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From water insecurity to niche water diplomacy: The Singapore experience

Singapore's water diplomacy has long centred on engaging Malaysia, which it has historically relied on for its freshwater supply. Singapore however recognised fairly early on the insecurity inherent in the asymmetrical dependence on Malaysia, with the result that it invested heavily in developing water technologies. This NTS Insight argues that its success in this area has in turn enabled it to develop its particular brand of niche water diplomacy, giving it the wherewithal to exercise considerable influence on international water issues and allowing it to contribute to global water security.

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Singapore has transformed itself from a water-scarce country to a global leader in water management and water-related technologies.
Credit: chensiyuan / Wikimedia Commons.

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Introduction

Water diplomacy is usually examined with reference to relations between and among states on the issue of transboundary rivers. Much less attention, however, has been given to the study of how states with limited water resources and no shared rivers employ diplomacy to ensure adequate supply of water for their people and for economic development. This paper examines the Singapore experience for the insights it yields on the practice of diplomacy under conditions of long-term water resource scarcity.

Singapore's water-related diplomatic efforts in the early years revolved around its bilateral agreements with Malaysia. However, over the years, the forms and functions of its water diplomacy have evolved immensely. This NTS Insight reviews how Singapore has been able to transform its weakness – its extreme water insecurity – into a strength by leveraging on technology. With its success in developing and implementing advanced water solutions, it has in effect turned the tables, from being in a position of relative weakness at the water negotiating table, to being a supplier of water-related expertise to other water-stressed countries.

Website

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Indeed, Singapore is now an internationally recognised name in the global water community. By drawing on its water expertise, the city-state has positioned itself as being able to help provide this increasingly important global public good. This has in turn allowed it to project its capability and influence in the international arena. In effect, then, this NTS Insight argues that Singapore's edge in water technology and management has enabled it to develop capacity in niche water diplomacy.

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The practice of water diplomacy

Water diplomacy is typically discussed as diplomacy 'applied to bilateral and multilateral negotiations on water issues between and among states' (Hefny, 2011:20). The literature on water diplomacy tends to focus on transboundary waters, of which rivers are the most prominent. When transboundary rivers cross political boundaries, their management is much more complex and contentious, with the potential to trigger armed conflicts. Within that context, the aim of water diplomacy is to secure the equitable use of shared waters and defuse tensions among riparian states. Water diplomacy is therefore an important tool for managing shared water resources among states in a manner that is politically sustainable.

As a country with limited natural water resources, water diplomacy is also important to Singapore. However, because the context under which it conducts such diplomacy differs – it does not have any transboundary rivers – the concerns and emphases of its water diplomacy diverge in some ways from that described in the literature. Issues of equity of access assume less importance than issues of continued water availability and access. For Singapore, water is seen in terms of national survival. The possibility is there that its supply of water from Malaysia could be completely cut off. This is unlike in the case of transboundary waters, where it is not that easy to completely stop the natural flow of rivers. This context has led Singapore's water diplomacy to outcomes different from those in transboundary water cases.

The practice of water diplomacy in Singapore is discussed in the next three sections, which describe three distinct phases in Singapore's response to water issues. In navigating through the three phases, it will be seen that the Singapore water diplomacy story is one of transformation, from a focus on bilateral diplomacy in order to ensure long-term water availability, to the emergence of niche water diplomacy predicated on Singapore's proven capabilities in water management.

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Phase I: Singapore's water diplomacy in the early years

With its small geographical area of just 714.3 sq km (Department of Statistics Singapore, 2012) and its low-lying topography, Singapore is devoid of any significant rivers. Also, it does not have much groundwater as its soils are clogged, tight and compact, resulting in a low rate of absorption of rainwater (Dobby, 1940). Singapore thus has very limited natural water resources despite an annual rainfall of 2,497mm, one of the highest in the world (figure is for 2009; see World Bank, 2012). Securing water from other sources is thus a necessity. It is to be expected then that the country's water diplomacy in its early years revolved around securing long-term water supply from Malaysia.

