

# THE TEESTA RIVER DISPUTE AND ITS ROLE IN SHAPING BANGLADESH'S PERCEPTION OF INDIA'S SOFT POWER

# MUSTAFA SYED IHTIMUM ALAM

RESEARCH SCHOLAR, DEPARTMENT OF POLITICAL SCIENCE, THE ASSAM ROYAL GLOBAL UNIVERSITY, ASSAM, INDIA.

#### **ABSTRACT**

The Teesta River dispute — a long-running transboundary water-sharing issue between India and Bangladesh — has produced outsized diplomatic, political, and perceptual effects beyond the hydrological domain. This paper examines how the unresolved Teesta negotiations and episodic breakdowns of agreement-making have affected Bangladesh's perceptions of India's soft power. Using a mixed-methods approach — synthesizing historical documents, secondary literature, press reporting, and public-opinion data — the study shows that the Teesta question functions as both a concrete resource conflict and a symbolic indicator of Indian willingness to accommodate Bangladeshi interests. The dispute has weakened certain channels of Indian soft power (development assistance, cultural influence, goodwill gestures) while simultaneously pushing Bangladesh to diversify its external partnerships, most visibly with China. Domestic politics in India — especially in West Bengal — and institutional asymmetries in water governance have repeatedly stalled agreements, creating recurring cycles of disappointment in Dhaka. The paper argues that India's soft power in Bangladesh is conditional and transactional: where political concessions on high-salience issues (like Teesta) are absent, material and symbolic goodwill is discounted by Bangladeshi publics and elites. The study concludes with policy recommendations for both states: for India, to separate interstate resource management from subnational electoral politics and institutionalize transparent hydro-diplomacy; for Bangladesh, to pursue pragmatic technical cooperation while leveraging multilateral mediation and regional water governance platforms.

**Keywords:** Teesta River; transboundary water conflict; India—Bangladesh relations; soft power; public perception;

hydrodiplomacy; West Bengal politics; China-Bangladesh relations.

## INTRODUCTION

The Teesta River dispute has become one of the most defining issues influencing Bangladesh's perception of India's soft power over the past decade. As a transboundary river originating in India and flowing into northern Bangladesh, the Teesta holds significant agricultural, economic, and ecological importance for thousands of farmers in Bangladesh's Rangpur region. Because India controls the upper stretches of the river — with nearly 80–85 percent of the catchment area located within its borders — Bangladesh remains highly dependent on upstream water releases, especially during the dry season. Scholars such as Pradip Chatterjee (2010) and later analyses by the Observer Research Foundation have noted that this asymmetric geographical position gives India considerable leverage and makes water-sharing negotiations inherently complex. Thus, the dispute is not limited to hydrology alone; it is deeply intertwined with political trust, regional diplomacy, and the broader question of how India manages relations with a smaller neighbouring state.

The political history of the Teesta negotiations underscores this complexity. A near-finalised agreement in 2011 — expected to be signed during Indian Prime Minister Manmohan Singh's visit to Dhaka — was halted due to objections raised by the West Bengal state government. This abrupt interruption became a turning point in Bangladesh's perception of Indian diplomacy. Many policy analysts between 2012 and 2020, including those cited by Subir Bhaumik and Sreeradha Datta, argue that the failure to conclude the agreement despite high-level assurances created a sense of disappointment in Dhaka. It highlighted a tension within India's federal structure: while the central government might favour cooperation, domestic political constraints can restrict its ability to deliver on promises. For Bangladesh, this episode raised questions about India's willingness and capacity to pursue equitable outcomes, thereby influencing assessments of its reliability as a regional partner.

The academic literature on India's soft power has increasingly treated the Teesta dispute as a barometer of bilateral trust. Komal Kaushik Baral (2018), for example, emphasises that soft power extends beyond cultural affinity or shared history; it relies heavily on perceptions of fairness, predictability, and mutual respect. While India enjoys strong



cultural and linguistic ties with Bangladesh — in music, media, education, and historical associations — these positive elements lose influence when unresolved material grievances persist. Similarly, Subhra Pratim Roy (2023) argues that India's soft power in South Asia is uneven: although India invests substantially in development cooperation and cultural diplomacy, its attractiveness diminishes when political asymmetries translate into unmet expectations. The Teesta dispute thus serves as a real-world test of whether India's soft power narrative can withstand the pressures of domestic politics and strategic calculations.

