



**JOURNAL OF
INTERNATIONAL STUDIES**

<https://e-journal.uum.edu.my/index.php/jis>

How to cite this article:

Abdullah, M. F., Nordin, M., Abadi, A. M., Mohd Noor, A., & Mohd Huda, M. I. (2026). Water concession and hydro hegemony in Malaysia-Singapore relations: The question of sovereign rights, asymmetric interdependence and power strategies. *Journal of International Studies*, 22(1), 222-240. <https://doi.org/10.32890/jis2026.22.1.12>

**WATER CONCESSION AND HYDRO HEGEMONY
IN MALAYSIA-SINGAPORE RELATIONS:
THE QUESTION OF SOVEREIGN RIGHTS,
ASYMMETRIC INTERDEPENDENCE AND POWER STRATEGIES**

**¹Mohd Firdaus Abdullah, ²Mardiana Nordin, ³Abdul Muein Abadi,
⁴Arba'iyah Mohd Noor & ⁵Mohd Ikbal Mohd Huda**

^{1,3&5}Center for Research in History, Politics and International Affairs,
Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia, Malaysia
^{2&4}Department of History, Faculty of Arts and Social Sciences, Universiti Malaya, Malaysia

²*Corresponding author: mardiana@um.edu.my*

Received: 27/1/2025

Revised: 28/6/2025

Accepted: 10/8/2025

Published: 30/4/2026

ABSTRACT

The 1962 Water Agreement between the State of Johor and the Government of Singapore, then a British Crown Colony, has long been a source of tension in Malaysia-Singapore relations. It reflects deeper contestations over sovereign rights, asymmetric interdependence, and divergent strategic priorities. Under this agreement, Johor granted Singapore the right to extract up to 250 million gallons of raw water per day at a fixed rate of RM0.03 (SG\$0.01) per 1,000 gallons. While initially justified as a developmental concession during the decolonisation period, this rate is now widely regarded by Malaysian policymakers as economically inequitable and as undermining resource sovereignty. The issue is further complicated by Singapore's resale of treated water to Johor at RM0.50 per 1,000 gallons, significantly higher than the original rate, thereby exacerbating public dissatisfaction and highlighting the uneven terms of exchange. This study examines the political economy of water pricing concessions in Malaysia-Singapore relations through the analytical lens of hydro hegemony and cost-benefit analysis, employing a qualitative methodology based on document analysis and international case comparison. The research situates the 1962 agreement within broader discourses on transboundary water diplomacy, drawing insights from other geopolitical cases such as the Jordan River (Israel and Palestine), the Indus Waters Treaty (India and Pakistan), the Mekong River Commission, and the Great Lakes Agreement (United States and Canada). The findings indicate that Malaysia bears disproportionate economic costs due to outdated pricing structures, while Singapore retains strategic advantages through legal and infrastructural leverage. The study concludes by recommending a revision

of the bilateral framework toward a more flexible, cost-reflective, and ecologically balanced model aligned with international norms in transboundary water governance.

Keywords: Water concession, hydro-hegemony, Malaysia, Singapore, transboundary water diplomacy.

INTRODUCTION

In examining the 1962 Water Agreement between the State of Johor and the Government of Singapore, then still a British Crown Colony, it becomes immediately evident that the issue extends far beyond the technicalities of raw water pricing or routine diplomatic disagreements. While often simplistically labelled as a bilateral deal between Malaysia and Singapore, it is historically more accurate to regard it as a concession agreement between Johor and Singapore, later enshrined in federal commitments upon the formation of Malaysia in 1963. This agreement grants Singapore access to 250 million gallons of raw water per day at a fixed rate of only RM0.03 (SG\$0.01) per 1,000 gallons (Lin, 2003). At the time, thus pricing was conceived as a strategic measure to support Singapore's developmental trajectory, particularly in the face of acute water scarcity and limited domestic supply (Abdullah et al., 2024c). However, six decades later, this fixed concession rate has come under increasing scrutiny in Malaysia, where it is perceived not merely as outdated but as an ongoing economic burden and a constraint on sovereign control over natural resources.

From 1962 to 2023, estimates suggest that the cumulative financial implication of maintaining this concession amounts to RM2.379 billion, or roughly RM39 million annually—effectively a significant economic concession extended by Johor to Singapore since the inception of the agreement (Ali, 2024). As this dynamic unfolds, it is difficult to ignore the broader shifts in power relations. Former Prime Minister Mahathir Mohamad and other Malaysian leaders have repeatedly argued that the pricing formula no longer reflects present-day realities and undermines Malaysia's rights as a resource-owning country (Sharanjit Singh, 2018). On the other side, Singapore has consistently maintained that the agreement is binding under international law and remains valid until its expiry in 2061 (Chai, 2018). For Singapore, the fixed rate is not merely a matter of affordability; it is emblematic of legal continuity and national security.

The controversy deepens when we consider that Singapore not only extracts raw water from Johor but also resells treated water back to the same state at a much higher rate of RM0.50 per 1,000 gallons. Currently, Johor purchases an average of 16 million gallons per day, exceeding the original provision of 5 million gallons per day stipulated in the agreement (Chew, 2019). This significant overreliance reveals an uncomfortable dependency, calling into question the fairness of an arrangement in which the resource-rich party bears both environmental and financial costs, while the resource-poor party controls pricing and treatment infrastructure. This imbalance reinforces the public perception in Malaysia that the agreement disproportionately favours Singapore and hampers Johor's capacity to assert its own water sovereignty.

In the broader frame of international relations, such asymmetrical water arrangements are neither new nor unique. As Wolf (1998) observed in the context of the Jordan River Basin, transboundary water management is intrinsically tied to competing narratives of sovereignty and mutual necessity, requiring constant diplomatic calibration. Lowi (1993) similarly notes that agreements between resource rich and resource poor countries often give rise to tensions when their terms are not adjusted to evolving political and ecological conditions. The Malaysia–Singapore water arrangement reflects this friction, with

Malaysia, as the provider, grappling with legacy commitments and domestic dissatisfaction, while Singapore, as the beneficiary, leverages the agreement as a geopolitical tool to ensure long-term stability.

The lens of hydro hegemony, as introduced by Zeitoun and Warner (2006), offers further analytical insight. According to this framework, states with greater economic and institutional capacity often secure advantageous resource terms not through coercion alone, but through subtle forms of consent, cooptation, and narrative framing. In this case, Singapore's insistence on the sanctity of the 1962 agreement, while simultaneously expanding its treated water sales to Johor, can be interpreted as a form of hydro-hegemonic strategy. While the agreement remains legally valid, its moral and economic foundations are increasingly being questioned.

Comparative insights from other transboundary water arrangements further underscore the importance of flexibility and mutual benefit. The US-Canada International Boundary Waters Treaty, as discussed by Itay Fischhendler (2008), is often lauded for its adaptability, offering clauses that allow for renegotiation in response to shifting hydrological, economic, and political contexts. Such provisions help prevent deadlock and preserve cooperative norms. These cases suggest that long-term agreements must not only codify access but also incorporate mechanisms for adjustment, especially in the face of climate variability, rising demand, and public discontent.

This study therefore aims to examine the Malaysia-Singapore water pricing concession through the lens of international relations theory and cost benefit analysis. By situating this bilateral issue within a global context of transboundary water diplomacy, and by comparing it with other international precedents such as the Indus Waters Treaty, the Mekong River Commission, and the Great Lakes Water Quality Agreement, we seek to interrogate the legal, ecological, and political sustainability of the current arrangement. Ultimately, our objective is not only to contribute to the scholarly discourse on hydro hegemony and resource sovereignty but also to offer policy insights for renegotiating water governance in a manner that balances strategic interests, economic fairness, and ecological sustainability.