At the time of its independence in 1965, Singapore had two water agreements with the southern Malaysian state of Johor. These agreements were signed in 1961 and 1962 respectively. The 1961 agreement allowed Singapore to purchase up to 86 million gallons per day (mgd) at 3 sen for every 1,000 gallons up till 2011. The 1962 agreement allowed Singapore to draw up to 250mgd at the same price through two key facilities in Johor up till 2060. Singapore was in turn required to provide Johor with a daily supply of treated water equivalent to 12 per cent of the raw water it purchases at a price of 50 sen per 1,000 gallons. These treaties were the cornerstone of Singapore's water security and their significance can be gauged from the fact that, in 1965, water imported from Malaysia accounted for 80 per cent of Singapore's freshwater supply (Chowdhury, 2009).

On Singapore's independence from Malaysia, both countries agreed to continue to honour the water agreements. This understanding was subsequently codified in the Separation Agreement of 7 August 1965. The Agreement stated that 'the Government of Singapore shall guarantee that the Public Utilities Board of Singapore shall on and after Singapore Day abide by the terms and conditions of the Water Agreements dated 1st September, 1961, and 29th September, 1962, entered into between the City Council of Singapore and the Government of the State of Johore' (UN, 1966: Annex B, para. 14). It further stated that 'the Government of Malaysia shall guarantee that the Government of the State of Johore will on and after Singapore Day also abide by the terms and conditions of the said two Water Agreements' (UN, 1966: Annex B, para. 14).

In subsequent years, however, the agreements became a major irritant in relations between the two countries, becoming the 'chief bilateral issue' (Smith, 2004). According to several accounts, Malaysia perceived the water agreements to be inequitable (Ming, 2009). In explaining Malaysia's growing discontent, S. Jayakumar, Foreign Minister of Singapore from 1994 to 2004, noted that Malaysia viewed the two water agreements, drawn up by the British as Singapore was about to join Malaysia, as 'favourable' to Singapore (Jayakumar, 2011).

In 2002, Malaysia proposed raising the price of water to as much as RM3 per 1,000 gallons (Habib, 2002), arguing that the price of water under the two agreements was 'too low and unrealistic' (Said, 2003). To Singapore, such a move represented a violation of the Separation Agreement and it argued strenuously against it. As the weaker party with respect to the water agreements with Malaysia, Singapore feared that if it did not object to Malaysia's unilateral proposal to raise the price of water, an unhealthy precedent could be set. It argued that 'being legalistic is not a matter of choice', and that, as a small country, the law is its 'only protection' (Singapore Ministry of Information, Communications and the Arts, quoted in NEAC, 2003). It emphasised that its very existence as an independent sovereign nation 'depends on such agreements being honoured' (Singapore launches, 2003). Singapore was adamant 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 (Singapore launches, 2003).

Water negotiations between the two countries from the late 1980s to the early 2000s were often accompanied by veiled threats that Malaysia would cut off the supply of water or repudiate the water agreements. Such assertions, regardless of whether they were meant for domestic posturing, nonetheless caused great concern to Singapore as they represented a potential water security risk. It is however important to note that despite the rhetoric of using military force, of unilaterally increasing the price of water, or of turning off the taps, none of these actions materialised. Although Malaysia was increasingly dissatisfied with the water agreements, it continued to honour them. A possible reason for this could be that Malaysia and Singapore were, and continue to be, enmeshed in a symbiotic relationship. Both countries are bound by a common history as well as deep and long-standing ties in all areas – political, security, socio-cultural and economic – evident in the fact that the two countries are each other's top trading partner with bilateral trade estimated at SGD112 billion in 2011, up from SGD106.7 billion in 2010 (IE Singapore, 2012).

Nevertheless, Singapore continued to regard water security as a critical national issue. It was fully aware that Malaysia's own water use would increase and that this would put pressure on Malaysia's capacity and willingness to supply water to Singapore in the future. And in fact, in 2002, Malaysia, in order to safeguard its own water needs, contemplated enacting laws that could potentially supersede the two water supply agreements with Singapore. It proposed that Johor could determine the amount of water it needed, supplying only surplus water to Singapore (Toh, 2002). In recent years, rapid economic development in Johor – it is projected to become the richest state in Malaysia by 2025 (Johor is to emerge, 2012) – has made it highly likely that Johor's water needs will rise significantly. Anticipation of factors such as these increased Singapore's insecurity over long-term water supply from Malaysia, and prompted the city-state to undertake a concerted effort to develop alternative sources of water, a policy initiative that has had great success, as the following section demonstrates.