Alongside these theoretical contributions, empirical studies from 2010 to 2024 have examined the economic and social implications of the dispute for Bangladesh. Research by Mohammad A. Hossen, Jeffrey D. Connor, and Faisal Ahammed (2024) demonstrates that cooperative water-sharing would significantly improve crop yields, enhance irrigation stability, and reduce seasonal vulnerabilities for Bangladeshi farmers. Their modelling shows that equitable flow arrangements could generate broad welfare gains for rural communities, thereby strengthening positive sentiment toward India. In contrast, Bangladeshi analysts such as Brigadier General Mohammad Shaheenul Haque (2018) highlight the strategic anxieties produced by delays in the agreement. According to these studies, the perception that India exercises upstream control without binding legal commitments contributes to Bangladesh's broader concerns about dependency, prompting calls for stronger institutional mechanisms and diversified diplomatic engagements.

The public perception dimension has received considerable scholarly attention as well. Case studies from 2015 onward — including fieldwork by researchers in Dhaka and Rangpur — reveal that affected local communities often adopt a pragmatic stance. For farmers directly facing seasonal water shortages, the dispute is not framed primarily in geopolitical terms but as a livelihood issue. However, national-level discourse within Bangladesh, shaped by media narratives and political debates, tends to portray the Teesta issue as a symbol of India's hesitancy to implement equitable resource-sharing. Scholars warn that these contrasting layers of public sentiment complicate bilateral cooperation: while people-to-people ties remain strong, unresolved disputes easily become rallying points for political opposition or nationalist rhetoric.

At the policy level, literature from 2010–2024 consistently stresses that technical solutions exist — including improved data-sharing, joint basin management, and more resilient infrastructure — but political will remains the determining factor. Studies published after 2015 increasingly advocate for institutional arrangements such as joint river commissions with binding authority. These proposals reflect an emerging consensus that soft power cannot flourish in the absence of transparent and rule-based mechanisms for resource governance. Indian and Bangladeshi scholars alike argue that the long-term credibility of India's soft-power strategy depends on whether it can address such sensitive issues through cooperative and predictable frameworks.

Overall, the accumulated academic work over the past decade portrays the Teesta River dispute as both a practical and symbolic challenge. It is practical because it affects agriculture, livelihoods, and ecological stability in northern Bangladesh; it is symbolic because it shapes how Bangladesh assesses India's intentions, commitments, and regional leadership. As the literature from 2010 to 2024 shows, the dispute has become a litmus test for India's soft power — a measure of whether goodwill, cultural ties, and development partnerships can overcome the strain caused by unresolved transboundary water issues. The introduction of new negotiations, enhanced diplomatic engagement, or concrete agreements in the coming years will therefore have significant implications for the broader trajectory of Indo-Bangladesh relations.

### SOFT POWER THEORY AND TRANSBOUNDARY RESOURCES

Soft power, a concept introduced by Joseph Nye, refers to a state's ability to shape the preferences, perceptions, and behaviour of other nations through attraction rather than coercion or monetary inducements. It rests on three core pillars: culture, political values, and foreign policy. For regional powers like India, maintaining favourable perceptions among neighbouring countries is integral to diplomacy, security, and economic integration. In South Asia, where historical ties, geographic interconnectedness, and shared resources define bilateral relations, soft power becomes particularly significant. One such critical domain is the governance of transboundary natural resources—especially rivers—which directly influence people-to-people relations, domestic politics, and bilateral trust.

Transboundary rivers often act both as connectors and flashpoints. While they offer opportunities for cooperation, equitable sharing, and joint development, they can also create friction when one state is perceived to be benefiting disproportionately. In this context, the Teesta River dispute between India and Bangladesh provides a compelling case for examining how resource-sharing behaviour shapes the soft power landscape. The Teesta, which originates in the Indian state of Sikkim, flows through West Bengal before entering Bangladesh, where it supports millions of people dependent on agriculture. Bangladesh has long sought a fair share of Teesta waters, especially during the dry season when the flows significantly diminish. Although both countries drafted an agreement in 2011 proposing a nearly equal water-sharing arrangement, its implementation stalled due to political resistance in West Bengal.

The unresolved nature of the Teesta issue has had a direct bearing on Bangladesh's perception of India's soft power. India has traditionally enjoyed substantial influence in Bangladesh through cultural affinity, linguistic connections, development assistance, and security cooperation. However, withholding or delaying water-sharing agreements is often interpreted in Bangladesh as a sign of insensitivity to its socio-economic needs. For a downstream country, water insecurity translates into livelihood challenges, agricultural stress, and political discomfort. When a neighbour



perceived as a regional leader does not address these concerns satisfactorily, it weakens the moral legitimacy that forms the basis of soft power.

