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Facilitators/barriers to the implementation of public policies and strategies towards water security, Lao PDR

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ABSTRACT

Lao PDR's growing economy, urbanization, and changing lifestyles are putting pressure on water resources, necessitating effective water management for economic growth and population well-being. This qualitative study aimed to explore the facilitators and barriers to the implementation of water-related policies in Savannakhet and Champassak provinces, both of which are considered vulnerable to reduced water security. Eighty-seven key informants (KIs) have been interviewed about the awareness of water policies/strategies and the facilitators/barriers to the implementation of water policy. Overall, KIs working at the national and provincial levels had a better understanding of existing policies compared with participants from the district officials. According to KIs, facilitators of the implementation of water policies were dissemination of the legislation and policies related to water security to the relevant ministries, departments and agencies, publicizing their obligations under these policies, and increasing community awareness and participation. Identified barriers were lack of technical capacity, infrastructure, and budget and coordination. Overall, these barriers were reported to contribute to a weak and somewhat fragmented approach to water security. Further effort is required to improve inter-agency collaboration and better resource the water resource sector.

Key words: Lao PDR, Water-related policies, Water security

HIGHLIGHTS

- Human resource's water infrastructure and finance are major obstacles in implementing water-related policies.
- Limited multi-sectoral collaboration, partly due to resource scarcity, results in a fragmented approach to implementation.
- The absence of gender issues in policy implementation may hinder the creation of an environment conducive to water equity.

1. INTRODUCTION

Water security is essential for public health, environmental sustainability, and economic growth, especially as population pressures and climate change intensify (Mishra *et al*., 2021). Water security means that every person has access to sufficient safe water at affordable prices while ensuring that the natural environment is protected and enhanced (Global Water Partnership, 2000). Water security also means ensuring equitable household access to adequate amounts of safe water and adequate sanitation. Water security, therefore, is a prerequisite for sustainable development, and as such, has a central place in achieving the agenda 2030, the Sustainable Development Goal (SDG) 6: 'Ensuring availability and sustainable management of water and sanitation for all'.

Achieving water security is complex, requiring action at all levels of governance, and coordination between state and non-state actors and frequently across international borders (Lalawmpuii & Rai, 2023; Cassidy-Neumiller *et al*., 2024). Further, water security is influenced by several intertwined factors including inadequate infrastructure, population growth, pollution, and more intense and frequent water-related disasters such as floods and droughts (Caretta *et al*., 2022). Managing these current and future threats to water security requires effective water governance. Water governance consists of institutions and institutional frameworks, such as laws, policies, and strategies, which facilitate and regulate interactions towards water security (Di Vaio *et al*., 2021). It relates to the decision-making process that determines the relationship between social institutions and public affairs within a society (Vannevel & Goethals, 2021). The increasing pressures and uncertainties related to water and its management also underscore the need for inclusive, adaptive approaches to water governance and security (Di Vaio *et al*., 2021; Ahopelto *et al*., 2023; Raja Noriza Raja Ariffin *et al*., 2024). Such collaborative approaches that involve local communities and align with community needs are demonstrated to enhance policy acceptance and are more effective.

Situated in Southeast Asia, the Lao People's Democratic Republic (PDR) is located almost entirely within the Lower Mekong Basin, sharing borders with China, Vietnam, Cambodia, Thailand, and Myanmar. The country is generally considered well-endowed with water resources. Climate change, population growth, urbanization, and rapid economic development including growth in water-intensive industries, such as tourism, irrigated agriculture, mining, forestry, and hydropower are, however, increasing competition for land and water resources and contributing to decreased water quality and concerns about continued water security (World Bank, 2017). Climate change is also increasing the severity, frequency, and impacts of flooding and drought and affects water resources. In 2018, for example, Lao PDR experienced the largest floods in a decade, with Tropical Storm Son-Tihn on July 18–19, followed by flash flooding on July 23–24 caused by a breach in the Xepien-Xenamnoy saddle hydropower dam which affected nearly 7,000 people downstream and displaced more than 1,000 (Souksakhone, 2019). Communities in the Mekong Basin also face seasonal water shortages, which are becoming more severe with changing precipitation patterns, aggravated by downstream impacts from the damming of rivers that have disrupted the hydrology of the Mekong River and its tributaries, quantity, and quality. Those most exposed to the combined impacts of water-related disasters and changes in the hydrology of the Mekong River are local people who depend on the river and its tributaries for food security, livelihoods, and overall well-being.

