
INDIA'S HYDRO-HEGEMONY OVER BANGLADESH IN GANGES WATER SHARING TREATY (2019-2024)

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ABSTRACT

As a resource that crosses countries, transboundary rivers often provide an arena for complex interactions between countries. Inequality in terms of geographical positions, water distribution, and capacity of water management can create various relational dynamics, from cooperation to tension. The Ganges River is one example reflecting such a relationship between India, in the upstream region, and Bangladesh, in the downstream region. The erection and operation of key infrastructure, particularly the Farakka Barrage, affected the water availability for the downstream region significantly. Although both countries were formally bound in the Ganges Water Sharing Treaty in 1996 and involved in water sharing cooperation, the questions rise when the cooperation occurred in an asymmetric power structure, particularly when one party had larger control over the infrastructure, hydrological data, and technical capacity. This study aimed to analyze hegemony in the river management between India and Bangladesh, using the hydro-hegemony theory developed by Mark Zeitoun and Jeroen Warner. The study employed the qualitative research method with document analysis of bilateral agreements and government official reports, as well as secondary data. The analysis focused on power asymmetry, sources of power, water resources management strategies, and outcomes. The findings show that material disparity, control over infrastructure in the upstream, and institutional design that did not create shared control, placed India in a dominant position in the structure of the river management. The cooperation remained relatively stable, but took place within the asymmetrical power configuration. Such a phenomenon reveals hydro-hegemony constructed through structural primacy and institutional authority, so that domination can be maintained without exercising coercive actions.

Keywords: Farakka Barrage, Transboundary river, Hydro-hegemony theory, Asymmetrical power.

1. INTRODUCTION

Transboundary river management often not only leads to technical issues of water allocation but also falls into a realm of politics and hegemony (Wang et al., 2021). The relation between the neighbouring countries, India and Bangladesh, regarding the Ganges River is one of the prominent examples of South Asia's dynamics. India controlled the majority of the upstream region as well as key infrastructure along the river, granting it a strategic position in determining water flows, in terms of quantity and quality, crossing to Bangladesh (World Bank, 2020). Such domination could be seen from Bangladesh's dependence on data, infrastructure, and technical policies originated from Indian institutions like the Central Water Commission (CWC) and the Ministry of Jal Shakti (Parven & Hasan, 2018). One of the main issues regarding the river management emerged when India, as the upstream country, constructed the Farakka Barrage in 1975 to divert the river's flow to the Hugli River for smooth navigation to

the Kolkata Port (Gain & Giupponi, 2014). The unilateral decision – followed by water distribution change – caused direct negative impacts on the Bangladeshi agricultural sector, public health, fisheries, and the local community's well-being (Kawser & Samad, 2016). The Farakka Barrage's operations decreased the water volume flowing to Bangladesh during dry seasons, with the flow rate often falling below the minimum for irrigation and domestic use (Islam et al., 2022).

Signed in 1996 by the two countries, the agreement called the Ganges River Water Sharing Agreement (GWST) marked a diplomatic effort to regulate the governance of shared water resources. The agreement established a water-sharing formula, as well as a Joint Committee and Joint River Commission (JRC) as institutional mechanisms responsible for monitoring water flow allocation, recording daily discharges, preparing annual reports, and resolving technical issues (Government of the People's Republic of Bangladesh & Government of the Republic of India, 1996; Rahaman, 2009). Despite an achievement in regional water diplomacy, the agreement did not fully correct the power imbalance that had entrenched the relationship between the two countries. The absence of provisions on sanctions and arbitration made its implementation more dependent on India's willingness to comply with agreed commitments, thus leaving Bangladesh relatively vulnerable (Siddiqui, 2013). Such disparity became increasingly evident between 2019 and 2024.

A formal framework for water allocation between India and Bangladesh as a technical mechanism for cooperation was established in the GWST. However, in practice, the structural imbalance between upstream and downstream positions maintained a hegemony, influencing its implementation, wherein India held control over flow, data, and institutional structures (Rahman et al., 2019). This study aimed to explain the implementation of Ganges River water management between 2019 and 2024, reflecting India's hegemony over Bangladesh in transboundary water governance through the GWST.

