

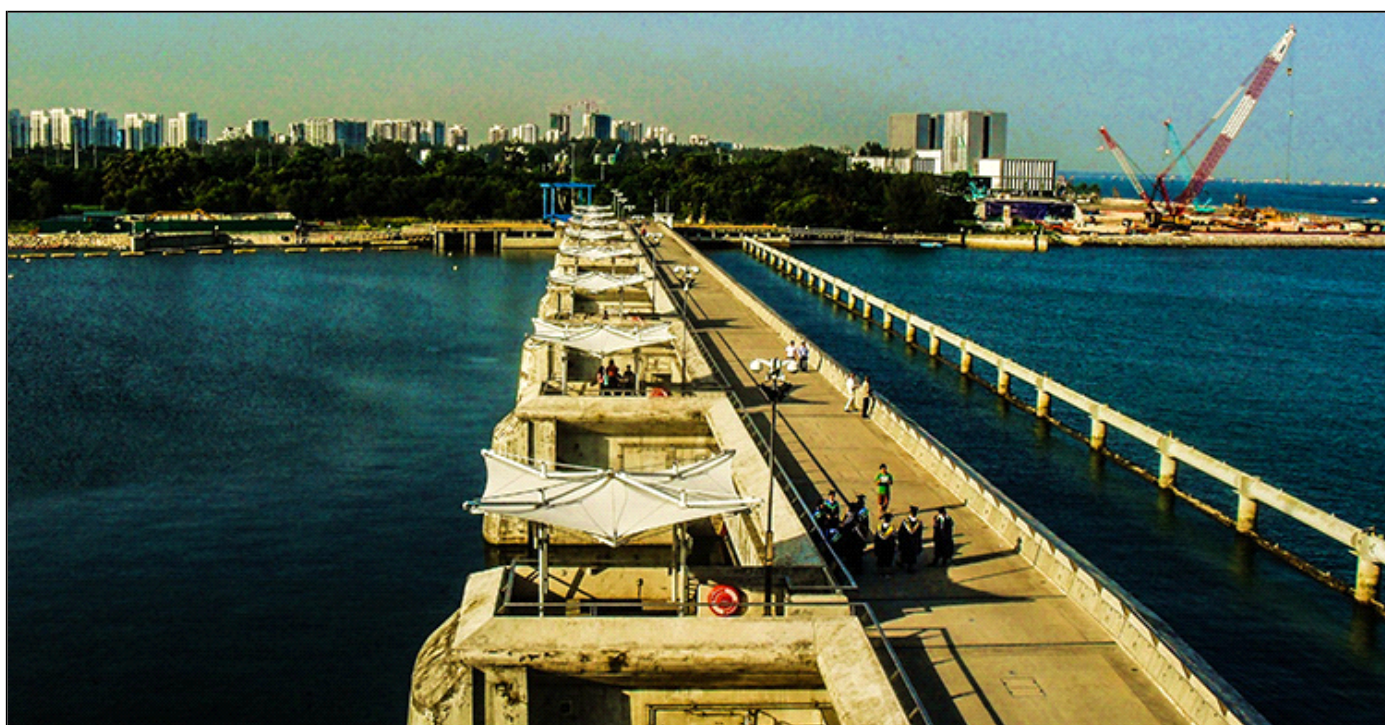
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Will rapid development in Johor impact water access, quality or price in Singapore?

Johor's growth has been both rapid and encompassing, and includes evolving trends in demographic, industrial, transportation and social spheres. Such growth raises significant questions for Singapore, which currently relies on Johor for 40 per cent of its water needs. What is the impact of the transformation now underway in Johor on the future capacity and willingness of the state to continue supplying water to Singapore? This NTS Insight explores the stresses on water availability in Johor, and argues that these, together with increasing politicisation of water within Malaysia itself, could potentially be critical for Singapore-Johor water relations. This is part of a series exploring the changing Singapore-Johor relationship in the sectors of freshwater, air and maritime ecosystems.

By Pau Khan Khup Hangzo and J. Jackson Ewing



Singapore's Marina Barrage, opened in 2010, is capable of meeting about 10 per cent of the country's water demand. Efforts such as this have enabled Singapore to increase its local water sources. Nevertheless, water imports from Johor remain an essential component of its water security.

Credit: P.K. Hangzo / RSIS Centre for NTS Studies.

