

TITLE

SYNERGISING LAKE MANAGEMENT WITHIN WST2040 OF MALAYSIA

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ABSTRACT

Malaysia has taken various initiatives since 2007 to sustainably manage lake governance. Current achievements of lake management in the country are adoption of the Strategic Plan for Sustainable development and management of lakes and reservoir and National Lake Water Quality Criteria and Standards. A guideline and research on Integrated Lake basin management plan were carried out for seven lakes in 11th Malaysian Plan. An updated inventory of lakes which include ex mining ponds, was undertaken in 2021. An additional of 11 lakes have had their lake briefs documented, compared to 28 lakes from 2009 to 2012. In connection to enhancing the country's water management, WST 2040 (Water Sector Transformation by 2040) study for Malaysia was completed in December 2021 and endorsed to be implemented in April 2022, encompassing the whole water sector which therefore encompasses lake resources and subsequently their governance. The proposal and recommendations of the WST2040 study, have been uploaded into the internet public domain. The WST2040 implementations are expected to be carried out from 2021 to 2040. Overall, the aim of water sector transformation 2040 is to ensure the availability of clean and sustainable water resources for future generations, while addressing the challenges posed by population growth, urbanization, climate change, and other factors. This paper focuses on enhancing lake management, riding on the policies recommended under WST2040, including creating awareness and capacity building, recommending required new researches, development of new indigenous technologies, innovation, and commercialization of such technologies to help further improve lake management by all, including local communities.

Keywords: Lake, Governance, Malaysia, Water sector transformation

1. INTRODUCTION

Malaysia has adopted an integrated water resources management (IWRM) framework comprising Integrated River Basin Management, Integrated Coastal Zone Management, and Integrated Lake Basin Management since the approach was introduced in 1992. The most significant initiatives were the establishment of the National Water Resources Council in 2011. The council was transformed into the National Water Council in 2019 to oversee the entire water sector, including water resources and water services. This Council is the highest forum for addressing national water management issues and establishing nationwide policies, including overseeing national responsibilities in international treaties.

Lakes remain important elements of water resources as most of them are part of the river system and provide a source of livelihood. About 20% of the country's water supply is drawn directly from lakes and additional lakes are created as off-river storage ponds for raw water supply. Numerous reservoirs serve a variety of purposes, including drought and flood control, hydropower generation, freshwater fishing, recreation and tourism.

2. NATIONAL LAKE MANAGEMENT INITIATIVES

Integrated Lake Basin Management (ILBM) initiatives in Malaysia have been undertaken since 2005. The adoption of the Strategic Plan for Sustainable Lake and Reservoir Development and management in 2012 through the National Water Resources Council, provided the long-term strategies for implementation to meet its vision of sustainable use of lakes for their ecosystem services and economic values. The Policy Framework clearly stated the adoption of ILBM approach to protect, restore and sustain lakes and reservoirs (ASM & NAHRIM 2009).

2.1 Lake issues and challenge

Recent inventory by National Water Research Institute of Malaysia identified that there are additional 280 lentic waters that provide various ecosystem services in addition to 90 major lakes and reservoir in the country (Sharip et al. 2020). A recent study showed more than 64% of 94 studied lakes in the literature reported experiencing eutrophication while about few reservoirs having storage losses of more than 50% due to sedimentation (Jansen 2019, Sharip et al. 2020).

2.2 Research and development direction

To support lake management, the Blueprint for Lakes and Reservoir Research and Development, sets out the propose R&D activities based on integrated research at catchment scale (NAHRIM 2014). Among the research direction needed are (1) inter-disciplinary studies that link physical and social sciences, (2) improvement of pollution monitoring (3) carrying capacity of lentic-lotic waters (4) rehabilitation of degraded lakes.

2.3 Specific standards for lake water quality monitoring

Standards for ambient monitoring of lake water quality was adopted in 2017 to support decision making and management. The standard, which focuses on protecting human and ecosystem health, considers maintaining lake quality for various recreational purposes.

