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Effective Stakeholder Engagement in Integrated River Basin Management within the Context of Water Resources in Malaysia

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Abstract

Integrated River Basin Management (IRBM) has become increasingly vital in addressing the complex issues surrounding global water resources management, with stakeholder engagement recognised as one of the crucial elements for IRBM. This study aims to develop a comprehensive conceptual framework for stakeholder engagement tailored to Malaysia's IRBM context, ensuring more effective collaboration in addressing water resource issues. It seeks to identify gaps in existing stakeholder engagement frameworks and examines their perspectives on IRBM to determine key factors that influence effective engagement. This study determined the type and mechanism of stakeholder engagement, identified key stakeholders and selection criteria, examined the factors that contribute to effective engagement from individual stakeholder perspectives, and analysed organisational roles and perspectives that contribute to effective stakeholder engagement. The research hypothesis suggested that inclusiveness, engagement strategies, stakeholder characteristics, organisational factors, and cultural and religious aspects influence stakeholder engagement effectiveness in IRBM. A mixed-method experimental design is adopted, combining quantitative survey data and qualitative interview insights to provide a holistic understanding of stakeholder engagement dynamics. It highlights the importance of inclusive engagement, selection criteria, information access, local knowledge integration, and navigating diverse interests for fostering collaborative solutions. These engagement methods prioritise effective leadership in water management, as well as the establishment of monitoring and evaluation tools. The findings from the surveys identified a

spectrum of factors affecting the effectiveness of stakeholder engagement across three stages of the engagement process: pre-engagement, during-engagement, and post-engagement. The response from the interviews not only validated most of the surveys' findings but also provided further insights, such as the need for adequate financial resources and the caution on involving politicians during the engagement processes. A robust conceptual framework is developed, outlining five independent variables crucial for successful stakeholder engagement: inclusiveness, engagement strategies, stakeholder characteristics, organisational factors, and cultural and religious aspects. Unlike existing IRBM engagement models, this framework integrates cultural, religious, and governance factors tailored to Malaysia's socio-political landscape. The effectiveness of engagement is determined by three dependent variables: knowledge transfer, decision impact, and stakeholder satisfaction; enhanced by adopting multi-stakeholder platforms (MSP), the Environmental, Social, and Governance (ESG) principles, and the whole-of-government and society (WGS) approaches. Major findings reveal that stakeholder engagement effectiveness is significantly enhanced when cultural and religious considerations are incorporated alongside governance-driven strategies. The study highlights the urgent need for an improved stakeholder engagement framework in Malaysia to address water issues and challenges. It provides a structured approach to refining IRBM policies, equipping policymakers with strategies for more inclusive, transparent, and multidisciplinary participation. By fostering collaborative problem-solving, this study also establishes a foundational reference for future IRBM policy development and research.

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List of Acronyms

ADB	Asian Development Bank
AEAM	Adaptive Environmental Assessment and Management
ASM	Academy of Sciences Malaysia
AWS	Alliance for Water Stewardship
CSO	Civil Society Organisation
CSR	Corporate Social Responsibility
DID	Department of Irrigation and Drainage, Malaysia
DOE	Department of Environment, Malaysia
EPA	Environmental Protection Agency, USA
ESG	Environmental, Social, and Governance
EU WFD	European Union Water Framework Directive
FoR	Friends of River
GEC	Global Environment Centre
GLC	Government-Linked Company
GWP	Global Water Partnership
IAP2	International Association for Public Participation
IPCC	Intergovernmental Panel on Climate Change
IRBM	Integrated River Basin Management
IWRM	Integrated Water Resources Management
LUAS	Lembaga Urus Air Selangor

MARDI	Malaysian Agricultural Research and Development Institute
MITI	Ministry of International Trade and Industry, Malaysia
MOU	Memorandum of Understanding
MPC	Malaysian Productivity Corporation
MRC	Mekong River Commission
MSP	Multi-Stakeholder Platform
MyCDNet	Malaysian Capacity Development Network for Sustainable Water Management
MyWP	Malaysian Water Partnership
NAHRIM	National Water Research Institute Malaysia
NGO	Non-Governmental Organisation
NRECC	Ministry of National Resources, Energy, and Climate Change, Malaysia
NWRP	National Water Resources Policy of Malaysia
OECD	Organisation for Economic Co-operation and Development
PETRA	Ministry of Energy Transition and Water Transformation, Malaysia
RBO	River Basin Organisation
REDAC	USM River Engineering and Urban Drainage Research Centre, University Science Malaysia
RHS	Rainwater Harvesting System
ROL	River of Life

R&D	Research and Development
SDG	Sustainable Development Goals
SE	Stakeholder Engagement
SPAN	National Water Services Commission, Malaysia
SPSS	Statistical Package for the Social Sciences
SWMA	Selangor Water Management Authority
TOR	Terms of Reference
UiTM	University Technology MARA, Malaysia
UM	University of Malaya
UKM	University Kebangsaan Malaysia
UNFCCC	United Nations Framework Convention on Climate Change
VTNA	Vietnam Technology Needs Assessment
WGRF	Water Governance Reform Framework
WGS	Whole-of-Government and Society
WRDPP	Water Regulatory Division Pulau Pinang
WWF	World Wide Fund for Nature

List of Published Papers

Chapter 2

Lim, C.H., Wong, H.L., Elfithri, R., Teo, F.Y. (2022) A Review of Stakeholder Engagement in Integrated River Basin Management. *MDPI Water*, 14(19). <https://doi.org/10.3390/w14192973>.

Chapter 3

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Chapter 4

Lim, C.H., Elfithri, R., Gibbins, C.N., Teo, F.Y. (2025) Stakeholder Engagement in Integrated River Basin Management: Understanding Organisational Roles and Perspectives in Malaysia. *International Journal of River Basin Management*. This paper is under consideration for peer review.

Chapter 5

Lim, C.H., Elfithri, R., Gibbins, C.N., Teo, F.Y. (2025) Conceptual Framework for Effective Stakeholder Engagement in Integrated River Basin Management in Malaysia. *MDPI Water*. This paper is under consideration for peer review.

Other related publications

Lim, C.H. and Teo, F.Y. (2024) Public Outreach Programme for Integrated Water Resources Management. In, *Proceedings of 2nd International Conference on Water and Environment for Sustainability (ICWES) and 7th Postgraduate Colloquium of Environmental Research (POCER) 2024*. Kuala Lumpur, Malaysia.

Lim, C.H. and Teo, F.Y. (2022) Management of Water Resources at River Basin Level. In, *Proceedings of 1st International Conference on Water and Environment for Sustainability 2022*. Kuala Lumpur, Malaysia.

Lim, C.H. (2017) Strategic Plan for Integrated River Basin Management (IRBM) in Malaysia, *Academy of Sciences Malaysia Position Paper* prepared for the Ministry of Science, Technology and Innovation, Malaysia.

Chapter 1 General Introduction

1.1 Overview

This chapter begins by providing the general background of the study, including the uniqueness of Malaysia's river basins. It proceeds to highlight the related perspectives and concepts of stakeholder engagement in river basin management. It then presents the problem statement, the study's aim, objectives, and scope. The structure of the thesis is illustrated at the end of the chapter.

1.2 Background of the study

Malaysia's river basins present unique challenges that necessitate the implementation of IRBM. The country experiences substantial rainfall, with a mean annual precipitation of 3,085 mm (DID Website, 2024), leading to high river discharge and frequent flooding, particularly during monsoon seasons. Moreover, the hydrological pattern in terms of spatial and temporal variability necessitates adaptive management strategies to mitigate both flood and drought risks and ensure water security. Malaysia's river basins are uniquely diverse, both geographically and in terms of the challenges they face regarding water resource management. The country's 189 major river basins span a wide range of environments, from urbanised catchments to pristine rainforest basins, each with distinct water management issues. Rapid urbanisation along river corridors, especially in cities like Kuala Lumpur, Penang, and Johor Bahru, has intensified land-use pressures, resulting in increased sedimentation, pollution, and heightened flood risks. This urban expansion often leads to informal settlements along riverbanks, where inadequate

sanitation infrastructure contributes to water pollution. Furthermore, Malaysia's rivers support rich freshwater biodiversity, including endangered species such as the Malayan mahseer; however, they face threats from hydropower projects, uncontrolled logging, agricultural runoff, and industrial pollution, necessitating conservation-focused management approaches to address water quality deterioration and ecosystem preservation. Compounding these issues, institutional fragmentation among federal, state, and local agencies leads to inefficiencies in river management, highlighting the need for improved coordination across governance levels. These interconnected challenges highlight the urgent need for a more integrated, community-inclusive, and ecologically sustainable IRBM framework tailored to Malaysia's distinct river basin conditions.

The failures of several river basin projects in Malaysia highlight the critical need for stronger stakeholder engagement and governance reforms in IRBM (Tan and Mokhtar, 2009; Mazlin et al., 2010). The Penang River Flood Mitigation Project in the state of Penang faced prolonged delays due to weak coordination between federal and state authorities and minimal community participation, leaving flood risks unresolved (Chan, 2012). Similarly, the 2019 Kim Kim River crisis in Johor exposed failures in regulatory enforcement, as poor coordination between local agencies delayed response efforts and heightened public health risks. The ongoing Muda River water dispute between Kedah and Penang exemplifies the challenges of transboundary water governance, where the absence of structured mediation frameworks has hindered long-term water sharing agreements (Hezri and Hasan, 2006). Additionally, marginalised communities, including undocumented settlers along riverbanks,

are often excluded from IRBM decision-making, limiting their access to beneficial flood mitigation measures, resettlement programs, and water quality improvements. The Klang River, which runs through Malaysia's capital Kuala Lumpur, has been plagued by pollution for decades. Despite multiple efforts to clean up the river, the pollution levels remain relatively high due to untreated industrial waste, illegal dumping, and poor waste management systems. The key issue is attributed to poor coordination between stakeholders, including local authorities, private industries, and the public. Without inclusive participation, top-down IRBM strategies continue to fall short in addressing pollution control and disaster management challenges (Hezri and Hasan, 2006).

The United Nations has repeatedly advocated good water governance by implementing the principles of Integrated Water Resources Management (IWRM), as the key to sustainable water management (UNEP, 2021). Implementing the principles of IWRM at the river basin level is generally referred to as Integrated River Basin Management (IRBM). The World Wide Fund for Nature (WWF) in its 2003 publication 'Managing Rivers Wisely', defined Integrated River Basin Management (IRBM) as the process of coordinating conservation, management, and development of water, land, and related resources across sectors within a given river basin, to maximise the economic and social benefits derived from water resources equitably while preserving and, where necessary restoring freshwater ecosystems (GWP, 2000; WWF, 2006).

The Dublin Conference on Water and the Environment, held in 1992, stressed the importance of stakeholder involvement and

agreed that water development and management should be based on a participatory approach (GWP, 2004). In this respect, stakeholder engagement is one of the pillars of IWRM and IRBM and plays a significant role in achieving the requirements and impact of good water governance (UN Water, 2015). With the Sustainable Development Goals (SDGs) officially endorsed in September 2015 at the United Nations Conference, it was agreed that by 2030, SDG 6.5 will be globally achieved through integrated water resources management being implemented at all levels, including basin, sub-basin, and transboundary basin (UN Water, 2015). The realisation of this goal could be enhanced via SDG 17, which seeks to encourage and promote effective public-private-civil society partnerships, capitalising on their respective capacities and experiences in resource management.

Stakeholder engagement in water management has long been practiced in the Global North, especially in Europe. In the Netherlands, the Polder Boards were established in the 10th Century with the participation of local landowner organisations; and in Spain, the involvement of water irrigation associations can be traced back to Roman and Arab times (Patel and Stel, 2004). In the tropical region of Southeast Asia, stakeholder engagement was carried out in the Mekong River Basin to maximise the values and functions of ecosystems in the lower Mekong River, and to address the poverty issue in member countries.

In Malaysia, the importance of stakeholders has been encapsulated in various policies, including the first National Policy on the Environment 2002, which clearly states that integrated and effective coordination among stakeholders shall be enhanced to achieve efficient environmental management and protection

(MOSTE, 2002). Similarly, the National Water Resources Policy of Malaysia (NRE, 2012) emphasises that water resources security shall be made a national priority through sustainable use, conservation, and effective management of water resources, enabled by a mechanism of shared partnership involving all stakeholders. Moreover, one of the three fundamental principles of this policy is collaborative governance, which stipulates that stakeholder inclusiveness and collaboration are essential for ensuring the security and sustainability of water resources and achieving common goals toward addressing multiple water resources governance concerns and priorities (NRE, 2012).

During the AsianWater Conference held on December 13, 2022, the Deputy Secretary-General of Water and Sewerage from the then National Resources, Energy, and Climate Change Ministry (NRECC) of Malaysia urged all state governments to implement the IRBM approach as a long-term measure to ensure rivers are well managed and preserved. It was also emphasised that: *"IRBM is an ideal approach but requires the involvement of all key stakeholders to achieve the objectives of ensuring sufficient and clean water, reducing flood risk, and improving environmental conservation."*

Stakeholder engagement has become a catchword in every river or water management-related event in Malaysia; however, a few major concerns and challenges must be addressed. Firstly, hardly any literature investigates the factors that impact the effectiveness of stakeholder engagement in IRBM for countries in the tropics. In Malaysia, there is no standard, guideline, or framework for stakeholder engagement in IRBM for any agency to comply with, and it has been left to consultants to devise

approaches to carry out stakeholder engagement. It is also important to ascertain to what extent the government's political will allows full participation from relevant NGOs, civil society organisations, academicians, and local communities towards water resources planning and management. The broad agreement over the need for stakeholder engagement in Malaysia, set against the limited guidance on how it can be best achieved, provides the context for this thesis.

1.3 Perspectives of stakeholder engagement in river basin management

1.3.1 Philosophical foundations of stakeholder engagement

Stakeholder engagement in river basin management is underpinned by fundamental philosophical principles stressing democracy, participation, and inclusivity. These principles are rooted in the ethical and moral dimensions of engaging stakeholders in decision-making processes related to managing natural resources, particularly in river basins.

At the core of stakeholder engagement is the democratic principle that all individuals and groups affected by decisions related to river basin management should have the opportunity to participate in the decision-making process. This principle aligns with the notion of democratic governance, which emphasises the importance of inclusive and transparent decision-making processes that reflect the diverse interests and perspectives of stakeholders (Young, I. M., 2000).

The philosophical foundation of stakeholder engagement also emphasises the value of empowerment through meaningful participation. This entails more than mere consultation; it involves active involvement in decision-making, planning, and implementation processes (Reed, M.S., 2008). There must be meaningful participation that acknowledges stakeholders' expertise, local knowledge, and experiences, recognising their unique contributions to the sustainable management of river basins.