RESEARCH METHODOLOGY

In this study, we employ a qualitative approach to analyze the issue of water subsidies and the dynamics of hydro-hegemony in Malaysia-Singapore relations. This approach is chosen as it allows for an in-depth examination of sovereignty conflicts, power strategies, and the implications of the water agreement for both countries. We focus on document analysis and a review of relevant literature to understand the historical, political, and economic context of the 1962 Water Agreement. The primary sources for this study include water agreement documents, official reports from the Malaysian and Singaporean government reports, as well as academic studies published in refereed journals. We utilize historical documents, such as the text of the 1961 and 1962 Water Agreements, to examine the conditions underlying this sovereignty conflict. In addition, we analyze official statements by political leaders from both countries, including speeches and media reports, to better understand the narratives shaping public perception of this issue. This qualitative approach is further reinforced through international comparative analysis. We refer to transboundary water resource management cases such as the Indus Waters Treaty between India and Pakistan, water-related disputes in the Jordan River involving Israel and Palestine, the Mekong River Commission in Southeast Asia, and the Great Lakes Water Quality Agreement between the United States and Canada. This comparative perspective enables us to situate the Malaysia-Singapore case within a broader framework of global water governance

practices. By examining how other countries address similar challenges, we are able to assess the strengths and limitations of existing water management models.

Qualitative data analysis in this study involves three main steps. First, we evaluate the content of treaty documents and related reports to identify key themes such as power imbalances, economic implications, and ecological significance. Second, we employ hydro-hegemony theory to explain how a dominant power, such as Singapore strengthens its position through strategies supported by this agreement. This theory serves as the main framework for understanding how water subsidies reflect power imbalances and affect Malaysia's sovereignty. Third, we link these findings to international relations theory and cost-benefit analysis to explain the long-term implications for both countries. In addition, we utilize a reflective narrative approach to ensure continuity between the main themes of the study. This approach allows us to examine not only political and economic aspects, but also social and ecological impacts that are often underexplored. We also integrate a historical dimension to better understand how colonial legacies have influenced the structure of water agreements and power relations between Malaysia and Singapore. This study aims not only to understand the issue of water subsidies from a theoretical perspective, but also to propose a more sustainable and equitable solution framework. By adopting this comprehensive qualitative approach, we seek to contribute to the academic discourse on transboundary resource management, particularly in the context of Southeast Asia.

LITERATURE REVIEW

To grasp the contemporary tensions surrounding the 1962 Johor–Singapore Water Agreement, a deliberate engagement with credible historical and policy literature is necessary. The agreement was signed on 29 September 1962 between the Singapore City Council and the State Government of Johor, prior to Singapore's accession to Malaysia in September 1963, demonstrating that this is fundamentally a subnational colonial-era concession rather than a federal-level treaty. This reframing sharpens the analysis, emphasizing how infrastructural and administrative dependencies were established under late colonial governance. Academic treatments, such as Lee (2012), examine how these water concessions enabled Singapore's developmental strategy by securing long-term, low-priced raw water; however, they have often overlooked the ecological externalities imposed on Johor. Similarly, Klise (2021) confirms that Johor refrained from exercising its option for price review in 1987 and 2012, an important detail underemphasized in later policy discussions. A focused study by Ewing and Domondon (2016) bridges this gap by chronicling how Singapore's Linggiu Dam project, formally agreed in 1990, heightened perceptions of an unequal ecological burden on Johor, despite securing Johor River water entitlements. Finally, Tortajada and Pobre (2013) explore the interplay between media narratives, bilateral politics, and public sentiment, highlighting an undercurrent of nationalistic framing that further obscures objective assessments of ecological impact.

Building on this historical foundation, the present study engages with a multidisciplinary body of literature. The hydro-hegemony theory, introduced by Zeitoun and Warner (2006), serves as the main framework for understanding the power dynamics inherent in this agreement. According to this theory, dominant countries leverage their political, economic, and technological advantages to control water resources. In the context of Malaysia-Singapore relations, it explains how Singapore, as the economically stronger party, was able to benefit from the 1962 Water Agreement by securing a supply of raw water at a very low price. Conversely, Johor bears the ecological and social burden resulting from the over-exploitation of the Johor River. This power imbalance also reflects the colonial legacy, as the treaty structure favors the party with greater diplomatic and economic leverage. A study by Ewing

and Domondon (2016) highlights how the agreement affects communities in Johor that rely on the river for daily needs and economic activities. Such disparities further contribute to political tensions between Malaysia and Singapore.

From the perspective of transboundary relations, The Mekong River Commission (Ratner, 2003) and the Indus Waters Treaty between India and Pakistan (Vater, 2021) demonstrate how joint management of shared water resources can reduce conflict and promote sustainable development. The Mekong River Commission, for example, has successfully integrated ecological preservation with economic needs, while the Indus Waters Treaty includes a clause prohibiting industrial pollution of the river. Such approaches can serve as model for developing a joint management framework between Malaysia and Singapore, particularly for the protection of the Johor River catchment area. From an economic perspective, a study by Wunder (2005) on Payment for Ecosystem Services (PES) shows how this mechanism can address power imbalances while supporting resource conservation. In Costa Rica, PES has successfully ensured the sustainability of watersheds by providing financial incentives to local communities. Applied to Johor, this model could involve requiring Singapore to compensate to Johor for conservation efforts, with funds directed toward projects such as reforestation, erosion control, and reduction of industrial pollution. Additionally, studies on NEWater in Singapore by Lefebvre (2018) show how technological innovation can reduce pressure on raw water resources. By collaborating on similar technologies, Malaysia and Singapore could decrease dependence on the Johor River. This approach would not only enhance the resilience of both countries against potential water crisis but also promote the development of sustainable water management technologies.

Literature on colonial legacies, such as Mawani (2015), emphasizes that many cross-border agreements that persist today tend to favour the interests of economically and politically stronger parties. The 1962 agreement, drafted in a post-colonial context, exhibited a bias towards Singapore, often at the expense of local communities in Johor and without sufficient consideration of long-term ecological impacts. In this context, revising the agreement becomes an urgent necessity to incorporate elements of ecological conservation and fairer economic compensation. In sum, the existing literature presents a fragmented but indicative picture. While there is considerable work on the technical and legal dimensions of the 1962 agreement, there remains a paucity of integrated studies that critically examine its geopolitical, ecological, and postcolonial dimensions. By combining theoretical insights from hydro hegemony, international treaty law, ecological economics, and Southeast Asian history, this study seeks to bridge that gap. It underscores that water diplomacy must evolve beyond purely economic calculations to include historical accountability, ecological equity, and regional trust building mechanisms. Only through such a multi-layered analysis can we begin to appreciate the enduring complexity—and the potential pathways for resolution—in Malaysia-Singapore water relations.