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Introduction

Johor, Malaysia's southernmost state, has been experiencing phenomenal economic growth in recent years. This is both a reflection of Malaysia's impressive national economic growth as well as Johor's dynamic relationship with Singapore, its neighbour to the south. While Johor's growth has positive aspects on both sides of the border, there are also a number of questions about how rapid development in the state might affect the quantity, quality and price at which water is supplied to Singapore in the future. While Singapore has famously reduced its dependency on water imports from Johor through technological development and strategic planning, such imports continue to constitute a significant portion of Singapore's water supply.

- Consortium of NTS Studies in Asia Website
- RSIS Centre for NTS Studies Website

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This NTS Insight thus investigates the potential impacts of Johor's economic growth and the attendant social changes on future water supply to Singapore. It first provides a snapshot of the Singapore-Johor water relationship alongside Johor's rapid development, emphasising its origins, drivers and primary characteristics. It then explores how these developments relate to the water resources upon which Singapore currently depends, from both quantity and quality perspectives. The article concludes with an analysis of the wider relationship between Johor and Singapore – both as partners and competitors – and presents guiding questions for future thinking on how they can manage resources and further economic integration.

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History of Singapore-Malaysia water relations

Singapore's small geographical area and lack of rivers and groundwater have made securing water from Malaysia a necessity. The needed water transfers are facilitated through two water agreements, one signed in 1961 and another in 1962. The 1961 agreement gave Singapore

drawing rights of up to 391 million litres per day (mld) until 2011 from the Tebrau and Skudai Rivers in Johor. The 1962 agreement allows Singapore to draw up to 1,136 mld from the Johor River until 2060 through two key facilities, the Linggiu Reservoir and the Johor River Water Works (JRWW).¹ Singapore is to pay RM0.03 for every 1,000 gallons of water supplied under the two agreements.

The Linggiu Reservoir and the JRWW are located near Kota Tinggi in eastern Johor and are managed by Singapore's Public Utilities Board (PUB). The reservoir was created by building a dam across a tributary of the Johor River, as agreed under a supplementary agreement signed in 1990, and has been in operation since 25 January 1995.² Raw water drawn from the reservoir is channelled to the three water treatment plants that make up the JRWW. Together, these plants provide a total output of 1,136 mld of water as stipulated under the 1962 agreement, and the treated water is then supplied to Singapore via pipelines.³

Despite these clear signs of functional cooperation, water has been at various junctures a major irritant in relations between the two countries, with Malaysia arguing that the treaties favour Singapore.⁴ Veiled threats by Malaysia to the effect that it would cut off the supply of water or repudiate the water agreements were not uncommon; particularly when relations became strained along other fronts. This rhetoric and the asymmetrically dependent relationship caused Singapore to become increasingly concerned about its water supply, to a degree that affected a host of diplomatic, political and security policies.

One response that began in earnest during the 1970s was Singapore's multipronged effort towards water diversification. The island state invested significantly in technologies and systems for converting wastewater and seawater into usable forms and improving catchment storage. The results are impressive: treated wastewater (named NEWater) now accounts for 30 per cent of Singapore's total freshwater needs and desalinated water 10 per cent; and Singapore's water catchment area has increased to two-thirds of the country's land surface (from 11 per cent in 1970).⁵ Each of these domestic sources continues to grow.⁶ As a result of these efforts, Singapore has been able to reduce its reliance on Malaysian imports. Today, roughly 40 per cent of Singapore's water needs are met by water from Malaysia, compared to 80 per cent at the time of independence in 1965.⁷ Significantly, when the 1961 agreement expired on 31 August 2011, Singapore decided against its renewal and has handed over two water treatment plants in Skudai and Gunung Pulai and two water pumps in Tebrau and Pontian to Johor.⁸

While Singapore has set a target for water self-sufficiency by 2061,⁹ which is not farfetched given the current pace of technological innovations, there are a number of factors that could potentially affect its existing water imports from Johor during the intervening period. The following section discusses these factors in turn, and presents questions about their possible cumulative effects.

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Johor's rapid economic development and implications for water resources

Johor is bounded by the states of Malacca, Negeri Sembilan and Pahang to the north, the South China Sea to the east, the Straits of Johor (and Singapore) to the south, and the Straits of Malacca to the west. With a population of 3.4 million as of 2010,¹⁰ it is Malaysia's second-most populous state after Selangor. Johor's economy grew at 9.3 per cent in 2010 and its gross domestic product (GDP) of RM53,197 million is behind only Selangor¹¹ and the Federal Territory of Kuala Lumpur.¹² The state has traditionally been a major producer of agricultural commodities. Johor accounted for 28 per cent of the total oil palm planted in Peninsular Malaysia in 2011 (the largest share among states in Peninsular Malaysia).¹³ It is also a significant producer of rubber, pineapples, coconuts, cocoa and coffee.¹⁴

The most pronounced developments in Johor are in its southern region, along Singapore's immediate periphery. A fall in commodity prices during the 1980s prompted the state government to diversify Johor's economy by enhancing the industrial sector to generate jobs and income; and there was growing recognition of the potential of south Johor as a major economic corridor that could fuel not only state but also national economic progress.