Another key philosophical underpinning of stakeholder engagement is inclusivity, which emphasises that all relevant stakeholders, including marginalised or underrepresented groups, can participate in decision-making processes. Inclusivity also addresses power imbalances and promotes equity in sharing the benefits and shouldering the burdens associated with river basin management.

In short, all these foundations provide a philosophical framework for understanding the rights, fairness, and responsibilities imperatives associated with engaging stakeholders in the decision-making processes of integrated river basin management, which is shaping the main direction of this study.

1.3.2 Intellectual perspectives on stakeholder engagement

Stakeholder engagement is critical to effective river basin management, enabling inclusive decision-making processes that account for diverse interests and values. For this, it is appropriate to explore a few important intellectual perspectives that have shaped the discourse on stakeholder engagement, namely social

capital theory, deliberative democracy, and adaptive governance. By examining these perspectives, it is possible to elucidate how they inform our understanding of stakeholder roles, relationships, and responsibilities in the context of river basin management.

Social capital theory focuses on social networks and relationships among individuals and groups contributing to collective action and societal well-being. In the realm of river basin management, social capital plays a pivotal role in fostering collaboration and trust among stakeholders. Bridging and bonding social capital mechanisms facilitate communication and cooperation among diverse stakeholders, ranging from governmental agencies and non-governmental organisations to local communities and businesses (Putnam, 1995).

Deliberative democracy emphasises the importance of inclusive and reasoned discourse in decision-making processes. It advocates for the active participation of stakeholders in deliberative forums where diverse perspectives are considered, and consensus is sought through reasoned dialogue (Habermas, 1996). In the context of river basin management, deliberative democracy frameworks promote transparency, accountability, and legitimacy in decision-making, empowering stakeholders to contribute meaningfully to policy formulation and implementation.

Adaptive governance emphasises the need for flexible and adaptive approaches to address uncertainty and complexity in natural resource management, including water. Rooted in resilience theory and complexity science, adaptive governance frameworks advocate for iterative learning, experimentation, and

adaptation in response to changing environmental and social conditions (Folke et al., 2005). In river basin management, adaptive governance enables stakeholders to navigate dynamic water resource systems, anticipate emerging challenges, and adjust management strategies accordingly. From a democratic society viewpoint, Videira et al. (2009), citing De Marchi and Ravetz (2001), say that engagement or participatory processes may lead to widening the span of policy issues including all sectors of society, thus delivering a decision-making style that is more responsible to democratic principles and improving the quality of decision through the inclusion of diverse and multiple perspectives.

All these intellectual perspectives and concepts have profound implications for stakeholder roles, relationships, and responsibilities in river basin management. By embracing the principles of social capital theory, deliberative democracy, and adaptive governance, stakeholders can forge robust partnerships, cultivate trust-based relationships, and navigate complex river basin and water resources challenges more effectively.

1.3.3 Conceptual models for stakeholder engagement

Stakeholder engagement in water and natural resources management may be guided by many conceptual models developed to understand the complex dynamics of stakeholder interactions, power relations, conflict resolution, and collaborative decision-making. One of the central concerns in stakeholder engagement is the analysis of power dynamics among different stakeholders. Various conceptual models, such as the Power Cube framework developed by John Gaventa

(2006), offer a systematic approach to understanding power relations within stakeholder groups and how power asymmetries can influence decision-making processes. This model identifies three dimensions of power - visible, hidden, and invisible - that shape stakeholder interactions and can impact the outcomes of natural resource management initiatives.

Conceptual models for analysing conflict resolution in stakeholder engagement emphasise the importance of addressing and managing conflicts that may arise among stakeholders with divergent interests and values. For example, the Mutual Gains Approach, developed by Roger Fisher and William Ury (2011), provides a collaborative negotiation and problem-solving model, focusing on creating value and building consensus among stakeholders to resolve conflicts and achieve mutually beneficial outcomes in natural resource management.

Several other conceptual models have also been developed to facilitate collaborative decision-making processes among stakeholders in natural resource management. For example, the Adaptive Environmental Assessment and Management (AEAM) framework, proposed by Lee Gunderson and colleagues (1999), emphasises the importance of adaptive governance and collaborative learning in addressing complex environmental challenges. This framework promotes the integration of diverse stakeholder perspectives and knowledge to inform decision-making and adaptive management strategies.

In the specific context of integrated river basin management, conceptual frameworks such as the Integrated Water Resources Management (IWRM) framework provide a holistic approach to

stakeholder engagement, emphasising the interconnectedness of social, economic, and environmental dimensions of water resource management. The IWRM framework promotes the active involvement of diverse stakeholders in decision-making processes, recognising the interdependencies and trade-offs associated with managing water resources within a river basin.

In terms of typology, various models have been conceptualised depending on the degree of the participant's involvement in the decision-making process (Carr G., 2015). Arnstein's (1971) 'Ladder of Citizen Participation' consists of 8 rungs arranged in a linear way to indicate levels of citizens' control and power in development projects, with the higher rung indicating greater public involvement. Pretty's (1995) typology classifies participation according to the extent of participants' involvement in activities and their control over outcomes. Similarly, Michener (1998) classifies participation according to whether it is planner-centered or people-centered. Luyet et al. (2012) maintain that any model on stakeholder engagement must possess its ability to adapt to different contexts, its holistic nature, its ability to integrate social and technical sciences, and its combination of these with practical participatory tools and mechanisms. Larson, S. et al. (2009) and Antunes, P. et al. (2008) suggest that monitoring and evaluating the success of stakeholder engagement is an essential part of the engagement process.

Arnstein's ladder has been further extended by Fung (2006) who conceptualises participation in three dimensions which cover: i) those who participate (elected officials, state administrators, professional stakeholders, lay stakeholders, and public), ii) how they communicate (provide technical expertise, deliberate and

negotiate, and express preferences), and iii) how much authority and power they have (direct authority, co-governance, advise and consult, communicative influence, and personal benefits). Another type of conceptualisation has been proposed by van den Hove (2000) based on the type of interaction taking place between participants, from an entirely cooperative situation to an entirely conflictive environment. Hulbert and Gupta's (2015) 'Split Ladder of Participation' is an adaptation of Arnstein's ladder that has been less discussed. Aside from identifying levels of participation, the split ladder advances the framework by splitting the ladder into an X-style split ladder with four distinct quadrants that relate to the problems and issues that can affect water resources.

All these approaches and models reinforce theoretical concepts and provide practical guidance for effectively engaging stakeholders in the sustainable management of natural resources, including water resources.

1.4 Problem statement

Effective river basin management is crucial for addressing challenges such as water scarcity, ecosystem degradation, and the impact of climate change. IRBM is widely recognised as a holistic approach that accounts for interconnections within a river basin and balances diverse stakeholder interests. However, the success of IRBM depends on structured and meaningful stakeholder engagement, which remains inconsistent and ineffective in Malaysia.

The absence of a standardised framework or guidelines for stakeholder engagement has led to fragmented implementation

across different river basins, with variations in approach among authorities. This inconsistency weakens coordination, reduces the quality of stakeholder contributions, and hampers the development of a comprehensive IRBM plan.

In addition, effective stakeholder engagement in IRBM in Malaysia is hindered by fragmented governance and weak institutional coordination. The division of responsibilities among federal, state, district, and local authorities often results in overlapping mandates, inconsistent policies, and inefficient decision-making. Moreover, existing engagement mechanisms are fragmented and do not always facilitate meaningful participation, particularly among districts and authorities within the river basin. The lack of a unified, cross-jurisdictional stakeholder platform makes it harder to address basin-wide challenges.

Due to the absence of proper stakeholder mapping, existing engagement mechanisms do not always facilitate meaningful participation, particularly among local communities and non-governmental organisations, despite their critical role in sustainable river basin management. As such, the engagement process often fails to incorporate local and indigenous knowledge, overlooking valuable insights for sustainable water management.

Additionally, communication barriers further weaken collaboration, leading to gaps in knowledge-sharing and ineffective coordination among stakeholders. Moreover, external pressures such as climate change, rapid urbanisation, and competing water demands add complexity to river basin management, highlighting the need for a more adaptive and

integrated approach to stakeholder engagement. There is also a significant gap in monitoring and evaluating stakeholder engagement effectiveness, preventing continuous improvement by the agency concerned.

At the national level, Malaysia's IRBM framework is shaped by policies such as the National Water Resources Policy (2012) and the IWRM framework. However, challenges in implementation arise due to variations in governance structures across different states, where jurisdictional conflicts and resource constraints affect the effectiveness of stakeholder engagement. While some states have established river basin organisations to facilitate coordination, others face institutional and technical limitations that impede collaborative decision-making. At the regional level, transboundary river basins such as the Muda, Klang, and Johor River Basins require enhanced multi-stakeholder cooperation to address issues such as water resource allocation, pollution control, and flood management. Differences in economic priorities and land use planning between upstream and downstream regions further complicate integrated river basin governance. These challenges highlight the need for a coordinated framework that strengthens stakeholder engagement strategies across multiple governance levels.

Given the increasing pressures on Malaysia's river basins, a structured and inclusive approach to stakeholder engagement is essential. Developing a comprehensive framework that addresses these challenges will result in ensuring participatory, adaptable, and effective stakeholder involvement in IRBM for Malaysia.

1.5 Development of the proposed conceptual framework

The proposed conceptual framework will be developed through an iterative process that integrates both theoretical foundations and empirical validation. The conceptual framework for this study is developed by integrating multiple theoretical perspectives to provide a comprehensive foundation for analysing effective stakeholder engagement in IRBM in Malaysia. Stakeholder engagement is a critical component of IRBM, as it ensures that diverse interests are represented, promotes collective decision-making, and enhances the sustainability of water resource management. A well-structured conceptual framework is essential for understanding the dynamics of stakeholder interactions, identifying challenges, and proposing strategies to strengthen engagement in IRBM. This study draws on four to five theoretical frameworks that collectively offer a holistic perspective on stakeholder participation, governance mechanisms, and adaptive management in the Malaysian context.

The first theoretical framework, Stakeholder Theory, provides a foundation for identifying and categorising stakeholders involved in IRBM, highlighting their roles, influence, and interests. Given Malaysia's multi-tiered governance structure, where federal, state, and local authorities interact with non-governmental organisations, businesses, and communities, this theory helps clarify the complexities of stakeholder relationships and the need for inclusive decision-making. The second framework, Collaborative Governance Theory, builds upon this by emphasising the importance of cooperation, shared responsibilities, and institutional mechanisms that facilitate stakeholder participation. This is particularly relevant in Malaysia,

where IRBM requires strong coordination among government agencies such as the DID Malaysia, state water authorities, and private sector entities.

Social Network Theory serves as the third pillar, offering insights into the structure and strength of stakeholder relationships. Effective engagement in IRBM depends on well-connected networks that promote knowledge-sharing and trust among actors. By mapping these relationships, the study can assess whether stakeholder interactions in Malaysia foster meaningful collaboration or remain fragmented. The fourth framework, Adaptive Management Theory, contributes a practical dimension, demonstrating how iterative learning and flexibility in stakeholder engagement enable IRBM to respond to emerging water management challenges. Given Malaysia's exposure to climate variability and urban expansion, an adaptive approach ensures that policies and management strategies remain relevant and effective over time. Additionally, Communication Management Theory is incorporated to address the critical role of dialogue, transparency, and conflict resolution in multi-stakeholder settings. Clear and effective communication strategies are essential for bridging gaps between scientific knowledge, policy directives, and community concerns in Malaysian IRBM.

To visually represent the relationships among these theoretical foundations, a conceptual model is developed, mapping key constructs and their interactions. This model clarifies how these theories complement one another, offering a structured approach to improving stakeholder engagement in IRBM. Through this synthesis, the conceptual framework provides a clear pathway for addressing the research questions, aligning theoretical

insights with practical applications. Ultimately, this approach ensures that findings contribute to strengthening water governance and promoting sustainable river basin management in Malaysia.

Initially, a systematic literature review will be conducted to identify existing stakeholder engagement models in IRBM and related fields. This review will provide the theoretical foundation, highlighting best practices, gaps, and contextual considerations relevant to Malaysia's river basins.

Subsequently, empirical data will be collected through survey questionnaires and interviews with key stakeholders, including government agencies, NGOs, local communities, and industry representatives. These methods will capture both individual perspectives and institutional insights, ensuring a holistic understanding of engagement challenges and opportunities. The findings from these empirical investigations will then be analysed to refine the framework, ensuring that it is not only theoretically sound but also practically applicable. By triangulating insights from literature, surveys, and interviews, the framework will be both conceptually robust and tailored to real-world IRBM implementation in Malaysia.

1.6 Aim and objectives of the study

This study aims to understand the perceptions of stakeholder engagement in Integrated River Basin Management (IRBM) in Malaysia and use this understanding to develop a conceptual framework for its application in the country.

In view of the problems mentioned above, the objectives of the study are (see Figure 1.1):

- (a) to determine the type and mechanism of stakeholder engagement in IRBM;
- (b) to identify key stakeholders and selection criteria within the context of IRBM;
- (c) to examine the factors that contribute to the effective engagement from individual stakeholder perspectives in IRBM;
- (d) to analyse the organisational roles and perspectives that contribute to effective stakeholder engagement in IRBM; and
- (e) to develop a conceptual framework for effective stakeholder engagement in IRBM for application in Malaysia, towards addressing the national water resources management challenges.



Figure 1.1 Problem statements and objectives of the study

1.7 Scope and layout of the thesis

To address these objectives, the work carried for the thesis includes:

- i) Conducting a review of academic literature on stakeholder engagement in IRBM to identify key themes, concepts, and research gaps;
- ii) Screening and examining policy and related documents on the requirements for the needs for stakeholder engagement in water and river basin management studies;
- iii) Collection, analysis, and interpretation of empirical information obtained through survey questionnaires and interviews with a range of stakeholders; and

- iv) Development of a best practice conceptual framework in IRBM for Malaysia, based on the findings of i to iii.

Methodologically, the study adopts a triangulation approach, incorporating a systematic literature review, survey questionnaires, and interviews, as shown in Figure 1.2. The latter two of these involved collecting primary information from individuals involved in stakeholder engagement as well as obtaining organisational-level insights from selected government entities, as shown in Figure 1.3.