RESULTS AND DISCUSSION

History and Dynamics of the 1962 Water Treaty

The 1962 Water Agreement between the State of Johor and the Government of Singapore, then a British Crown Colony, reflects not only the pragmatic needs of the time but also the evolving power dynamics between the two parties. In the early years of this agreement, Singapore faced significant challenges in meeting the increasing demand for water due to population growth and industrialization (Padzil, 2007; Sherard, 2019). As a country lacking substantial natural water resources, Singapore relied on a stable supply of raw water from Johor to support its economic development (Luan, 2013). Under the 1962

Water Agreement, Malaysia supplies raw water to Singapore at a fixed rate of 3 sen per 1,000 gallons, while Johor retains the right to buy back treated water from Singapore at a rate of 50 sen per 1,000 gallons (Chew, 2019). At the time, this rate was considered reasonable, however, in the following decades, it has raised major questions regarding economic justice and resource sovereignty.

When the 1962 Water Treaty was drafted, both parties were still in the early stages of development. Singapore, under the leadership of Lee Kuan Yew, viewed the agreement as a foundation for securing long-term water supplies (Tan et al., 2009). At the time, Singapore had just begun its economic transformation toward becoming a developed country (Luan, 2013), and a stable water supply was seen as essential for industrial and urban development. Johor, as Singapore's closest neighbour, was positioned as a strategic partner capable of supporting this need at minimal cost, despite previous interbasin water transfers before the independence of Malaya. This agreement represented a significant step in strengthening diplomatic relations between the two newly independent countries. Economic and political ties between Johor and Singapore were strong, with extensive cross-border cooperation in trade and transport (Abdullah, 2019). However, the fixed rate of 3 cents per 1,000 gallons of raw water did not account for inflation, operating costs, or the rapid increase in demand due to Singapore's accelerated development (Chew, 2019). While the agreement initially met the needs of both parties, it gradually revealed limitations as economic conditions and regional geopolitics evolved.

We believe Tunku Abdul Rahman, the first Prime Minister of Malaysia, viewed this agreement as a symbol of close cooperation between Malaysia and Singapore at the time. In several of his statements, the Tunku emphasized that the agreement reflected the mutual trust between the two newly formed countries (Mohamad, 2015). However, the lack of an in-depth assessment of its long-term implications for Malaysia's resource sovereignty ultimately contributed to tensions in the decades that followed. Malaysia also missed a critical opportunity to revise the agreement after the first 25-year period, in 1987, under the government of Mahathir Mohamad (Ministry of Foreign Affairs Malaysia, 2019). Based on the terms of the agreement, both countries had the right to renegotiate provisions, including pricing, yet no action was taken by Malaysia at the time. This omission allowed the original conditions to persist, which are now widely regarded as no longer reflective of current cost realities (The Straits Times, 2018). The loss of this opportunity became a key factor in Malaysia's continued adherence to an agreement structure that has generated dissatisfaction, particularly in light of the economic burden borne by Johor. Furthermore, the limited pressure from Malaysian political leaders at the time to pursue revision also contributed to the persistence of this imbalance.

One possible explanation for Malaysia's inaction in 1987 lies in its broader diplomatic and regional priorities during the late 1980s. Although Malaysia had the legal right to review raw water pricing after 25 years, no formal steps were undertaken (Dhillon, 2009). This period coincided with a pragmatic recalibration in Malaysia-Singapore relations, particularly in areas such as trade, infrastructure, and cross-border cooperation. While Kassim (1988) notes that a memorandum was reportedly signed in 1988 reaffirming the original pricing structure, official documentation on this remains limited in the public domain. This inaction may also be understood within the context of Malaysia's broader foreign policy under Prime Minister Mahathir Mohamad, who, as Saravanamuttu (2010) and Selamat and Yaacob (2018) explain, demonstrated selective assertiveness—being vocal on global issues while exercising caution in sensitive bilateral matters with neighbouring states. Political analysts such as Chong and Balakrishnan (2016) similarly suggest that Mahathir adopted a pragmatic stance towards Singapore, particularly when economic stability and regional cooperation were at stake.

Domestically, the muted response from the Johor state government, coupled with limited parliamentary and public discourse on the water agreement—as evidenced by the absence of sustained cabinet or legislative debate—suggests that water sovereignty was not prioritised at the federal level (Teik, 2003). Consequently, when the 1990 Agreement was signed, the original pricing and concessionary terms of the 1962 Agreement were effectively reaffirmed rather than renegotiated. This missed diplomatic opportunity has continued to fuel contemporary dissatisfaction over issues of resource sovereignty, ecological burden, and economic fairness (Segal, 2004). This lack of urgency was not limited to Johor. During the same period, similar patterns of neglect could be observed in the federal and state administrations of Kedah, Perlis, and Penang (Abdullah et al., 2024a; Abdullah, 2024). Despite ongoing water-sharing arrangements—such as the transboundary water supply agreement between Kedah and Perlis, and the informal understanding between Kedah and Penang regarding the use of raw water from the Muda River—there was little political initiative to formalise or renegotiate these terms (Abdullah & Mohd Noor, 2018; Abdullah et al., 2024a). The absence of binding legal frameworks, coupled with limited proactive institutional engagement, further suggests that issues of water governance and sovereignty were marginalised in both interstate and federal policy discussions. This reflects a broader pattern of reactive, rather than strategic, water diplomacy across Malaysia (Abdullah & Mohd Noor, 2018).

Figure 1

The Water Supply Map Shows the Linggiu Dam in Southern Johor, the Johor River Basin, the Pipeline System, and the Water Treatment Plants Operated by Singapore's PUB



Source. Channel News Asia. (n.d.). *Singapore and Malaysia: The water issue* (Graphic by Rafael Estrada). June 27, 2025. <https://infographics.channelnewsasia.com/interactive/waterissue/index.html>

The 1962 Water Agreement also illustrates the asymmetric dependency relationship between Malaysia and Singapore. Malaysia, as the source country, serves as the primary supplier of raw water, while Singapore acts as both consumer and processor (Winnebeck et al., 2023). This dependence places Singapore in a strategic position, enabling it to control the treatment and distribution of water. Under the structure of the agreement, Johor is granted the right to purchase treated water from Singapore at a rate of 50 sen per 1,000 gallons (Fujii & Ray, 2021). Although this rate was initially regarded as fair compensation, it has become increasingly disproportionate over time as production costs have risen and Singapore has derived additional economic value from the sale of treated water.

The concept of hydro-hegemony (Zeitoun & Warner, 2006) provides a useful lens for understanding this dynamic. Resource-dependent states, such as Singapore, often leverage their influence to ensure that resource agreements remain favourable to them. In this case, Singapore maintains a low pricing structure for raw water while selling treated water at a higher rate. This dependency not only affects Johor's economy but also contributes to local discontent, as communities perceive that their natural resources are being disproportionately utilized for external benefit. From Singapore's perspective, however, the agreement is viewed as a strategic necessity for ensuring water security. The island nation has invested heavily in water infrastructure, including desalination plants and NEWater technology, to reduce reliance on external sources (Chew et al., 2021). Nevertheless, supplies from Johor remain a critical component of Singapore's overall water security strategy, underscoring the continued importance of the agreement in shaping bilateral relations between the two countries.

Although the rate of RM0.50 per 1,000 gallons of treated water from Singapore may appear high compared to the RM0.03 for raw water, Johor in fact continues to derive significant economic benefit from the arrangement. Johor purchases an average of 16 million gallons of treated water per day from Singapore, at an estimated annual cost of approximately RM180,000 (Tham, 2024). This translates to an effective price of about RM0.11 per cubic metre, substantially lower than the domestic cost of water treatment, which is estimated at around RM1.80 per cubic metre (Choy, 2024). This considerable disparity between purchase price and production cost explains why Johor remains reliant on Singapore's treated water, despite ongoing political and public concerns over sovereignty and perceived inequality.