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Phase II: Singapore's drive towards self-sufficiency and its emergence as a global hydrohub

NEWater or recycled waste-water is used mainly by industries and now meets 30 per cent of Singapore's freshwater demand.

Credit: kewl / flickr.

Singapore's water insecurity – its water scarcity and heavy reliance on Malaysia – led it to seek to diversify its sources of water supply. Its first water master-plan was drawn up in 1972. In 1974, it developed a pilot plant to turn waste-water into potable water (PUB, 2011). The idea was not pursued at the time as the cost of undertaking the project was found to be prohibitive and the technologies unreliable. By 1998, however, the technology had advanced to a stage where production costs had become low enough to make the process economically and technologically viable. Singapore subsequently opened its first such plant in 2003. The product from that plant was dubbed NEWater. By 2010, the number of NEWater plants had increased to five. NEWater now meets 30 per cent of Singapore's total freshwater demand, with the figure projected to increase to 50 per cent by 2060 (Walton, 2011).

Singapore also pursued the conversion of sea water to potable water, and its first desalinisation plant opened in 2005. The second is expected to be completed in 2013. Desalinated water now meets 10 per cent of Singapore's total freshwater needs, and it is projected that this source will fulfil 30 per cent of Singapore's freshwater demand by 2060 (Walton, 2011).

In addition to pursuing new sources of water, Singapore improved its ability to collect and store raw water. Rainwater is now harvested through a comprehensive network of drains, canals, rivers and storm-water collection ponds; and then channelled into the country's 17 reservoirs. This makes Singapore one of the few countries in the world to harvest storm-water on a large scale. The total land area that Singapore utilises for water catchment has increased from 11 per cent in 1970 to over 60 per cent in 2011 (Rahman, 1993). It is projected that by 2060, 90 per cent of Singapore's total land area would be water catchment (PUB, 2012a).

As a result of these developments, Singapore now has four major sources of water supply, known as the Four National Taps. In addition to imported water from Malaysia, it has access to water from local catchment, NEWater, and water from its desalination plant. These alternative sources have enabled Singapore to gradually reduce its reliance on water imported from Malaysia. Imported water now accounts for just 40 per cent of Singapore's water supply, a remarkable achievement given that, as mentioned earlier, Singapore had to import 80 per cent of its water needs at the time of its independence (Chowdhury, 2009; Walton, 2011). By 2060, Singapore's desalination and NEWater plants are expected to supply 80 per cent of Singapore's water (Teh, 2011). It is important to note that Singapore's self-sufficiency efforts are underpinned by strong political will and effective governance geared towards providing an enabling environment that includes appropriate institutional and legal/regulatory frameworks to ensure the effective implementation of its water management policies.

Singapore's success in the water arena has had an important corollary effect. It has given Singapore a new economic growth engine. In 2003, the value-added contribution of the water sector was SGD0.5 billion, or 0.3 per cent of gross domestic product (GDP). By 2015, the sector is expected to contribute SGD1.7 billion, or 0.6 per cent of GDP, in the process creating 11,000 jobs (EWI, 2012).

The Environment & Water Industry Programme Office (EWI) was created in June 2006 to support the growth of the water sector. The EWI is an inter-agency body led by the Public Utilities Board (PUB) and involving government agencies charged with enhancing Singapore's economic position, including the Economic Development Board (EDB), International Enterprise (IE) Singapore, and SPRING Singapore.[1] An initial amount of SGD330 million was allocated to boost the development of the local environment and water industry through research and development (R&D) and manpower development programmes. This amount was increased by a further SGD140 million in 2011, bringing the total to SGD470 million. Singapore now has a thriving water industry that provides water solutions (drawing on innovations such as reverse osmosis, ion exchange and chemical treatment for ultra-pure water purification or waste-water treatment) to a number of countries.

The recognition of the water sector as a strategic growth area and the resultant increase in investment has also enabled Singapore to position itself as a global hydrohub. Major international water companies are increasingly using the country as a base to testbed and pilot new water technologies, and as a launch pad to expand into the Asia-Pacific region. In all, there are 100 water companies, local and foreign, based in the country, double that in 2006 (SPRING Singapore, 2012).