Since 1995, the government of the Lao PDR has introduced various water policies and programmes with the intent of creating a sustainable water supply. The Water and Water Resources Law was issued in 1996 (National Assembly, 1996), and the Water Supply Law (2009) (National Assembly, 2009) provides the policy frameworks for overall sector oversight. In 2011, the Ministry of Natural Resources and Environment (MONRE) was appointed to implement policies in relation to land and natural resource management. More recently, a new Law on Water and Water Resources was adopted in May 2017 (amended 7/7/2022) (MONRE, 2021a). The Water Law adopts the river basin as the fundamental unit of water resources and proposes an integrated

water resource management (IWRM) approach, providing a framework for an inter-sectoral, integrated approach to water management. Implementation of the law is supported by the 8th and 9th National Socio-economic Development Plans and aims to promote 'the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems' (National Assembly, 2020a). While water infrastructure within the country has improved significantly over the last decade, inequities are evident. Basic Water, Sanitation, and Hygiene (WASH) infrastructure and services, for example, are stretched in rapidly growing urban areas, while access to basic WASH facilities remains a major challenge in rural areas. According to the World Bank data for 2020, only 12% of the rural population in Lao PDR had access to a safely managed drinking water service, while 26% of the urban population had access (WB Open Data, 2020).

Given the criticality of water security, this study aimed to investigate facilitators and barriers to policy implementation from the perspective of those directly involved. By gaining a nuanced understanding of these factors, the study seeks to inform the ongoing development of water governance processes, ultimately contributing to long-term water security and the well-being of communities and ecosystems. The study also contributes to the limited literature on water security and its management in lower-middle-income countries such as Lao PDR.

2. MATERIALS AND METHODS

2.1. Study area

This qualitative study was conducted at the national, provincial, district, and village levels. Districts and villages in Savannakhet and Champassak provinces were purposively selected in discussion with provincial and district authorities based on their subjective assessments of vulnerability to water insecurity and water-related hazards. These two provinces were selected as they are persistently impacted by water-related hazards, with 14 out of 15 districts in Savannakhet (36% of the villages) and over a third of its population affected by floods. In Champassak province, 51% of villages routinely experience flooding events, impacting nearly half of the province's population (see Figure 1).

2.2. Theoretical model

To analyse policy, Sabatier & Jenkins-Smith (1993) developed four 'stages heuristic' models: (1) agenda setting, (2) policy formulation, (3) policy implementation, and (4) policy evaluation. The Walt and Gilson Health Policy Triangle (Walt & Gilson, 1994) was chosen to guide data collection and analysis due to its systematic approach to understanding policy content, actors involved in the policy-making, the context in which these actors act, and the process of policy-making.

2.3. Participants and data collection

Eighty-seven in-depth key informant (KI) interviews were conducted using a semi-structured interview guide to interview development partners, health officials, water, agricultural and natural environmental officials, and actors from other involved sectors. At the central level, 17 KIs from the Department of Hygiene and Health Promotion, Division of Environment, Center of Namsaath (Clean water), Disaster Preparedness, Department of Water Resources, Department of Planning, Department of Climate Change, MONRE, Department of Irrigation, Department of Fishery, Ministry of Agriculture and Forestry, Department of Water Supply, Ministry of Public Work, and Transportation, National Disaster Committee at MLSW, Lao Red Cross, Lao Youth Union (LYU), Lao Women's Union (LWU), WHO, and UNICEF participated in the study. Thirteen in-depth interviews were conducted with KIs working at the provincial and district levels from each province.