To this end, the Iskandar Development Region was launched by the Sultan of Johor in November 2006. Later named Iskandar Malaysia, the special zone covers an area of 2,217 sq km, roughly three times the size of Singapore, and is modelled after China's Pearl River Delta Economic Zone, the most economically dynamic region of the Chinese mainland since the launch of economic reforms in 1979. The zone focuses on nine priority sectors, three of which are industrial (electronics, petrochemical, food/agro processing) and six service-based (logistics, tourism, health services, education services, finance, information and communications technology (ICT) and creative). Iskandar Malaysia seeks to capitalise on its synergies with Singapore – with the two locations complementing each other as one integrated economic hub. The zone has already been hailed as a success. Between 2006 and 31 March 2013, it registered cumulative committed investments totalling RM111.37 billion, of which 40.2 per cent has been realised.¹⁵ Manufacturing recorded the highest cumulative committed investment at RM35.33 billion, followed by petrochemicals and oleo-chemicals (RM5.95 billion) and logistics (RM4.43 billion).¹⁶

Yet the potential implications of these developments on Johor's water resources are not yet fully understood. As is the case with much of Malaysia, Johor is relatively water-abundant, receiving an average annual rainfall of 1,778mm per year.¹⁷ The state is also graced by numerous rivers flowing in multiple directions from a central mountainous area.¹⁸ Not only is the state self-sufficient in water, it is also a key supplier to Singapore and Malacca. However, trends suggest that water usage in the state is on the cusp of expanding substantially, and in ways that may have implications for Singapore. Besides increasing water demand, growing threats of river pollution from rapid development, and increasing politicisation of water could further complicate matters. These factors are further compounded by seasonal dry spells and the general lack of water conservation efforts, each of which the next section discusses in greater detail. In concert, these factors are relevant to the future cross-strait water relationship and the prices, quantity and quality of Singapore's water imports.

Rising demand for water

Demand for water in Johor comes from the entire range of sectors – domestic, industrial, commercial and institutional – and is increasing alongside population growth and economic development. Johor's 2010 population of 3.4 million is projected to increase to as much as 5 million in 2030.¹⁹ Consequently, water demand is also projected to increase from 1,506.48 mld in 2010 to 2,280.37 mld in 2030 and 2,715.78 mld in 2050.²⁰

The largest growth (in terms of volume) in water demand is expected to come from the district of Johor Bahru, from 817.93 mld in 2010 to 1,561.40 mld in 2050.²¹ This is unsurprising as more than 44 per cent of Johor's population reside there. Johor Bahru is the most developed district in Johor and forms a major portion of fast-developing Iskandar Malaysia. Johor's ability to meet this growing demand for water alongside its water export commitments (to Singapore and Malacca) is an important question.²² As the economic transformation in Iskandar Malaysia spreads out to other parts of Johor, competition for water may become more intense.

Increasing water pollution

Water quality monitoring of 464 rivers nationwide undertaken by Malaysia's Department of Environment in 2011 showed that 32.3 per cent were 'slightly polluted' and 8.4 per cent 'polluted' (59.3 per cent of the rivers were 'clean').²³ As water uses increase across multiple sectors, surface water pollution grows as a concern for Johor and its water export recipients. Major sources of pollution include improper discharge from sewage treatment plants, agro-based factories, livestock farming, land clearing and domestic sewage, much of which is linked to Johor's primary sources of economic revenue and can lead to significant pollution.



Rapid economic development in Johor, particularly in the Iskandar Malaysia zone, could result in increased competition over the state's water resources and could affect Singapore's water imports.

Credit: Calvin Teo.

In 2008, 14 out of 21 rivers in Iskandar Malaysia had moderate pollution levels while 5 rivers (Pandan, Plentong, Sebulung, Sengkuang and Tampoi) in the Tebrau catchment exhibited more serious pollution.²⁴ One river in the Pasir Gudang catchment experienced severe pollution 'most likely caused by industrial and development activities'.²⁵ As pollution worsens, the cost of water treatment has gone up, placing new strains on the government. With urbanisation increasing, runoff from urban areas may lead to large amounts of heavy metals entering the water, soil and air through various pathways. Growth in industrial activity and transportation trends in bustling Johor Bahru will further exacerbate the pollution threats.