This price differential illustrates that, while the RM0.50 rate may seem disproportionate on the surface, it reflects the added value of water treatment, including energy costs, chemical use, plant maintenance, and efficient distribution management. From a comparative economic standpoint, Johor continues to benefit from a favourable concession, even as the agreement remains politically contentious. However, the long-term dependence on an external source raises strategic concerns regarding Johor's water security. In response, the Johor state government introduced the "Zero Dependency on Singapore" initiative in 2020, aimed at reducing reliance through the construction of new treatment plants, more sustainable management of domestic water sources, and the adoption of cost efficient treatment technologies (Shadiqe, 2025). While these measures are crucial for strengthening resource sovereignty and resilience, they require substantial investment and robust institutional capacity to be effectively realised. Therefore, this issue should not be viewed solely through the lens of pricing, but rather as part of a deeper structural imbalance embedded within a long-term transnational agreement. By considering the actual costs of water treatment, the implicit cross-subsidisation, and the urgent need for reform grounded in principles of equity and sustainability, this discussion reframes the broader narrative surrounding rights, responsibilities, and collaboration in the management of shared water resources.

Over time, this agreement has become a point of contention in Malaysia-Singapore relations. Mahathir Mohamad's stance has consistently emphasized issues of economic injustice and Malaysia's sovereign

right over its water resources. He has argued that the fixed price of 3 cents is no longer relevant and should be renegotiated to reflect current cost realities. Mahathir views the agreement as an example of the need for Malaysia to assert its economic rights in cross-border relations (Ali, 2024). On the other hand, Singaporean leaders have firmly adhered to the principle of international law that agreements, once signed, must be respected. Singapore has consistently maintained that the 1962 Water Agreement remains legally valid and that any attempt to renegotiate it could introduce instability into bilateral relations (Chai, 2018). This position reflects Singapore's broader approach of safeguarding its strategic and economic stability through firm and consistent diplomacy.

These tensions became more pronounced as the issue of the reselling of treated water to Johor gained attention (Abdullah, 2009). While Singapore uses revenue from treated water sales to offset operational costs, this practice is perceived by Malaysia as an exploitation of Johor's water resources (Leong, 2024). This dynamic mirrors patterns observed in other transboundary water arrangements, where asymmetric dependence often generates dissatisfaction and calls for renegotiation. At the domestic level, local leaders have frequently urged the federal government to reconsider the terms of the agreement, particularly with regard to the pricing of raw water supplied by Johor. However, these concerns are often overshadowed by broader national political considerations. The effects of this imbalance are felt most directly by local communities in Johor, where limited reinvestment in water infrastructure further exacerbates existing challenges. Consequently, this issue has increasingly been mobilised by local political actors as a means of pressuring the central government to pursue revisions to the agreement.

Economic and Socioeconomic Analysis of the 1962 Water Agreement

The management of water resources between Malaysia and Singapore following the 1962 Water Agreement illustrates the complex power dynamics underpinning their bilateral relationship (Devlaeminck, 2024). Water governance in Johor involves layered controls with significant implications for sovereignty, economic justice, and ecological development. The administration of raw water distribution from Johor to Singapore encompasses three interrelated aspects: the pricing concession for raw water, the resale of treated water, and Singapore's long-term water security strategy (Kesavapany, 2024). Under the 1962 Water Agreement—signed between the State of Johor and the Government of Singapore prior to Singapore's accession to the Federation of Malaysia in 1963—raw water was sold at a fixed rate of 3 cents per 1,000 gallons. At the time, this pricing was considered fair and appropriate within the context of postcolonial development and regional cooperation (Fuji & Ray, 2021). However, after more than six decades, this rate no longer reflects current economic realities. Malaysia, and Johor in particular, has borne a significant economic burden as a result of this fixed pricing structure. The rising costs of operating and maintaining water infrastructure present an ongoing challenge for Johor. Without adequate economic returns, Johor faces constraints in reinvesting in essential facilities, such as water treatment plants (Salim, 2024). This situation is further exacerbated by limited external investment, which could otherwise help improve the efficiency and sustainability of local water systems.

Conversely, Malaysia's failure to revise water prices within the first 25 years of the agreement reflects a strategic weakness that has afforded Singapore a long-term advantage. Mahathir Mohamad has repeatedly criticised the water agreement as outdated and unreflective of current economic realities. He has argued that its terms are unfair to Malaysia and do not align with contemporary financial or infrastructural demands. Commenting on the broader context of international agreements, Mahathir remarked, "Well, international agreements have been broken before. I have seen people go to war even, which is not by agreement." This statement underscores his pragmatic view that agreements, while

binding, are not immutable and may be reconsidered as circumstances evolve. For Mahathir, renegotiating the water agreement is essential to achieving a fairer and more sustainable arrangement that benefits both Malaysia and Singapore while reflecting present-day economic conditions (Ministry of Information, Communications and the Arts Singapore, n. d). Although Singapore bears significant processing costs, the substantial disparity between the price of raw and treated water points to a deep economic imbalance. Singapore maintains that technologies such as NEWater and desalination plants have enabled efficient water processing (Silva & Martínez Omaña, 2023). While this provides Singapore with a strategic advantage, Johor continues to face challenges in securing treated water at comparatively high prices.

For Singapore, the agreement forms a cornerstone of its national water security strategy. By relying on a stable supply of raw water from Johor, Singapore is able to ensure the reliability of its water supply at relatively low cost (Kog, 2020). At the same time, sustained investments in desalination and water recycling technologies allow it to gradually reduce dependence on external water sources (Yeniçeri & Yeniçeri, 2023). Water security remains a critical component of Singapore's economic and defense planning, with the country aiming to achieve near water self-sufficiency by 2060 through technological innovation (Fujii & Ray, 2021). The position of leaders such as Goh Chok Tong further illustrates how Singapore prioritizes strategic stability in this domain. In a speech in 2002, he emphasized that "Any breach of the Water Agreements would also call into question the Separation Agreement, and undermine our very existence." This statement highlights that, for Singapore, this agreement extends beyond an economic arrangement and constitutes a vital element of its national strategy.

In the geopolitical context of Southeast Asia, the 1962 Water Agreement can be compared to other forms of transboundary water resource management, such as the Mekong River Commission (MRC). The initiative involves Thailand, Laos, Vietnam, and Cambodia, working collaboratively to ensure sustainable water governance (Jacobs, 2002). Despite various challenges, this model demonstrates how regional cooperation can serve as an effective diplomatic tool. Malaysia and Singapore could draw from the MRC approach to foster more equitable cooperation in water management. Such efforts might include joint initiatives in the development of desalination technologies or water recycling systems that benefit both countries. In addition, the views of local stakeholders should also be given greater consideration. Community leaders, for instance, have frequently highlighted the need to improve access to clean water in rural areas. Incorporating these views is important to ensure that any renegotiation of the agreement benefits not only the central government but also the communities most directly affected. The lack of reinvestment in local water infrastructure has further intensified this dissatisfaction. Inequities in resource distribution not only affect the local economy but also generate enduring social pressures. Local residents have often voiced their dissatisfaction with both state and central governments, which are perceived as failing to adequately safeguard their interests in negotiations with Singapore. Despite its significance, this perspective is frequently underrepresented in national discourse, even though it has a direct impact on the well-being of communities in Johor. By situating this issue within the broader context of transboundary water management in Southeast Asia, it becomes evident that a more sustainable and inclusive approach is needed. Regional cooperation that draws on best practices from neighbouring countries may offer a viable pathway toward resolving long-standing conflicts, while ensuring more equitable outcomes for affected communities.