2. THEORETICAL FRAMEWORK

This Study used the theory of hydro-hegemony proposed by Zeitoun and Warner (2006). The theory of hydro-hegemony describes how countries with a stronger position, both geopolitically and economically, are able to dominate the management and distribution of transboundary water resources through a combination of power strategies and tactics. Furthermore, Zeitoun and Warner (2006) assert that hydro-hegemony is a form of hegemony at the level of international river basins, where countries with greater power exploit power asymmetries to control access to and allocation of water, whether through coercive actions or normative mechanisms.

Zeitoun and Warner (2006) formulate the hydro-hegemony theoretical framework, consisting of four pillars of hydro-hegemony: power asymmetry, sources of power, water resource control strategies, and outcomes, with the following explanations:

- 1) Power asymmetry: Power asymmetry is the key determinant enabling the establishment of water hegemony. Differences in military, economic, diplomatic, and technological power between upstream and downstream countries create conditions in which powerful countries are able to dictate the structure of water resource management.
- 2) Sources of power: Sources of power can be divided into several dimensions: (a) material power, which encompasses economic, military, and technological capabilities;

(b) ideational power, which is power over ideas and discourse, whereby the powerful party can instil legitimacy through the construction of knowledge and sanctioned discourse to frame water issues according to its interests; and (c) bargaining power, a country's ability to negotiate through cross-sectoral issues, international law, or global morality that strengthens its bargaining position.

- 3) Water resource control strategies: The three sources of power are then manifested in water resource control strategies, that is, how actors exercise and maintain their influence over transboundary water resources. The strategies encompass the use of infrastructure, operational policies, and international treaties as instruments of control. Thus, transboundary water agreements are not neutral; rather, they can function as indirect means of control that bind other actors within a predetermined framework. Control strategies can be direct, such as regulating water flow, or indirect through rules, procedures, and implementation mechanisms that potentially limit the scope of action of other actors.
- 4) Outcomes: As a result of the application of the control strategies, the theory of hydro-hegemony identifies several possible outcomes in transboundary water interactions: cooperation, domination, contestation, and asymmetric cooperation. Cooperation is not always synonymous with fairness or equality because it may occur under conditions of significant power asymmetry. Within the framework, hegemony is understood not as a given, but as a potential outcome of consistently exercised hegemony. The relationship between agreements, compliance, and long-term stability is crucial since the stability resulting from cooperation amid inequality is often fragile and potentially generates future latent conflicts.

The theory of hydro-hegemony served as the analytical framework to understand India's hegemony over Bangladesh in the management of the Ganges River through the GWST for the 2019–2024 period. The fairness of the water treaty depended on how the upstream country (India) projected its power in regulating both access to and allocation of water for the downstream country (Bangladesh). With Zeitoun and Warner's (2006) analytical framework, the outcome of interstate interactions could fall within two spectra: conflictive domination (coercive domination) and cooperative hegemony (collaborative leadership). The outcome depended on the form of strategy pursued by the hegemon: whether it was oriented toward an integrative (collaborative) strategy or a resource-capture (exploitative) strategy. The theory helped explain the hegemony of the relationship from conflict to cooperation in the management of transboundary water resources between India and Bangladesh.

3. METHODS

This study employed a qualitative research design using an exploratory method and a case study approach. According to Creswell (2014), qualitative research focuses on understanding meanings and processes. Exploratory methods aim to systematically explain phenomena based on empirical evidence (Stebbins, 2001). Exploratory research not only describes phenomena but also seeks to establish preliminary understandings and generalizations regarding social phenomena that have not yet been systematically explained. The study focused on analyzing India's hegemony as an upstream country over Bangladesh

through the GWST during the 2019–2024 period to gain an in-depth understanding of how the treaty was implemented, as well as the factors influencing the outcomes.

Secondary data were used as the primary source of analysis. It not only assessed the formal content of the GWST but also examined how actors such as the governments of India and Bangladesh, as well as the JRC, contributed to the implementation process and decision-making regarding the transboundary water management of the Ganges River. Data were obtained from official documents and publications, as well as reports and news.

