

## WATER SECURITY: GLOBAL CONTEXT AND LESSONS LEARNT FOR VIETNAM

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**Abstract:** *Water is a finite renewable resource and it is facing high stress across the globe. More than one third of the world nations now experience water shortage. This situation is getting worst and a low level of water security will pose a growing threat to societies. Water security has many different aspects and there are different approaches to enhance water security. However, they vary from definitions to practices and from nation to nation. This paper efforts to present a quick overview of water security under the global context and lessons learnt for Vietnam. Findings and recommendations are considered a good reference to inform decision makers in order to enhance the national water security.*

**Keywords:** *Water security; Water security drivers; Global context and practice*

### 1. INTRODUCTION

Known as a renewable resource, water has been facing a high risk of both quantitative and qualitative degradation on a global scale. The World Bank (WB) recently raised three major problems related to “water” today, namely: “too much”, “too little” and “too dirty”. “Too much” due to the increase in rain leading to flood in the context of climate change; “too little” due to prolonged drought in the context of climate change; and “too dirty” due to increased discharge of pollutants and wastewater into the environment [1].

In one of the messages to the public, the United Nations (UN) Secretary-General expressed that more than one third of the world nations experience water shortage and it is estimated that by 2025, about 1.8 billion

people will expose to water scarcity<sup>1</sup>. This situation is getting worst by 2030 when a half of the global population will be living in the areas of most water-stressed.

Water has become a top prioritized topic in sustainable development. In 1997, the UN Water Conference emphasized that everyone has the right to have access to drinking water in quantities and of a quality equal to their basic needs. The it was accepted that access to drinking water is a basic human right. Water holds the key to sustainable development.

Vietnam has 3,450 rivers having lengths greater than 10 km or more. A total amount of surface water is about 840 billion m<sup>3</sup>, about 520 billion m<sup>3</sup> (or 63%) flows in from neighboring countries. Surface water per capita in Vietnam is about 10,200 m<sup>3</sup>/year [1], only about 3,800 m<sup>3</sup> are internally generated within the country boundary which is low

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Receipt Date: November 08<sup>th</sup>, 2022

Review Approval Date: November 30<sup>th</sup>, 2022

Publish Approval Date: December 03<sup>th</sup>, 2022

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<sup>1</sup> UN Secretary-General's message (Mar. 2016)

compared to the average in Southeast Asia (4,900 m<sup>3</sup>) and the world (4,000 m<sup>3</sup>).

Thus, Vietnam is not a rich country in water resources. The country is facing a rising level of water-related issues that seriously threaten the national water security. According to the assessment of the Asian Development Bank (ADB), Vietnam's water security index was ranked 26th out of 49 member countries and belonging to the group of high water-stressed countries [2]. The World Bank reported that water threats to Vietnam would have economic costs of inaction ranging from range from 0.2 percent to 3.5 percent of the national Gross Domestic Product (GDP) [1].

In 2020, the country water security index was ranked 28th out of the 49 member countries and standing above such countries in the region as Thailand, Laos, Cambodia, and Myanmar. Improvements were recognized in urban water security and disaster risk reduction [3].

Water insecurity is not only a problem for developing countries, but also a challenge in many developed countries such as the US, Germany, Japan, Singapore, and so forth. These countries are also facing many issues such as: water pollution, water shortage, conflicts among water users, between downstream and upstream countries. Thus, water security is not just a national issue, it has become a global issue.

This paper, based on available literature, reviews water security under a global context and lessons learnt for Vietnam in order to enhance the national water security.

## 2. GLOBAL WATER SECURITY

### 2.1. Water security indicators

Water security is commonly understood as the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and

water-related disasters, and for preserving ecosystems in a climate of peace and political stability [4].

To determine a level of water security, the UN Water Organization (2013) has conducted a quantitative assessment of public safety through four groups of indicators, including: (i) water for domestic consumption; (ii) water for production; (iii) water for the ecosystem; (iv) water-related hazards and climate change<sup>2</sup>. ADB with Asian Water Development Outlook series with a focus on WS developed an assessment framework of five key groups of interrelated indicators, namely: (i) rural household water security; (ii) economic water security; (iii) urban water security; (iv) environmental water security; and (v) water-related disaster security [2],[5],[3]. Meanwhile, WB recommended a simple approach based on three main pillars to build a global water security vision, namely: (i) ensuring sustainable water resources; (ii) increase efficiency in water supply; (iii) increase resilience to natural disasters and climate change [6]. At the simplest version, the World Resources Institute just used two indicators on water resources (quantity and quality) and water management to measure the level of water security [7].

### 2.2. Water security drivers

- *Dependence on the water generated beyond the boundary*

Singapore and Israel are typical countries that strongly depend on the water sources coming from their neighbors. Israel depends on the water generated in Jordan and Syria and Singapore has to buy two third of its water demand from Malaysia.