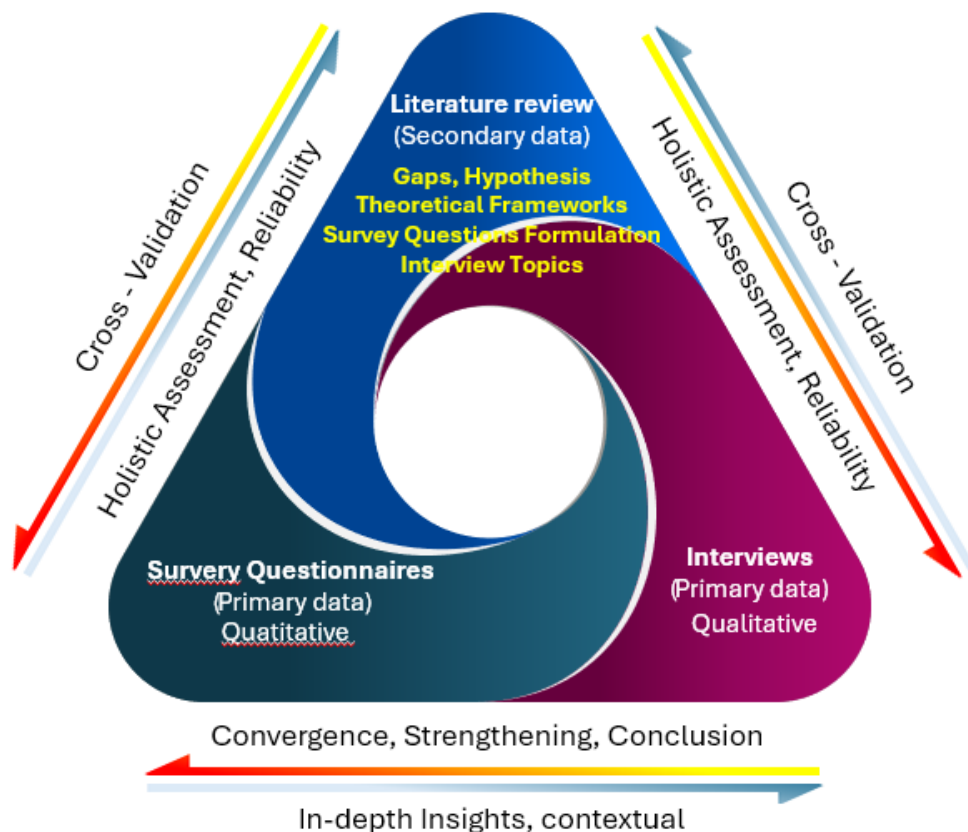


Figure 1.2 Triangulation approach for the study

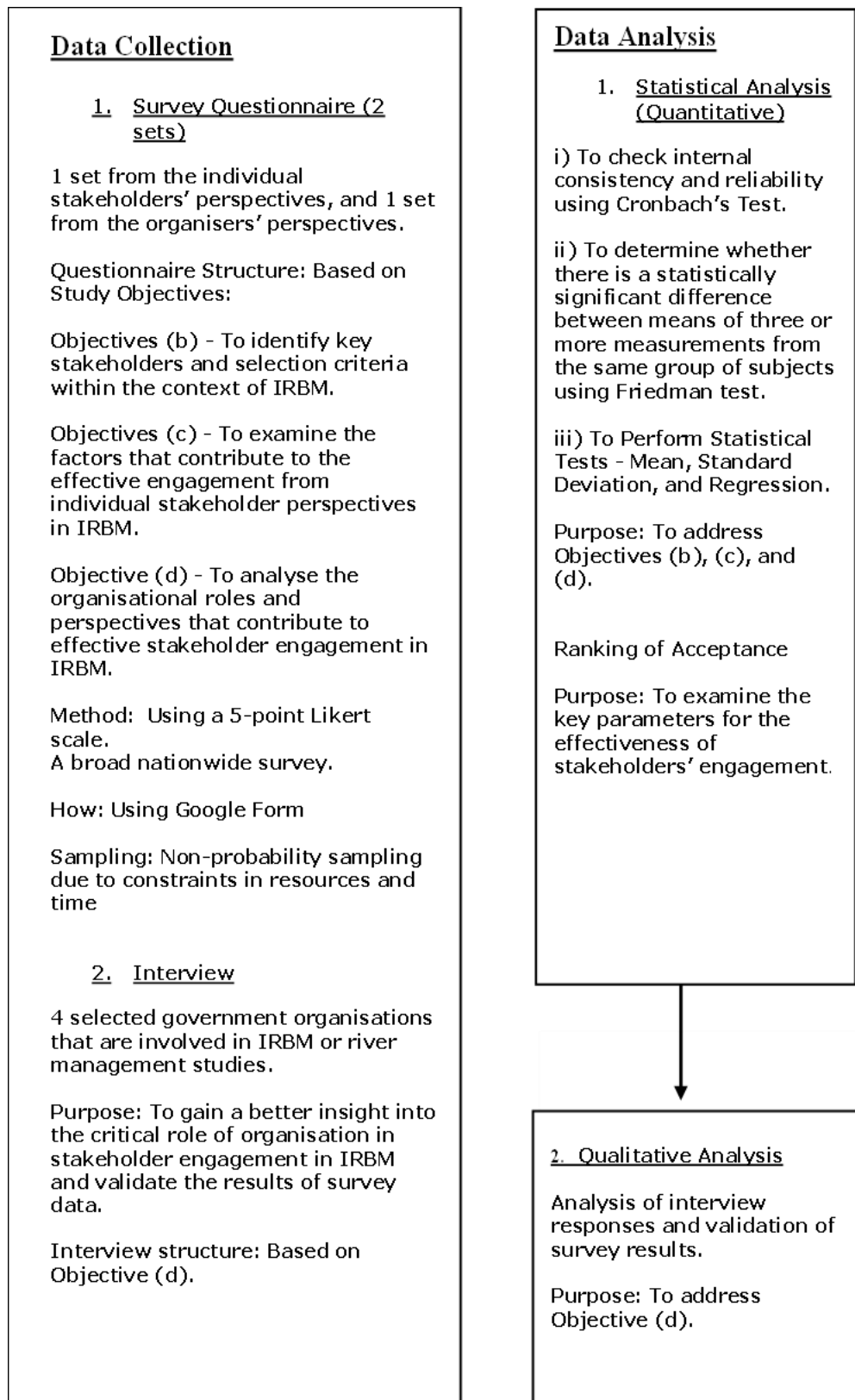


Figure 1.3 Methodology for primary data collection and analysis

The thesis is presented through 6 chapters. It follows a journal format (except Chapters 1 and 6), with each chapter containing its own abstract, introduction, methodology, results and discussion section, conclusion, and references. However, the references at the end of the thesis are from Chapters 1 and 6. Chapter 5 presents the proposed conceptual framework and is essentially the synthesis of the thesis, integrating all the empirical findings from the preceding chapters. The contents of Chapters 2 to 6 are as described below.

Chapter 2 - Literature Review

- Summarises existing literature, identifies research gaps, and sets the foundation for the study. The content of this chapter has already been published in the MDPI Water Journal in 2022, entitled "A Review of Stakeholder Engagement in Integrated River Basin Management" (*Water* 2022, 14, 2973). The chapter differs slightly from the published paper, as some changes and updates to the paper have been included here to make it more suitable as a literature review for this thesis.

Chapter 3 - Individual Stakeholder Perspectives of Public Engagement and Participation in Integrated River Basin Management

- Examines the perspectives of various individual stakeholders on public engagement and participation in IRBM.
- Analyse survey data for stakeholders to identify key trends and insights regarding stakeholder perceptions.

Chapter 4 - Stakeholder Engagement in Integrated River Basin Management: Understanding Organisational Roles and Perspectives in Malaysia

- Examines the roles and perspectives of organisations involved in IRBM in Malaysia.
- Analyses survey data for organisations to provide a comprehensive understanding of organisational roles and perspectives on stakeholder engagement.
- Analyses interview responses to gain a better insight into factors impacting stakeholder engagement and validate the survey results.

Chapter 5 - Conceptual Framework for Effective Stakeholder Engagement in IRBM in Malaysia

- Conducts document screening to determine any mandatory requirements to carry out stakeholder engagement.
- Examines the proposed three important elements of stakeholder engagement: namely, the independent variables, the enhancers, and the dependent variables.
- Develop a conceptual framework based on the study's findings.
- Proposes best practices and strategies for effective stakeholder engagement in the Malaysian context.

Chapter 6 - Conclusion and Recommendations

- Summarises the main findings of the study.
- Discuss the limitations of the research study.
- Provides recommendations for future research and practical applications for stakeholder engagement in IRBM.

Figure 1.4 below shows the layout structure of the thesis. As indicated in the figure, the four main chapters (Chapters 2 to 5) address the particular objectives of the study.

Effective Stakeholder Engagement in Integrated River Basin Management within the Context of Water Resources in Malaysia	
Chapter 1	<u>Introduction</u> • Problem Statement • Aim and Objectives • Scope of Research
Chapter 2	<u>A Review on Stakeholder Engagement in IRBM</u> (MDPI Journal Water 2022) Objective (a)
Chapter 3	<u>Individual Stakeholder Perspectives on Public Engagement and Participation in IRBM</u> (MDPI Journal Water 2022) Objective (a), Objective (b) & Objective (c)
Chapter 4	<u>Stakeholder Engagement in IRBM: Understanding Organisation Roles and Perspectives in Malaysia</u> Objective (d)
Chapter 5	<u>Conceptual Framework for Effective Stakeholder Engagement in IRBM in Malaysia</u> Objective (e)
Chapter 6	<u>Conclusion and Recommendations</u> • Summary of Main Findings • Limitations • Future Research

Figure 1.4 Layout structure of the thesis

Chapter 2 Literature Review

2.1 General note

This chapter is adapted from the review paper that was published in the MDPI Journal on Water in 2022 entitled “A Review of Stakeholder Engagement in Integrated River Basin Management” (*Water* 2022, 14, 2973. <https://doi.org/10.3390/w14192973>). It has been updated and modified to provide a review of published work that matches the breadth of material covered in the thesis.

2.2 Abstract

To address water-related issues of river pollution, floods, droughts, and ecological water allocations, an integrated river basin management (IRBM) plan for all the river basins in the country needs to be developed. Stakeholder engagement is one of the important elements for the effective implementation of the IRBM plan. In this paper, a systematic bibliometric analysis has been successfully carried out to identify the trends, patterns, and research gaps to develop stakeholder engagement frameworks in IRBM. Three renowned scientific databases were used to assess the published literature on stakeholder engagement quantitatively. The search contributed by providing a clear understanding and mechanisms for effective stakeholder engagement, thus highlighting the lack of an effective stakeholder engagement framework for IRBM and the necessary research gap. Based on the analysis results, it was found that many pieces of literature have been written about the implementation of IRBM, including the importance of stakeholder engagement or participation. However, there is limited research on how stakeholder engagement should be carried out effectively

to enhance the level of water management at the river basin level. The findings highlighted the type and mechanism of stakeholder engagement in IRBM and also recorded that stakeholder engagement can serve as a form of social learning. From the review analysis, it was concluded that further research studies need to be carried out at the river basin level to formulate a conceptual framework for an effective stakeholder engagement framework for the sustainable management of water resources.

2.3 Introduction

2.3.1 Context, aim, and objectives

IWRM can be defined as a process that promotes the coordinated development and management of water, land, and related resources in order to maximise the resultant economic value and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (GWP, 2000). It holds the key to sustainable water management is generally based on three major fundamental principles: ecological sustainability, social equity, and economic efficiency (Biswas, 2004). In the process of implementing IWRM, it is important to be mindful of the need for integration (GWP, 2000). As for the human system, integration shall comprise (i) a comprehensive institutional arrangement, (ii) the sound planning of water resources to cater to all sectors, (iii) integration in all water-related national policies, (iv) the linkage of water resources planning to national security and economy, and (v) stakeholders' engagement in decision-making in the planning and implementation processes (Jonch-Clausen and Fugl, 2001).

UNESCO (2009) had advocated that IWRM should be implemented at the river basin level, and such application has often been generally referred to as Integrated River Basin Management (IRBM). The World Wide Fund for Nature (WWF) has defined IRBM as a process of coordinating the conservation, management, and development of water, land, and related resources across sectors within a given river basin, to maximise the economic and social benefits derived from water resources equitably (WWF, 2003). IRBM recognises the close link between land use and water resources, promoting sustainable land use practices that protect water resources and ecosystems (Shamsiah Omar et al., 2023).

A river basin, which is defined by its own geographical and hydrological characteristics, will facilitate the practical integration of all downstream, upstream, as well as basin-wide issues, particularly those related to the aspects of the quantity and quality of the basin's available surface and groundwater resources. All forms of land use in a river basin, such as land development for residential, commercial, and industrial purposes, agricultural and plantation activities, logging, mining, and other forestry activities, can have profound impacts on the water resources in the river basin (Camara, Jamil and Abdullah, 2019). Hence, it is necessary to have in place a system of good water governance at the river basin level (Suleymanov, 2024).

In Malaysia, the implementation of the IRBM concept is through the process of coordination, management, development, and conservation of water, land, and related resources covering various sectors regardless of administrative boundaries within a river basin. It aims to maximise the economic and social benefits

derived from water resources equitably while maintaining and restoring the water resources ecosystem under the four main national objectives as shown in Figure 2.1 (Shamsiah Omar et al., 2023).

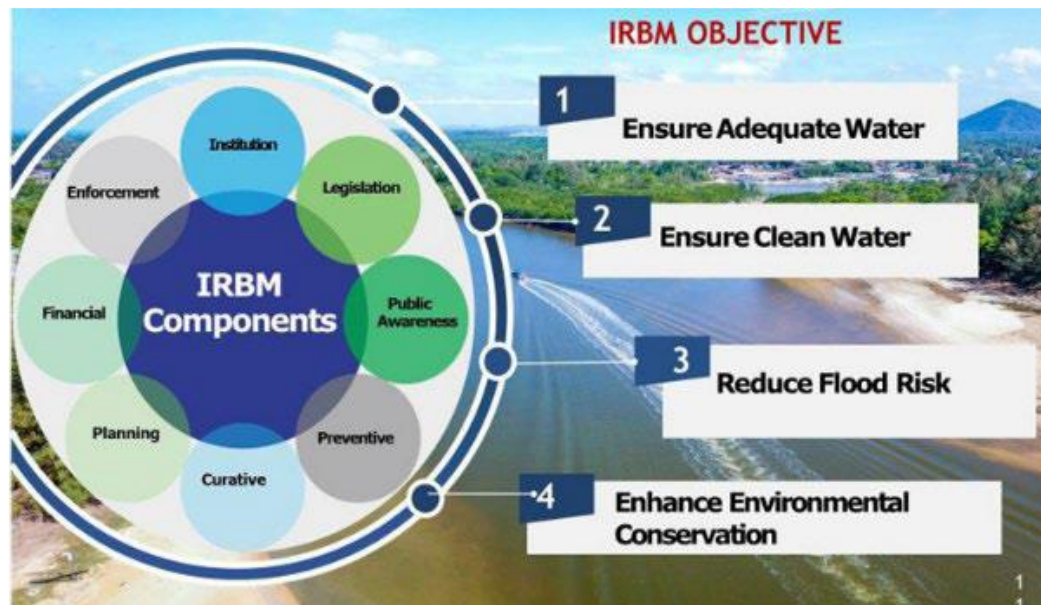


Figure 2.1 IRBM concept and objectives in Malaysia, adapted from (Shamsiah Omar et al., 2023)

Besides the importance of water security, there is also a need to address the aspect of water-related hazards; hence, the necessity of incorporating the concepts of Integrated Disaster Risk Management (IDRM) within the IRBM plan. IDRM integrates disaster risk reduction strategies into water and environmental management to enhance resilience against natural hazards like floods and droughts.