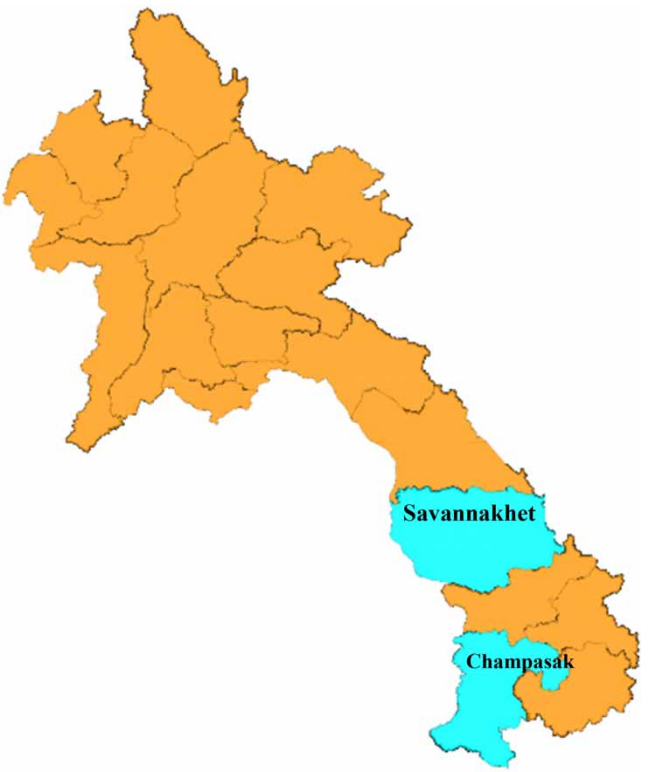

Fig. 1 | Study area in Lao People's Democratic Republic (Lao PDR), highlighting Savannakhet and Champasak provinces.

2.4. Data analysis

The study collected data through KI interviews with stakeholders involved in implementing water-related policies in Lao PDR, including government officials, policy-makers, non-government organization representatives, and local leaders. Participants were purposefully selected to ensure diverse perspectives. Interviews were conducted in participants' preferred language, recorded with consent, and transcribed verbatim to accurately capture the conversations. A qualitative approach was used, with thematic analysis following Braun & Clarke (2006) to explore facilitators and barriers to water policy implementation. This method was chosen for its ability to identify, analyse, and report patterns within the qualitative data. Two researchers independently reviewed the transcripts to thoroughly understand the interview content and context. They systematically coded the transcripts, identifying key features related to the study's objectives, such as facilitators and barriers to policy implementation. The researchers then grouped similar codes into broader categories, forming themes that captured the main ideas across the interviews. These themes were refined to ensure accuracy and coherence. The transcripts were translated into English, with both researchers verifying the translation and coding for consistency. To ensure reliability, the researchers engaged in peer debriefing and reached a consensus on their analysis, reducing individual biases and strengthening the study's findings.

2.5. Socio-demographic characteristics of participants

A total of 63.2% of participants were female, the mean age was 46.9 with a minimum age of 32 years old and a maximum age of 62 years old. Two-thirds of participants held a bachelor's degree and slightly higher than

one-fourth (26.4%) were heads of a unit, followed by heads of department (20%). The mean working experience was 7.4 years with a minimum experience of 1 year and a maximum experience of 35 years (see Table 1).

3. RESULTS

3.1. Awareness of policies/strategies/law related to water security

Most participants from the provincial and central levels were aware of several water policies and water resource management strategies. At the central level, participants were also aware of policies and procedures related to water safety and water-related disasters (Government of Lao PDR, 2019a), and knew the MONRE, which is responsible for all natural water sources. Participants were also aware of work on a watershed management strategy.

Few participants at the provincial and district levels, however, were aware of the various policies.

Table 1 | Socio-demographic characteristics of KIs from the central/provincial/district levels.

		Number ($n = 87$)	Percentages
1	*Sex*		
	1. Male	55	36.8
	2. Female	32	63.2
2	*Age (Mean: 46.9; Med: 47.0; Min = 32; Max = 62; SD: 8.1)*		
	1. <35 years	6	6.9
	2. 35–45 years	34	39.1
	3. 46–55 years	31	35.6
	4. >55 years	16	18.4
3	*Education*		
	1. Below Bachelor, Diploma	26	29.9
	2. Bachelor's degree	35	40.2
	3. Master's degree	22	25.3
	4. PhD and higher level	4	4.6
4	*Position*		
	1. Head of the department	17	19.5
	2. Deputy head of the department	12	13.8
	3. Head of office	16	18.4
	4. Deputy head of office	13	14.9
	5. Head of unit	23	26.4
	6. Deputy head of unit	6	6.9
5	*Working experiences (Mean: 7.4, Med: 5.0; Min = 1; Max = 35; SD: 6.7)*		
	1. <5 years	40	46.0
	2. 5–10 years	28	32.2
	3. 10–15 years	12	13.8
	4. >15 years	7	8.0