Another evidence of its growing stature as a global hydrohub is the Singapore International Water Week (SIWW). Held every year since 2008, SIWW provides a platform for addressing water management challenges and exploring opportunities in the integration of water solutions and urban planning in cities around the world. The 2012 SIWW saw a record SGD13.6 billion in the total value of announcements of various kinds – projects awarded, tenders, investments and R&D memorandums of understanding. The event attracted 19,231 participants from 104 countries/regions as well as a record 750 participating companies.

The role of Singapore's water bodies such as its reservoirs extends beyond water collection, storage and drainage. They also serve as lifestyle attractions where recreational and communal bonding activities can take place. Most reservoirs are now used for activities such as boating, windsurfing, kayaking, dragon boating, etc. All these have significantly improved Singapore's liveability and attractiveness. For example, a new study ranking Asia-Pacific cities for their 'greenness' placed Singapore first in terms of water management and green building policy (Singapore tops, 2011).

Singapore – through strategic planning and investment in research and technology, as well as strong political will and effective governance – has built a robust and diversified range of water sources and in the process successfully addressed its water challenges. As a result, it has earned international recognition as a model city for water management and is emerging as a global hydrohub. This has also led to its water diplomacy changing in character. Whereas up to the late 1990s, Singapore's water diplomacy centred on securing water supply from Malaysia, this decade has seen the emergence of a new direction in its water diplomacy.

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Phase III: Water as a potential diplomacy niche

Singapore has in recent years capitalised on its domain expertise in water management to transform its water diplomacy. In examining this shift, it would be useful to draw on the work of Evans (2011), who defined 'niche diplomacy' as an area and/or issue where a country is able 'to have the most useful impact'. According to Evans (2011), it requires 'concentrating resources in specific issue areas best able to generate returns worth having, rather than trying to cover the field'. In practical terms, a niche is a specific policy area in which a state has specific knowledge, a developed network, and sustainable activity. Evans' concept of niche diplomacy draws on similar ideas raised by Cooper (1997, quoted in Van Genderen and Rood, 2011:12–15), who coined the term to describe the role of middle powers, and how – through their ideas, influence and positive international impression – they can influence international issues regardless of their size and lack of military power. In applying this concept in the context of Singapore's water diplomacy, we see how a small, water-scarce country has been able to turn its niche in the management of an increasingly important resource, water, into a viable diplomacy approach that allows it to enhance its regional and international standing as well as influence. It does this through various means – through engaging in international standards setting, sharing of water expertise and humanitarian activities.

Reservoirs are a major source of freshwater supply in Singapore. This reservoir in downtown Singapore is one of 17 in the city-state.
Credit: kfcatles / flickr.

Engaging in standards setting

Singapore's growing expertise in water management has increased its international clout and enabled the country to set the agenda on a number of global water issues including water standards which remains a challenge worldwide. Singapore signed a Cooperation Arrangement with the World Health Organization (WHO) in 2007 to promote safe management of drinking water in water-scarce regions.

In March 2012, the Technology and Water Quality Office of Singapore's PUB was designated a WHO Collaborating Centre for safe drinking-water management and integrated urban water management (PUB, 2012b). Under this arrangement, Singapore would serve as the WHO's regional policy research hub on relevant concerns such as regulatory issues, water industry structure and water pricing. In addition, it would conduct capacity-building activities and training courses for WHO member states, particularly those in Southeast Asia and the Western Pacific region.

Sharing water management expertise

Urban water security has become an important policy agenda in most countries. Cities in developing countries are under pressure to meet the burgeoning demand for water brought about by rapid economic and population growth. With the number of people living in urban areas projected to increase tremendously, from 3.6 billion in 2011, to 6.3 billion, or 67 per cent of the world's population, by 2050 (UN, 2012), the situation is set to become more critical. These challenges however present significant opportunities for Singapore to contribute to tackling global water security challenges. There are already several projects along these lines.

In 2011, the Singapore Cooperation Enterprise (SCE) signed an agreement with the government of Mauritius to assist it in the following areas: to develop a system capable of providing an uninterrupted supply of potable water, to reduce non-revenue water to a minimum, to improve the country's Total Water Management system and to develop a plan to meet increasing and changing needs (SCE, 2011).