According to Rijswick et al. (2014), the effectiveness of water governance can be achieved via a multiple dimension approach consisting of segments such as: (i) information about the water system, (ii) principles and policy, (iii) stakeholder involvement,

(iv) enforcement, and (v) the prevention of conflict and resolution.

The Hague Declaration in the year 2000 reinforced the pertinent message that the success of water resource management depends on close participation or engagement at all levels, ranging from individual citizens to organisations, based on a mutual commitment towards the need for water security. As such, it is necessary to have the cooperation and collaboration of all sectors, which can complement each other (Samekto, 2015). As IRBM is holistic, it is important to gather different perspectives from the stakeholders (Julio et al., 2021). Within the river basin level, it has been argued that stakeholder engagement plays an important role in sustainable catchment management (Erdogan, 2013). IRBM, as a subset of IWRM, therefore deals with managing the river basin from the aspects of water allocation, pollution control, flood and drought control, etc. Thus, effective stakeholder engagement in river basin management must be given due recognition and attention for sustainable water management (Whitley et al., 2024).

Recently, the United Nations has reported that many countries in the Global South encounter water issues due to poor coordination, the non-alignment of national policies related to water, and ineffective stakeholder engagement (United Nations, 2021). In addition, the OECD Principles on Water Governance have recognised that there is no one-size-fits-all solution to global water issues. The option selected should depend on the different administrative, legal, socio-economic, and cultural systems of the country concerned (OECD, 2015). However, it advocates for active stakeholders' engagement to ensure the

local conditions, needs, and capacities are duly considered as the basic aspects of good governance in water management (Heikoop et al., 2023; Salamanca-Cano et al., 2023). According to Ahmad (2025), stakeholder engagement is also an important step in any water-related corporate social responsibility (CSR) projects, since it allows organisations to meet stakeholders' real requirements rather than offering what the firm believes is best for them.

However, stakeholder engagement is one of the twelve water governance principles (as shown in Figure 2.2) that serves as a catalyst for highlighting good practices and initiating reform processes toward good water management at any level of the government or country (Akhmouch and Correia, 2016).

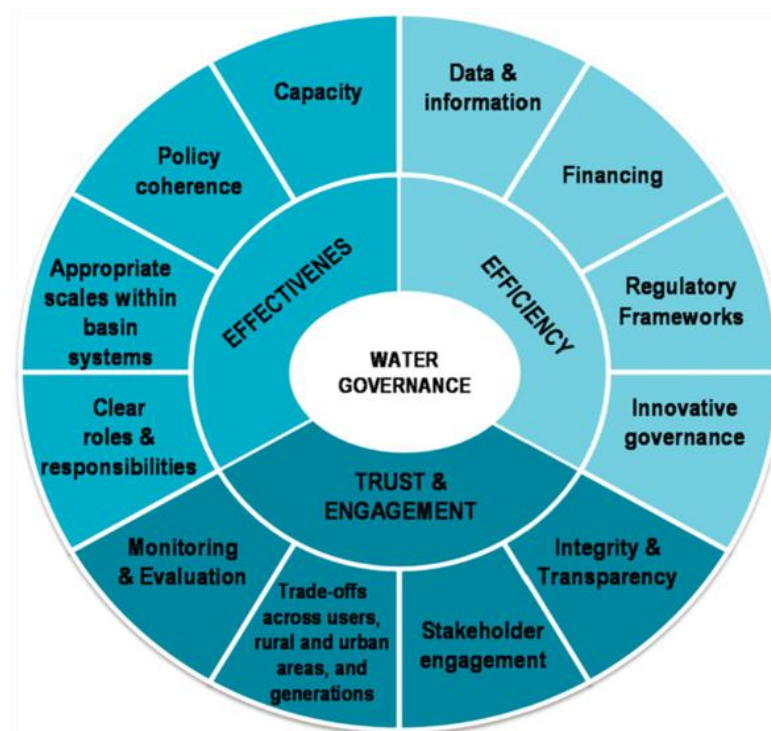


Figure 2.2 The OECD principles on water governance, adapted from Akhmouch and Correia (2016)

This chapter provides a systematic review of stakeholder engagement in river basin management, with the specific

objectives to: (i) quantitatively assess how many published works contributed to the stakeholder engagement in water resources management, particularly at the river basin level, (ii) synthesise findings of the various types and mechanisms of stakeholder engagement in river basin management, (iii) determine to what extent stakeholder engagement can serve as a form of social learning, and (iv) identify research gaps for researchers to set a research agenda for addressing the gap. This chapter starts by stressing the need for stakeholder engagement in river basin management. This is followed by the methodology and main findings of the analysis, which are organised according to the abovementioned four objectives.

2.3.2 The needs and mechanisms of stakeholder engagement in river basin management

The Cambridge Dictionaries Online defines a stakeholder as “a person such as an employee, customer, or citizen who is involved with an organisation, society, etc. and therefore, has responsibilities towards it and an interest in its success.” Using this definition, one can proceed to identify both internal and external stakeholders. The next step is to map those stakeholders into four groups: (i) low interest, low influence - those you need to keep informed; (ii) high interest, low influence - those you need to involve and consult with; (iii) low interest, high influence - powerful key stakeholders you need to engage; and (iv) high interest, high influence - partners you need to collaborate with.

A thorough search in the literature on the word ‘engagement’ may yield numerous related terms such as ‘public participation’, ‘public outreach’, ‘community participation’, ‘community involvement’, ‘community engagement’, and ‘stakeholder

engagement'; all of which describe rather similar processes and aims. From the perspective of river basin management (RBM), stakeholder engagement can be generally driven by the relevant host authority or by self-organised action, initiated by a civil society organization or the concerned public at large (Porzecanski et al., 2022). Having identified all the relevant stakeholders, one can proceed to divide them into internal and external stakeholders, and then map those stakeholders into groups (Mitchell et al., 1997).

There was a recent study carried out to detect a variation of opinions and differences for the same resource in the river basin, and highlighted that there is a need for a bottom-up strategy for stakeholder engagement (Garau et al., 2020). Therefore, research studies must be undertaken to confirm the need for stakeholder engagement in river basin management. According to Mitchell et al. (1997), a systematic way of identifying which stakeholders are relevant is by considering who possesses the three attributes: power, legitimacy, and urgency. Power can be manifested based on physical forces, material or financial resources, and symbolic recognition such as prestige and esteem. Legitimacy implies that there is an element of social goodness for the community. Urgency relates to the speed of response by the relevant authority to the stakeholder's view. A stakeholder may have one, two, or all three of these attributes in RBM.

Another research study has been highlighted by Wilson and Bryant (2021) using the three-layer approach to demonstrate how different stakeholders can be engaged to participate in RBM. The study was done based on several types of drivers, such as social, cultural, political, economic, technical, and legal. The first layer referred to the center core, which consisted of water

agencies and regulatory bodies. The second outer layer represents all the different players involved in RBM, such as the local authorities, water users, the private sector, researchers, technical professionals, and the public. The third outermost layer represented the impact on RBM and the public participation processes due to the contribution from the four groups of drivers, namely cultural, technical, economic, and legal drivers. While each layer of stakeholders has a different role and responsibility, they are all equally important.

Depending on the level and extent of participation, various frameworks have been conceptualised for public participation and stakeholder engagement (Carr, 2015). Arnstein's eight-step ladder framework (Arnstein, 1969), which was originally developed for urban planning, has been applied to water management, whereby the higher rung denotes greater public involvement (Pretty, 1995). Pretty's topology categorised participation according to the degree of participants' involvement and control over the outcomes of the water-related activities. However, Michener classified participation according to whether it is centered on the host-organiser or the people (Michener, 1998). The EU Water Framework Directive stated that participation may take place in three different ways, namely by the supply of information, by consultation, and by active involvement.

Many approaches or platforms of stakeholder engagement can be used and may include multi-stakeholder workshops, water users' associations, or multi-stakeholder platforms, which consist of local management committees, advisory committees, NGOs, and various forms of stakeholder partnerships. Luyet et al. (2012)

mentioned that any framework for stakeholder engagement must possess the ability to adapt to different contexts, its ability to integrate social and technical sciences, and its application of practical participatory tools and mechanisms. Carr et al. (2009) and Heiland (2006) stressed the requirements and methods used as well as the integrated approach in carrying out stakeholder engagement. Arnstein's ladder was further expanded by Fung (2006), who conceived participation in three dimensions: (i) who the participants are, (ii) the way they communicate, and (iii) the level of authority and power they have.

Antunes et al. (2008) and Measham and Brake (2009) have suggested that monitoring and evaluating the success of stakeholder engagement must be an essential part of the engagement process. Another different type of conceptualization has been proposed by Hove (2000) based on: (i) the way participants interact with one another, and (ii) situations where stakeholders are entirely cooperative to entirely conflictive. It was found that the use of digital platforms and social media can greatly enhance public outreach and facilitate effective real-time engagement (Ezeh et al., 2024).

Han et al. (2024) developed a systemic and reflective framework for stakeholder engagement in natural resources management by focusing on five components (5 Ps): P₁ - problems to be examined, P₂ - purpose of engagement, P₃ - participant identification, P₄ - process of engagement, and P₅ - product of engagement.

Nevertheless, all the points articulated above indicate that it is important for more research studies to be conducted for further

understanding of the needs of stakeholder engagement in river basin management.

2.4 Methodology

The systematic bibliometric analysis has been successfully carried out to identify the trends, patterns, and research gaps in the establishment of a stakeholder engagement framework in IRBM. Renowned scientific databases (i.e., SCOPUS®, Publon®, and Google Scholar®) were utilised to perform the review analysis with the relevant keywords. SCOPUS® was used as its contents are more globalised as compared to other databases with more comprehensiveness. For further comparison, Google Scholar® was used as it can identify a large amount of grey literature that is not found in other databases, in addition to its ability to find specific literature (Haddaway et al., 2015). On the other hand, Publon® was used as it links directly to the Web of Science®, ORCID, and other scholarly journals that could help retrieve reliable research data for comparison.

An advanced search was done using the Boolean operators, mainly “AND” and “OR”, to search for publications with specific keywords. For SCOPUS®, TITLE-ABS-KEY (“Keywords”) was entered for all the search strings to include all publications that have the keywords in their title, abstract, and in their paper’s keywords. For Google Scholar® and Publon®, the keywords were entered with the same Boolean operators, “AND” and “OR”, in their search engines. The number of publications from each search was then recorded. The analysis started with a search on the availability of water resource management framework publications. As the word “framework” was considered general, a wide range of frameworks appeared, resulting in 17,021

publications on the SCOPUS® database, 10,905 publications on Publon®, and 15,600 publications on Google Scholar® as summarised in Table 2.1.

Table 2.1 Comparison of the number of publications found for each keyword on the three scientific databases

Keywords	Frequency		
	SCOPUS®	Publon®	Google Scholar®
Water Resource Management Framework	17,021	10,905	15,600
Water Resource Conceptual Framework	1308	20,904	2890
Stakeholder Engagement	22,169	10,262	21,900
(i) Topology of stakeholder engagement	4	10,267	293
(ii) Public participation	3790	1206	5610
(iii) Public Awareness	124	1244	1090
(iv) Stakeholder collaboration partnership	851	284	4190
(v) Communication	3273	1435	4340
(vi) Social learning	737	850	2360
River Basin Management	21,589	10,523	14,200
IWRM	2650	1172	1320
IRBM	434	897	1200
Stakeholder Engagement Framework for IRBM	3	1	32

With that, a more detailed search was done to identify the number of publications on the conceptual framework for water resource management, resulting in 1308 publications on SCOPUS® and 2809 on Google Scholar®. Publon® in this case showed an unreasonable result of 20,904 publications, which was more than its previous search on the general framework. Hence, for comparison purposes, Google Scholar® and SCOPUS® were given higher priority due to higher accuracy and reliability. The same procedure was done with keywords related to stakeholder engagement, including the subtopics on (i) the topology of stakeholder engagement, (ii) public participation, (iii) public awareness, (iv) stakeholder collaboration partnership, (v) communication, and (vi) social learning as shown Table 2.1. Other keywords also included: IWRM, IRBM, and other related keywords to study. Figure 2.3 shows the keyword filtering stage for the systematic bibliometric analysis.

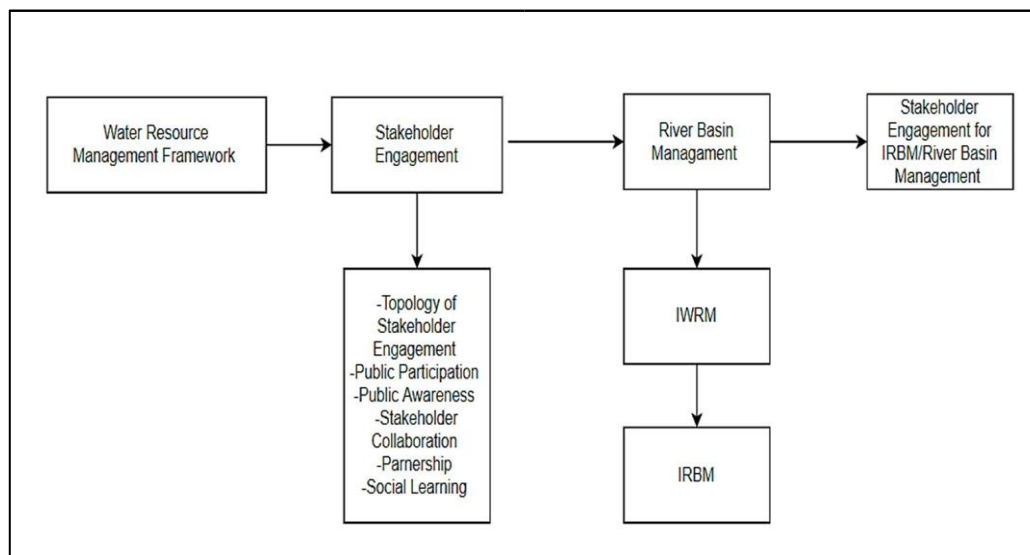


Figure 2.3 Keyword filtering stage for systematic bibliometric analysis

2.5 Review findings

2.5.1 Publication patterns and foci

Publication patterns and research focus in this section are important because they help reveal where this study fits within existing research. Looking at publication trends can highlight what has already been studied, what is missing, and how this research adds something new.