Furthermore, the Teesta dispute magnifies the domestic political narrative within Bangladesh. Opposition groups frequently portray India as an untrustworthy partner, using the river issue as evidence of hegemonic or dismissive behaviour. This undermines India's ability to rely on soft power tools such as development projects, cultural diplomacy, or historical ties to maintain goodwill. Even India's substantial investment in connectivity, energy cooperation, and infrastructure development sometimes receives less appreciation than expected because the Teesta dispute dominates public discourse. As a result, India's overall attractiveness as a responsible regional leader becomes contested

However, the Teesta issue also presents an opportunity for India to strengthen its soft power. A fair, transparent, and timely resolution—whether through political consensus with West Bengal, technological solutions like basin augmentation, or joint river management—would significantly boost India's credibility in Bangladesh. By demonstrating sensitivity to Bangladesh's developmental needs and water vulnerabilities, India can reinforce the perception that it values cooperative regionalism. Thus, the Teesta River dispute not only shapes current attitudes but also offers potential for improving India's soft power through sustainable and empathetic transboundary resource governance.

## TEESTA DISPUTE AS A LITMUS TEST OF INDIAN GOODWILL

The Teesta River dispute has emerged as one of the most critical determinants shaping Bangladesh's perception of India's soft power and regional goodwill. As a transboundary river essential to the agrarian economy of northern Bangladesh, Teesta's water-sharing arrangement has long been a central expectation in Dhaka—New Delhi relations. While both nations maintain historically strong political, cultural, and economic ties, the unresolved status of the Teesta agreement acts as a symbolic measure of India's sincerity, reliability, and benevolence—values that are the foundation of soft power.

The disagreement over the Teesta stems from competing needs: Bangladesh seeks a larger share of dry-season flows to support agriculture and food security, while the Indian state of West Bengal asserts its own irrigation requirements. Although India's central government and Bangladesh reached a draft agreement in 2011 proposing a 42.5% share for India and 37.5% for Bangladesh, domestic political resistance within West Bengal prevented its implementation. This internal constraint is often misunderstood in Bangladesh as a deliberate reluctance by India to compromise, amplifying the perception that India's strategic interests overshadow its stated commitments to partnership and regional harmony. In the context of soft power, the Teesta issue is more than a technical water-sharing problem; it embodies the emotional and political expectations Bangladesh has from India as a trusted neighbour. Bangladesh has supported India on multiple regional security and connectivity issues, including cooperation against insurgency, facilitation of transit routes to the Northeast, and alignment on broader geopolitical concerns. The lack of progress on Teesta is therefore viewed as a mismatch between Bangladesh's goodwill gestures and India's reciprocation, creating an asymmetry in expectations.

Moreover, China's increasing engagement in Bangladesh's infrastructure and water diplomacy further complicates the perception dynamics. The prolonged stalemate enables competing actors to offer alternative partnerships, challenging India's traditional sphere of influence. For many in Bangladesh, resolving the Teesta issue would serve as a demonstration that India prioritizes equitable cooperation over political hesitance. This makes Teesta a litmus test: success would reaffirm India's image as a responsible regional power; failure risks eroding its narrative of leadership based on fairness, empathy, and shared prosperity.

However, India does maintain significant goodwill through development assistance, trade benefits, cultural diplomacy, and security cooperation. Yet these positive contributions are often overshadowed in the public discourse when compared to the symbolic weight of Teesta. The dispute, therefore, does not diminish India's soft power entirely but highlights its vulnerabilities—how unresolved bilateral issues can disproportionately influence perceptions regardless of broader cooperation.

Ultimately, the Teesta dispute stands as a defining feature in Bangladesh's evaluation of India's goodwill. Whether resolved or prolonged, it directly affects how India's intentions, commitments, and soft power are interpreted across Bangladeshi political, academic, and civil society circles. A mutually beneficial settlement would not only enhance India's regional image but also redefine the foundation of Indo-Bangladesh relations for the coming decades.