Germany is a downstream riparian country of the Rhine river basin. The country also faces challenges such as uneven distribution of water resources in time and space, dependence on upstream countries. Renewable water

<sup>2</sup> <https://www.unwater.org/publications/what-water-security-infographic>

resources per capita of Germany is about 1870 m<sup>3</sup>, which is much lower than the world average (4000 m<sup>3</sup>).

In Southeast Asia region, increasing water demand, construction of reservoirs, and improper forest management in the upper portions of the Red River and Mekong River have caused changes in flow regime, mud and sand imbalance. These are main drivers that exacerbate floods, droughts, saline intrusion, riverbank and coastal erosions in the deltas.

*- Increasing demand and conflict among water users*

It is found that the water per capita is decreasing significantly at the global scale. In Egypt, 98% of the country's water demand is supplied by the Nile. But up to 85% of the water in the Nile comes from Ethiopia where water demand is increasing because of high population growth associated with larger food supply requirement.

In the Mekong region, the population of Cambodia has doubled from 7 million people (1979) to more than 16 million (in 2017), leading to an increase in food and aWater-related hazards have increased in frequency for the past 20 years. Since 2000, flood-related disasters have increased by 134%, and the number and duration of droughts also increased by 29%. Similarly, Thailand's population also increased rapidly from 49 million people (in 2008) to 69 million people (in 2017). Total water demand in Thailand in 2008 was just over 70 billion cubic meters, but by 2018 it was 152 billion cubic meters.

China owns 7% of the world's freshwater, but there are about 300 major cities which experience severe water shortage. Given the population explosion during 1990-2000, China's water per capita is now only a half of the world average.

The history showed advantages of upstream countries over downstream countries in a transboundary river basin. For example, Turkey takes advantages over Syria and Iraq,

Nepal over India, India over Bangladesh and so forth.

*- Increased water-related disasters*

Weather-related disasters such as floods, droughts, storms and extreme temperatures have significantly increased over the past 50 years. The disasters have claimed, on average, the lives of 115 people and causing \$202 million in economic losses every day. More than 2 billion people are living in countries under water stress and 3.6 billion people face inadequate access to water at least one month per year [8].

There were almost 3,500 disasters recorded in Asia in the last 50 years, accounting for 30% of weather-, climate- and water-related disasters reported globally. Storms had the highest impacts on life, causing 72% of the lives lost, while floods led to the greatest economic losses (57%). The top ten recorded disasters in Asia account for 70% (680,837 deaths) of the total lives lost and 22% (US\$ 266.62 billion) of economic losses for the region [8].

*- Capacity of water infrastructure*

Conventional water infrastructure was implemented within a river basin scale. Only a few countries implemented water carriers across the basin boundary. The national water carrier of Israel is a large water project completed in 1964. Its main purpose is to transfer water from the Sea of Galilee in the north of the country to the highly populated center and arid south and to enable efficient use of water and regulation of the water supply in the country. A South-North water transfer project to transport 44.8 billion m<sup>3</sup> of water annually, create a water supply source, and improve the livelihoods of 150 million of Chinese people living in water-scarce regions in the north, including the capital Beijing, Tianjin and Hebei.

*- Institutions and policies*

Water resources management in general and water security in particular needs the

involvement of the whole government system from the central to local levels. However, it is found that the fragmentation in water management at the national level creates a certain overlap in responsibilities among relevant sectors leading to obstacles in water governance at different levels. Current practices from China, South Africa, Thailand, Jordan, India show that the assigned ministry responsible for water management is mainly managing and allocating water resources, while specific exploitation management is assigned to different ministries. Due to certain limitations in cooperation and coordination among ministries and sectors, there have been some overlaps in water resource management and administration.

In developed countries such as the US, Japan, and South Korea, water resources is managed by many ministries and sectors (of infrastructure, of agriculture, army, land reclamation agency). Coordination mechanisms are well established and effectively operated. Thus, the water management in these countries is considered quite effective.

In terms of water governance policy, sustainable financing is one of the key instruments to ensure the success of national water policy implementation. Investment in water infrastructure is mostly from the state budget. Some countries have very specific regulations on state investment in water the sector such as Pakistan (50%), Japan (40-70%), Korea with (30%). Australia supports investment of hundreds of billions of dollars for a program to modernize irrigation systems to save water. In 2011, the Chinese government decided to double the annual investment budget for the water sector (approximately US\$608 billion) for the period 2011-2020 in order to enhance water security and accelerate economic development.

Private sector investment in the water sector is relatively limited. Water supply and wastewater treatment are most interested by

the private sectors in China, Korea, Australia and Japan.