Inefficient usage

Beyond pollution, inefficient water usage could also impact the quantity and quality of water available for export from Johor, particularly during dry seasons. Malaysia receives one of the world's highest annual rainfall volumes per hectare, the bulk of which occurs from December to March, with June to September experiencing dryer conditions.²⁶ With 97 per cent of Malaysia's water needs dependent on surface water fed by precipitation, prolonged dry spells are a persistent concern.²⁷

Johor, for its part, has faced seasonal dry spells that have led to reduced water levels at rivers and dams, and insufficient water supply to its population. As a result, the state has at times had to resort to water rationing. In 2010, more than 500,000 people in the districts of Batu Pahat and Kluang were affected by measures such as provision of water supply for only 12 hours a day or 24 hours of water supply alternating with 24 hours of dry taps.²⁸ The state government also undertook cloud seeding around water catchment areas and dams in an effort to increase water levels.²⁹ Such experiences have led some commentators to question Johor's continued sale of water to Singapore.³⁰ It is unclear to what degree 2010's stresses were outlier events, but growing demand will certainly make water allocation challenges more acute.

The lack of consumer water efficiency and conservation in Malaysia further complicates the water situation. Malaysia reportedly has the highest water usage in ASEAN, with a daily water consumption of 280 litres compared to 155 litres in Singapore, 175 litres in the Philippines and 130 litres in Indonesia.³¹ A Domestic Water Consumption Study undertaken by the Federation of Malaysian Consumers Associations (FOMCA) and the Ministry of Energy, Green Technology and Water between 2007 and 2010 found high instances of water leaks and wastage in Malaysian households.³² The study observed that of the 1,792 households that were investigated across Malaysia, 70 per cent did not have dual-flush systems, and more than 70 per cent did not use rainwater or recycled water (such as water from the last rinse of clothes) to flush toilets. Also, 80 per cent of households did not collect rainwater for gardening, nor did they use watering cans or hoses with controlled heads. There is little indication that these trends will change.

One reason for the continued lack of consumer water efficiency in Malaysia is that water is relatively cheap for consumers due to government subsidies. The price of water is such that the current rate imposed on the people is not more than 5 per cent of their disposable income and is much lower than their electricity bill.³³ There have been calls, such as from the Malaysian Water Association (MWA), to increase current water tariffs in order to promote water sustainability.³⁴

It is important to note that Johor has arguably the highest water tariffs among Malaysian states following a 59 per cent hike in 2010. As of 2012, the tariff for the first 20 cubic metres of water stood at RM0.60 per cubic metre. However, some quarters have called for Johor to emulate Selangor, where charges for the first 20 cubic metres of water (used by households) have been waived since the 2008 elections. Table 1 shows water prices for Johor and Selangor, and demonstrates the higher overall rates levied in the former. Analysis following this figure argues that this may have future political implications.

Table 1: Water rates for Johor and Selangor, 2012.

Category	Rates	
	Johor	Selangor
Domestic water	<ul style="list-style-type: none"> ● 0–20 cubic metres @ RM0.60/cubic metre ● >20–35 cubic metres @ RM1.65/cubic metre ● >35 cubic metres @ RM2.96/cubic metre 	<ul style="list-style-type: none"> ● 0–20 cubic metres @ RM0.57/cubic metre ● >20–35 cubic metres @ RM1.03/cubic metre ● >35 cubic metres @ RM2.00/cubic metre
Commercial water	<ul style="list-style-type: none"> ● 0–35 cubic metres @ RM2.60/cubic metre ● >35 cubic metres @ RM2.96/cubic metre 	<ul style="list-style-type: none"> ● 0–35 cubic metres @ RM2.07/cubic metre ● >35 cubic metres @ RM2.28/cubic metre

Source: Suruhanjaya Perkhidmatan Air Negara (SPAN), 'Water rates 2012', 2012, accessed 31 July 2013, http://www.span.gov.my/index.php?option=com_content&view=article&id=529&Itemid=424&lang=en