Exploratory qualitative analysis was used to analyze data, referring to the process of examining and interpreting non-numerical data systematically and attempting to link empirical patterns with the underlying causal mechanisms. According to Miles et al. (2014), qualitative data analysis is a continuous process comprised of three main stages: data condensation, data display, and conclusion drawing. With the approach, patterns, themes, and relationships emerging from the data could be identified, enabling the construction of a comprehensive understanding of the research.

4. RESULTS AND DISCUSSION

4.1. Ganges River in India-Bangladesh Cross-Border Relations

According to Wheeler (2018), transboundary river management is influenced by the physical and geographical characteristics of river flows, particularly the difference in location between upstream and downstream countries. Upper-stream countries play a crucial role in determining the quantity and timing of water flow, while lower-stream countries tend to be in a more dependent position (Munia et al., 2018). Specific periods, such as the dry season, increase dependence when water availability is restricted, while domestic and economic needs rise. Thus, transboundary river management cannot be understood solely as a technical hydrological issue, but rather as a process requiring fair and predictable cross-border regulation.

Various arrangements for transboundary river management are generally established through agreements or mechanisms of cooperation among nations to manage water distribution, maintain stable interstate relations, and prevent emerging open conflicts (UN-Water, 2024). However, Smith and Winterman, (2022) argue that the effectiveness of such arrangements relies heavily on the relationships among the involved countries, including the roles each country plays, differences in management capacity, domestic interests, and the degree of dependence on the shared water resources. Thus, transboundary rivers serve not only as waterways but also as media for interstate interaction that reflect the dynamics of joint management within structural conditions, but not always equitably. To understand the dynamics of transboundary river management begins with examining the position, function, and role of the rivers within the national contexts of the countries they flow, as a basis to interpret the resulting cross-border interactions.

The Ganges River was essential to India's domestic affairs, seen from a social, economic, or national development perspective. Northern India, one of the most densely populated regions in the world, benefited from the river, providing the main sources for domestic, agricultural, and industrial needs (Singh & Singh, 2020). The majority of river flows are situated in India's territory, making the country the dominant actor in infrastructure and river management (FAO, 2012). As the river as strategic resource for economic development

and social stability, the management was integrated into India's national development. Furthermore, its position as the upstream country heightened the ability to control water flows through infrastructure building and operational policies within its own territory (Salman & Uprety, 2003).

The Ganges River is part of the transboundary Ganges-Brahmaputra-Meghna (GBM) river basin system, serving as the primary water source for Bangladesh's economic and ecological needs (Khalequzzaman, 2026). Geographically, Bangladesh was traversed by dozens of transboundary rivers, most of which were part of the GBM system; consequently, the reliance on external water flows was extremely high for the entire river system and the people of Bangladesh. Such conditions had a direct impact on socio-economic and ecological life, including the irrigation, agriculture, fisheries, and water transportation sectors, which were centered on the main flow of the river during both the dry and rainy seasons. The flow of water entering Bangladesh was heavily influenced by water management practices in the upstream region, while the country had limited capacity to regulate the water supply it received, further creating distinct structural conditions between the upstream and the downstream countries.

The Ganges River – a significant part of the transboundary GBM river basin system – influenced the dynamics of interstate relations in the region because it served not only as a water resource but also as a transboundary structure (Sadoff & Grey, 2002). The positioning was not merely a geographical location, but it also became a form of disparity directly affecting management capacity and decision-making (Zeitoun & Warner, 2006). The river basin's total catchment area was noted to be approximately 1,086 million km² (FAO, 2012). The upstream countries, such as India, Nepal, and China, if combined, covered most of the GBM basin, leaving only rest 7% for Bangladesh (Rahman et al., 2022).

While the water availability became a crucial issue for those dependent on the Ganges River, Bangladesh's dependence was worsened by the erratic nature of flows throughout the year. During the dry season, water supply for Bangladesh was significantly reduced; on the other hand, during the monsoon season, approximately 85% of the surface runoff flowed to the country (Global Water Partnership, 2025). Cascão (2009) noted that seasonal patterns indicate that downstream countries were not only dependent on flow volume but were also heavily affected by the timing and distribution of flows, being shaped by upstream hydrological conditions. Such situations underscored the critical role of bilateral agreements, joint commissions, and data coordination forums as joint management mechanisms. Riparian countries could normatively balance their respective domestic needs and address the challenges caused by transboundary interdependence through the mechanisms (Sadoff & Grey, 2002).

