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Singapore's Law on water security and lessons for Vietnam

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Abstract
Water security is one of the major global and complex challenges facing humanity, and Vietnam is among the nations currently facing this issue. To ensure sustainable, coordinated, and harmonious development between economic growth and social interests, it is necessary to study and analyze the legal frameworks of advanced jurisdictions. This article focuses on clarifying the legal regulations of Singapore regarding water security and drawing practical lessons for Vietnam.

Keywords: Water security, singapore law, public utilities act 2001, water resources law

Introduction

For many years, Vietnam has been facing serious challenges in water security due to the combined effects of climate change, population growth, and rapid urbanization. According to Vietnam News, annual water demand could increase to about 122.5 billion cubic meters by 2030 and 131.7 billion cubic meters by 2050, while about 60% of the country's water originates from abroad, distributed unevenly between regions and seasons. These are alarming figures leading to increasingly fierce competition for water use. Although the State has issued a relatively complete and comprehensive system of legal regulations to control this issue, it still reveals many limitations, and the results achieved are not as expected. Meanwhile, Singapore is a country with a very high population density, limited natural resources, and a very large demand for water, but it has been highly effective in managing national water resources and ensuring a high level of water security. Therefore, studying Singapore's legal regulations to improve the law on ensuring water security at the present time is necessary.

Singapore's Law on Water Security

General overview of Singaporean law on water security

Singapore is a small island nation, one of the most densely populated countries in the world, at about 8,062 people/km2. With almost no significant domestic water resources, Singapore has become highly dependent on imported water. This has prompted the country to urgently find solutions to promote sustainable water security, overcoming the country's 'survival' situation. Currently, Singapore has emerged as a typical and most successful country in the world in urban water management. To achieve that result, there is a significant contribution from a strict, comprehensive, and thoroughly enforced legal system. The core laws that make up the legal system on Water Security include: Public Utilities Act 2001, Sewerage and Drainage Act 1999, and Environmental Protection and Management Act 1999. Singapore's law gives management power to a single agency, the Public Utilities Board (PUB), which has the authority to manage the entire water cycle. In addition, this national law also has special features, notably the 'Four national taps' and economic tools such as taxes, fees, or water pricing.

Singaporean law on the unification of management agencies and coordination mechanisms to control water security

Singapore is considered a typical model thanks to its comprehensive water management system with a dedicated management agency and a close coordination mechanism. Singaporean law not only stipulates the rights and responsibilities of the management agency but also establishes an inter-agency coordination mechanism to optimize water resource management. Currently, PUB is the agency that manages the entire water cycle in Singapore, established under the Public Utilities Act 2001. The organizational structure of PUB is strictly regulated, headed by the Board of Directors with the functions specified in Article 6 of PUA, including constructing and maintaining reservoirs and other facilities as necessary to collect, supply, and use water for public and private purposes. and other functions assigned to the board by the Minister. This is the basis for PUB to take full responsibility for water security in Singapore, forming a 'one-stop' integrated management model, avoiding overlapping tasks between agencies, facilitating unified decision-making, and optimizing infrastructure investment. In addition, Article 7 of the PUA grants PUB the authority to carry out any activity that the Board deems beneficial, necessary, or convenient to carry out for or related to its functions and duties. Article 7A, added through the Public Utilities (Amendment) Bill 2023, clearly stipulates that the exercise of powers under PUA must also take into account the provisions of the Sewerage and Drainage Act 1999 (SDA) and vice versa. In other words, the provisions of PUA on PUB's powers have contributed to enhancing the agency's effective decision-making capacity, especially on issues of water supply, drainage, and wastewater treatment.

Although it is given the authority to manage the entire water cycle, to effectively manage water security, PUB and other agencies have closely coordinated with each other through specialized laws. According to the provisions of Chapter III of the National Environment Agency Act 2002, the NEA (National Environment Agency) is assigned to coordinate with PUB in sharing water quality data, coordinating decisions on penalties for violations to monitor water pollution and protect the environment. To protect the basin, manage forests and reservoirs, PUB has regulations to coordinate basin protection with NParks (National Parks

Board) through the legal document National Parks Board Act 1996. These agencies do not operate separately by field and coordinate according to an inter-sectoral mechanism under the coordination of PUB. With a unified management agency, an inter-agency coordination mechanism and the thorough application of modern technology in its management process, Singapore has achieved positive results in water security management. In 2016, PUB proposed additional plans to expand wastewater reuse to industrial wastewater and reduce the need for treated water by industry by encouraging coastal industrial units to use seawater for cooling processes. In particular, PUB supports the development of lower energy consumption desalination techniques and reuse technologies to increase recovery rates. PUB has set a target of doubling the amount of clean water by 2060 without using additional energy.