Theoretical Perspectives and International Comparisons: Evaluating the 1962 Water Treaty between Malaysia and Singapore

Hydro-hegemony theory provides a useful framework for understanding how a dominant power such as Singapore maintains a strategic advantage through the control of water resources (Zeitoun & Warner, 2006). In the context of the 1962 Water Treaty, Singapore has demonstrated the capacity to leverage political, technological, and economic influence to strengthen its position as a primary beneficiary (Goh, 2003). The fixed price of raw water at 3 cents per 1,000 gallons, which has remained unchanged for over six decades, illustrates how elements of power operate to sustain this imbalance. This advantage has been reinforced through a combination of technological innovation and diplomatic strategy. For instance, advancements in water desalination and recycling technologies, such as NEWater, have enabled Singapore to reduce its dependence on Johor. A report by the Public Utilities Board (PUB) notes that control over water sources constitutes "the basis of the country's strategic stability" (Vincent et al., 2014). Singapore not only relies on the agreement but also invests heavily in infrastructure that enhances its water autonomy. This capacity allows it to minimize the risk of supply disruptions while maintaining a beneficial economic relationship with Malaysia.

Malaysia's inability to revise the agreement in 1987 further strengthened Singapore's position. This reflects how the diplomatic limitations and reliance on legacy agreements can constrain Malaysia within an unfavourable structural arrangement (Ministry of Foreign Affairs Malaysia, 2019). From a hydro-hegemonic perspective, this imbalance extends beyond the national level and has tangible effects on local communities, influencing their social and economic development. For example, disruptions in water supply in rural areas of Johor not only affect agricultural productivity but also contribute to the rural-urban migration, placing greater economic pressure on the remaining population. This introduces a social dimension that is often underexplored in discussions of the agreement. This theory also highlights how colonial and post-colonial structures continue to shape diplomatic relations between the two countries. Singapore's proactive approach has enabled it to consolidate its authority over water resources, while Malaysia's comparatively reactive stance has contributed to a widening economic disparity between the resource-providing region (Johor) and the beneficiary state (Singapore).

From a cost-benefit perspective, the 1962 Water Treaty reveals a critical economic dimension. For Singapore, the low price of raw water reduces operating costs and provides a significant economic advantage. These implicit subsidies enable Singapore to allocate resources toward the development of technologies such as NEWater, which in turn strengthens its economic competitiveness (Lide, 2016). NEWater, which contributes over 30% of the country's water supply, demonstrates how Singapore has leveraged these advantages to develop sustainable alternatives, thereby reinforcing its position as a regional economic powerhouse (Chew et al., 2021). From Malaysia's perspective, however, the costs appear to outweigh the benefits. Revenue generated from the sale of raw water remains insufficient to cover the expenses associated with maintaining water infrastructure in Johor. At the same time, local users are required to purchase treated water from Singapore at 50 cents per 1,000 gallons, further increasing the economic burden. This creates a structural economic dilemma, in which the outcomes of the agreement are perceived as offering limited direct benefit to local communities (Rosli, 2023).

In a broader cost-benefit assessment, geopolitical considerations must also be taken into account. Singapore has utilized the 1962 Water Treaty as a mechanism for maintaining diplomatic stability with Malaysia. The strong trade relationship between the two countries indicates that Singapore relies on Malaysia not only for water but also for food, raw materials, and labour (Aftab & Rehman, 2017). However, Malaysia does not appear to benefit proportionately, particularly given Johor's role as the

primary source without a corresponding compensation mechanism for local communities. This analysis can be further strengthened through the inclusion of comparative statistical data, particularly on the total cost of maintaining water resources in Johor relative to the revenue derived from the agreement. For instance, reports indicate that the Malaysian government allocated RM206.8 million for water infrastructure development in Johor, while revenues from the agreement cover only a fraction of these costs (Malay Mail, 2024). This disparity highlights the extent to which the agreement no longer aligns with current economic realities. By foregrounding these social and economic dimensions, cost-benefit analysis underscores the need for a more equitable revision of the agreement.

International examples, such as the water agreements between the United States and Canada, demonstrate how compensation mechanisms and bilateral cooperation can generate more comprehensive benefits for both parties (Ek & Fergusson, 2015). By drawing on such approaches, Malaysia could strengthen its diplomatic position while ensuring that the economic interests of communities in Johor are better protected. The water dispute in the Jordan River basin, involving Israel and Palestine, provides another useful point of comparison to the 1962 Water Treaty. In this case, Israel, as the dominant power, has utilized control over the Jordan River as a geopolitical tool to secure strategic advantage (Kusuma & Hawaril, 2015). Similar to Singapore, Israel has developed sophisticated infrastructure to manage water resources and ensure adequate supply for domestic and agricultural use. However, this case also underscores the importance of more equitable water diplomacy. Mechanisms such as the Joint Water Committee (JWC) were established to facilitate more balanced resource sharing, although their effectiveness remains contested (Selby, 2013). Malaysia and Singapore could adopt a similar model by establishing a joint committee to manage water resources more equitably and reduce bilateral tensions. Moreover, the Israeli-Palestinian experience highlights the importance of incorporating the perspective of directly affected communities—an aspect that remains less developed in the Johor-Singapore context.

The Indus Waters Treaty of 1960 between India and Pakistan offers another relevant example (Gupta, 1960). This agreement provides a structured framework for sharing the resources of the Indus River, while recognizing the needs and sovereign rights of both parties (Sarfaz, 2013). In the Malaysia-Singapore context, similar challenges arise when calls for revision are met with resistance. Notably, the Indus framework includes mechanisms for dispute resolution, such as international arbitration—an option that Malaysia could consider to reduce tensions and promote greater fairness in water resource governance. Such mechanisms not only facilitate conflict resolution but also provide legal safeguards for less advantaged parties in negotiations.

In addition, the cooperation between the United States and Canada in the management of the Great Lakes provides a flexible and equitable model. Both countries established the International Joint Commission (IJC) to oversee water resource management and resolve disputes through diplomatic means. This mechanism enables both parties to benefit while preserving their respective sovereignty. Malaysia and Singapore could draw from this model by establishing an independent body responsible for joint water governance. An institution similar to the IJC could promote greater transparency and facilitate more balanced resolutions on issues such as water pricing and subsidies (Clamen & Macfarlane, 2015). Furthermore, the involvement of international bodies as observers or arbitrators could enhance the credibility of the renegotiation process, while reducing the risk of disputes that might strain bilateral relations. Such an approach offers a constructive pathway to address the structural imbalances embedded in the 1962 Water Treaty, while ensuring that benefits are more equitably distributed between both parties. Finally, situating this issue within the broader context of transboundary water management in Southeast Asia—particularly through reference frameworks such as the Mekong

River Commission—can help expand the scope of water diplomacy. This broader perspective supports the development of a more inclusive, cooperative and sustainable approach to managing shared water resources.

Economic-Ecological Balance: An Analysis of Malaysia-Singapore Transboundary Water Conservation

Balancing economic needs with ecological preservation remains a central challenge in the management of the Johor River basin, which lies at the core of the cross-border relationship between Malaysia and Singapore (Pak, 2020). This river not only supplies raw water for domestic and commercial use but also plays an important role in sustaining the ecological balance of the Johor region. However, the prioritisation of economic development has often come at the expense of environmental conservation. Addressing these challenges requires a reflective approach that integrates theoretical perspectives, international comparisons, and practical solutions to achieve a more sustainable balance.