The next year, in June 2012, the SCE and Singapore's Temasek Foundation signed an agreement with the Delhi Jal Board in New Delhi, India, to set up waste-water treatment plants to generate water for consumption (Jal Board, 2012). The programme is co-funded by the Temasek Foundation, which committed SGD463,149 in grants, and the Delhi Jal Board. The programme will establish a water reclamation plant with 40mgd capacity. It is projected that this plant will benefit 3 to 4 million consumers. Singapore will, through various advisory and capacity-building activities, help the Delhi Jal Board understand the challenges involved in developing an integrated water management framework that includes the reuse of treated sewage and waste-water.

The SCE also established a similar arrangement with the city of Bangalore in India (Singapore to assist, 2012). The SCE and the Temasek Foundation will, under a Grant Agreement, assist the Bangalore Water Supply and Sewerage Board (BWSSB) by providing advice on and capacity-building services in waste-water management and water supply. BWSSB officials will be trained to manage, operate and maintain recycle-and-reuse plants. In addition, the programme will help BWSSB officials to develop strategies to raise public awareness and acceptance of recycled waste-water.

Providing humanitarian assistance and aid

Singapore is increasingly integrating its water expertise into its response strategy in times of humanitarian emergencies in Southeast Asia,

a region highly vulnerable to natural disasters such as earthquakes, floods, epidemics and storms. In response to the devastating floods in Thailand in 2011 which caused more than 800 deaths (Guha-Sapir et al., 2012), Singapore's PUB delivered water quality monitoring equipment to Thailand's Metropolitan Waterworks Authority (MWA) (PUB helps, 2011). PUB, together with industry partners, also provided training to MWA staff on risk assessment and water safety plan formulation. In addition, it provided laboratory services for the testing of water samples. Singapore also supplied 4,000 water filtration sets to Cambodia in response to the flood in 2011 (Cambodia thanks, 2011). The equipment provided can filter up to 500 litres of water from any available source and also convert muddy water to clean, drinkable water with no boiling involved.

Other initiatives have involved tackling more chronic needs. Through the Water for Life project launched by the Singapore International Foundation (SIF) in 2010, Singapore helped rural communities in Siem Reap, Cambodia, gain access to clean water. Specifically, it provided some 2,000 bio-sand filters which could help to reduce the incidence of water-borne diseases. The project took pains to ensure the proper operation of the installed filters, testing the resulting water at a water laboratory to ensure appropriate water quality (SIF, 2012). Following this, the SIF launched a follow-up project in Kampong Speu in 2012. This initiative provided over 8,400 Cambodian villagers with convenient access to clean drinking water through the installation of 1,400 bio-sand water filters in rural households over three years (SIF, 2012).

It could be seen then that Singapore has made determined efforts to bring its water expertise beyond its shores. In so doing, it has shown recognition of the value of its niche in water, in strengthening its ties with other states and increasing its influence at the regional and international level.

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Conclusion

From the preceding discussion, it could be seen that the early years of Singapore's water diplomacy focused on ensuring national water security through protecting its access to sufficient water from Malaysia. It showed great facility in its diplomacy, with the result that Malaysia, despite periods of many difficult challenges, continues to supply water to Singapore. However, its water diplomacy story does not end with the success of its negotiations with Malaysia.

What has been interesting in terms of the evolution of its water diplomacy in recent years has been the shift in emphasis towards niche water diplomacy. With its efforts to diversify its water options coming to fruition, it might be expected that water diplomacy would become less salient for Singapore. Instead, in an era of increasing global water insecurity, Singapore's expertise in water technology and urban water management appears to have increasing currency. This paper has shown that Singapore has not been slow to take advantage of this. It has put in time, money and effort into developing its niche water diplomacy, and water has become a significant platform for Singapore to increase its regional and international stature and influence.

To further enhance its ability to contribute to addressing global water challenges, advancing its niche water diplomacy should be considered a key element of Singapore's foreign policy. To this end, water can constitute an integral part of the Singapore Cooperation Programme (SCP). The SCP, established in 1992, is the primary vehicle through which Singapore's Ministry of Foreign Affairs (MFA) extends technical assistance to other developing countries. Incorporating water into this programme can help the country find weight in one sector that is set to become even more important in the future.

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Note

1. The Economic Development Board (EDB) is the lead government agency for planning and executing strategies to enhance Singapore's position as a global business centre while International Enterprise (IE) Singapore is tasked with promoting the overseas growth of Singapore-based companies. SPRING Singapore is an agency under Singapore's Ministry of Trade and Industry, and is responsible for helping Singapore enterprises grow.

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