Focusing on key research topics makes the study stronger and more relevant by showing how it connects to what other researchers have done. It also helps explain why this research matters and how it contributes new ideas. Including these points will make the study more credible and clearly show its value in the field.

The first keyword search was conducted on the water resource management framework from renowned scientific databases. From the search records, more than 40,000 publications combined across all the databases were related to the water resources framework. The publications shown ranged from numerical framework, geo-information framework, uncertainty estimation framework, and other different types of frameworks. Since the stakeholder engagement framework in river basin management is categorised as a conceptual framework, the search was further narrowed down to a conceptual framework for water resource management, which further yielded down to less than 15,000 publications. Figure 2.4 shows the comparison of the frequency of publications found for each keyword from the three scientific databases (i.e., SCOPUS®, Publon®, and Google Scholar®), indicating the lack of publications on stakeholder engagement in IRBM.

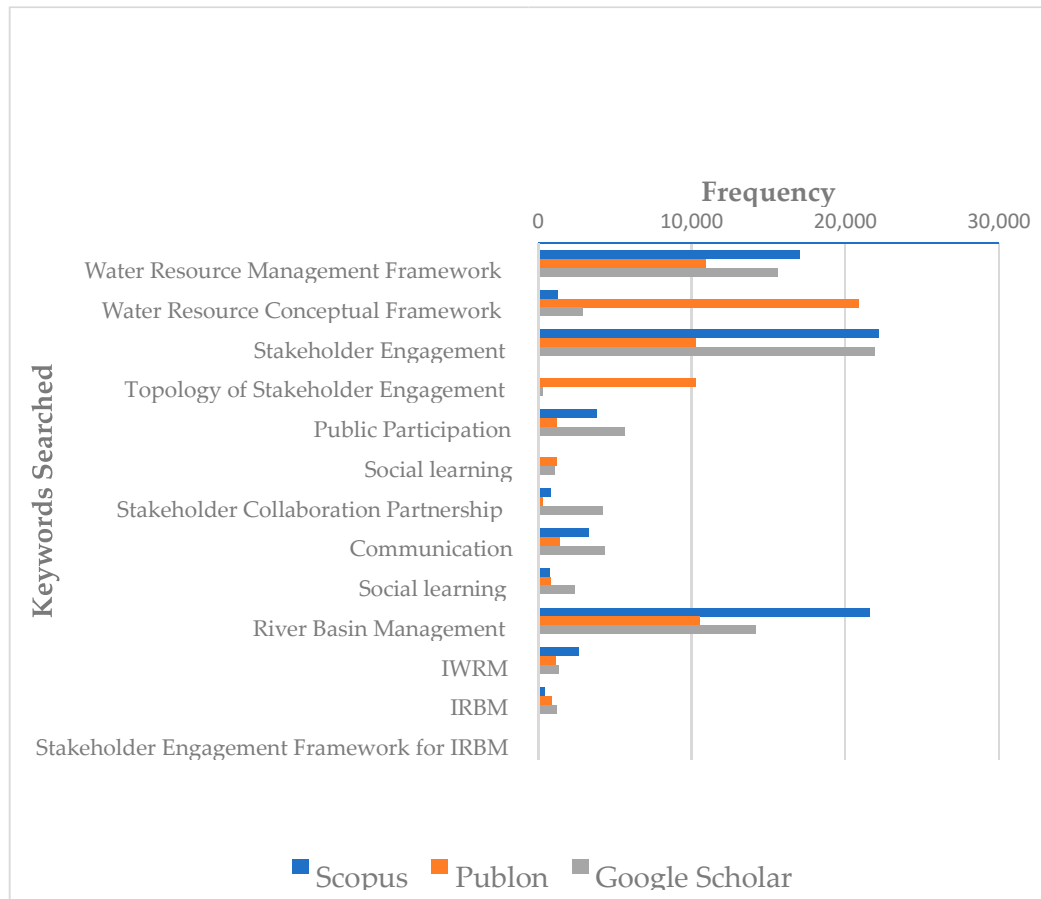


Figure 2.4 Comparison of the frequency of publications found for each keyword on the three scientific databases

Figure 2.5 shows the search records in percentage from Google Scholar® for the main topic of stakeholder engagement with different subtopics. Based on these high-quality search records, papers dealing with stakeholder engagement on the subtopic of public participation (31.4%) were the most numerous, followed by communication (24.3%), stakeholder collaboration partnership (23.4%), social learning (13.2%), public awareness (6.1%), and the last one on the topic of the topology of stakeholder engagement (1.6%). These synthesised findings have successfully provided an understanding of the various mechanisms that contribute to the effectiveness of stakeholder

engagement in river basin management. The findings also elaborated further to what extent stakeholder engagement can serve as a form of social learning for value add to the effective stakeholder engagement in river basin management.

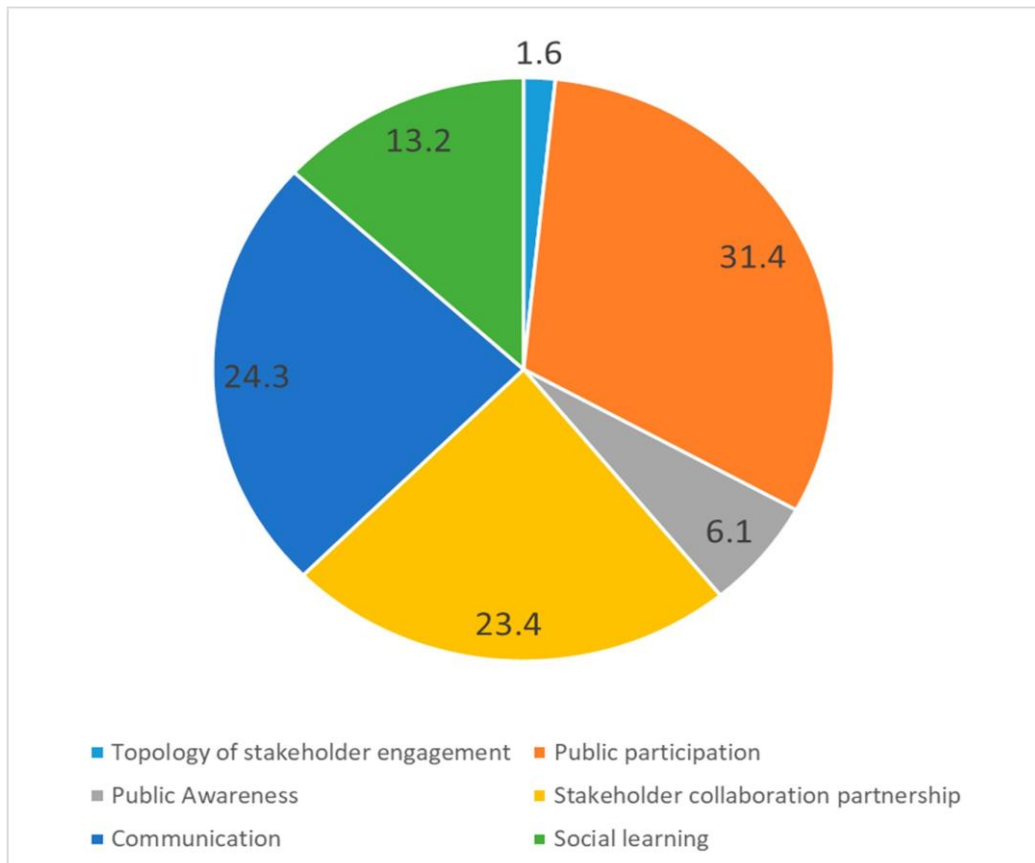


Figure 2.5 Search records from Google Scholar® for the stakeholder engagement with different subtopics in percentage (%)

The systematic review analysis then proceeded with the search of publications related to stakeholder engagement, which can be narrowed down to the subtopic of the topology of stakeholder engagement, public participation, public awareness, collaboration, communication, social learning, and other related terms. Other than that, there were also numerous publications

found related to river basin management, IWRM, and IRBM as summarised in Table 2.1. Since the crucial keywords for this research would be IRBM and stakeholder engagement, a further search was done by combining the keywords of IRBM, stakeholder engagement, and other keywords related to stakeholder engagement and framework.

For the detailed review analysis, a time range from the year 2000 to the year 2022 was set. With that, the more recent publications were focused on examining the current status and research studies on the topic of stakeholder engagement in river basin management. As a result, a total of 36 publications were found to be related to stakeholder engagement in IRBM for the tropical and non-tropical regions, as shown in Figure 2.6. While six publications were not available for access, the rest of the publications were further reviewed to highlight the important findings from the research studies. A detailed search of peer-reviewed publications revealed all the papers detailing the stakeholder engagement in IRBM as shown in Figure 2.7, with the number of publications for each year in the range of the years 2000 to 2022. There was an increase in publications for the years 2012, 2015, and 2021. Other years showed an average of one to two publications annually.

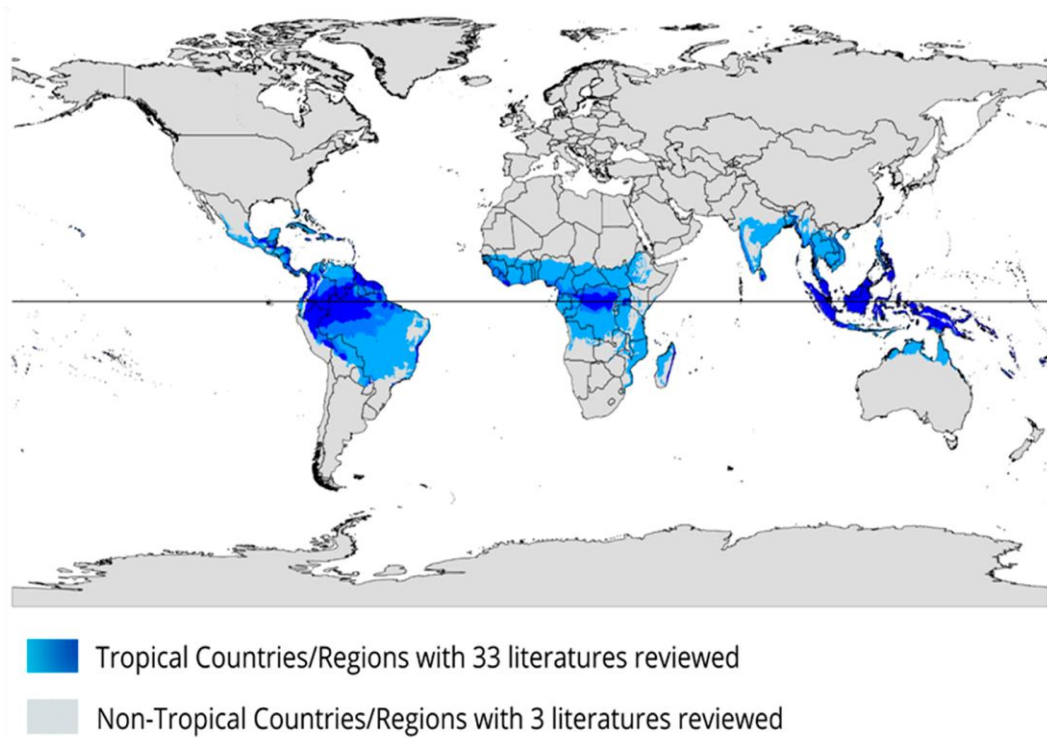


Figure 2.6 The number of literature studies recently reviewed for the tropical and non-tropical regions, with figure adapted from Beck et al. (2018)

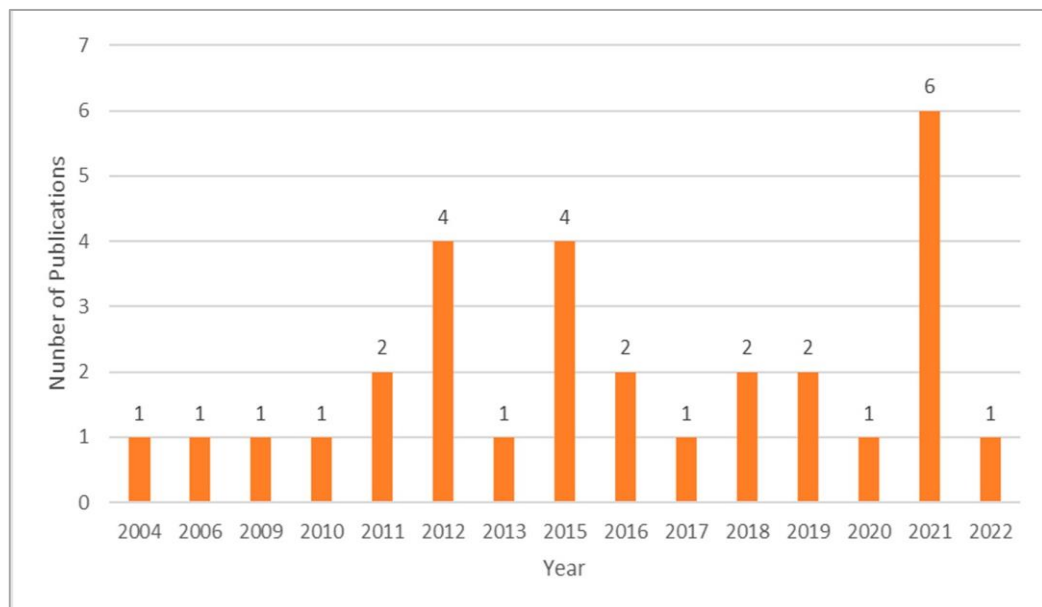


Figure 2.7 Number of publications on stakeholder engagement framework for IRBM from the years 2000–2022

One of the four key components for non-tropical regions, particularly in Europe, is enabling inclusive multi-stakeholder governance. This advocates the adoption of governance models that manage water availability for all sectors and purposes for river basin management based on the true value of water, thus using fit-for-purpose governance mechanisms (WaterEurope, 2019). The legal mandate for stakeholders' participation is stated in Article 14 of the EU Water Framework Directive, whereby "every Member State shall encourage the active involvement of all interested parties in the implementation of this Directive, especially in the production, review, and update of the river basin management plans" (Council, 2000).

Based on the findings, in many countries within the EU, public participation is mandatory with the view of achieving an amicable solution to any water issue, thus ensuring the successful implementation of IWRM at the river basin level (Antunes et al., 2009; Allan and Rieu-Clarke, 2010; Aaltonen et al., 2024). On the other hand, the Alliance for Water Stewardship (AWS) has strongly advocated for the concept of water stewardship, which is an 'action and result oriented' resource management framework for establishing sound social-ecological governance, whereby there will be an equitable allocation and sustainable use of shared water resources (AWS, 2021). The twin goals of stewardship are human well-being and ecosystem resilience, which shall be achieved through stakeholders' engagement, focusing on the integration of social and ecological processes (Chenoweth et al., 2018).