'As I knew right now the country has approved a Law on Water, National Policy on Water Supply, Sanitation and Hygiene, 2019 and a Strategic Framework for Rural Water Supply, Sanitation and Hygiene, 2019–2030. A Climate Change and Health Adaptation Strategy (2018–2025) and action plan (2018–2020) was also developed and approved. National Disaster Management Law was also adopted in 2020'. (Female, 49 years, MOH)

'At the district level, we don't know much about water laws or policies. I think the water law depends on each sector, such as the health sector may talk about drinking water, and the supply of clean water. The district nature resource and environment office is working on natural water resource management strategies'. (Female, 42 years, District Public Works Office)

Participants from the Ministry of Health mentioned the policy to expand the clean water network, especially underground and spring water to the community through the Clean Water (Namsaath) Center and inspection of water quality by the Department of Food and Drugs (MOH, 2019). Other laws and policies mentioned included the Law on Sanitation and Health Promotion (revised version) of 2020 (National Assembly, 2020b), National Policy on Water, Sanitation and Hygiene, Management on Water Quality, Vulnerability Assessment Report and Public Health Adaptation to Climate Change in the Lao PDR and Basic Knowledge Training Guide on Mitigation and Adaptation of the Public Health Sector to Climate Change, National Policy on Water, Sanitation and Hygiene in 2019 (MOH, 2019), National Strategy for Clean Water Supply, Sanitation and Hygiene in Rural Areas in Lao PDR 2019–2030 (MOH, 2021).

A participant from the Department of Social Welfare, Ministry of Labor and Social Welfare explained that there were several laws and policies related to disaster management, including the Law on Disaster Management (Government of Lao PDR, 2019b), National Disaster Risk Reduction Strategy from 2021 to 2030 (Prime Minister Office, 2021), Decree on Disaster Management Fund (Government of Lao PDR, 2020), and Decree on Social Assistance. The participant explained as follows:

'As for other management, the Ministry's laws are specific to each ministry'. (Male, 55 years, Department of Social Welfare, Ministry of Labor and Social Welfare)

As another participant explained:

'Currently, the Ministry of Health, the Ministry of Labor and Welfare have issued legislation, laws and policies of each department, namely: Law on Disaster Management, National Disaster Risk Reduction Strategy, National Policy on Water, Sanitation and Hygiene, Management on Water Quality Management, Water and sanitation has been released to inform the community about disasters and laws in order to create knowledge and strength for people to survive from disasters. Each department and each ministry will have legislation, regulations and laws of water in each department'. (Male, 62 years, Water and Sanitation Expert of UNICEF)

Some provincial participants, especially those from the Environment and Natural Resource, the Office of Labor and Social Welfare, and the Office of Public Health were aware of the water policies/strategies; however, provincial participants from other sectors had less awareness of these policies and strategies. Most district participants had limited knowledge of current policies and strategic plans related to water security as these policies had not been disseminated at the district level at the time of the study.

'The water-related policy was relied on Water Law No. 34/K dated 24/12/2022 which has just come out, now that we previously had the agreement of the Minister, the Prime Minister's Decree as a basis to be expanded and translated into this law'. (Water Sector, Department of Water Resources, Male, 49 years old)

'We did not know about the water policy and law as we did not hear yet from the MONRE, central level, as MONRE did not disseminate the water policy and law to the provincial and district level yet'. (District Public Works Office, Female, 42 years old)

3.2. Awareness of gender policy

Gender is expected to be mainstreamed across all sectors rather than a standalone activity to ensure equal access for men and women in decision-making and access to resources. Regarding water, at the community level, the local Lao women's committee in the village has the responsibility for promoting gender equity in all community activities, including water use and protecting water sources. While the Lao Women's Union has a policy to promote gender equality, it has no specific activities or resources to promote equitable access to water within the community not specific for water resources (Lao Women's Union, 2021).