Singaporean law on economic instruments in water security control

First, regarding the mechanism for determining water prices

Singapore law has established a system of principles to ensure fair and efficient water pricing. Water in Singapore is priced on the principle of full cost recovery, which is a pillar principle that ensures financial autonomy for the Board. Section 14 of the Public Utilities Act 2001 requires that revenue must cover all reasonable costs including: operating costs, maintenance, depreciation of assets, interest payments and costs for future service development. This principle aims to ensure financial sustainability for the water sector, reducing dependence on the state budget. This rule is specified in Article 20.2, the lawmakers have clearly listed the cost items in the entire 'water cycle' that the Council can include in the selling price, starting from the stage of importing raw water, water treatment, storage, distribution, maintenance of the entire system and the cost of ensuring the quality and security of water sources. The water price determined by the council is the actual price of water, reflecting the true economic value of the supply of clean water. The Act also provides the legal basis for the application of different prices, the Council is required to prescribe 'different prices for different objects' and in particular 'different prices for different volumes of water supplied'. This is the foundation for implementing the progressive water price list - a tool to encourage consumers to use water more economically because the more water used, the higher the unit price per cubic meter at the following levels. The progressive water price list affects people's awareness of water use, so that water resources are used economically, effectively and ensure water security. Not only that, the council must also comply with the principle of not giving preferential treatment or discriminating between consumers in similar circumstances. This feature ensures relative fairness and equality in access to water, enhancing people's trust in the state. Singapore's water pricing mechanism combines economic efficiency, resource conservation and social equity.

Second, on the mechanism for determining taxes and fees

In addition to the basic water tariff, water bills also include taxes and fees for various purposes. Article 20.7 of the Public Utilities Act provides for the Waterborne Tax. The purpose of this tax is to finance the implementation of activities related to used water (including domestic wastewater, industrial wastewater, sludge) and drainage systems. Wastewater tax is not applied uniformly but can vary based on: the volume of water consumed, the volume of exploited water used or supplied, the type of water or the circumstances of water use/supply, and the estimated volume of wastewater. This allows the levy to be more closely aligned with the wastewater treatment burden that each individual creates. The Act also stipulates that the wastewater levy collected must be paid into the Board's funds, which are used directly for wastewater treatment operations and sewerage system maintenance. This is a compulsory levy, which ensures dedicated financial resources for the Council to carry out its duties. In addition, Singapore also provides for a Water Conservation Levy; Section 20A.1 requires that a Water Conservation Levy be paid in relation to the supply of water, regardless of the source, by the Council or any other party. The difference between this tax and the Wastewater Tax is that the revenue is paid into the Government's Consolidated Fund, not the Council's own fund. It is an economic tool to regulate water consumption; the aim is to encourage water conservation by making water more expensive, giving consumers an incentive to reduce unnecessary water use.

Singapore's Law on Control of Diversified Water Supply (Four National Water Taps)

In its strategy to ensure water security, Singapore has established a legal framework to simultaneously exploit four sources of supply (four national water taps): (i) basin water; (ii) imported water; (iii) recycled water; (iv) desalinated seawater. According to Section 6 of the Public Utilities Act 2001, the PUB has the function of: providing, constructing and maintaining basins, reservoirs and works necessary for the collection, supply and use of water for public and private purposes, and assigned PUB the task of providing and maintaining adequate and reasonable water supply, collecting and treating wastewater and 'promoting water conservation'. It is an important legal regime that paves the way for the management of water supplies in Singapore.

Firstly, for basin water. This is rainwater collected from rivers, canals and inland reservoirs. Singapore law clearly stipulates the protection and exploitation of this source when it empowers PUB to establish and maintain basins, canals and reservoirs under the Public Utilities Act. Along with that, the Regulations on Reservoirs, Basin Areas and Waterways 2006 have strictly prohibited any activities that pollute or take water from the basin without permission. Extended nationwide, Article 7A prohibits any individual from withdrawing water from any water source without the approval of the competent authority. These regulations ensure that basin water is only legally extracted for public water supply purposes and to protect the environmental quality of the reservoir.

Second, for importing water, this water source is mainly raw water imported from the Johor River (Malaysia), agreed upon by bilateral agreements: Johor - Singapore Water Supply Agreement (signed in 1961, 1962, 1990), allowing Singapore to exploit and use up to 250 million gallons of raw water every day from the Johor River. In return, Singapore is obliged to supply Johor with treated water, which accounts for up to 2% of its water imports. Legally, the Public Utilities Act has given PUB the mandate to purchase and distribute water, including importation through

government agreements to 'provide adequate water supply.' That has created a legal basis for PUB to control and allocate imported water sources reasonably, aiming at the goal of self-sufficiency in water supply.

Third, for recycled water, this is treated and reused water, recovered from domestic wastewater. Singapore law stipulates: NEWater is provided through the Commission's water distribution system to those who have signed an agreement with the Commission to provide NEWater. In addition, the law assigns to PUB the function of collecting and treating wastewater, meaning that PUB is responsible for collecting wastewater to the treatment plant before production. The Sewerage and Drainage Act 1999 also prohibits the discharge of industrial wastewater into public sewer systems without written permission from PUB. The above legal regulations have created a protective shield for the wastewater treatment process, ensuring that the wastewater recycled meets the best standards. Along with scientific and technical advances, NEWater is produced through a 3-step treatment process (microfiltration, reverse osmosis, sterilization) using advanced membrane technology has 'turned wastewater into drinking water'.