For tropical regions, for example in Zimbabwe, a study has found that due to the uneven playing field, stakeholders from rural

areas have low representation in the consultation meetings arranged by the water agency, and when they are present, they contribute little despite the devolution that has taken place during the water reform process (Sithole, 2001). The voices or concerns of the local community, the indigenous people, the youth, and women should not be neglected when an engagement is planned.

In Australia, for the two water planning projects that have been carried out, namely, the Collaborative Water Planning Project 2007–2009 and the Water Planning Tools Project 2008–2010, significant attention was given to developing the necessary tools to identify and engage unorganised or neglected communities, such as the indigenous people and the youth. The views of these stakeholders and local communities have contributed to the enhancement of the ecological balance while maintaining water resources security in terms of quantity and quality for the Murray–Darling Basin (Guo et al., 2025). This was achieved by considering the application of a more comprehensive approach towards the integrated management of the environment and water (Tan et al., 2012). Measham and Brake (2009) reported that for the Lake Eyre Basin in Australia, generic mechanisms and elements have been well recorded for achieving successful stakeholder engagements based on both on-ground research and the literature for natural resources management engagement.

In developing the stakeholder engagement strategies to improve lean construction principles in Indonesia, Adhi et al. (2023) applied a mixed-method study, using quantitative analysis for the survey data and qualitative analysis to validate the semi-structured interview responses. Ibrahim et al. (2024) and Li et

al. (2024) stressed the importance of stakeholder engagement when applying nature-based solutions in addressing water-related issues and landscape protection.

2.5.2 Mechanisms for effective stakeholder engagement

From the synthesised review findings on the various mechanisms that contributed to the effectiveness of stakeholder engagement in river basin management, many countries have recorded difficulties implementing IWRM and IRBM, as there was a lack of engagement and collaboration between water-related agencies and stakeholders who frequently do not understand each other and have different interests (Ison and Watson, 2007; Knox, Marin-Cadavid and Oziri, 2024; Duda and Hirji, 2025). Currently, in many developing countries, there are still absences or ineffectiveness of stakeholder engagement and public participation in decision-making at the basin, local, and national levels (Zhang et al., 2025). For example, in northern Chile, the lack of a basin-level shared vision has been identified as an obstacle to cooperation and collaboration (Galvez et al., 2020; Sanka, 2024). Additionally, as pointed out by many researchers, the absence of a 'shared vision' is due to the non-existence of basin organizations in Chile (Dourojeanni, 2010). Beek and Arriens (2014) pointed out that there is a need for stakeholder engagement and collaboration to be carried out based on the overall IWRM planning cycle.

Despite the importance of stakeholder engagement in IWRM and IRBM, there could be situations where engagement may not be desirable (Tan, 2008) as several research studies have also noted the conditions to decide on the need for collaboration. The need should be based on the 'three-way test' - whether it is legitimate,

fair, or wise. Frost (2001) suggested that the following six conditions should be satisfied before proceeding with the necessary collaboration, that is when: (i) there is a high priority for addressing the issue, (ii) the issue is of great concern for the community involved, (iii) disagreement among the water-related agencies on resolving the issues that arose, (iv) limited resource and shortage of skillsets of the water agencies in resolving the issues, (v) the agency concerned needs the help and cooperation from other agencies to resolve the issue, and (vi) interest among other stakeholders in solving the issue. However, Ansell and Gash (2008) have developed a framework that considers engagement as a process that produces certain outcomes.

It cannot be denied that the need to identify and include all relevant stakeholders effectively at the early stage of a project or program is the first essential step in terms of best management practices (Sarkissian, 2013). The allocation of sufficient time and the application of soft skills such as effective facilitation are indeed needed for either face-to-face or even virtual dialogue. It is necessary to hear from all interested parties, develop a shared understanding, explore areas of common interest, and consider ways to compromise (Ansell and Gash, 2008; Belinda et al., 2024). An inclusive approach will foster greater legitimacy and acceptance of decisions for effective and sustainable management of water in the river basin (Type, Karambelkar, and Gerlak, 2024).

It is recognised that participants are generally reluctant to contribute fully when the purpose of the host is mainly to give information to stakeholders and the public. Many government agencies failed to recognise that stakeholders would be willing to

sacrifice their time and effort in the engagement process if their contributions were useful for better decision-making (IAP2, 2022; Tan, Bowmer, and Baldwin, 2012) and not for the sake of formality. Hence, the purpose of any engagement needs to be made clear and relevant to the identified stakeholders, according to the levels of participation (Twyford, 2006; James and Simatele, 2024).

Again, according to Dissanayake, Zhang and Gu (2015), the public must be given the assurance that their views will be taken into consideration for the decision-making process, which shall be more transparent and based on evidence rather than political motivations. There is a need to be flexible in managing diverse information and knowledge for the common good of all parties (Reed, 2008). In addition, the success of effective participation depends largely on the availability of water-related data and information. Many a time, stakeholders may not have access or the privilege of relevant information and are therefore reluctant to participate actively.

In developing a new basin management plan for the Lake Ontario and St. Lawrence River areas, Furber et al. (2016) found that the participatory approach based on the 'shared vision planning' has been very successful in minimising conflicts. In a research program that required engaging Native American tribes in the southwestern part of the USA, Chief et al. (2016) gave appropriate respect to the culture of the local community by following the necessary tribal protocols and community rules. The need for effective communication has been cited by many authors, such as Akhmouch et al. (2016) and Lacroix and Megdal (2016). There is always a need to carry out extensive networking

to exchange and share good engagement practices both locally and abroad (Neto et al., 2018).

Hall et al. (2016), in planning the public participation program for the 2015 Montana State Water Plan's Yellowstone Basin, had recommended that stakeholder engagement for the planning of water resources should be to obtain and organise social and biophysical information and data. The comments from the citizens can be used as the informational basis of planning and relational basis, but legitimation should not be the objective of stakeholder participation. Pedroso et al. (2013) explored the progress in the IRBM DRR integration with the overall legislation related to environmental policies and heightened the importance of water governance and community-led initiatives for a more successful disaster risk reduction (DRR) initiative planning. Zeng et al. (2006) provided a detailed review of some selected transboundary basins to draw lessons for IWRM contexts with selected basins representing Africa, Asia, Europe, Latin America, and more. Zeng et al. (2006) also mentioned that goals should be identified and prioritised through a stakeholder process for the greater benefit of all concerned.

Darnswadi et al. (2015) performed a stakeholder engagement and analysis field survey to understand the stakeholders' perception of Songkla Lake Basin in Thailand, and this reflected the extent of social sustainability of the lake basin. UNDP (2021) listed several measures on stakeholder engagement during performance partnership grants (PPG) and project implementation related to IRBM based in the USA and North Brazil. Glick et al. (2009) stated that the input from the stakeholders will be critical for making trade-offs that require

considerations of the cultural traditions, moral factors, and local history when planning for climate change adaptation related to IRBM in the United States. Ahmed et al. (2021) developed a research methodology and strategy for stakeholder engagement based on the participatory approach to improve groundwater management for the enhancement of agriculture and farming livelihoods in Pakistan.

Sreeja et al. (2016) commented that the exclusion of coastal reaches in the river basin management plan of the West Coast of India has resulted in (i) the extensive use and exploitation of the local groundwater resources, (ii) uncontrolled coastal reclamation, and (iii) the deprivation of stakeholder roles in the overall basin developmental processes. The Mekong River Commission, MRC (2011) mentioned that in adopting IWRM in the countries concerned, there is a need for broader stakeholder engagement. Under the flood management and mitigation program in Malaysia, Caddis et al. (2012) and Cheah et al. (2019) stated that there is a need to consult and raise awareness among policymakers and among the broader group of stakeholders in the process of policymaking for floodplain and river management. Several conference proceedings also mentioned the importance of stakeholder engagement in IRBM (Bhandari et al. 2018). Smith et al. (2015) showed that the water quality criteria based on the environmental aspect and public health must be integrated with the social and economic goals of those affected, which initiated a 'twin-track' and cross-sector approach of stakeholder engagement and scientific research.

ADB (2017) showed several ways for stakeholder engagement and community involvement, including turning the monitoring

process into communication products for the relevant stakeholders, helping them to be engaged and involved in basin management. Biswas (2021) mentioned that a collective approach that involves stakeholders in the joint management of the watershed is considered the best option to ensure livelihood sustainability and the eco-restoration of the catchment areas. Gilman et al. (2004) stated that the basic premise of IRBM is that the stakeholders should participate in the process, and the conservationist can benefit from the lessons shared by the IRBM's practitioners based on their history of stakeholder engagement. Isaac (2021) contended that there is a large gap in the framework for managing transboundary resources in Kenya as they are not capable of supporting the desired stakeholder participation, synergy, and collaboration. Kishore et al. (2012) also mentioned that while formulating a long-term strategy for reducing the risk of disaster, tangible short-term outcomes are equally beneficial to the local communities, which will consider them to be critical for the effectiveness of the main stakeholder engagement. Quang et al. (2012) listed the stakeholder engagement process followed by the Vietnam Technology Need Assessment (TNA) for each of the respective stakeholders.

Ken et al. (2012) reported that the government, landowners, and traditional authorities could work together harmoniously at the local level for the Dayi River Basin through stakeholder engagement. Ghosh and Ramesh (2020) described a participatory and integrated watershed management approach with the involvement of multiple stakeholders in the decision-making processes implemented in Nepal. One of the findings from Ghosh and Ramesh (2020) was that incentivised and enabling mechanisms are necessary to account for the historical

grievances of the communities as well as to reduce the conflict among the park people. Anuar et al. (2022) concluded that empowering governance of river basins through Green Courts will lead to unpolluted rivers, a reduction in water treatment costs, and ensure continuous water supply.

Grafton et al. (2019) examined water management practices in five different countries spread across the globe, i.e., Australia, Tanzania, Mexico, the USA, and Vietnam. In order to reduce water risks in relation to water availability, the study proposed the need for a Water Governance Reform Framework (WGRF), which includes key strategic recommendations such as well-defined reform objectives that must be made public, the availability of relevant data, and transparency in decision-making.

Sahay and Perez-Viscasillas (2019) in their master project explored the use of the citizen science water monitoring (CSWM) program as a potential tool for influencing water policy and water resources management (WRM) in five representative countries in the Global South region, namely India, Kenya, Malaysia, Philippines, and Mexico. This kind of participatory management which advocates local ownership not only empowers communities through data and science but also provides a platform for the national government to inform local communities about water policy, strategies, and action plans.

There was also a participatory evaluation carried out to compare the stakeholder-preferred management of river basins (Sanchez-Plaza et al., 2021). Reynaud et al., (2015) applied the participatory approach to outline the development priorities in

the Mékrou Transboundary River Basin, which involved Benin, Burkina Faso, and Niger in West Africa. By bringing together all the scientific knowledge and practical experience of stakeholders at the beginning stage of the project, there will be a greater possibility of quality contributions to decision-making for formulating a sustainable water policy.

At the river basin management planning in the Republic of Ireland, it was also concluded that well-resourced communications with improved collaboration among the stakeholders are essential to delivering effective and efficient water supply and quality (Antwi et al., 2021). Yaxin et al. (2024) revealed that organisational structure has a significant impact on the commitment, responsibility, and the manner an organisation conducts stakeholder engagement.

From the water governance perspective, Malaysia has much to emulate the successful approaches of other nations. Table 2.2 provides a summary of the comparison of international approaches and Malaysia's approaches to IRBM.

Table 2.2 Comparison of international approaches and Malaysia's approaches to IRBM

Aspect	International Approaches	Malaysia's Approach
Legal Framework	Guided by EU Water Framework Directive, US Clean Water Act, Australia's Water Act 2007, and UN Water Governance Guidelines. Clearly defines stakeholder roles with legal mandates.	Governed by National Water Resources Policy (2012), IRBM Guidelines (DID), and state enactments. Implementation is non-binding, leading to varied enforcement across states.

Aspect	International Approaches	Malaysia's Approach
Institutional Mechanism	Dedicated River Basin Authorities (RBAs) (e.g., Murray-Darling Basin Authority in Australia, Mississippi River Commission in the US) manage stakeholder engagement at multiple levels.	River Basin Organizations (RBOs) exist but often lack decision-making power and financial autonomy. DID plays a key role, but cross-agency coordination remains a challenge.
Stakeholder Participation	Multi-tiered: Government, NGOs, private sector, research institutions, and community-based organisations have structured roles in governance.	Engagement through State DID, NGOs, local communities, and industry players. Participation is often top-down, with limited community-driven decision-making.
Monitoring & Evaluation (M&E)	Uses structured performance indicators (e.g., EU's River Basin Management Plans) with quantifiable targets and external audits.	M&E is project-based, often linked to Environmental Impact Assessments (EIA). No standardised long-term basin-wide performance tracking.
Funding & Financial Mechanisms	Public-private partnerships (PPP), water tariffs, environmental taxes, and international donor funds (e.g., World Bank, GEF) ensure sustainability.	Mostly government-funded, with some corporate social responsibility (CSR) contributions from industries, but long-term financial sustainability is uncertain.
Technology & Data Use	Advanced GIS, remote sensing, AI-driven hydrological models, and real-time monitoring systems enhance decision-making.	Increasing adoption of GIS, LiDAR, and hydrological models (iRIC, HEC-RAS), but data sharing and integration between agencies remain fragmented.

Aspect	International Approaches	Malaysia's Approach
Conflict Resolution & Governance	Formal mediation frameworks exist to address stakeholder conflicts (e.g., Water Tribunals in Australia). Transparent grievance mechanisms are in place.	Conflict resolution is ad hoc, often through ministerial interventions or inter-agency committees. No dedicated conflict resolution tribunal for water disputes.
Policy Integration & Cross-Sector Collaboration	Strong linkages between water, agriculture, urban planning, and climate policies at basin-scale management levels.	Efforts are improving (e.g., IRBM-Integrated Flood Management coordination), but sectoral silos persist, affecting holistic decision-making.

2.5.3 Stakeholder engagement as a form of social learning

In many instances, the review findings also showed that stakeholder engagement could be considered a form of social learning through the meaningful interaction of various stakeholders. Pearson et al. (2010) described social learning as a dynamic process in which individuals can take part in new ways of brainstorming to address challenging issues such as river pollution and water demand. To enable social learning, there is therefore a need to possess a wide range of knowledge and information about water and the environment, and to share it in a practical and transparent manner (Reed, 2008).