'We had only gender policy that is implemented by the Lao women's committee from the central to the local level, including raising awareness about environmental protection, but there are not the water policy in particular with gender perspective'. (Clean Water Sector, Provincial Health Department, Female, 52 years old)

3.3. Facilitators to the implementation of policies/strategies

Despite the stated commitment to disseminating new laws and policies, most participants said that dissemination was often poor due to limited capacity and resources, including financial resources, especially at the provincial and district levels:

'So, you may have a well written and well-developed strategy and action plan, for example on nutrition and food security. Then the national level could be able to bring that down to the provincial levels, but in actual implementation the provincial level might have limited capacity or even limited resources to bring it down to the district'. (P4: Department of Water Resources, MONRE)

3.4. Access to resources

Several participants felt at the provincial level, implementation of IWRM and water-related disasters was hampered by insufficient technical capacity, infrastructure, budget, and other resources as well as a lack of guidelines or regulations.

'Regarding the policy and practice guidelines, we are following orders from the top, but there will be limitations in the implementation due to lack of budget, insufficient specialized technicians'. (P5: Male, 56 years, Department of Labor and Social Welfare)

'Obstacles to work in local areas are the lack of specialized skills, limited knowledge at the district and local levels, there is a problem with the infrastructure, especially the water, is there any readiness to build a water system that is not tight, sometimes it is an old system that does not think about the disaster that will occur,

so the infrastructure is very weak, there is a rapid deterioration, the knowledge of staff is not limited, but sometimes the public sector does not have the experts at all'. (Male, 52 years, MONRE)

3.5. Limited communication and coordination

The exchange of information was reported to be decentralized in many sectors. There are many different departments within the government institutions that look after different facets of water management such as its use, supply, and pollution level. According to some participants, very little or no coordination and interaction occurs among these institutions. An example given was the release of dam water, the Meteorological Department and the Dam Department work independently of one another resulting in poor technical coordination before making decisions.

'Normally, provincial natural resources department must exchange data every day. When the situation arises, we will be able to know the amount of cubic meters of water coming out of the dam and how much more water can be released from the dam. Then there will be a group of people, who will be the ones to determine how many water cubic meters could be released, and then there will be the warning meteorology unit, who will notify that there is a storm that has passed the level, the water level and how much water will be able to receive'. (P13: Department of Water Resources, Meteorology and Hydrology).

3.6. Weak law enforcement of strategy/policy

A few participants reported that the penalties specified in the legislation are rarely applied and, therefore, do not act as an incentive for compliance.

'Among the various legislation, punishments and fines have been set for those who commit crimes or destroy water resources, but the fines and punishments for the actual perpetrators are not strict and are not taken seriously, so many people are not afraid'. (Chief of Public Health Department, Pathumphon District, Female, 52 years old)

3.7. Lack of guidance in the implementation of legislation

Some participants said that there is a lack of guidelines for the implementation of the legislation, making it hard for it to be followed and implemented.

'The way to implement it is related to many sectors; for example, water legislation and water resources; calculating water at 5000 kip per cubic meter, we have not been able to implement it yet. For example, there are drinking water companies that absorb water to treat it and make it drinkable. There is a set amount of water, but we don't have a measuring device to measure the amount of water absorption or the time of absorption. Advise the upper level to consider before issuing the legislation and issue a decree or specific guidelines for implementation'. (Water Resources Sector, Provincial Office of Natural Resources and Environment, Male, 45 years old)

A few participants said that details regarding which departments and divisions are responsible for legislative and policy implementation are lacking.

'There are limitations in the implementation or development of policy guidelines, such as that some legislation exists but has not yet been expanded or implemented. For example, now that we have the 2021 water decree, the

agreement on the use of underground water, the decree on the release and treatment of wastewater, and the decree on the use of water have been signed, but there are still many provinces that cannot be implemented because it is not clear what level or what level should be allowed'. (Meteorology and Hydrology, Department of Natural Resources and Environment, Male, 49 years old)

Participants from the Ministry of Health mentioned provinces, districts, and health centres have been informed after the publication of the National Policy on Water, Hygiene, and Sanitation, and the National Strategy for the Supply of Clean Water; however, districts and health centres were largely unaware of these strategies.

'*After the National Policy on Water, Hygiene and Sanitation, and the National Strategy for the Supply of Clean Water was announced, the strategy was disseminated to provinces, districts, and health centers, but it was seen that they were still uninformed and did not use the strategy in accordance with reality, and there were no measures to prepare for disaster preparedness*'. (Male, 58 years old, MOH)

4. DISCUSSION

Globally, water is recognized as being core to sustainable development, healthy ecosystems, and human well-being. While the Lao PDR is generally well-endowed with water resources, rapid economic growth, development activities such as hydropower, mining, tourism, urbanization, and population growth increase the demand for water (UN-Water, 2020). The effects of climate change, including increased frequency and intensity of water-related disasters, also create new water security challenges. These emerging challenges highlight the need for integrated and adaptive water management strategies to enhance resilience and ensure sustainable water security in the face of a changing climate (McCartney & Brunner, 2020; Di Vaio *et al*., 2021). This study identifies insights into some of the facilitators and barriers to implementing water-related policy in Lao PDR, from the perspective of key stakeholders from the central, provincial, and district levels.