Politicisation of water

As Johor's voting constituency grows and the state becomes more influential politically, water could become a major battleground for political parties. The case of Selangor illustrates how water can lead to state-federal government rivalry and friction among various political parties. Selangor is Malaysia's richest and most populous state with more than 2 million voters and as such is a centre of competition for the country's major political actors, which have used water issues to entice voters in the past. During the 2008 general election, the opposition coalition, Pakatan Rakyat, promised 20 cubic metres of free water to each household and went on to win the election.³⁵ The ruling coalition, Barisan Nasional, in its bid to reclaim Selangor from Pakatan Rakyat made a similar pledge during the 2013 general election, promising free water to those registered with the MyKasih (Love My Neighbourhood) programme.³⁶

The politicisation of water in Selangor is in many ways a result of the complex management structure of the Malaysian water sector which is characterised by multiple players. In the case of Selangor, a private company, Syarikat Bekalan Air Selangor Sdn Bhd (SYABAS), was tasked in 2004 with managing and supplying water to Selangor for 30 years.³⁷ It is however alleged that its parent company, and hence SYABAS, has close ties with Barisan Nasional,³⁸ and that the party is using its ostensible influence over water management to realise strategic advantages. The water supply disruption that affected the Klang Valley in 2012 was seen in this vein by some and framed as an instance of 'political sabotage' orchestrated by SYABAS against Selangor's Pakatan Rakyat-led government.³⁹ SYABAS however argued that the water crisis was caused by a prolonged dry spell which caused water levels at reservoirs to decrease.

To address this and other recurring water supply problems, SYABAS and the federal government suggested the construction of the Langat 2 water treatment plant and also an increase in water tariffs. The Selangor government however accused SYABAS of 'manufacturing' a crisis⁴⁰ and opposed both the plan for a water treatment plant and an increase in water tariffs, a potential political landmine for the government. It instead called for existing infrastructure to be upgraded and made another bid to seize control of SYABAS through a takeover bid of RM9.65 billion in February 2013.⁴¹ The case of Selangor shows how politics and the lack of a unified regulatory structure can affect water supply even when a country is relatively water-rich. The stalemate over water issues in Selangor not only affected domestic users but has also reportedly resulted in the withdrawal of more than 100 companies with a potential to create 25,000 jobs.⁴²

Although water issues in Johor are not currently as politicised as those in Selangor, with the state possibly becoming Malaysia's richest state by 2025,⁴³ and with the projected increase in the state's population, water's significance as a political issue could increase. If the recently concluded 13th Malaysian General Election is any indication, party politics and elections in Johor have become increasingly competitive and relevant to national political trends.⁴⁴ Although Barisan Nasional, the ruling coalition, retained control of the state, a number of opposition parties made significant gains. And as is the case in Selangor, increasing pressure on water resources could lead to tensions and conflicts among users resulting in water becoming a major political issue, one that could potentially influence the course of future elections. Singapore's continued purchase of water from Johor at the comparatively low existing rates therefore could become a rallying point for political parties trying to score political points.

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Conclusion: Implications for Singapore



The Johor River meets about 40 per cent of Singapore's water needs and remains the most cost-efficient source of water. Increasing demand and competition for water in Johor could however lead to an increase in the prices currently paid by Singapore for water from the river.

Credit: Peter in s.

Despite the agreement between Prime Minister Lee Hsien Loong of Singapore and Prime Minister Najib Tun Abdul Razak of Malaysia in February 2013 to honour the terms of the 1962 water agreement and implement the 'necessary measures to ensure reliable water supply from the Johor River',⁴⁵ as the preceding section has shown, there are a number of factors that could change the water status quo. If such factors materialise, the first shift would most likely be in water pricing.

Water prices have long been a 'chief bilateral issue',⁴⁶ and at times a thorn in relations between Malaysia and Singapore. Malaysian leaders have stated that the 1961 and 1962 water agreements priced water at a level that is 'too low and unrealistic'.⁴⁷ Malaysia's National Economic Action Council (NEAC) asked in July 2003, 'Can any person on this earth, in this day and age, truthfully say that 3 Malaysian sen – or 1.4 Singapore cents or 0.8 US cent – is a fair price to pay for 1,000 gallons of water?'⁴⁸ The central issue for Malaysia therefore is attaining a fair price, and various prices have been floated, from RM0.60 to RM6.25 for every 1,000 gallons of raw water.⁴⁹

Singapore countered that the prices it pays are agreed mutually upon and are legalised under the two water agreements and the Separation Agreement of 7 August 1965. Singapore reasoned that 'international law and the sanctity of treaties voluntarily entered into by governments are the foundation of inter-state relations' and must be adhered to.⁵⁰ As a small country, and most importantly, as the less water-secure party in comparison with Malaysia, Singapore suggests that the law is its 'only protection',⁵¹ and perceives that its very existence as an independent sovereign nation 'depends on such agreements being honoured'.⁵²