Many works of literature concurred and supported the view that through the process of social learning, stakeholders' collaboration yields more benefits compared with just one-off public consultation. Learning together will lead to stronger fellowship and will result in better joint management, thus confirming the

advantages of different stakeholders' contributions toward the integrated management of natural resources (Wolters et al., 2007; Ijlil et al., 2025). In other words, stakeholder engagement can turn out to be an opportunity for social learning where water users can better understand scientific and technical issues at hand, acquire new knowledge and skills, and reconcile their views with those of others (Susskind et al., 2012). This could be particularly so for transboundary basins with complex issues (Tippett et al., 2005; Carmona et al., 2013).

Social learning can also serve as an important process of informing water users about the policy development and implementation strategy of the water authority (Pahl-Wostl et al., 2008). Moreover, during the process of social learning, gaps due to power, influence, and institutional differences may be reduced or eliminated, thereby creating mutual trust and developing a common sense of ownership toward sustainable water resources management. In most well-organised stakeholder engagements, there is also the possibility of knowledge transfer and knowledge co-creation apart from social learning (McLaughlin et al., 2025). One of the positive aspects of knowledge co-creation between government agencies and citizens is the mutual recognition and respect that will develop while working together towards the same objectives (Wehn et al., 2018).

2.6 Research gaps

The review findings showed that many works of literature have been written about the implementation of IWRM and the importance of stakeholder engagement or participation in IRBM. However, based on the systematic bibliometric analysis that was carried out in this study, there were very limited studies on how

effective stakeholder engagement should be carried out to enhance water resources management at the river basin level.

Given this general gap, there is a need to gain a better understanding of how stakeholder engagements are conducted and the strengths and weaknesses of these. Based on the review, several areas that have been stressed by numerous authors will need to be incorporated into stakeholder engagement for IRBM, and these areas will be examined further in more detail. However, this chapter has included the following three sub-sections, which suggest amongst others, possible areas that may also be considered for further investigation to enhance the implementation of stakeholder engagement for IWRM at the river basin level.

2.6.1 The inclusion of the elements related to environmental social governance

According to the principles of IRBM, water resources management with a sustainability goal can only occur where there is an integrated and coordinated management of the environment, and the natural resources are at large. Therefore, the water policy and strategies of a given basin should be aligned with and coordinated in conjunction with policies of other multiple sectors, such as environment, agriculture, land conservation and development, forestry, biodiversity, fisheries, energy, and so on (Greenwood, 2007). Hence, it is strongly advocated that there must be balanced considerations from the socio-economic, ecological, and governance perspectives when addressing issues within the river basins (Xia et al., 2024; Hammond et al., 2025). In this respect, it is proposed that further investigation be conducted to ascertain the need to incorporate the elements of

Environmental Social Governance in the stakeholder engagement for the river basin.

2.6.2 The need for a multi-stakeholder platform

Water-related problems are complex and require the involvement of diverse stakeholders from the scientific as well as social disciplines, with knowledge and experience in the field of natural resources management, which includes water (Maak, 2007). Since the early 2000s, the concept of a multi-stakeholder platform (MSP) has become popular for various applications and has adopted different names such as the multi-stakeholder forum, multi-stakeholder partnership, and multi-stakeholder initiative (Bryson, 2004). The concept of MSP calls for collective and sometimes collaborative initiatives, focusing on improving public resources and service deliveries (Jager et al., 2016). The strength of such a kind of platform is the ability to bring experts from all walks of life (Wu et al., 2024), such as the government, civil society organisations, academics, and the private sector, to address complex issues that none can do alone (Sigalla et al., 2021; Xu et al., 2024). Moreover, another characteristic of MSP is that it focuses on learning by doing, with the application of a systematic mechanism for obtaining feedback (Warner, 2005). However, in situations where various agencies and non-state actors are involved in the development activities within the river basin, the need and prospect of forming a formidable and sustainable MSP need further investigation.

2.6.3 The whole of government and society approach

Like many other critical sectors, water management demands the existence of a sound institutional arrangement at the river basin

level to ensure that good water and environmental practices are adhered to. Elfithri et al. (2011) advocated that in river basin management, there must be strong integration among all government agencies, private sectors, NGOs, and citizens. Weng (2005) suggested that the government must entrust some of its responsibility for river care and management to all relevant stakeholders, including the local communities, with each playing a distinct role in various stages of development (Yuan et al., 2024). In this respect, the approach of the 'whole-of-government and society' could be applied to enhance the function of sustainable river basin management. However, this suggestion will require further research to determine its practicality and acceptance in developing countries like Malaysia.

2.7 Conclusions

From the systematic review analysis, it is evident that several elements contribute to effective stakeholder engagement. As highlighted in this review, these include the type and mechanisms of engagement employed, the inclusiveness of all relevant stakeholders, the involvement of stakeholders in the early stages of the engagement, the access to pertinent information, the incorporation of local knowledge and expertise (Valin and Huitema, 2025) and the time and resources made available for the engagement. Moreover, other important elements examined include the purposes of engagement, the commitments and willingness of the participants, and the extent to which stakeholders' views are incorporated in the decision-making processes. Many works of literature concurred and supported the view that, through the process of social learning and knowledge transfer, stakeholders' engagement yields more benefits compared with just one-off public consultation.

However, in many countries, multiple aspects of the mechanism and implementation framework for stakeholder engagement in river basin management remain unclear and not well perceived. In addressing these research gaps, research priorities can be placed on formulating a model conceptual framework for an effective stakeholder engagement implementation for every river basin, keeping in mind that no one framework can fit all the river basins. Hence, from this model, researchers can set a research agenda to address this gap so that every river basin can have an effective stakeholder engagement framework for more successful river basin management.

Nevertheless, there is a limitation of the review conducted as the analysis was only based on the three scientific search engines. Moreover, there is currently no available guideline or research that has been carried out on stakeholder engagement in IRBM within the context of water resources management, particularly for Malaysia. As such, this thesis will endeavour to fill critical gaps via its objectives as stated in Chapter 1: (a) determining the type and mechanism of stakeholder engagement in IRBM; (b) identifying key stakeholders and selection criteria within the context of IRBM; (c) examining the factors that contribute to the effective engagement from stakeholder perspectives in IRBM; (d) analysing the organisational roles and perspectives that contribute to effective stakeholder engagement in IRBM; and (e) developing a conceptual framework for effective stakeholder engagement in IRBM towards addressing the integrated challenges within the context of water resources management for application in Malaysia.

The next chapter (Chapter 3) deals with objectives (a), (b), and (c) from the perspective of individual stakeholders who are involved in IRBM.

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Chapter 3 Individual Stakeholder Perspectives of Public Engagement and Participation in Integrated River Basin Management

3.1 Abstract

With the growing recognition of the major challenges facing water security, stakeholder involvement has emerged as a fundamental tool for navigating the river basin's social, economic, and cultural complexities. Integrated River Basin Management (IRBM) is a comprehensive approach that acknowledges the interconnectedness of diverse stakeholders, ecosystems, and socio-economic factors within a river basin. IRBM aims to reconcile competing interests and promote sustainable water resource management practices by fostering collaboration and dialogue among stakeholders. This chapter identifies key stakeholders and the selection criteria and examines the factors that contribute to effective engagement from individual stakeholder perspectives in IRBM in Malaysia, focusing on the diverse views and perspectives. A questionnaire survey was designed to address questions related to the type and mechanism of engagement, key stakeholders and selection criteria, and factors contributing to effective engagement. It was distributed online, with 250 responses received. Based on the respondents' data, factors influencing engagement effectiveness were categorised into 3 stages, namely, pre-engagement, during-engagement, and post-engagement. Statistical analysis carried out on the survey data ensured reliability, with Cronbach's alpha values (>0.7) indicating strong internal consistency. The Friedman test was applied to identify statistically significant differences within the same group of parameters for the 3 different engagement phases. Findings highlighted the

importance of stakeholder inclusion, and the selection criteria and credibility at the pre-engagement stage for developing the IRBM plan. Transparent, structured participatory processes during engagement facilitated the most fruitful collaborative discussions, while post-engagement emphasised implementing stakeholder contributions and feedback, and the need for a monitoring and evaluation mechanism. The work conducted for this chapter underscores the need for an inclusive and legitimate governance model to enhance the effectiveness and credibility of stakeholder engagement.

3.2 Introduction

3.2.1 The importance of stakeholder engagement at the river basin level

The World Economic Forum recently identified climate-related disasters such as floods as major global risks (Yasin, Breadsell and Tahir, 2021). Concurrently, drought events also demonstrated a parallel trajectory of increasing severity, compounding the challenges that exist in water management (Báliková et al., 2024). As these trends persist, the mismatch between supply and demand for water resources is expected to become more prominent (Song et al., 2024). The growing global population, coupled with rising demands of socioeconomic development across sectors such as water, energy, agriculture food systems, and community resilience, further escalates the strain on water security (Kimambo et al., 2023; (Kimambo et al., 2023; Trammell et al., 2025).

Insufficient public awareness and inadequate participation in environmental issues contribute to the crisis (Li et al., 2017). In

response to this multifaceted challenge, Integrated Water Resources Management (IWRM) has emerged as the pivotal framework for addressing the complexity of water resources sustainability. Against this backdrop, UNESCO (2009) advocated for the implementation of IWRM reinforced by capacity development (Sabbatini and Indij, 2022) at the river basin level, a concept often referred to as Integrated River Basin Management (IRBM). This approach emphasises the need for holistic management of water resources within a specific geographical area (Moore, 2021), recognising the interconnectedness of various water-related activities and the need for coordinated action among various stakeholders. IRBM is particularly vital in addressing the intricate decision-making process involving numerous actors and stakeholders with divergent objectives and values (Comino et al., 2016; Hassanzadeh et al., 2019). Similarly, the Organisation for Economic Co-operation and Development (OECD) which is an international institution dedicated to enhancing societal well-being through better policies, underscores the pivotal role of stakeholders' engagement as one of the twelve water governance principles that will ensure mutual commitment through collaboration and complement each other towards water security (OECD, 2020; Lim et al., 2022). The OECD Principles of Water Governance advocate for active stakeholders' engagement to ensure the local conditions, needs, and capacities are duly considered as the foundation of good governance in water management (Heikoop et al., 2023).

Efforts to create more inclusive processes are increasingly prominent in the water policy landscape (Hassenforder et al., 2019). Stakeholder involvement is especially important in the water sector since it is fragmented, with several parties

participating and various requirements that must be fulfilled (OECD, 2015).

Gathering data through stakeholders' engagement can further enhance collaboration and involvement of governance institutions, leading to more outcome-oriented contributions to the design and implementation of water policy (Ukpai, 2022), negotiation, and overcoming complex problems (Suyeno et al., 2024). Actively engaging stakeholders is crucial in ensuring the broader community embraces and supports significant changes. It involves gaining their acceptance by fostering a sense of unity and cooperation among them (Frijns and Smith, 2024). The successful implementation of IRBM is anticipated to yield tangible and positive outcomes that are measurable (Lim et al., 2023).

In summary, stakeholder engagement is critical to IRBM for various reasons. Fundamentally, water is necessary for life and therefore anyone who depends on a water resource should have the right to participate in decision-making regarding its management. Stakeholder engagement in planning helps avoid making mistakes in design that would make a water-related project fail due to ignoring the local context. Besides, involving stakeholders in planning will help facilitate better communication, enable conflict resolution, foster ownership, and ensure greater acceptance of a project or programme.

3.2.2 Identifying key stakeholders for IRBM planning, including the selection criteria

European policies are progressively advocating inclusive approaches to water management, emphasising the recognition of river basins as socioecological systems. These policies

prioritise participatory strategies to enhance inclusivity and ensure the representation of all local stakeholders (Garau, Torralba, and Pueyo-Ros, 2021). Recognising the composition of relevant participants involved in decision-making processes, as well as those who are left out, is crucial for developing collaborative solutions that prioritise fairness, equity, and the harmonisation of diverse water interests. By understanding who is included and excluded, decision-makers can strive to incorporate the perspectives of all relevant stakeholders, ensuring that the resulting solutions account for the needs and concerns of various groups. This inclusive approach fosters greater legitimacy and acceptance of decisions, leading to more effective and sustainable water management practices (Type, Karambelkar, and Gerlak, 2024). The European Water Framework Directive mandates the engagement of all stakeholders, including regulation of the upstream and downstream local governments (Li, Lu, and Li, 2022) in developing the most effective strategies to achieve its objectives in addressing land use concerns within river catchments to mitigate pollution and attain a high ecological standard in surface water bodies (Jessel and Jacobs, 2005). It is also important to acknowledge that each stakeholder plays a distinct role in various stages of development (Yuan et al., 2024).

By adopting a more participatory approach, management decisions can become more inclusive, integrating diverse perspectives, values, and priorities of the individuals residing within the river basin territory. This inclusive process will foster increased legitimacy, public engagement, and broader acceptance of the planning procedures. Consequently, the outcomes of the planning and management of processes (Blackstock et al., 2012) will yield a genuine integration of

diverse experiences and knowledge from all stakeholders, guided by the principles of inclusivity, equity, and social justice (Garau, Torralba, and Pueyo-Ros, 2021). Establishing high levels of stakeholder trust and participation will be the principal in identifying and achieving sustainability in river basin management (Marshall and Duram, 2017). In due time, the public-private partnership (PPP) acts as evidence of stakeholder trust in solving the financial woes of a basin (Jiang et al., 2023). A stakeholder who is well-informed about a water project has the potential to become a valuable funder for the project. When stakeholders understand the goals, benefits, and potential impacts of a water project, they are more likely to recognise its importance and be willing to invest financial resources to support its implementation. Their informed decision-making is often driven by a clear understanding of how the project aligns with their interests, values, and objectives (Podolak et al., 2017).

Enserink et al. (2007) offered insights into public participatory experiences and the impact of institutional, legal, cultural, and geographical factors on river basin management. Public participation is both a prerequisite and an integral element of good governance and sustainable natural resources management. The intertwining of public participation and cultural aspects with national, local, and professional cultures, alongside formal institutions, jointly determines the level and methods of public involvement. These factors collectively serve as a basis for comparing and understanding the diverse political and historical trends of public participation within river basin management planning. Benson et al. (2014) assessed the implementation of the European Union Water Directive Framework, which mandates stakeholders' involvement in drafting river basin management plans and water planning. The study specifically examined the

transition from a top-down, technocratic approach in water management to a more inclusive model of participatory environmental governance. Krantzberg et al. (2015) examined the Great Lake Futures Project's impact on fostering collaboration among individuals from academia, government, industry, non-governmental organisations, and other sectors. Their study focused on identifying inclusive priorities, goals, objectives, and implementation tactics, as well as enhancing the roles and responsibilities of local actors and non-governmental sectors. The project aimed to promote a better balance between top-down and bottom-up efforts, nested within a framework of strong stakeholder engagement. Marshall and Duram (2017) studied how education levels and professional experience influence stakeholders' perceptions of basin management. Their research revealed notable variations in stakeholder responses based on different levels of education and participants' institutional affiliations, particularly between those from the public and private sectors. These findings suggest that individuals' educational backgrounds and professional contexts play a significant role in shaping their perspectives on basin management practices. Eaton et al. (2021) emphasised the crucial role of empowering stakeholders to participate alongside experts in decision-making processes.