The present study indicates that the Lao PDR has relevant institutional frameworks in place to facilitate and regulate actions towards ensuring water security through an IWRM approach. Governance arrangements, that is the political, social, economic, and administrative elements that regulate, influence, and shape water use and disaster risk, however, are weak (Pahl-Wostl, 2017), hindering effective policy implementation and capacity to respond to emerging challenges in water security. Strengthening these governance structures is essential for maximizing the potential of existing frameworks and ensuring sustainable water management (Raja Noriza Raja Ariffin *et al*., 2024).

Water governance arrangements require multi-sectoral decision-making and coordination. Our study, however, supports McCartney & Brunner's (2020) study that institutional fragmentation and technical challenges prevent solutions that achieve multiple cross-sectoral objectives are missed despite the amended Water Law and associated strategies recognizing the need for cross-sectoral, collaborative decision-making. Participants acknowledged, for example, the challenges of working across diverse sectors and in practice, collaboration and information sharing were limited. This is not that surprising as within the Lao PDR there are a few initiatives or incentives for multi-sectoral collaborations or decision-making processes (McCartney & Brunner, 2020). This, however, acts as a barrier to comprehensive water management and security (Maher & Buhmann, 2019; McCartney & Brunner, 2020). For example, the Meteorological Department and the Dam Department work independently of one another. The study indicates that water-related policies are driven from the top down, often ignoring alternative perspectives (Maher & Buhmann, 2019). Top-down processes also result in overlapping responsibilities and unclear mandates, further impeding collaborative efforts and undermining the effectiveness of governance frameworks (Voorn *et al*., 2012; Maher & Buhmann, 2019).

The study found that effective water governance arrangements are hampered by a lack of skilled institutional capacity including personnel and technical expertise, infrastructure, and budget. Effective policy implementation, however, requires technical expertise, financial ability, and coordination within and across borders (Abd Rahman *et al.*, 2024). Insufficient infrastructure, for example, further exacerbates water management and policy implementation, especially in areas routinely exposed to water-related disasters (UN-Water, 2018; Houghton *et al*., 2021; MONRE, 2021b). This is at a time when the Lao PDR is increasingly vulnerable to growing water security challenges, due to climate change and increased risks of water-related hazards such as floods and droughts. Further, the combined effects of climate change and increased frequency and intensity of water-related disasters are threatening rural livelihoods and are an important part of water governance. Climate change and its impacts particularly threaten rural livelihoods, where communities depend heavily on agriculture and natural water resources (Roy *et al.*, 2024). As climate change intensifies, adaptive and participatory governance frameworks are essential to enhance community resilience and build resilience in complex systems and the capacity to adapt to changing contexts. In Lao PDR, however, capacity is constrained by water governance being addressed largely through a conventional administrative approach to governance with efforts to improve water governance and security focused on creating new legislation and policies but with limited community engagement or opportunities for the flexibility and collaborative learning needed to enable adaptive governance (Agarwal, 2020). From this more technocratic perspective, the social implications – such as equitable access to water resources and decision-making power – are undermined (Agarwal, 2020). In this study, this technocratic approach is seen, for example, by a few participants mentioning equity and justice dimensions of water security, including gender dimensions. This technocratic approach tends to ignore the voices and needs of people who are economically disadvantaged or lack political influence. In contexts such as Lao PDR for example, rural women are often responsible for water collection and its management at the household level and face unique challenges during water crises, yet are rarely included in water governance decision-making (Rong *et al*., 2023).

