that Pakistan had a direct role in the heinous terrorist attack.¹³ The future will therefore see massive efforts to improve the accessibility of the borders for effective monitoring, the right mix and usage of technology, a robust communication grid, and the ability of the country to move the required forces in the shortest possible time to handle any attempt to intrude or alter the status quo.

Infrastructural Developments

For years, the Jammu-Akhnoor Road has been a bottleneck for traffic travelling up to Poonch, including military convoys serving troops along the Line of Control.¹⁴ The entire Ladakh region remained cut off from the mainland for more than 6 months every year during winters.¹⁵ For decades, economic linkages with Myanmar and Bangladesh in the Northeast have been kept hostage by non-existent roads and inadequate infrastructure.¹⁶

The government's focus has therefore shifted towards building infrastructure right up to India's borders. Long pending tunnel construction like the Rohtang, Z-Morh, Zojila, and Sela have been

¹³ India starts efforts to isolate Pakistan after Pulwama attack, foreign secretary meets envoys of 25 nations. Hindustan Times. (2019, February 15). Retrieved November 1, 2022, from <https://www.hindustantimes.com/india-news/india-starts-efforts-to-isolate-pakistan-after-pulwama-attack-foreign-secretary-meets-p5-nation-envoys/story-EpVnL0e5cnp4nHuw9REUGJ.html>

¹⁴ Ani. (2022, October 5). Construction of 6-km flyover on Jammu-Akhnoor Highway completed. ThePrint. Retrieved November 1, 2022, from <https://theprint.in/india/construction-of-6-km-flyover-on-jammu-akhnoor-highway-completed/1155067/>

¹⁵ The long winter: Border face-off dashes hopes of tourism in Ladakh. <https://www.outlookindia.com/>. (2020, July 4). Retrieved October 31, 2022, from <https://www.outlookindia.com/website/story/india-news-the-long-winter-border-face-off-dashes-ladakhs-hopes-for-tourism/356019#:~:text=Ladakh%20remains%20cut%20off%20for,blocked%20due%20to%20heavy%20snowfall>

¹⁶ 602. (2021, August 31). Linking land borders: India's integrated check posts. CSEP. Retrieved November 1, 2022, from <https://csep.org/working-paper/linking-land-borders-indias-integrated-check-posts/#section3>

expedited on the Northern and Eastern borders.¹⁷ The road infrastructure is under radical upgradation with strategic bridges like Col Chewang Rinchen Bridge, Ujh and Basantar Bridges, Sisseri River Bridge, and Daporijo Bridge coming up along the borders to ensure a smooth flow of traffic.¹⁸ Finance Minister Nirmala Sitharaman outlined a plan to improve infrastructure in areas around the Line of Actual Control (LAC). She even states that more funds will be available for these infrastructure developments.¹⁹ “Border villages with a sparse population, limited connectivity and infrastructure often get left out from the development gains. Such villages on the northern border will be covered under the new Vibrant Villages Programme... The activities will include construction of village infrastructure, housing, tourist centres, road connectivity, provision of decentralised renewable energy, direct-to-home access for Doordarshan and educational channels, and support for livelihood generation”²⁰, Sitharaman said in her budget speech.

Key projects like “Bharat Mala” which proposes a road network stretching along India’s land border from Gujrat to Mizoram, and “Sagar Mala”, which oversees the construction of coastal infrastructure throughout the country’s enormous coastline, are being implemented to make the movement of goods and people within India smooth and fast.²¹The Border Road Organisation

¹⁷ Zojila, Z-morh tunnels: All you need to know - tunnels on Srinagar-Leh Highway. The Economic Times. (n.d.). Retrieved October 31, 2022, from <https://economictimes.indiatimes.com/news/india/zojila-z-morh-tunnels-all-you-need-to-know/20-tunnels-in-all/slideshow/86644536.cms>

¹⁸ India constructs 24 bridges, three roads at China and Pakistan borders for Swift Troop Movement. The Economic Times. (n.d.). Retrieved October 31, 2022, from <https://economictimes.indiatimes.com/news/defence/swift-troops-movement-at-china-and-pakistan-borders-india-constructs-24-bridges-three-roads/articleshow/88544529.cms?from=mdr>

¹⁹ Correspondent, S. (2020, June 19). Centre unveils plans for ₹102 lakh CR. infra projects. Return to frontpage. Retrieved October 31, 2022, from <https://www.thehindu.com/business/Economy/nirmala-sitharaman-unveils-102-lakh-crore-of-infra-projects-for-next-5-years/article30442498.ece>