For example, the tragedy of the commons theory explains how unregulated resource exploitation can lead to long-term environmental decline. In the context of the Johor River, high water demand from Singapore has, at times, placed pressure on the sustainable capacity of the river basin (Tan et al., 2009). This strain not only affects the ecosystem but also diminishes the river's ability to support aquatic life. The situation is further exacerbated by the absence of sufficiently effective regulatory mechanisms. Malaysia, particularly Johor, has not received a commensurate level of compensation or investment to support the restoration of affected catchment areas (n. a., 2019). In this regard, the imbalance of power between Malaysia and Singapore emerges as a central concern. Singapore, as the more economically advanced state, has been able to utilize these water resources to support its economic growth, while Johor continues to bear the associated ecological and social costs.

One potential solution is the implementation of a Payment for Ecosystem Services (PES) mechanism (Salzman et al., 2018). Under this approach, Singapore could provide compensation to Johor to ensure the protection and sustainable management of the Johor River catchment area. Such compensation could be directed toward conservation initiatives, including reforestation, erosion control, and the reduction of industrial pollution. A successful example of PES implementation can be observed in Costa Rica, where local communities receive financial incentives to maintain forest catchments. This model not only promotes ecological sustainability but also enhances the livelihoods of local residents (Rosendal & Schei, 2014). In Johor, a PES framework could be implemented through collaboration among the state government, local communities, and non-governmental organizations. Industries in Johor could also be encouraged to contribute to conservation funds, creating shared responsibility for safeguarding water resources and maintaining the ecosystem.

Further lessons can be drawn from other transboundary river management models, such as the Mekong River Commission and the Indus Waters Treaty. The Mekong River Commission, for instance, fosters cooperation among five Southeast Asian countries to ensure that economic development does not come at the expense of ecological preservation. Its success lies in the shared responsibilities and benefits of sustainable river management (Ha, 2011). In the context of the Johor River, this approach could inspire a framework that integrates ecological protection with economic interests. Malaysia and Singapore could establish a joint body to manage the river's resources, ensuring fair compensation for conservation efforts and promoting investment in green technologies.

The water agreement between India and Pakistan under the Indus Waters Treaty also provides valuable lessons. The treaty includes an ecological protection clause that ensures river resources are not polluted by industrial activities (Jamir, 2016). A similar approach could be adapted for the Malaysia and Singapore agreement by incorporating a specific clause to preserve and restore the Johor River catchment area. Currently, the Malaysia-Singapore agreement prioritizes economic aspects and water supply while largely overlooking ecological conservation. In light of this imbalance, there is an urgent need to revise the agreement to reflect more equitable ecological, economic, and social considerations. Since its signing, the agreement has bound Malaysia—particularly Johor—to a low raw water price that does not account for inflation or the actual costs Johor incurs to maintain its water catchment area. In contrast, treated water resold by Singapore can reach up to 15 times the original price, underscoring a significant economic disparity. This situation not only imposes a financial burden on the Johor community but also places increasing pressure on the Johor River ecosystem.

Revising the water agreement should place ecological conservation at its core. One key step would be to include an ecological protection clause that bans the discharge of industrial waste into the river and limits water withdrawal rates to ensure long-term sustainability. Singapore could also be required to provide compensation to Johor for catchment protection, with funds directed toward projects such as reforestation, erosion control, and green infrastructure development. Lessons from the Mekong River Commission in Southeast Asia further illustrate how countries with different interests can cooperate to protect and manage water resources. This model highlights the importance of data sharing and collaborative efforts to preserve ecosystems while meeting economic needs (Campbell, 2016). For Malaysia and Singapore, adopting a similar mechanism could foster more inclusive cooperation, involving not only government agencies but also local communities and non-governmental organizations.

The 1962 agreement, like many others established in the post-colonial context, did not adequately account for the needs of local ecosystems or communities (Adams & Mulligan, 2003). Colonial power structures which prioritised economic interests, have left a legacy of imbalance that continues to contribute to present-day tensions. In reassessing the agreement, it is essential to incorporate a historical perspective to better understand how these colonial legacies shaped its structure and to identify pathways for reform. Such a framework should incorporate the voices of local communities, including fishermen and farmers in the downstream areas of the Johor River, who are often most affected by resource exploitation. Studies indicate that these communities possess valuable knowledge of local ecosystems and can serve as important partners in conservation efforts. Their inclusion would also help ensure that social and economic justice is upheld, thereby reducing social tensions arising from perceived imbalances in the agreement.

The revision of the water agreement should also incorporate more flexible mechanisms to address future challenges. Changing climate patterns and rising water demand necessitate a dynamic approach in resource management (Tan et al., 2015). For example, periodic reviews of water extraction rates, along with pricing adjustments aligned with ecological conditions, could promote more sustainable governance. Technological innovation can also play an important role. Singapore, known for innovations such as NEWater, could collaborate with Malaysia to advance systems that reduce reliance on raw water from the Johor River (Stefanakis, 2019). Such initiatives would not only alleviate pressure on the river basin but also enhance the resilience of both countries in the face of future water challenges.

CONCLUSION

This study examines the issue of water concession pricing and the dynamics of hydro-hegemony in Malaysia–Singapore relations, with particular focus on asymmetric interdependence, disputes over sovereign rights, and the broader economic and ecological implications of the 1962 Water Agreement. The central argument advanced is that the 1962 Water Treaty, established in a post-colonial context, reflects a significant power imbalance and is no longer well-suited to addressing contemporary ecological and socioeconomic challenges. The structure of the agreement not only reinforces Singapore's dominant position but also imposes considerable implications for Malaysia, particularly the state of Johor.

This study further demonstrates how hydro-hegemony theory explains the strategies employed by dominant actors, such as Singapore, in securing access to water resources under favourable terms. It highlights that this imbalance has had substantial economic consequences for Johor, including social burdens and uncompensated conservation costs. At the same time, ecological pressures arising from the over-exploitation of the Johor River basin have contributed to declining biodiversity, increased pollution, and degradation of catchment areas.

The approach advanced in this study advocates for reforming the agreement by incorporating elements of ecological protection and economic compensation mechanisms, such as Payment for Ecosystem Services (PES). This mechanism can help balance economic and conservation priorities while fostering greater cooperation between Malaysia and Singapore. Comparisons with international models demonstrate that fair and sustainable transboundary resource management can be achieved through more inclusive and adaptive forms of collaboration.

This study contributes to the academic literature by integrating theoretical analysis, historical perspectives, and international comparisons to develop a more comprehensive understanding of transboundary water resource management. The findings underscore the urgent need to revise the 1962 Water Treaty so that it better reflects current realities and future challenges, including climate change, ecological pressures, and the needs of local communities.

Furthermore, this study highlights the broader geopolitical implications of water concession arrangements and hydro-hegemony in shaping regional diplomacy and power asymmetries. The issue extends beyond a bilateral concern between Malaysia and Singapore, reflecting wider challenges in cross-border resource governance in Southeast Asia. As member states of ASEAN, Malaysia-Singapore relations are closely linked to regional stability. Prolonged tensions over water agreements may generate spillover effects, potentially influencing regional cooperation in other critical sectors such as energy and food security. In this context, the pursuit of inclusive and sustainable solutions not only has the potential to improve bilateral relations but also to strengthen ASEAN solidarity in addressing increasingly complex resource challenges.