Further emphasizing the technocratic approach to governance, the study revealed significant variation in awareness of water-related policies and strategies across different government levels and sectors. Central-level participants were generally well-informed about policies on water safety, disaster management, and watershed strategies. In contrast, awareness at the provincial and district levels was inconsistent, with many district-level participants lacking knowledge due to inadequate dissemination of information. Participants also suggested the need for increased sensitization and publicity with relevant government agencies and other stakeholders as has been noted elsewhere (Adom & Simatele, 2021). This is important for ownership at all levels of the water system. The challenge, however, is converting complex knowledge into language that is easily accessible to a range of stakeholders enabling a more inclusive approach and opportunities to participate in collaborative discussions about water security (Rogers, 2006; von der Porten *et al.*, 2016).

4.1. Strengths and limitations

This study took a qualitative approach to a complex, multi-sectoral water-related security issue. As a qualitative study, we did not use specific indicators of water governance or attempt to measure the implementation gap. Further, the study may not be representative of all the views and experiences in the implementation of existing water laws, policies, and strategies. There is also the possibility of social desirability bias, especially where provincial and district officials were present during the data collection process. Nonetheless, the large sample size and the inclusion of many different actor groups strengthen the validity of this study. Finally, while we recognize the role of culture and social norms on water security (Voorn, 2008), this aspect was beyond the scope of the current study.

5. CONCLUSIONS

Effective water governance is critical for a society's overall well-being, including equitable access to water, and resilience to climate change and water-related disasters. The Lao PDR has a strong legal and policy framework for water management, but it is not fully implemented. The current technocratic approach to governance in practice, however, prevents the effective implementation of e-policies and strategies. To reach their full potential, the institutions that support the implementation of the legal and policy frameworks require an enabling environment for meaningful dialogue and collaboration. Such an approach, however, requires more than policies and strategies; rather, it requires a fundamental shift in approach and power dynamics to enable a more adaptive approach that gives more power and ownership to communities and potentially allows for more creative, local problem-solving. Such an approach, however, also requires more effort directed towards an integrated, collaborative planning process, recognizing that these will require trade-offs in taking a more holistic approach to balancing water security needs with other socio-economic priorities. More pragmatically, financial and non-financial barriers need to be addressed, including investing in improved communication and policy dissemination and increasing human and infrastructure capacity. While a shift to more adaptive governance is recommended, managing the tensions and finding a balance between stability and flexibility is also likely to be needed to reflect the complexity of water security and the socio-economic and political context of the Lao PDR.

6. RECOMMENDATIONS

The following recommendations aim to enhance the effectiveness of water policy implementation.

(1) *Enhance dissemination and awareness:*
- Expand outreach: Implement comprehensive strategies to effectively communicate water-related policies at the provincial and district levels using workshops, training sessions, and digital platforms.
- Targeted training: Offer targeted training for provincial and district officials to bridge knowledge gaps and improve local policy implementation capacity.

(2) *Improve technical capacity and resources:*
- Invest in infrastructure: Allocate more funding and resources to improve technical capacity and infrastructure for effective IWRM and disaster response.
- Develop guidelines: Create detailed guidelines for water policy implementation, clarifying departmental responsibilities and procedures.

(3) *Enhance communication and collaboration:*
- Foster collaboration: Establish mechanisms for better coordination and information sharing among water management departments, such as through regular meetings and joint task forces.
- Centralize data: Develop a centralized platform for sharing water management data to improve collaborative efforts and decision-making.

(4) *Strengthen law enforcement:*
- Enforce penalties: Ensure consistent application of penalties in water-related legislation to enhance compliance and strengthen monitoring and enforcement mechanisms.
- Increase transparency: Implement systems for transparent reporting and accountability to track penalty application and law enforcement effectiveness.

(5) *Provide implementation guidance:*
- Develop clear guidelines: Distribute detailed guidelines outlining the roles and responsibilities of departments and stakeholders in implementing water policies.

– Regular updates: Keep districts and health centres informed about new policies and strategies, providing support to facilitate effective implementation.

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AUTHOR CONTRIBUTIONS

All the authors have together participated in the design of the study. V.Sychareun, S.T., V.V., P.P., V.Somphet, K.D., and V.T. were involved in the interview and supervised the data collection process. V.Sychareun, V.V., S.T., and J.D. analyzed the data together, V.Sychareun, S.T., V.V., and J.D. have participated in the interpretation of data and preparation of the manuscripts. All the authors have read and approved the final manuscript.

DATA AVAILABILITY STATEMENT

Data cannot be made publicly available; readers should contact the corresponding author for details.

CONFLICT OF INTEREST

The authors declare that there is no conflict.

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