²⁰ Pti. (2022, February 2). Modi Govt to boost infrastructure in villages along china border. mint. Retrieved October 28, 2022, from <https://www.livemint.com/budget/news/modi-govt-to-boost-infrastructure-in-villages-along-china-border-11643771633848.html>

²¹ Border Infrastructure: Modi government driving strategic projects with radical changes. The Economic Times. (n.d.). Retrieved October 31, 2022, from

(BRO) has taken up many projects since 2015, especially to improve the roads in critical border areas. The formation of the National Highways and Infrastructure Development Corporation Limited (NHIDCL), which took over many projects from the BRO last year, largely in the Northeast but also in a few other critical locations, has been essential to the transition. Its objectives are straightforward: build 10,000 kilometres of roads by 2020 and revitalise India's relations with its neighbours.²²

Communication Requirements

The requirement to monitor and communicate under all circumstances requires very reliable communication that is not affected by war, weather, or other natural calamities. There has to be adequate redundancy which means that in the event of sabotage or a natural calamity, the communication (using a combination of Satellite, Optical and/or Microwave systems, all of which are not affected at the same time) thereby avoids complete isolation of important tactical/operational areas along the border.

Communication is also required to be secure and safe from interception. As the world becomes more technologically oriented, warfare cyber security has worked to become more secure and effective. Satellites have been made to cater to such secure communications. The GSAT 7 satellites are sophisticated satellites built by the Indian Space Research Organization (ISRO) to satisfy the communications demands of the Indian military. The GSAT 7 satellites were launched in August

<https://economictimes.indiatimes.com/news/economy/infrastructure/border-infrastructure-modi-government-driving-strategic-projects-with-radical-changes/articleshow/47303236.cms?from=mdr>

²² Government aims to build 18,000 km of highways in FY23: Gadkari. The Economic Times. (n.d.). Retrieved November 4, 2022, from <https://economictimes.indiatimes.com/news/economy/infrastructure/government-aims-to-build-18000-km-of-highways-in-fy23-gadkari/articleshow/91519502.cms>

2013 from Kourou, French Guiana, on an Ariane 5 ECA rocket.²³ The GSAT 7 offers a wide range of services for military communication demands, from low-bit voice rates to high bit-rate data capabilities, including multi-band communications. The Rukmini satellite, which carries payloads in UHF, C-band, and Ku-band, assists the Navy in maintaining a secure, real-time communication link between its ground bases, surface ships, submarines, and aircraft. The communication lines, therefore, must be built up using the best available technology that provides reliability, capacity, and redundancy.

Build-up of Advanced Landing Grounds (ALGS)

Advanced Landing Grounds or ALGs are mini airports especially constructed for military purposes like heavy and light transportation, Strategic and Tactic airlifting, attack, and landing of aircraft like MiG-21, CH-47 Chinook, Boeing C-17, and many others. They are makeshift airfields often located very close to the forward-deployed forces. They are essential to enable timely reinforcements when needed and serve as the logistic base to bring in much-needed supplies including food, clothing, and ammunition for the troops.

The construction of advanced landing grounds, especially in the northern and northeastern borders, will serve as a great help in deploying Indian forces in areas with uneven terrain and tough climatic conditions. ALGs would also ease the movement during uncertain times as they are specially constructed for the armed forces. An ALG at Fukche was built in Ladakh just before the 1962 Sino-Indian War and was revived in 2008.²⁴ The construction of Nyoma's advanced landing ground for the operation of fighter aircraft within 50km of the LAC is another example of this

²³ Chhina, M. A. S. (2022, March 25). Explained: The GSAT 7B and India's other military satellites. The Indian Express. Retrieved November 4, 2022, from <https://indianexpress.com/article/explained/explained-the-gsat-7b-and-indias-other-military-satellites-7834659/>

²⁴ Subramanian, N. (2020, June 16). Explained: The strategic road to DBO. The Indian Express. Retrieved November 1, 2022, from <https://indianexpress.com/article/explained/lac-stand-off-india-china-darbuk-shyok-daulat-beg-oldie-dsdbo-road-6452997/>

thought process. During the 2020 India-China face-off, the Nyoma airfield was used for the transportation of men and materials. It has also seen Chinook heavy-lift choppers and C-130J special operations aircraft in action²⁵. The north and Northeast borders are sensitive areas, which makes it imperative to have advanced landing grounds in these areas. The Vijaynagar airfield in the easternmost tip of Arunachal Pradesh was reopened fully for operations after the 1962 war, with the landing of AN-32 transport aircraft.²⁶ India is investigating several possibilities for establishing airfields in eastern Ladakh, including Daulat Beg Oldi (DBO), Fukche, and Nyoma, all of which are only a few minutes away from the Line of Actual Control (LAC) with China

Reorientation of Forces to Handle Emerging Situations

The future will also see the re-orientation of forces in large numbers to handle developing situations quickly and effectively. The Indo-China skirmish in Ladakh saw the galvanizing of a sizeable number of forces to the Ladakh and northeastern sectors to handle the emerging situation. The speed and magnitude of the response were one that had never been witnessed before. It can be expected that in future, the resources and capital required for such major changes will be readily available, and the country will be better prepared to make drastic changes if necessary.