A demand management approach has been implemented in some countries to raise awareness in water saving, encourage the development of water-saving technology and reuse of wastewater (Australia, Pakistan, Japan, Hungary). Water pricing mechanism and building a water market are now practical in Australia or under an evaluation stage in China. These target to encourage the participation of private sectors in the management and operation of irrigation services for agriculture (Japan).

### **3. LESSONS LEARNT FOR WATER SECURITY IN VIETNAM**

#### **3.1. Point of view**

International practices on water security are diverse, with different concepts and interpretations. But they all include basic elements such as ensuring adequate quantity and quality of water for domestic and production needs, protecting the ecological environment and limiting risks brought by water.

By recognizing water security as a non-traditional type of security, it helps propose a comprehensive approach and solution which structural and non-structural solutions are harmoniously combined. Water security for transboundary river basins such as the Red River and Mekong River should be closely linked with strengthening international cooperation, especially with upstream countries. In terms of water security policy, it is necessary to allocate sufficient resources, in which the state budget still plays a decisive role.

#### **3.2. Lesson learns**

There are many factors that impact water security and it has been found that solutions and options may be specific to a region, country or city. In which the ADB's recommendations for China water security are a good reference for Vietnam up to 2030 and a vision to 2045. They are summarized as follows:

- *Elevate water security to high-level as the national security*

This requires the establishment of national security committee, the formulation of a national target program on state security, the strict implementation of Laws and policies on general management of water resources, disaster risk reduction, management and treatment of wastewater.

- *Strong reform in water governance*

This implies the needs in improvement of institutions and policies to clarify responsibilities and encourage cooperation among all stakeholders, reorganization of river basin management committees, establishment and completion of monitoring network, database and information systems on water sources, management and allocation to water use sectors.

- *Build optimal water infrastructure capacity to enhance national water security*

In this aspect, focuses are on: (i) Modernize irrigation and water infrastructure to adapt to climate change, aiming to supply water on the demands of users; (ii) Control water loss in urban areas; (iii) Encourage the reuse of wastewater; (iv) Prioritize investment in water conservation (including groundwater) and engineering innovations; and (v) Increase the water productivity in the agricultural sector.

- *Implementation of prices/fees in water exploitation and use*

The implementation of prices/fees includes (i) Support local authorities in implementing regulations on water usage fees, (ii) Strengthen the management and promote the piloting of the water market, (iii) Develop the market, attracting investment and participation from the private sector, and (iv) Convert water resource fee to water resource tax.

- *Promote water-related disaster risk management*

Disaster risks will be reduced through the formulation of a disaster risk management

system to minimize damage and loss and increase resilience. It is necessary to improve the quality of water for domestic consumption to avoid potential hazards to human health.

- *Science and technology*

Water security requires the research, development, application of scientific and technological advances, innovative measures to utilize water effectively by recirculation and reuse of water, to increase water productivity; effectively managing water demand in various sectors, especially the agricultural sector.

- *International cooperation*

International cooperation is key to increasing water security. It includes information exchange and information sharing, technology transfer, experience sharing on water security policies. More importantly, the international cooperation will be a platform to setup a cooperation mechanism in transboundary water resource, especially the consultation, sharing of information and data (monitoring, operation, water use, wastewater), coordination for regulating water sources in the dry season.

- *Communication and awareness raising*

Raising awareness is so importance to encourage the participation of political and social organizations in the implementation of projects and programs on water security.

#### **4. REMARK**

Countries in the world approach to water security in different lenses, from the concept of water security to the define of long-term, strategic goals for water security. Some countries such as Jordan and Singapore have defined water security as national security in order to prepare for specific policies and appropriate options. Some developed countries such as the United States, Germany, and Japan also faced many problems that threat the water security such as water pollution, drought, water shortage, demand tension between water-using sectors, increasing conflicts between downstream and upstream regions.

Available options for water security are quite diverse. But the common characteristic for water security is that it relies heavily on public investment by governments to solve water stresses. The United States, Israel, Japan, and Singapore have expensive subsidies for water security which investments for innovation technologies are prioritized. However, Australia have introduced a water price policy, which serves as a basis for demand management and a premise for the most unique water market in the world.

Useful ADB's recommendations for China water security are so important to inform the Government of Vietnam in developing a

comprehensive national water security scheme that considers strong reforms of institutional arrangement, physical investment, science and international collaboration, and financing instruments. More importantly, water security must be promoted to high-level as the national security.

#### **ACKNOWLEDGEMENT**

This work was financially supported by Asian Development Bank (ADB) under the Technical Support (TA-9634 REG): Strengthening Integrated Flood Risk Management - Development of Viet Nam National Scheme on Water Security and Dam Safety.

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