Table 1: Teesta Dispute and Its Impact on Bangladesh's Perception of India's Soft Power

Dimension	Bangladesh's	India's Actions/Constraints	Impact on Soft Power
	Expectations		
Water Security	Increased dry-season flow	Domestic political opposition	Creates perception of
	for agriculture	from West Bengal	unfulfilled commitments



Political Trust	Reciprocity for Bangladesh's regional support	Strong intent but stalled agreement	Trust deficit in public opinion
Strategic	India as reliable regional	India balances internal/state-	Opens space for Chinese
Influence	partner	level concerns	influence
Development	Greater hydrological and	Continued aid, connectivity,	Positive, but overshadowed
Cooperation	technical collaboration	trade benefits	by Teesta stalemate
Symbolic	Conclusive and fair water-	Prolonged negotiations without	Perceived gap in India's
Goodwill	sharing treaty	outcome	goodwill

#### PUBLIC OPINION: EVIDENCE FROM SURVEYS AND REPORTING

Public opinion plays a central role in shaping Bangladesh's perception of India's soft power, particularly in the context of the long-standing Teesta River dispute. Surveys, media reporting, and public commentary collectively reveal that the unresolved water-sharing issue significantly influences how Bangladeshi citizens evaluate India's reliability, goodwill, and regional leadership. While India's soft power traditionally draws strength from cultural proximity, educational exchanges, democratic values, and development cooperation, public sentiment in Bangladesh increasingly reflects frustration over the stalled Teesta agreement, which many view as a test of India's sincerity toward its closest neighbour.

Survey reports over the last decade show a recurring pattern: Bangladeshis tend to hold favourable views of Indian culture and people-to-people ties, but their trust declines sharply when asked about political cooperation and water management. For example, several opinion polls conducted by regional think tanks and Bangladeshi media outlets highlight that a significant portion of respondents believe India has not acted adequately to resolve the Teesta issue. This perception is compounded by strong media emphasis on the economic costs faced by Bangladeshi farmers, particularly in the northern districts dependent on Teesta waters for irrigation. Public reporting frequently links the absence of the treaty with crop losses, seasonal water scarcity, and livelihood challenges, deepening public dissatisfaction.

Media narratives also shape public understanding by contrasting India's repeated assurances with the lack of concrete policy outcomes. Editorials in Bangladeshi newspapers often point out that Indian state-level politics—especially the objections raised by the West Bengal government—have overshadowed bilateral commitments. As a result, many citizens perceive the delay as a sign of India's inability or unwillingness to prioritize Bangladesh's concerns. This perception weakens India's soft power image, suggesting inconsistency between its stated foreign policy goals and actual actions on the ground.

Social media analysis further demonstrates rising scepticism. Online discussions—particularly on platforms like Facebook and YouTube, which are widely used in Bangladesh—show that the Teesta dispute frequently appears in debates about India's intentions, regional influence, and fairness in bilateral relations. These sentiments often spill over into other areas, such as trade, border issues, and political cooperation, reflecting how a single unresolved dispute can widen into broader distrust.

Public opinion data also show that positive developments—such as India's assistance during natural disasters, capacity-building programs, or scholarships for Bangladeshi students—receive appreciation but do not fully counterbalance the negative feelings associated with the Teesta issue. In other words, the dispute acts as a "soft-power bottleneck," limiting India's ability to fully leverage cultural diplomacy and development partnerships.

Overall, evidence from surveys and public reporting clearly indicates that the Teesta River dispute has become a defining factor in shaping Bangladesh's perception of India's soft power. The unresolved water-sharing arrangement continues to overshadow India's cultural and developmental appeal, reinforcing a public narrative that India must demonstrate genuine responsiveness to earn deeper trust. Resolving the Teesta issue, therefore, is not only a matter of resource management but also a strategic necessity for rebuilding positive public opinion and enhancing India's soft-power credibility in Bangladesh.

# DOMESTIC POLITICS IN WEST BENGAL AND ITS INTERNATIONAL SPILLOVERS

Domestic politics in West Bengal plays a pivotal role in shaping India's diplomatic engagements with Bangladesh, especially regarding the Teesta River dispute. Although water-sharing treaties are constitutionally the responsibility of the Union Government, the political realities of India's federal structure make state-level consensus indispensable. West Bengal's internal political dynamics—rooted in electoral considerations, regional identity, agricultural demands, and party competition—directly influence New Delhi's ability to finalize agreements with Dhaka, thereby affecting Bangladesh's perception of India's soft power.

The Teesta River is crucial for irrigation in North Bengal, particularly in the districts of Jalpaiguri, Cooch Behar, and Uttar Dinajpur. Agricultural dependence on the river makes water-sharing a politically sensitive issue. Political parties in West Bengal, especially the ruling Trinamool Congress (TMC), must balance local concerns about water scarcity with national imperatives for strong India—Bangladesh relations. Any perception of compromising state interests risks



electoral backlash. As a result, successive state governments have shown reluctance to endorse water-sharing formulas that involve releasing additional flows to Bangladesh during lean seasons.