It is important however to note that Singapore has not always opposed an increase in the price of water outright. During talks between Senior Minister Lee Kuan Yew and Prime Minister Mahathir Mohamad in September 2001, for instance, Singapore made a counter-offer of RM0.45 per 1,000 gallons of water to Malaysia's proposed RM0.60 for the same amount of water.⁵³ The key issue for the country is how any price revision is realised. In the end, however, Malaysia and Singapore could not agree on a fair price or the appropriate methodology for discovering one. Partly as a result of this, Malaysia and Singapore are currently compelled to abide by the original price of RM0.03 per 1,000 gallons of water.

However, the developments in Johor call into question whether the water relationship can remain on an even keel into the coming years and decades. Concerns have already been raised over the 'inconsistent' rates at which Johor sells its water to Malacca (RM0.30 per 1,000 gallons) and Singapore.⁵⁴ This had prompted former Malaysian Prime Minister Mahathir Mohamad to comment that Johor seemed to be 'less generous towards Malacca than it is towards a foreign country'.⁵⁵ Furthermore, the practice of selling raw water to Singapore at RM0.03 per 1,000 gallons and then buying back treated water from Singapore at RM0.50 is also prompting suggestions that it should extract better terms.

Johor is not likely to increase domestic water tariffs in the near future given the likelihood of a political backlash should it do so. The state may in fact go the other direction towards further subsidising water. Already, Barisan Nasional has extended its 2013 election promises of free water to those registered with the MyKasih programme to Johor.⁵⁶ Barisan Nasional's success in the recent general elections could lead to further efforts to renegotiate water rates with Singapore as a means of mitigating domestic subsidy costs.

Singapore's own population and consumption growth could also play an important role in determining the future course of cooperation between itself and Johor. As of June 2012, Singapore's total population is estimated at 5.31 million.⁵⁷ This is projected to increase to between 5.8 million and 6 million by 2020 and could reach between 6.5 and 6.9 million by 2030. Consequently, water demand, which stood at 1,727 mld in 2010 is expected to double in the next 50 years, with about 70 per cent of the demand coming from non-domestic sectors such as industry.⁵⁸

Although Singapore has attempted to meet the water needs of this growing population by ramping up local sources of water and through conservation, its capacity to sufficiently meet its growing water requirements domestically remains to be seen and is tied closely to energy costs. Water recycling, treatment and particularly desalination are energy intensive, and rising energy costs thus present a key water challenge for Singapore. Some have gone so far as to suggest that Singapore has translated its dependence on water into a dependence on energy.⁵⁹ This may make continuing water imports from Johor more attractive at a time when Johor's capacity to meet Singaporean demands is becoming less certain.

It is therefore prudent for Singapore to prepare for scenarios whereby Malaysia again pushes for an increase in the price of water flowing from Johor. Given the realities in Johor, it is important to question whether Singapore's longstanding argument that 'international law and the sanctity of treaties voluntarily entered into by governments are the foundation of inter-state relations' will continue to carry the necessary weight. More specifically, it is important to work out mechanisms to manage the cross-strait relationship surrounding the price of water, and prevent it from becoming an area of pronounced disagreement between Singapore and Malaysia.

Even in the face of uncertainties, Johor continues to gravitate towards Singapore as a source of investment, and symbiotic cross-strait opportunities are expanding. This is largely in line with greater Malaysian interest in strong relations with its Singaporean neighbour and the emergence of Johor as a growth engine for the country. However, water issues present a case in which Malaysian federal and state interests do not squarely align, and political forces in Malaysia that are critical of Singapore's cheap access to Johor's water – particularly in comparison to the rates paid by Malacca – will likely gather steam as the issue of water becomes more prominent in the future.

Responding to this situation will require regulatory diligence and clear-minded diplomacy by authorities in Johor and Singapore as well as Kuala Lumpur. Specifically, it is in Singapore's interest to continue its collaboration with Malaysia on water management issues given its continued dependence on Johor for part of its water supply and its considerable experience in the area of water management. Such collaboration may come in the form of investment in cleaner industrial practices, efforts to help Johor reduce its household water consumption, and inputs that can bolster catchment management and mitigate river pollution. Regardless of the specific mechanisms used, it is important that such resource protection and management efforts do not fall victim to the rush for economic growth. If this occurs, such growth might undermine the very cross-strait relations that it calls upon and attempts to strengthen.

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