Massive Investment in the Upgradation of Forces

²⁵ India to soon upgrade Nyoma airfield near Lac with China for fighter ops, BRO to build new runway. The Economic Times. (n.d.). Retrieved October 27, 2022, from <https://economictimes.indiatimes.com/news/defence/india-to-soon-upgrade-nyoma-airfield-near-lac-with-china-for-fighter-ops-bro-to-build-new-runway/articleshow/95120537.cms>

²⁶ IAF: IAF Reopens Advanced Landing Ground in Arunachal. The Economic Times. (n.d.). Retrieved October 31, 2022, from <https://economictimes.indiatimes.com/news/defence/iaf-reopens-advanced-landing-ground-in-arunachal/articleshow/71195195.cms>

The requirement of forces to be present near remote border locations in large numbers will require a massive effort to create infrastructure for housing, besides storage for fuel, ammunition, and other logistics. There will also be a requirement to upgrade the equipment available to the forces to operate in mountainous and rugged terrain. All this will involve high costs, but in the long run, will enable the forces to work in diverse terrain and weather conditions due to the availability of necessary support structures. The Ministry of Home Affairs is dedicated to better border infrastructure and administration. This decision will improve border administration, policing, and border guarding by strengthening border infrastructure. “The cost of the scheme from 2021- 22 to 2025- 26 will be Rs. 13,020 crores”²⁷.

Engagement of the Local Population in the Border

The future will see the government going all out to engage with the local population at the borders. Such a need has been felt over the years, in the insurgency that affected Punjab, the North-East and J&K. It has been abundantly clear that a very effective measure to deter intrusion is the availability of a local population that is not sympathetic to intruders.

Success in all states affected by insurgency has been largely by winning the trust of the local population. An example of a willing and trustworthy source was the much-acclaimed Tashi Namgyal who while looking for his missing yak, saw the camouflaged Pakistani intruders before the Kargil conflict.²⁸ He informed the nearest post of the Army who cross-checked and found the

²⁷ Ani. (2022, February 21). Govt approves rs 13,020 CR for Border Infrastructure and Management. ThePrint. Retrieved October 28, 2022, from <https://theprint.in/india/govt-approves-rs-13020-cr-for-border-infrastructure-and-management/841240/>

²⁸ Banerjee, S. (2014, August 7). 13 years on, a good Shepherd awaits recognition. Return to frontpage. Retrieved November 1, 2022, from <https://www.thehindu.com/news/national/13-years-on-a-good-shepherd-awaits-recognition/article6288671.ece>

information to be correct. The subsequent effort to dislodge the enemy hinged on this critical information. This then forms the pillar of strength in handling borders effectively.

Conclusion

Considering the steps that are being taken now and the ones that are in the pipeline, it can be inferred that the future will see very robust and well-connected borders that are within easy reach of the forces. The government has enormous plans for border infrastructure and is preparing to face the worst-case scenario at a feverish pace. The initiatives by the BRO and NHIDCL on improving the roads that go to border areas and along the border area will continue till the remotest area is connected. Moreover, the opening of ALGs and the construction of new ALGs would add to military efficiency. All this adds to the preparedness of the Indian borders.

This infrastructural work has another key objective in mind. Better infrastructure enables the local population to benefit and stay in the area. This cements the claim of the government as a sizeable population is vital to stake a claim. The better infrastructure also attracts tourists, who also help in the overall effort. Moreover, the government will be required to be responsive to the aspirations of the people in the border states and see that they are not neglected. Adequate opportunities for the youth will have to be created to keep them engaged and connect them to the mainstream population. Therefore, the future will see borders being developed and on par with other regions of the country. The future of the Indian border will be a mutually agreed and demarcated border as far as possible. Where this mutual agreement is not achieved, reliance on effective monitoring is a must. The availability of infrastructure to keep adequate forces in the vicinity to deter any alteration would be the likely course of action. There will also be a preponderance towards the use of technology to make monitoring easier. This will require sensor fusion on a large scale with smart fencing and a robust communication system to relay information to the forces guarding the border. It will be imperative to create an international opinion regarding our borders and also make dissenting neighbours aware of the consequences they would incur in the event of any attempt to cross the border or capture land in and around the border area..

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