This tension is further complicated by the highly competitive political environment within West Bengal. Opposition parties—such as the BJP and the Left—often frame water-sharing negotiations as concessions to Bangladesh at the expense of farmers in North Bengal. This creates political pressure on the state government, making it cautious and often resistant to proposals emanating from the central government. As a result, New Delhi's commitments to Dhaka sometimes remain unfulfilled, creating diplomatic friction.

From Bangladesh's perspective, delays in concluding the Teesta agreement raise doubts about India's reliability as a regional partner. Despite India's significant cultural influence, development cooperation, and historical support during Bangladesh's liberation, these domestic political constraints weaken India's soft-power narrative. When Dhaka observes that internal politics in West Bengal can override bilateral commitments, it perceives India as constrained by domestic fragmentation, reducing its diplomatic credibility.

Moreover, China's growing involvement in Bangladesh adds a strategic dimension. The vacuum created by delays in the Teesta agreement allows China to invest in river management projects, infrastructure financing, and energy cooperation. This enhances Beijing's influence and complicates India's regional diplomacy. Bangladesh, while maintaining its friendship with India, becomes more open to diversified partnerships, subtly recalibrating its perception of India's soft power.

Therefore, West Bengal's domestic political landscape has a significant geopolitical spillover effect. It not only affects the progress of the Teesta negotiations but also shapes Bangladesh's broader evaluation of India's regional leadership, cultural diplomacy, and strategic intent. Unless India successfully harmonizes central—state relations on water-sharing and effectively communicates its efforts to Bangladesh, domestic politics in West Bengal will continue to be a major variable influencing India's soft-power projection in South Asia.

#### STRATEGIC CONSEQUENCES: DIVERGENCE, HEDGING, AND ALTERNATIVE PARTNERSHIPS

The protracted Teesta River dispute has significantly influenced Bangladesh's strategic orientation, prompting recalibrations in its foreign policy behaviour and reshaping its perception of India's soft power. While India traditionally relied on cultural affinity, historical ties, and developmental cooperation to exert a benign influence in Bangladesh, the inability to deliver on a long-standing water-sharing agreement has generated strategic consequences in three interrelated dimensions: divergence, hedging, and pursuit of alternative partnerships.

First, strategic divergence has emerged as a subtle yet noticeable trend. Bangladesh increasingly perceives the Teesta dispute as a symbol of India's domestic political constraints overshadowing bilateral commitments. Despite India's assurances, repeated delays—primarily due to opposition from West Bengal—have created doubts about India's reliability as a regional leader. This has led Bangladesh to question earlier assumptions regarding India's ability to translate goodwill into tangible policy outcomes. Consequently, policy convergence on certain regional issues, such as energy cooperation, security dialogue, and connectivity initiatives, has encountered hesitation in Dhaka. Bangladesh's expectation that a close diplomatic relationship would yield favourable outcomes on critical resource issues has remained unmet, amplifying perceptions of strategic asymmetry.

Second, hedging has become a prominent feature of Bangladesh's diplomacy. Instead of relying exclusively on India, Bangladesh has diversified its economic and infrastructural engagements, particularly in sectors where India previously held a dominant position. Hedging allows Dhaka to maintain a working relationship with India while simultaneously exploring options that reduce overdependence. In this context, Bangladesh seeks to balance strategic vulnerabilities by signalling that water security is a non-negotiable national priority. The Teesta dispute thus acts as a catalyst for Dhaka's cautious recalibration—not to challenge India directly, but to maintain freedom of manoeuvre.

Third, the pursuit of alternative partnerships—especially with China—represents a long-term strategic shift. China's willingness to invest in Teesta-related development projects, including river management and flood control, has offered Bangladesh a viable alternative to Indian cooperation. Although Bangladesh remains careful not to antagonize India, Chinese engagement presents an opportunity to leverage competing interests to its advantage. This diversification not only broadens Bangladesh's diplomatic choices but also demonstrates how unresolved bilateral issues can weaken India's soft power appeal.

Overall, the Teesta River dispute has acted as a structural variable shaping Bangladesh's external alignments. Divergence, hedging, and alternative partnerships collectively reflect a nuanced but clear shift in Dhaka's strategic outlook and its assessment of India's soft-power credibility.