In conclusion, this study not only interrogates the dynamics of water concession pricing and hydro-hegemony, but also proposes actionable policy frameworks aimed at reconciling sovereign rights and economic interests with long-term ecological sustainability and regional stability. Reforming this agreement is essential not only important for improving Malaysia-Singapore diplomatic relations, but also for safeguarding the ecosystem of the Johor River basin and ensuring justice for affected communities. By integrating historical, ecological, and socioeconomic dimensions, this study offers a comprehensive analytical framework and practical insights for addressing transboundary resource management challenges in Southeast Asia.

ACKNOWLEDGMENT

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

- Abdullah, K. (2019). Johor in Malaysia-Singapore relations. In *Across the causeway: A multi-dimensional study of Malaysia-Singapore relations*. Institute of Southeast Asian Studies.
- Abdullah, M. F., & Mohd Noor, A. (2018). Kerjasama Kedah dan Perlis dalam pembangunan sistem bekalan air domestik di negeri Perlis, 1969-1978. *JEBAT: Malaysian Journal of History, Politics & Strategy*, 45(1), 56-78.
- Abdullah, M. F. (2024). Sustainable Development Goals (SDGs) through the water treaty between Kedah and Perlis (1971-1999): Implications for water resource management and equitable resource sharing in Malaysia and globally. *Thammasat Review*, 27(2), 197-224.
- Abdullah, M. F., Mohd Noor, A., Chee Seng, T., & Wan Ibrahim, W. K. (2024a). The water war between Kedah-Penang in Malaysia: The relation in the management of Sungai Muda raw water, 1965–1985. *Geopolitics Quarterly*, 20(2), 151-170.
- Abdullah, M. F., Wan Ibrahim, W. K., Mohd Noor, A., Mohamed Hassan, N., Ali, I., & Mohamad Yasid, A. F. (2024b). Water architecture in Malaysia: A case study in Penang, 1957-1985. *Journal of Sustainability Science and Management*, 19(7), 23-38.
- Abdullah, M. F., Padzil, R., & Nordin, M. (2024c). The impact of inter-basin water transfer between Johor and Singapore on Johor's water supply system, 1927 to 1941. *MANUSYA: Journal of Humanities*, 27(1), 1-22.
- Adams, W. B., & Mulligan, M. (2003). *Decolonizing nature: Strategies for conservation in a post-colonial era*. Routledge.
- Aftab, M., & Rehman, I. U. (2017). Exchange rate risk and the bilateral trade between Malaysia and Singapore. *Studies in Economics and Finance*, 34(3), 407-426.
- Ali, F. S. (2024, Julai 12). "Jual air 3 sen kepada Singapura hingga kiamat' - Tun Mahathir," *Sinar Harian*. <https://www.sinarharian.com.my/article/674700/berita/nasional/jual-air-3-sen-kepada-singapura-hingga-kiamat---tun-mahathir>
- Campbell, I. C. (2016). Integrated management in the Mekong River Basin. *Ecohydrology & Hydrobiology*, 16(4), 255-262.
- Chai, T. S. H. (2018). Singapore and Malaysia's water deal: The thorny issue of price revisited. *The News Lens*. <https://international.thenewslens.com/article/100407>.
- Channel News Asia. (n.d.). Singapore and Malaysia: The water issue (Graphic by Rafael Estrada). *Channel News Asia*. <https://infographics.channelnewsasia.com/interactive/waterissue/index.html>
- Chang, J. H. Y. (2003). Culture, state and economic development in Singapore. *Journal of Contemporary Asia*, 33(1), 85-105.
- Choy N. Y. (2024, June 28). Price of raw water sold to S'pore unchanged, as M'sia still needs treated water from city state- deputy minister. *The Edge Malaysia*. <https://theedgemaalaysia.com/node/736180>
- Chew, M. Y., Watanabe, C., & Tou, Y. (2021). The challenges in Singapore NWater development: Co-evolutionary development for innovation and industry evolution. *Technology in Society*, 33(3-4), 200-211.

- Chew, V. (2019). Singapore-Malaysia water agreements. *Singapore Infopedia*. <https://www.nlb.gov.sg/main/article-detail?cmsuuiid=6b60db0e-95f5-4656-95e1-b1081ff83044>
- Chong, A., & Balakrishnan, K. S. (2016). Intellectual iconoclasm as modernizing foreign policy: The cases of Mahathir bin Mohamad and Lee Kuan Yew. *The Pacific Review*, 29(2), 235-258.
- Clamen, M., & Macfarlane, D. (2015). The International Joint Commission, water levels, and transboundary governance in the Great Lakes. *Review of Policy Research*, 32(1), 40-59.
- Devlaeminck, D. J. (2024). Perspectives and prospects for International Water Law in the ASEAN region: Is there an ASEAN way to transboundary Water Cooperation under International Law? *Journal of Current Southeast Asian Affairs*, 1-23.
- Dhillon, K. S. (2009). *Malaysian foreign policy in the Mahathir era, 1981-2003: Dilemmas of development*. NUS Press.
- Ek, C., & Fergusson, I. F. (2015). Canada-US relations. *Current Politics and Economics of the United States, Canada and Mexico*, 17(1), 73.
- Ewing, J., & Domondon, K. (2016). Drought, pollution and Johor's growing water needs. *Perspective: Yusof Ishak Institute*, 47, 1-10.
- Fischhendler, I. (2008). When ambiguity in treaty design becomes destructive: A study of transboundary water. *Global Environmental Politics*, 8(1), 111-136.
- Fujii, T., & Ray, R. (2021). *Singapore as a sustainable city: Past, present, and the future*. Routledge.
- Goh, K. C. (2003). Water supply in Singapore: Challenges and choices. *Greener Management Internasional*, 42, 77-86.
- Govt allocates RM2.068m for water infrastructure development in Johor. (2024, July 13). *Malay Mail*. https://www.malaymail.com/news/malaysia/2024/07/13/govt-allocates-rm2068m-for-water-infrastructure-development-in-johor/143609#google_vignette
- Gupta, S. (1960). The Indus Waters Treaty. *Foreign Affairs Reports*, 9, 153-15.
- Ha, M. L. (2011). The role of regional institutions in sustainable development: A review of the Mekong River Commission's first 15 years. *Consilience*, 5, 125-140.
- Isu air: Rakyat Johor perlu berjuang – Dr Mahathir. (2019, February 28). *Sinar Harian*. https://www.sinarharian.com.my/article/15523/berita/nasional/isu-air-rakyat-johor-perlu-berjuang---dr-mahathir#google_vignette
- Jacobs, J. W. (2002). The Mekong River Commission: Transboundary water resources planning and regional security. *Geographical Journal*, 168(4), 354-364.
- Jamir, O. (2016). Understanding India-Pakistan water politics since the signing of the Indus Water Treaty. *Water Policy*, 18(5), 1070-1087.
- Kassim, I. (1988, June 29). PM Lee, Mahathir satisfied with outcome of talks. *Straits Times*, 18.
- Kesavapany, K. (2024). *Singapore's foreign relations with Malaysia*. Singapore: Foreign Policy, Governance and Leadership.
- Klise, F. (2021). *Singapore-Malaysia water conflict*. Spring.
- Kog, Y. C. (2020). Water reclamation and reuse in Singapore. *Journal of Environmental Engineering*, 146(4), 03120001.
- Kusuma, B. M. A., & Hawaril, M. Y. (2015). The water security management and its influence towards inter-state conflict in the Middle East Region. *Jurnal Manajemen Dakwah*, 1(2), 163-178.
- Lee, P. O. (Ed.). (2012). *Water issues in Southeast Asia: Present trends and future direction*. Institute of Southeast Asian Studies.
- Lefebvre, O. (2018). Beyond NEWater: An insight into Singapore's water reuse prospects. *Current Opinion in Environmental Science & Health*, 2, 26-31.
- Leong, C. (2024). Policy note: Mental accounts and water prices. *Water Economics and Policy*, 10(02), 2371002.
- Lidé, S. (2016). *Water management strategy (Singapore)*. Routledge.