4.2. Ganges Water Sharing Treaty (2019–2024)

Following Bangladesh's independence in 1971, the issue of water allocation from the Ganges River, particularly during the dry season, was one of the most critical matters in bilateral relations with India. India's operation of the Farakka Barrage in the mid-1970s heightened the urgency, as the diversion of water flow at a strategic point in the upstream region was deemed to have a direct impact on water availability in the downstream areas of Bangladesh (Hossain, 1998). For Bangladesh, the absence of a permanent agreement made the management of the agricultural, fisheries, and deltaic ecological sectors highly vulnerable to the instability of water flow from the upstream region. Meanwhile, for India, the temporary

arrangement provided freedom in managing domestic water infrastructure without strict long-term commitments.

The limitations of the interim agreement ultimately prompted both countries to seek a more stable and long-term regulatory mechanism. From the early to mid-1990s, bilateral political changes and growing awareness of the importance of regional stability led to more substantive negotiations. The negotiations were aimed at formulating an agreement that would not only technically regulate the sharing of water flows but also provide a normative foundation for sustained cross-border cooperation. The GWST was then signed on December 12, 1996, in response to the issue of water flow allocation (Government of the People's Republic of Bangladesh & Government of the Republic of India, 1996). The treaty was signed with a 30-year validity period, expiring in December 2026, replacing the previous temporary agreement and serving as a long-term solution to the issue of water sharing between the two countries. The main focus of the treaty was to regulate water flow at the strategic Farakka Barrage, a water control infrastructure in Indian territory that was a key factor in the dynamics of the river's management.

Technically, the GWST was designed to regulate the allocation of water from the Ganges River, particularly during the dry season annually, when water availability was at its most critical and river flow instability became more dependent on water withdrawals upstream. The water allocation mechanism applied ten-day periods, allowing for a more flexible distribution of water in response to the river's fluctuating flow. The allocation mechanism was specified in Annex I of the treaty and was based on the actual water availability at the Farakka Barrage, with three main scenarios: first, if the flow was at or below 70,000 cusecs, India and Bangladesh each received 50 percent of the total flow; second, if the flow passed between 70,000-75,000 cusecs, Bangladesh received 35,000 cusecs, while India received the remaining flow; and third, if the flow exceeded 75,000 cusecs, India received 40,000 cusecs, and Bangladesh received the remaining flow (Government of the People's Republic of Bangladesh & Government of the Republic of India, 1996).

A temporary, crucial mechanism was established to allocate a minimum flow of 35,000 cusecs for three ten-day periods, particularly during the critical period, guaranteeing both countries on a rotating basis (Government of the People's Republic of Bangladesh & Government of the Republic of India, 1996). The provision was aimed at mitigating the extreme impacts of reduced flow during the peak of the dry season, while maintaining the stability of water supply for domestic, irrigation, and ecological needs in the downstream region. Despite this, it remained contingent that water availability at the Farakka Barrage was under the control of the upstream country, meaning that the scope for adaptation remained within the framework of control over key measurement points in the upstream. Furthermore, Annex II of the treaty bore a schedule for water allocation based on the ten-day average flow during the period 1949–1988 (Government of the People's Republic of Bangladesh & Government of the Republic of India, 1996).

Joint Rivers Commission (JRC)

The institutions under the GWST, to ensure the implementation of the water-sharing scheme, the Joint Rivers Commission (JRC), as the key institution, was created on March 19, 1972, to coordinate technical cooperation between the two countries (Dhar, 2024). The JRC

served as a bilateral forum tasked with monitoring the treaty's implementation, managing technical communication, and serving as a consultation in the event of differences (Hossain, 1998). Mechanisms for monitoring, data exchange, and evaluation as an integrated part of technical implementation were established under the JRC. While monitoring was carried out through river flow measurements at agreed-upon points, the hydrological data were shared periodically to serve as the basis for water allocation and joint evaluation. Consultation was also facilitated when the river flow fell below a certain threshold, and within the established framework of cooperation, changing hydrological conditions could be discussed by the two parties (Government of the People's Republic of Bangladesh & Government of the Republic of India, 1996).