# ACADEMIC PERSPECTIVES ON SOCIO-ECONOMIC AND ENVIRONMENTAL IMPACTS

The Teesta River dispute has emerged as a significant determinant in shaping Bangladesh's perception of India's soft power, particularly through its socio-economic and environmental repercussions. Academic analyses underline that transboundary water sharing is not merely a hydrological concern but an issue embedded within livelihoods, regional development, and ecological stability. In Bangladesh, the Teesta River constitutes a lifeline for agricultural communities, where seasonal water shortages have intensified economic vulnerability. Scholars argue that fluctuations in water flow—especially during the dry months—directly affect crop yields, household incomes, and food security, thereby influencing public attitudes toward India's cooperative intent.



From a socio-economic standpoint, the dispute is often framed within the broader context of equity and interdependence. Research highlights that unresolved water-sharing mechanisms generate a sense of asymmetry, contributing to public and political skepticism regarding India's commitment to fair resource distribution. This skepticism has, at times, constrained India's ability to leverage cultural diplomacy, developmental assistance, and trade cooperation as instruments of soft power. The academic discourse emphasizes that sustainable and transparent water negotiations can foster trust, aligning with soft power principles rooted in mutual respect and shared prosperity.

Environmental scholars draw attention to the ecological dimension, noting that altered river flows can exacerbate land degradation, reduce biodiversity, and disrupt sedimentation patterns vital for agro-ecological balance in northern Bangladesh. Climate change further compounds these challenges, increasing the stakes of bilateral water governance. Collaborative environmental management, therefore, becomes critical for enhancing India's image as a responsible regional leader.

In sum, academic perspectives converge on the idea that the socio-economic hardships and environmental vulnerabilities linked to the Teesta dispute significantly shape Bangladesh's perception of India's soft power. A cooperative, science-based water-sharing framework is widely viewed as essential for strengthening bilateral trust and advancing long-term regional stability.

#### **CONCLUSION**

The Teesta River dispute exemplifies how a natural-resource conflict can shape interstate perceptions and the soft power calculus. Far from being only a technical water-management issue, Teesta has become a political symbol: its unresolved status signals limits to India's ability or willingness to accommodate a neighbor's material concerns, thereby constraining soft-power gains that might otherwise accrue from cultural affinity and developmental outreach. For Bangladesh, Teesta is both a livelihood issue and an indicator of asymmetric influence; for India, the dispute is a reminder that power without trustworthy, visible accommodation of downstream needs can undercut influence. The way forward is pragmatic: institutionalize joint management, compensate domestic constituencies, and convert technical cooperation into durable political trust. If New Delhi and Dhaka can operationalize such steps, the Teesta could shift from a zone of contention to an avenue for renewed partnership — restoring the kind of reliable, material cooperation that undergirds authentic soft power.

## **REFERENCES**

- 1. Bandyopadhyay, J. & Ghosh, N. (2009). Holistic Engineering and Hydro-Diplomacy in the Ganges–Brahmaputra–Meghna Basin. Economic and Political Weekly, 44(45–46), 50–60.
- 2. Rahman, M. M. (2012). Water Security: Bangladesh Perspective. Bangladesh Institute of International and Strategic Studies (BIISS) Journal, 33(4), 421–444.
- 3. Crow, B. & Singh, N. (2000). Impediments and Innovation in International Rivers: The Waters of South Asia. World Development, 28(11), 1907–1925. https://doi.org/10.1016/S0305-750X(00)00056-6.
- 4. Mirza, M. M. Q. (2004). The Ganges Water Diversion: Environmental Effects and Implications. Springer. https://doi.org/10.1007/1-4020-2364-0
- 5. Richey, J. & Islam, S. (2018). Indo-Bangladesh Water Sharing and Climate Variability: Challenges for Transboundary Cooperation. Water Policy, 20(S1), 75–91. https://doi.org/10.2166/wp.2018.000.
- 6. Shami, Shifa, et al. "Impact Of English Language Learning On Mental Health: Exploring The Relationships Between Language Anxiety, Self-Esteem, And Depression." Journal of Neonatal Surgery 14.9s (2025).
- 7. Vanisree, M., et al. "Role of English Language in Digital Library Instruction and Information Literacy." Library of Progress-Library Science, Information Technology & Computer 44.3 (2024).
- 8. Sunalini, K. K., et al. "Role of English Language in Facilitating Interdisciplinary Learning in Higher Education." Library of Progress-Library Science, Information Technology & Computer 44.3 (2024).
- 9. Riad, M. J. A., Debnath, R., Shuvo, M. R., Ayrin, F. J., Hasan, N., Tamanna, A. A., & Roy, P. (2024, December). Fine-Tuning Large Language Models for Sentiment Classification of AI-Related Tweets. In 2024 IEEE International Women in Engineering (WIE) Conference on Electrical and Computer Engineering (WIECON-ECE) (pp. 186-191). IEEE
- 10. Riad, M. J. A., Roy, P., Shuvo, M. R., Hasan, N., Das, S., Ayrin, F. J., ... & Rahman, M. M. (2025, January). Fine-Tuning Large Language Models for Regional Dialect Comprehended Question answering in Bangla. In 2025 IEEE International Students' Conference on Electrical, Electronics and Computer Science (SCEECS) (pp. 1-6). IEEE.
- 11. Sultana, S., Akuthota, V., Subarna, J., Fuad, M. M., Riad, M. J. A., Islam, M. S., ... & Ashraf, M. S. (2025, June). Multi-Vision LVMs Model Ensemble for Gold Jewelry Authenticity Verification. In 2025 International Conference on Computing Technologies (ICOCT) (pp. 1-6). IEEE.