Fourth, for desalinated seawater. Although Singapore does not have a separate law regulating this water source, it is managed as a form of regular clean water supply. Based on the responsibility of ensuring the supply that the law has assigned to PUB, in fact, over the years, Singapore has built desalination plants, that water source is imported into the normal water supply network. The quality of desalinated water must comply with the drinking water safety standards set by the Public Health and Environment Act 1987 and other legal regulations. Thus, essentially, desalinated water is one of the water supplies that shares the PUA water supply legal framework and public drinking water quality regulations.

Singaporean law on sanctions for violations related to water security

In the context of severe constraints on natural water resources, the Singapore Government has built a strict, synchronous and deterrent legal framework to ensure that the exploitation, use, management and protection of water resources are carried out in accordance with the law. The legal basis for the penalty mechanism for violations is stipulated in PUA, SDA 1999 and EPMA (Environmental Protection and Management Act). These three laws not only regulate each aspect of the water system separately but are also designed to be closely linked, forming a unified legal coordination mechanism between the authorities. The Public Utilities Act 2001 has given PUB the authority to handle violations of water infrastructure operation and safety such as maintenance of water supply systems under Article 45, causing damage to property owned or managed by PUB under Article 47. In addition, violations of drainage and wastewater treatment system protection will be regulated by SDA 1999, and violations of water pollution control will be enforced by NEA through EPMA. Instead of relying solely on administrative fines, the Singapore legal system allows a combination of measures: administrative fines, temporary measures (suspension, water cut-off, equipment sealing), compulsory remediation, and criminal prosecution. Singapore's sanctions for violations of water security have been effective in ensuring law enforcement thanks to highly deterrent penalties and integration in enforcement.

Lessons for Vietnam

Lessons on unifying management agencies and building a coordinated management mechanism

Although the Law on Water Resources and the Law on Environmental Protection have established a relatively comprehensive legal framework, the dispersion of authority among ministries and sectors has made the coordination and comprehensive management of water resources difficult and ineffective. Vietnam can consider merging the current dispersed functions into a specialized national agency similar to PUB, with the authority to coordinate and manage the entire water cycle. In addition, it allows agencies to coordinate with each other in water resource management, applying the development of modern technology so that water resource security management is comprehensive, and decisions are made based on unity.

Lessons on improving the level of control and tightening sanctions for violations

Singaporean law combines administrative and criminal sanctions and remedial measures to ensure deterrence and restoration of the water environment in accordance with the laws, under the coordination of management agencies. Although the Law on Water Resources 2023 and Decree 36/2020/ND-CP (amended and supplemented by Decree 04/2024/ND-CP) have provisions on administrative sanctions for violations in the field of water resources, Vietnam's sanction system is still not deterrent enough and lacks effective remedial measures. Vietnam can refer to Singapore's model to supplement mandatory remedial measures in addition to administrative sanctions.

Lessons on building a legal framework to regulate and expand water supply sources

Article 3 of the Law on Water Resources 2023 defines the main water sources in Vietnam as groundwater, surface water, tap water, rainwater, etc. However, as an agricultural country, the above-mentioned water sources only partially meet the daily life and production needs of the people, posing the risk of competition for water sources in large cities or densely populated areas. To ensure water security, Vietnam can refer to Singapore's legal model on diversifying supply sources such as: promulgating a legal framework to control water supply sources, regulating the responsibilities of specific agencies associated with specific supply sources, tightening sanctions to control discharge activities into the environment, creating a mechanism to encourage investment in wastewater and seawater treatment infrastructure, combining activities to promote research and application of science and technology in water treatment and allocation, etc.

Lessons on determining water prices, determining taxes and fees in water security control

Vietnam has regulations on calculating water prices and collecting environmental protection fees for wastewater. However, Vietnamese law does not specifically and detailedly regulate in legal documents like Singapore, but is regulated in sub-law documents such as Decrees and circulars. Thus, it is necessary to legalize or regulate in more detail in documents with high legal effect on the costs included in water prices, fully reflecting the water supply cycle similar to Article 20.2 of Singapore's Public Utilities Act.

In Vietnam, environmental protection fees for wastewater after deducting a portion for the collection unit, the remaining portion is paid into the local budget. This regulation does not absolutely guarantee that the entire amount collected will be returned to invest in and operate the wastewater treatment system as Singapore does. Vietnam could establish separate environmental protection funds in localities to receive this revenue source, ensuring that wastewater treatment activities are carried out effectively.

Conclusion

Ensuring national water security is an important factor contributing to promoting sustainable and healthy socio-economic development. In addition to educational measures and propaganda to raise people's awareness, legal instruments still play a key role, determining the success of the water security policy. It can be seen that Singapore has built a relatively comprehensive and complete legal system to effectively manage water resources, showing the advantages of this country's law in unified water management activities, in determining water prices and appropriate sanctions. The group of authors recommends that Vietnam can refer to Singapore's legal regulations on water security to contribute to perfecting the legal system to strictly control this issue.

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