Hydrological conditions – particularly during the critical period when river flow naturally decreased significantly – determined the actual allocation despite an established formula for water allocation at the Farakka Barrage. During certain dry seasons, for instance, the volume of water flowing to the downstream region was affected, which was not always stable and was often at a level vulnerable to (Rahman et al., 2019). The dynamics of natural conditions and technical decisions changing over time influenced the implementation, suggesting that the agreement did not occur under static conditions. Implementation was assessed based on the actual water allocation, not solely through the treaty's text.

Though the JRC was responsible for a data-sharing mechanism, including the recorded daily flow rates during the dry season, the effectiveness of the mechanism was determined by several factors, such as the quality of the measurement systems, access to real-time data, and effective coordination between the technical authorities of both countries. India's response to the dry season was one of the most critical indicators for assessing the dynamics of implementation. The volume of water available for release to the downstream region was affected by changes in rainfall patterns, rising domestic demand, and pressure on water use for irrigation and other sectors in the upstream region. The instability of water discharge during the dry season became more pronounced compared to the long-term period that served as the basis for the agreement, according to recent years' regional hydrological reports (Rahman et al., 2019). The dynamics of implementation assessed how the agreement was functioning in practice, and how the recurring management patterns over the past five years shaped the structure of interaction between the two countries in the management of the river's flow.

India's Hegemony Over Bangladesh (2019–2024)

The relationship between India and Bangladesh reflected an imbalance in the management of the Ganges River under the GWST (Mirumachi & Allan, 2007). India was geographically located in the upstream region and controlled key infrastructure such as the Farakka Barrage, serving as the point for regulating water flow before entering Bangladeshi territory; the capacity granted India a stronger bargaining position in day-to-day operational management (Kawser & Samad, 2016). During the 2019–2024 period, the determination of water allocations during the dry season under the treaty was heavily influenced by the recorded flow rate at the Farakka Barrage before the water flowed to downstream regions. Based on annual averages, the flow of the river at the Farakka Barrage ranged from 12,000 to 14,000 m³/s; however, during the peak of the dry season – particularly in March-April – the flow

drastically dropped to approximately 1,500–3,000 m³/s during certain periods (Mirumachi, 2015; World Bank, 2014).

While water allocation during the dry season was determined within the framework of the JRC agreement and forum, Bangladesh lacked direct control over the starting point for flow regulation (Rahaman, 2009). Such dependency created differing positions in technical negotiations, particularly when flow levels were low. Approximately 54 transboundary rivers were flowing from India to Bangladesh (UNECE, 2013). The stability of bilateral relations was crucial, so Bangladesh's approach during the dry season tended to be cautious and grounded in existing cooperative frameworks. The pattern was evident during the 2019–2024 period, during which water allocation continued to follow the terms of the agreement, while technical communication persisted, although the flow conditions were not always stable. The sensitivity to fluctuating water flows was further exacerbated by increasing climate variability in South Asia (Moors et al., 2011). Despite mechanisms for water allocation and cooperation through the JRC, key hydrological data were still generated and managed at monitoring stations located within Indian territory.

Data availability and transparency became the basis to shape water allocation decisions, particularly during the dry season. For example, the average flow rate at the Farakka Barrage during the dry season could fall below 70,000 cusecs during certain periods, which then served as the basis for implementing water-sharing arrangements in accordance with the agreement (Mirumachi, 2015). Formally, cooperation between India and Bangladesh continued through agreed-upon mechanisms, such as technical meetings, data exchanges, and routine coordination, indicating that relations between the two countries were not in an open conflict. However, operationally, water management patterns revealed unequal power dynamics regarding control over resources, technical capacity, and decision-making authority. Infrastructure was located in the upstream region, flow regulation was made before water flowed downstream, and Bangladesh's dependence on the flow remained high. Such conditions illustrate how cooperation could proceed within a formal framework while still operating within a relational structure, leading to the dominance of implementation by the party with greater material capacity and a favourable geographical position.