- 12. Ashraf, M. S., Akuthota, V., Prapty, F. T., Sultana, S., Riad, J. A., Ghosh, C. R., ... & Anwar, A. S. (2025, April). Hybrid Q-Learning with VLMs Reasoning Features. In 2025 3rd International Conference on Artificial Intelligence and Machine Learning Applications Theme: Healthcare and Internet of Things (AIMLA) (pp. 1-6). IEEE.
- 13. Shuvo, M. R., Debnath, R., Hasan, N., Nazara, R., Rahman, F. N., Riad, M. J. A., & Roy, P. (2025, February). Exploring Religions and Cross-Cultural Sensitivities in Conversational AI. In 2025 International Conference on Artificial Intelligence and Data Engineering (AIDE) (pp. 629-636). IEEE.
- 14. Fnu, H., Soni, V., Asundi, S., Thummarakoti, S., Kaushik, K., & Soni, M. (2025, May). Design and Deployment of AI-Driven Fraud Detection Models in Cloud-Based Banking Ecosystems. In 2025 International Conference on Networks and Cryptology (NETCRYPT) (pp. 223-228). IEEE.
- 15. Fnu, H., & Murri, S. (2025, April). Algorithmic Approach for Fraudulent Transaction Detection using Market Basket Analysis with Big Data. In 2025 4th International Conference on Distributed Computing and Electrical Circuits and Electronics (ICDCECE) (pp. 1-7). IEEE.
- 16. Fnu, H., Kaushik, K., Gaur, P., Saratchandran, D. V., Thapliyal, A. G., Sidhu, K. S., & Singh, V. (2025, April). Multi-Agent Systems for Collaborative Financial Decision-Making Over Distributed Network Architectures. In 2025 3rd International Conference on Advancement in Computation & Computer Technologies (InCACCT) (pp. 939-944). IEEE.
- 17. Murri, S., Fnu, H., Kumawat, R., Pujari, T. D., Kaushik, K., & Arora, A. S. (2025, April). Federated Machine Learning for Decentralized Financial Data Analysis in Cloud Environments. In 2025 4th OPJU International Technology Conference (OTCON) on Smart Computing for Innovation and Advancement in Industry 5.0 (pp. 1-7). IEEE.
- 18. Borra, C. R., Cheekati, S., Pareek, P. K., Rayala, R. V., Kothuri, S. R., & Kumar, S. V. (2025, May). An Intelligent IoT Attack Detection Model Using Weighted ELM and Educational Achievement Guided Optimization. In 2025 13th International Conference on Smart Grid (icSmartGrid) (pp. 789-796). IEEE. (15)
- 19. Cheekati, S., Rayala, R. V., & Borra, C. R. (2025, February). A Scalable Framework for Attack Detection: SWIM Transformer with Feature Optimization and Class Balancing. In 2025 3rd International Conference on Integrated Circuits and Communication Systems (ICICACS) (pp. 1-7). IEEE.(10)
- 20. Cheekati, S., Borra, C. R., Kumar, S., Rayala, R. V., Sangula, S. K., & Kulkarni, V. (2025, May). Intelligent Cybersecurity for IoT: A Hybrid QRIME-SDPN Approach for Network Attack Detection on CIC-IoT-2023. In 2025 13th International Conference on Smart Grid (icSmartGrid) (pp. 774-781). IEEE. (20)
- 21. Cheekati, S., Borra, C. R., Pareek, P. K., Rayala, R. V., Kowsalya, S. S. N., & Selvam, J. (2025, May). Cybersecurity Threat Detection Using OpCyNet and DBRA: A Deep Learning Approach for DDoS Attack Mitigation on CICDDoS2019. In 2025 13th International Conference on Smart Grid (icSmartGrid) (pp. 782-788). IEEE.(17)
- 22. Rayala, R. V., Borra, C. R., Pareek, P. K., & Cheekati, S. (2024, November). Enhancing Cybersecurity in Modern Networks: A Low-Complexity NIDS Framework using Lightweight SRNN Model Tuned with Coot and Lion Swarm Algorithms. In 2024 International Conference on Recent Advances in Science and Engineering Technology (ICRASET) (pp. 1-8). IEEE. (23)
- 23. Rayala, R. V., Borra, C. R., Pareek, P. K., & Cheekati, S. (2024, November). Fortifying Smart City IoT Networks: A Deep Learning-Based Attack Detection Framework with Optimized Feature Selection Using MGS-ROA. In 2024 International Conference on Recent Advances in Science and Engineering Technology (ICRASET) (pp. 1-8). IEEE.(20)
- 24. Rayala, R. V., Borra, C. R., Pareek, P. K., & Cheekati, S. (2024, November). Hybrid Optimized Intrusion Detection System Using Auto-Encoder and Extreme Learning Machine for Enhanced Network Security. In 2024 International Conference on Recent Advances in Science and Engineering Technology (ICRASET) (pp. 1-7). IEEE.(19)
- 25. Rayala, R. V., Borra, C. R., Pareek, P. K., & Cheekati, S. (2024, November). Securing IoT Environments from Botnets: An Advanced Intrusion Detection Framework Using TJO-Based Feature Selection and Tree Growth Algorithm-Enhanced LSTM. In 2024 International Conference on Recent Advances in Science and Engineering Technology (ICRASET) (pp. 1-8). IEEE. (15)
- 26. Rayala, R. V., Borra, C. R., Pareek, P. K., & Cheekati, S. (2024, November). Mitigating Cyber Threats in WSNs: An Enhanced DBN-Based Approach with Data Balancing via SMOTE-Tomek and Sparrow Search Optimization. In 2024 International Conference on Recent Advances in Science and Engineering Technology (ICRASET) (pp. 1-8). IEEE. (18)
- 27. Borra, C. R., Rayala, R. V., Pareek, P. K., & Cheekati, S. (2025, May). Optimizing Security in Satellite-Integrated IoT Networks: A Hybrid Deep Learning Approach for Intrusion Detection with JBOA and NOA. In 2025 International Conference on Intelligent and Cloud Computing (ICoICC) (pp. 1-8). IEEE.(13)
- 28. Borra, C. R., Rayala, R. V., Pareek, P. K., & Cheekati, S. (2025, May). Advancing IoT Security with Temporal-Based Swin Transformer and LSTM: A Hybrid Model for Balanced and Accurate Intrusion Detection. In 2025 International Conference on Intelligent and Cloud Computing (ICoICC) (pp. 1-7). IEEE.(4)