2.4 Guidelines, lake briefs and management plan

Development of lake briefs begun in 2009 and span over four series with a total of 39 lakes completed to date. These lake briefs provided an overview of the current state of the lake, their management and governance challenges. A specific guideline in preparing lake management plan has been introduced in 2018 to promote development of lake basin management plan by respective managers. A total of seven ILBM Plans were completed over the period of 2016 to 2020 namely Sembrong, Batang Ai, Durian Tunggal, Bukit Merah, Chenderoh, Timah Tasoh & Melati Lake.

2.5 Participatory ecosystem services shared value assessment

To enhance lake management initiatives at international level, collaborative research between National Water Research Institute of Malaysia and the International Lake Environment Committee to use the tool, developed by ILEC, known as Ecosystem Services Shared Value Assessment to enhance ILBM process. Research using this tool is being conducted at Chenderoh Lake and Bukit Merah Lake in Perak. The research hopes to increase public awareness and shared values among for participation in lake management initiatives.

3. WATER SECTOR TRANSFORMATION 2040

Integrated Water Resources Management (IWRM) was incorporated as a national policy for Malaysia, since the 8th Malaysia Plan, beginning in 2001.

In December 2021 the study on WST 2040 (Water Sector Transformation by 2040 -<https://wst2040.my/>) was completed, aiming at mainstreaming IWRM paradigm as a central policy towards achieving national sustainable development goals on water, in the light of various challenges faced, such as climate changes, population increase, rapid development and urbanisation. WST 2040, with 2 objectives, “water security & sustainability and water as an economic opportunity” was endorsed for implementation since April 2022.

WST2040 focuses on whole eco-system perspectives as well as whole social and management perspectives (government, private sectors, academia, NGOs and communities) with people as the main driver. The study encompasses integration of land and water management. Details of the study is uploaded on <https://wst2040.my/> and is accessible to all.

While all aspects of water were studied, eight new game changes were included namely: Advocacy, Awareness, Capacity Building & Public Participatory Platforms (AACB), Integrated Water Sector Data Centre (IWSDC), IR4.0 in the Various Water Sector (IR4.0 WS), Water-Food-Energy Nexus (WFE Nexus), Virtual Water and Water Footprint (VW&WF), Climate Change Impact and Adaptation (CCIA), Alternative Water Financing (AWF) and Water as an Economic Sector (WES)

4. SYNERGISING LAKES IN WST 2040

To improve ILBM implementation, lake management initiatives will be based on the policies recommended under WST2040, including

4.1 Creating awareness and capacity building

Main effort to synergize lakes by strengthening the participation of all stakeholders in the lake basin, including the community, through advocacy, awareness and capacity building (AACB). AACB is considered a game changer, seeks to educate Malaysians about the concept of water management, including lake resources, and their respective roles and responsibilities in supporting the change (EPU 2021). AACB on lake governance include promoting scientific and citizen science on lake monitoring and management, and public participation in lake care.

4.2 Recommending new researches and open data

Among research areas promoted to achieve WST 2040 are research and model development linking water sector with food (irrigation) and energy (hydropower) nexus to ensure that water resources with good water quality are available to meet the water needs up to 2040 and beyond. Other research needs promoted include water footprint, alternative water and the economics of the water sector including financing mechanism. The development of new indigenous technologies, innovation, and commercialization of such technologies based on Industrial Revolution technology such as drones, integrated models, artificial intelligence, and artificial wetlands to further improve lake management for all, including local communities.

There is also a need to establish a national integrated data centre known as IWSDC that supports open data sharing and enables all water sector stakeholders, including water managers, to make science-based decisions. An example of open data sharing is Digital NAHRIM, where research publications are stored.

4.3 Adaptation to future climate changes to enhance lake resilience

This includes improving prediction and forecasting of climate change and its impacts on lakes, adapting to changing impacts of drought and flooding, and mitigating extreme events by promoting nature-based solutions.

5. CONCLUSIONS

ILBM is an important management mechanism for lentic water resources in support of IWRM in Malaysia. IWRM paradigm as a central policy (20-year plan) for the commitment of countries to achieve the sustainable development goals in the water sector. Lake synergy in WST2040 includes improving capability in data-driven decision-making capabilities such as long-term programs including research and development to improve monitoring and restoration of lakes, stakeholder and community collaboration on governance, and adaptation to future climate change.

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