- Lin, C. L. (2003). Singapore's troubled relations with Malaysia: A Singapore perspective. *Southeast Asian Affairs*, 2003(1), 259-274.
- Lowi, M. R. (1993). Bridging the divide: Transboundary resource disputes and the case of West Bank water. *International security*, 18(1), 113-138.
- Luan, I. O. B. (2013). Singapore water management policies and practices. *Asian Perspectives on Water Policy*, 101-116.
- Mawani, R. (2015). Law and colonialism: Legacies and lineages. In *The handbook of law and society, Chapter 27*, pp.417-432. <https://doi.org/10.1002/9781118701430.ch27>
- Ministry of Foreign Affairs, Malaysia. (2019, March 12). "Press release: Issue of the 1962 Johor River Water Agreement with Singapore," Official Portal, Ministry of Foreign Affairs, Malaysia. <https://www.kln.gov.my/web/guest/-/siaran-akhbar-isu-perjanjian-air-sungai-johor-1962-dengan-singapura>
- Ministry of Information, Communications and the Arts, Singapore. (n.d.). *Water talks? If only it could*. Singapore: Ministry of Information, Communications and the Arts.
- Mohamad, K. (2015). *Malaysia-Singapore: Fifty years of contentions 1965-2015*. The Other Press.
- Padzil, R. (2007). An analysis on Johor-Singapore water issue: Supply and demand. *JATI-Journal of Southeast Asian Studies*, 12, 55-69.
- Pak, H. Y. (2020). *An assessment of river water quality: Case study of Johor River basin, Malaysia*. [Unpublished master's thesis]. Nanyang Technological University, Singapore.
- Rosendal, G. K., & Schei, P. J. (2014). How may REDD+ affect the practical, legal and institutional framework for 'Payment for ecosystem services' in Costa Rica? *Ecosystem Services*, 9, 75-82.
- Ratner, B. D. (2003). The politics of regional governance in the Mekong River Basin. *Global Change, Peace & Security*, 15(1), 59-76.
- Rosli, F. A. (2023, November 1). Kenapa babitkan Singapura dalam kaji selidik air di Johor? *Berita Harian*. https://www.bharian.com.my/berita/nasional/2023/11/1171920/kenapa-babitkan-singapura-dalam-kaji-selidik-air-di-johor#google_vignette
- Salim, S. (2024, May 30). Malaysia-Singapore water pact: Time to revisit the agreement? *The Edge Malaysia*. <https://theedgemalaysia.com/node/713622>
- Salzman, J., Bennett, G., Carroll, N., Goldstein, A., & Jenkins, M. (2018). The global status and trends of payments for ecosystem services. *Nature Sustainability*, 1(3), 136-144.
- Saravanamuttu, J. (2010). *Malaysia's foreign policy, the first fifty years: Alignment, neutralism, Islamism*. Institute of Southeast Asian.
- Sarfraz, H. (2013). Revisiting the 1960 Indus waters treaty. *Water Internasional*, 38(2), 204-216.
- Shadiqe, J. (2025, March 9). Johor's RM5bil water plan to cut Singapore dependency by 2030. *New Straits Times*. <https://www.nst.com.my/news/nation/2025/03/1185889/johors-rm5bil-water-plan-cut-singapore-dependency-2030>
- Segal, D. (2004). *Singapore's water trade with Malaysia and alternatives*. Harvard University.
- Selamat, A., & Yacob, S. (2018). Ucapan kontroversi "Anti-semitik," 2003: Pendirian sebenar Tun Dr Mahathir. *Jurnal Peradaban*, 11(1), 62-85.
- Selby, J. (2013). Cooperation, domination and colonisation: The Israeli-Palestinian joint water committee. *Water alternatives*, 6(1), 124.
- Sharanjit Singh. (2018, November 12). Malaysia, Singapore ready to revisit 1962 Water Agreement. *Berita Harian*. https://www.bharian.com.my/berita/nasional/2018/11/497344/malaysia-singapura-sedia-bincang-semula-perjanjian-air-1962#google_vignette
- Sherard, J. (2019). The murky waters of treaty law: The 1962 Malaysia-Singapore Water Agreement. *Singapore Comparative Law Review*, 106, 106-115.

- Silva, J. A., & Martínez Omaña, M. C. (2023). Comparative study of drinking water management in Mexico City and Singapore. *Management of Environmental Quality: An International Journal*, 34(2), 308-330.
- Stefanakis, A. I. (2019). The role of constructed wetlands as green infrastructure for sustainable urban water management. *Sustainability*, 11(24), 6981.
- Tan, M. L., Ibrahim, A. L., Yusop, Z., Duan, Z., & Ling, L. (2015). Impacts of land-use and climate variability on hydrological components in the Johor River basin, Malaysia. *Hydrological Sciences Journal*, 60(5), 873-889.
- Tan, Y. S., Lee, T. J., & Tan, K. (2009). *Clean, green and blue: Singapore's journey towards environmental and water sustainability*. Institute of Southeast Asian Studies.
- Teik, K. B. (2003). *Beyond Mahathir: Malaysian politics and its discontents*. Zed Books.
- Tham, L. (2024, December 2). No renegotiation of raw water rates with S'pore for now, says ministry. *Free Malaysia Today*. <https://www.freemalaysiatoday.com/category/nation/2024/12/02/no-renegotiation-of-raw-water-rates-with-spore-for-now-says-ministry>
- The Straits Times. (2018, June 26). Singapore, Malaysia must comply fully with 1962 Water Agreement provisions. *The Straits Times*. <https://www.nationthailand.com/international/30348629>
- Tortajada, C., & Pobre, K. (2013). The Singapore–Malaysia water relationship: An analysis of the media perspectives. In *Asian perspectives on water policy* (pp. 13-37). Routledge.
- Vater, J. J. (2021). *The Indus Waters Treaty: Prospects for India-Pakistan peace*. Institute of South Asian Studies.
- Vincent, L., Michel, L., Catherine, C., & Pauline, R. (2014). The energy cost of water independence: the case of Singapore. *Water Science and Technology*, 70(5), 787-794.
- Wolf, A. T. (1998). Hydrostrategic decision making and the Arab-Israeli conflict. *Yale F&ES Bulletin*, 103, 221-273.
- Winnebeck, J., Sutter, O., Hermann, A., Antweiler, C., & Conermann, S. (2023). The analytical concept of asymmetrical dependency. *Journal of Global Slavery*, 8(1), 1-59.
- Wunder, S. (2005). *Payments for environmental services: Some nuts and bolts*. Cifor.
- Yeniçeri, M., & Yeniçeri, K. T. (2023). Recycling wastewater with membrane technology and the case of Singapore. *Bitlis Eren Üniversitesi Fen Bilimleri Dergisi*, 12(2), 478-484.
- Zeitoun, M., & Warner, J. (2006). Hydro-hegemony—a framework for analysis of trans-boundary water conflicts. *Water Policy*, 8(5), 435-460.