The Farakka Barrage was instrumental in creating hegemony as the structure consisted of 109 gates that could be opened or closed to regulate water flow, as well as feeder channels capable of conveying up to 40,000 cusecs of water to the Hugli River when necessary (Ministry of Water Resources, 2024). Due to its location approximately 16.5 km upstream from the border, Indian authorities had initial control over how water flow was measured, channelled, or diverted before entering Bangladeshi territory, a form of infrastructure control, underpinning the operational management of transboundary water flow (Islam et al., 2022). To relieve water pressure and prevent structural damage during heavy rainfall, India could open all gates, even releasing over 1.1 million cusecs in a single day (Dhar, 2024). India asserted that such releases were part of routine operations based on hydrological conditions, and discharge data regarding the opening of the gates was shared with the JRC in accordance with the agreement's protocols.

The impact of the Farakka Barrage's operational controls on downstream areas was very evident in recent decades. Overall, the Farakka Barrage caused changes in the flow patterns of the Padma River in Bangladesh, particularly during the dry season. During the 2019–2024 period, access control and the operation remained critical in transboundary water

management. Although treaty mechanisms formally regulated water allocation throughout the dry season, India's ability to regulate releases through its infrastructure directly impacted the volume and timing of inflows, which in turn affected ecological conditions and domestic needs in the downstream region. Thus, the operational patterns of the Farakka Barrage were not merely a technical issue but also reflected how water control infrastructure created unequal bargaining power between upstream and downstream nations in the treaty's implementation.

The GWST shall be valid for 30 years and may be reviewed by mutual agreement of both parties. However, during the 2019-2024 period, there were no major renegotiations despite increased climate variability and flow instability. Nevertheless, discussions in recent years tended to focus on the issues of cooperation of other rivers and the strengthening of bilateral relations in general, rather than on alternatives to the main structure of the Ganges River water allocation. It means that room for renegotiation remained, but it was highly dependent on bilateral political dynamics. Based on findings regarding dry-season allocation, operational control of the Farakka Barrage, access to flow data, and decision-making space, it was evident that the implementation of the agreement did not fully occur on an equal footing. Despite formally binding water-sharing regulations, the flow measurement points, infrastructure arrangements, and initial control over water releases were located in the upstream region. The conditions formed a pattern of relations, consistently placing one party as the initial controller of the flow, while leaving the other party in a position to accept the results of those arrangements. The findings also indicate that the imbalance did not occur in a single specific event, but rather emerged repeatedly within daily operational mechanisms.

4.3. Structure of Hegemony in Ganges River Management

Power Asymmetry in India-Bangladesh Relations

According to Zeitoun and Warner (2006), differences in geographical position, material capacity, and control over resources and institutions as a condition of structural inequality in riparian relations, emboldening power asymmetry. One party has greater influence than the other thanks to an unbalanced distribution of capacity and structural positions. In the management of the Ganges River, India's position as an upstream country structurally held a geographical advantage; approximately 79.2% of the river's watershed lies within India, while only about 4.28% is in Bangladesh (World Bank, 2014). India became the main controller of the upstream region within the river system, structurally granting it greater capacity to influence the flow before entering the downstream region. Such a situation turned out to be even more critical when viewed from the perspective of Bangladesh as a downstream. The World Bank (2014) noted that approximately 160 million Bangladeshis lived in areas heavily dependent on transboundary river systems for agriculture, fisheries, domestic water supplies, and ecological stability.

India's Sources of Power

1) Material Power

Using Zeitoun and Warner's (2006) theoretical framework, material power reinforced India's structural position, allowing it to project technical control. India's Central Water Commission (CWC) undertook a national water flow measurement network operating hundreds of flow measurement stations and a numerical model-based forecasting system. On

the other hand, Bangladesh's Flood Forecasting and Warning Centre (FFWC) was constrained by its dependence on data supplied from the upstream. In addition, the scale of the National River Linking Project (NRLP), encompassing 30 national river-linking projects, allowed India's structural capacity to carry out large-scale domestic water diversion schemes across regions. From an economic perspective, according to the World Bank (2024a, 2024b), India's nominal GDP reached approximately USD 3.9 trillion, while Bangladesh's stood at around USD 450 billion. Infrastructure such as dams unveiled disparity, where India had more than 5,700 large dams, while Bangladesh had a very limited number of large dams and lacked a major dam at the confluence of the river (World Bank, 2024a, 2024b).