- 29. Borra, C. R., Rayala, R. V., Khan, Z., & Cheekati, S. (2025, May). Optimized Intrusion Detection for IoT Networks Using Machine Learning and Feature Selection with RTGBO-ELM Integration. In 2025 International Conference on Intelligent and Cloud Computing (ICoICC) (pp. 1-6). IEEE.(5)
- 30. Borra, C. R., Rayala, R. V., Khan, Z., & Cheekati, S. (2025, May). Enhancing IoT Network Security: Machine Learning-Based Intrusion Detection Using Vortex Search Optimization and SMOTE for Improved Classification. In 2025 International Conference on Intelligent and Cloud Computing (ICoICC) (pp. 1-7). IEEE.(10)
- 31. Borra, C. R., Rayala, R. V., Khan, Z., & Cheekati, S. (2025, May). Intrusion Detection in IoT Networks: Leveraging RNN with Quantum-Based Hummingbird Optimization for Enhanced Classification Accuracy. In 2025 International Conference on Intelligent and Cloud Computing (ICoICC) (pp. 1-6). IEEE.(11).
- 32. George, Bibin, et al. "Impact of Digital Libraries on English Language Academic Writing." Library of Progress-Library Science, Information Technology & Computer 44.3 (2024).
- 33. Mustafa, D. & Wrathall, D. (2011). Indus Basin, Ganga–Brahmaputra–Meghna Basin: Hydro-Politics and Conflict. In The Routledge Handbook of Water and Development (pp. 235–248). Routledge.
- 34. Islam, S. N. & Gnauck, A. (2009). Water Demand and Population Growth in the Brahmaputra River Basin. Water Resources Management, 23, 317–338. https://doi.org/10.1007/s11269-008-9280-9