2) Bargaining Power

Bargaining power highlighted an actor's ability to mould the outcome of negotiations through, for example, diplomatic leverage, control over the negotiation agenda, and the capacity to determine the cooperation institutional framework (Zeitoun & Warner, 2006). Due to the upstream checkpoint controls and dominance in the formulation and implementation of the treaty, India possessed greater bargaining power than Bangladesh. In fact, the water-sharing formula was based on measurements at Farakka (India), not at the entry point into Bangladesh.

3) Ideational Power

The stability of the unequal relationship – established through material and bargaining power – was reinforced by India's ideational power, as suggested by Zeitoun and Warner (2006). The GWST's document framed the water allocation as a normatively fair agreement, but hydrological control structurally remained within India. Furthermore, the steady reference to cooperation as the sharing arrangement served to neutralize the politics of power distribution imbalances. Thus, the relationship was not perceived as a dispute, but rather as routine technical management.

Institutional and Operational Mechanisms in Management of Ganges River

The institutional framework of the GWST could reflect a closed, non-sanction-based internal dispute resolution mechanism, meaning that oversight of implementation relied more on bilateral mechanisms than on formal legal enforcement instruments. The two countries established a joint committee to monitor the implementation of water sharing and submit reports to their respective governments (Government of the People's Republic of Bangladesh & Government of the Republic of India, 1996). However, the treaty text contained no provisions regarding legal sanctions in the event of distribution violations, nor did it include provisions for international arbitration or mechanisms for referral to a third party. It suggested that the transboundary management of the Ganges River did not indeed have formal monitoring and consultation mechanisms, but lacked external enforcement mechanisms. Substantively, it reinforced the character of a stable regulatory framework that remained within a power structure that was not entirely equal. Overall, the mechanisms offered stable formal cooperation, yet within the framework, the regulatory structure continued to grant greater influence to the upstream country.

Final Structure through Ganges Water Sharing Treaty

Based on an analysis of the distribution of power, institutional design, and implementation of the GWST, the structure of relations between India and Bangladesh in the

management of the Ganges River exhibited characteristics consistent with the framework of hydro-hegemony as formulated by Zeitoun and Warner (2006). This study suggests that hegemony among riparian countries was the key factor determining the level of control over water resources achieved by each country (Zeitoun & Warner, 2006). India, as the upstream country, with material advantages in the form of its upstream geographical position, controlled important infrastructure such as the Farakka Barrage, technological capacity for monitoring and hydrological modeling, and control over the production of primary data. Such advantages caused a direct impact on control over flow and water regulation within the river system.

According to Zeitoun and Warner (2006), hegemony can be defined as leadership supported by authority. On the other hand, domination is defined as leadership supported by coercion. In the case of India and Bangladesh, there was no use of coercion or overt force, military threats, or unilateral termination of bilateral agreements. Cooperation sustained to proceed steadily, and Bangladesh remained within the existing institutional framework. However, such stability existed within a structure where material and institutional control remained with the stronger party. Thus, the outcome of hegemony did not represent coercive domination, but a hegemonic form maintained through structural and institutional authority by India.

5. CONCLUSION

Based on the hydro-hegemony perspective, this study shows that the relationship between India and Bangladesh in transboundary water governance operated in an asymmetrical power structure. Geographical advantage, as the upstream country granted India the ability to influence the arrangement of water flow and distribution. In addition to geographical factor, institutional capacity and material factors strengthened such an asymmetrical relation. On the other hand, Bangladesh only had limited influence on shared water management, and it relied on data and decisions made by the upstream actor.

The findings suggest the Ganges River management between the two countries occurred within the hydro-hegemony framework. Despite sustained bilateral agreement and cooperation, the relationship was constructed by an imbalanced power structure, with control of material and institutional resources concentrated in India. Such a situation does not reflect coercive domination, instead hegemony based on structural superiority and institutional capacity. Future research shall seek other factors potentially influencing hydrological hegemony, such as domestic actors' roles, internal political changes, and climate change impacts, causing uncertainties in power distribution in transboundary water governance.

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