Meaningful environmental transformation can be achieved through stakeholders' engagement characterised by social learning, community capacity building, and fostering behavioral changes at the individual, group, and community levels. Mussehl et al. (2022) underscored the significance of incorporating environmental flow programs into stakeholders' engagement initiatives to enhance the development of riverine environments within a more comprehensive adaptive management cycle. Their

holistic approach delineates key steps within an environmental flow's adaptive management cycle, outlining the roles of various stakeholders and suggesting engagement tools to facilitate the process. Velasco et al. (2023) explored the OECD Water Governance Principles as the approach for good water governance, emphasising the inclusion of stakeholders' interests and concerns and holding decision-makers accountable for water management.

For a river basin, the stakeholders generally include regulatory authorities, government employees, industry representatives, landowners, farmers, academicians, professionals, NGOs, CSOs, experts from the scientific community, members of the general public, the marginalised groups, as well as any others who may contribute to the understanding and management of the river ecosystem. In short, stakeholders are the people and organisations who may impact or be impacted by the outcomes of a decision in developing the IRBM plan.

However, too many stakeholders can render the engagement process unwieldy and unproductive. It is necessary to identify the key players who should be involved in the engagement or participatory process. Stakeholder analysis must be carried out and would include identifying stakeholders, establishing their attributes or characteristics, investigating relationships between stakeholders, and prioritising who should be involved and to what extent.

Key stakeholders involved in IRBM can be generally categorised into five groups: i) all relevant ministries, departments, and agencies at the national, state, district, and municipal levels; ii) academics, professionals, consultants, scientific institutions, and individual experts; iii) NGOs and CSOs; iv) private/corporate

sector consisting of developers, contractors, and industries; and v) representatives from local communities including the marginalised (APFM, 2006).

Most methods of stakeholder analysis or mapping divide stakeholders into one of four groups, each representing a different level of influence and interest (Figure 3.1).

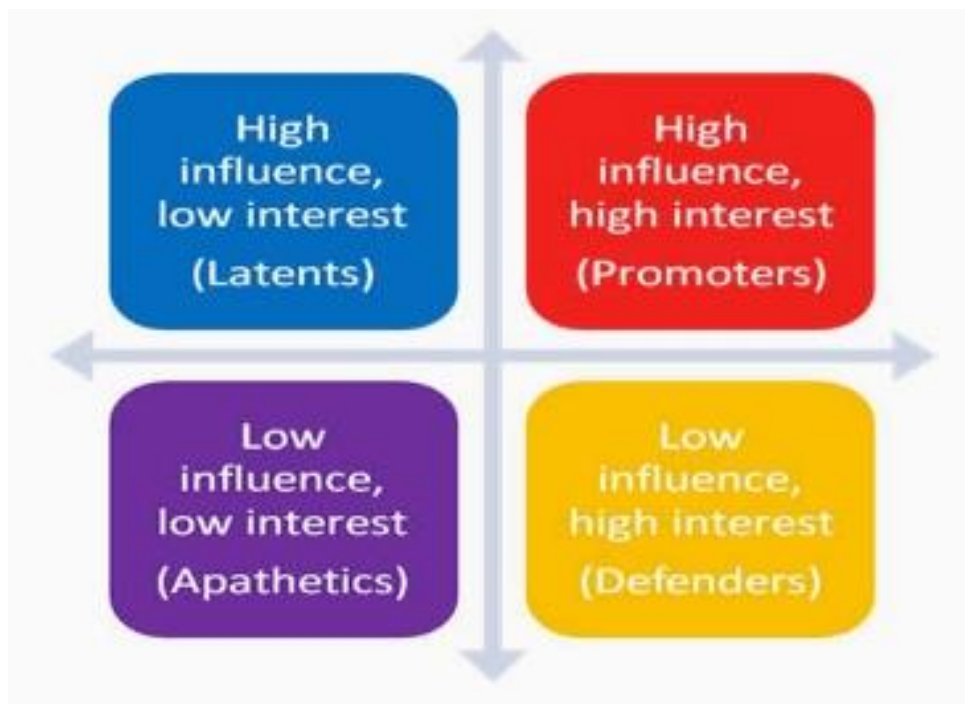


Figure 3.1 Stakeholders' classification based on influence and interest grid

Both influence and interest can be either positive or negative, depending on the perspectives of the stakeholders in question. Influential or powerful people with the highest interest are most important, followed by those with influence and less interest. Those with high interest, and less influence come next, and those with low interest and low influence come last. The people considered key stakeholders would generally appear in the upper right quadrant.

Scientific literature about stakeholder analysis proposes several criteria for characterising and categorising stakeholders. Mitchell et al. (1997) from the field of business management classify stakeholders based on three attributes: power, legitimacy, and urgency. Besides the work of Mitchell et al. (1997), several other criteria are also mentioned in other various literature. Despite the many approaches and settings, the following elements have consistently emerged as categorisation and selection criteria: i) level of interest of the stakeholder in an issue or concern; ii) attitude of the stakeholder towards the project or programme; iii) power or influence of the stakeholder; iv) degree of impact of an issue on the stakeholder; v) degree of commitment of the stakeholder; vi) expertise of the stakeholder; and vii) willingness of the stakeholder to contribute or share.

Aside from the characteristics of individual stakeholders, the relationships between stakeholders may also be taken into consideration. For example, potential conflicts and coalitions between stakeholders and their agendas should be examined (Fottler et al., 1989; Reed et al, 2009). In addition, Prell et al. (2009) describe how information generated by social network analysis can be used to select stakeholders for participation. They use social network analysis to identify the role and influence of stakeholders according to their positions in the stakeholder network.

Despite the common use of the above-mentioned classification criteria, the choice of criteria will depend on the context and objectives of the engagement (Grimble and Chan, 1995; Luyet et al., 2012). In the case of the stakeholders representing an organisation or entity, the representation capability of the stakeholder is also an important aspect to consider. Catt and Murphy (2003) mention four methods for selecting

representatives from an entity: selection by the government agency based on seniority or knowledge, via random sampling, through an election process, and by self-appointment (i.e. individuals appoint themselves as representatives of a group). Again, the appropriateness of each method is dependent on the type of group in question and the purposes of involvement in the engagement process.

In this chapter, the views and insights from diverse stakeholders concerning who key stakeholders are, their selection criteria, and the factors impacting effective stakeholder engagement in Malaysia were obtained through an online questionnaire survey. The responses to the questionnaires are presented here according to three stages: pre-stakeholder engagement, during the engagement, and post-engagement. The chapter addresses the study objectives of i) identifying key stakeholders and selection criteria within the context of IRBM, and ii) examining the factors that contribute to effective engagement from stakeholders' perspectives in IRBM. This understanding is important for developing a novel evidence-based conceptual framework for stakeholders' engagement in Malaysia, which is presented later in the thesis.

3.3 Methodology

3.3.1 Survey questionnaires

Literature reviews assist the researcher in comprehensively understanding the subject matter, with an overview of the scholar's community insight into the subject matter (Acampora et al., 2022). However, in this chapter, to address both the objectives of identifying key stakeholders, including the selection

criteria, and examining the factors that contribute to the effective engagement from stakeholder perspectives in IRBM, an online survey was carried out to obtain individual stakeholders' feedback via a set of survey questionnaires.

The questionnaire development process followed a structured approach to ensure validity, reliability, and alignment with the study's objectives. Initially, a systematic literature review was conducted to identify key themes in stakeholder engagement for IRBM, drawing from peer-reviewed studies such as Reed et al. (2009) on stakeholder participation and Jager et al., (2016) on governance processes. These studies informed the categorization of questions into thematic sections, including stakeholder roles, inclusivity, governance mechanisms, and evaluation metrics.

To enhance content validity, expert consultations were conducted with IRBM practitioners, policy analysts, and academic researchers specializing in water governance. Their feedback helped refine the wording, clarity, and relevance of questions, ensuring they were comprehensible to diverse stakeholders while maintaining methodological rigor. Following a tailored design method, the questionnaire was structured to minimize cognitive load, beginning with straightforward demographic questions before progressing to more complex opinion-based inquiries.

A combination of question types was used to facilitate comprehensive data collection: Likert-scale questions allowed standardised assessments of stakeholder perceptions, multiple-choice questions captured key factors influencing engagement, and open-ended responses provided deeper insights into challenges and recommendations. Pilot testing was conducted with a small sample of stakeholders to assess readability, response time, and potential ambiguities. Based on feedback,

minor modifications were made to improve question clarity and logical flow, ensuring the questionnaire was both practical and effective for diverse respondents.

To achieve useful feedback, the design of the questionnaires had to be practical and easily understood by the targeted respondents (Aithal and Aithal, 2020). Questionnaires need to be reasonable in length and well-structured. A lengthy questionnaire would exhaust the respondents and create discomfort that led to less attentive feedback. Confusion could appear causing the respondents to rush to finish the questionnaire with less accurate responses. To overcome this shortcoming, keeping the questions short and simple is the key to improving the accuracy of the responses.

For this chapter, the formulated questionnaires based on the two objectives mentioned above have also complied with these four criteria: simple factual requiring yes or no feedback, complex factual with some requiring translation, opinion, and attitudinal questions, and open-ended questions. There are a variety of scales used, and the majority of the scales consist of the Likert scale.

To address the two objectives of this chapter, the questionnaires sought respondents' perspectives on the purpose of stakeholder engagement, the type of key stakeholders as the driving force behind stakeholder engagement, including their selection criteria, the need for inclusivity and multi-disciplinary participation, and the factors contributing to effective engagement in IRBM. Among the factors covered are the need for flexibility in the scope of stakeholder engagement, the need for an element of social learning, the need for incorporating environmental, social, and governance aspects, the multiple stakeholders' viewpoints and

qualifications, and the need for monitoring and evaluation of stakeholder engagement in IRBM.

From the above requirements, the survey questionnaires were divided into four sections, covering the various aspects of the stakeholders' perspective as follows:

Section A – the stakeholder's personal information, such as gender, type, and size of the organisation, role in the organisation, and level of education.

Section B – the purpose of the stakeholder engagement; the need for multi-disciplinary participation; the key stakeholders as driving force behind a stakeholder engagement; the need for stakeholder engagement to be inclusive, credible, legitimate, and flexible; the need for social learning; the need to incorporate the element of Environmental, Social, and Governance (ESG); and the need to adopt the Whole of Government and Society (WGS) approach.

Section C - the reasons for participating in the engagement; the need to possess a certain type of knowledge and experience; the total duration necessary for the engagement; the willingness to compromise, and to seek an amicable solution.

Section D – the selection criteria for key stakeholders, the need for the process to be free from any political interference; the need to take into consideration the social-economic, cultural, religious, and organisational factors; the need for competent facilitators; the need for trust, and transparency; the need for clear Terms of Reference (TOR); the degree of impact on decision-making; and the need for a mechanism to monitor and evaluate the effectiveness of the stakeholder engagement.

Besides, at the end of this section are also two open-ended questions; the challenges that stakeholders faced during the stakeholder engagement process, and the suggestions for improvement in conducting the engagement process.

For the study, online survey questionnaires were sent to water-related government agencies, consultants, academia and researchers, water utility entities, the corporate sector, NGOs and CSOs, and the local community, as each has a distinct and essential role to play. Government agencies generally focus on policies, laws, and regulations, including project implementation, while consultants provide technical expertise. Academia and researchers advance knowledge and evaluate processes and practices, while the corporate sector plays a significant role in socio-economic development and contributes to the environmental impact on the river basin. NGOs and CSOs will normally advocate for conservation efforts. The water utility entities and the local community are generally the concerned parties within the river basin. The survey targeted these diverse stakeholders to gather a comprehensive range of perspectives on the effectiveness of stakeholder engagement in IRBM. By including all these groups, the survey aimed to capture a broad spectrum of insights into technical challenges, policy impacts, community involvement, industrial practices, and conservation efforts, thus ensuring a well-rounded understanding of river basin processes and activities, and ultimately the development of an IRBM plan.

The survey questionnaires, which have been approved by the UNM FOSE Research Ethics Committee (SEREC) as minimal-risk ethics, were sent separately to 1000 individual staff from the key

stakeholders mentioned above through emails and WhatsApp within one month. There are instances where more than one member of staff from the same entity was invited to participate in the survey. The complete set of survey questionnaires for the individual stakeholders with the Google Form format responses can be found in Appendix 1.

3.3.2 Data structure

Of the 1000 invitations sent out, two hundred and fifty (250) responses were received over the three months that the survey was left open. The survey generated both quantitative data and qualitative information.

Analysis of the data is presented under separate sections consisting of the three phases. This classification allows for a comprehensive assessment of each phase of the engagement process: pre-engagement focuses on initial stakeholder expectations and outreach strategies, during-engagement examines the effectiveness of the engagement activities and participation levels, and post-engagement evaluates the outcomes of the engagement efforts and stakeholder satisfaction. By analysing these distinct phases, we can identify strengths and weaknesses in the engagement process, understand how stakeholder involvement impacts IRBM initiatives, and gain insights for improving future engagement strategies.

3.3.3 Sampling

A purposive sampling strategy was selected over random sampling due to the specialized nature of stakeholder

engagement in IRBM. Unlike random sampling, which assumes a homogeneous population where every individual has an equal probability of selection, purposive sampling is more effective when targeting specific groups with relevant expertise, experience, and decision-making roles. Since IRBM involves multidisciplinary collaboration among government agencies, private sector actors, NGOs, local communities, and researchers, it was crucial to ensure that participants had direct involvement in IRBM processes. This approach aligns with stakeholder theory, which emphasizes the importance of engaging key actors who influence and are affected by water governance decisions. Furthermore, purposive sampling enhances data richness and reliability, as it allows for the inclusion of diverse perspectives from those directly impacted by river basin management challenges. This approach was deemed the most appropriate for ensuring that the study accurately reflects the dynamics and challenges of stakeholder engagement in IRBM while capturing detailed insights into its effectiveness.

Additionally, the probability of representative sampling was chosen since stakeholder engagement in IRBM was limited to the boundaries of a river catchment area. Similarly, not all segments of a population would have engaged in IRBM activities. The identified focus groups include all relevant government agencies and government-linked companies (GLCs), consultants, water utilities, social workers, the local community, manufacturers, suppliers, non-governmental organisations (NGOs), civil society organisations (CSOs), academia, researchers, developers, contractors, and suppliers.

3.3.4 Reliability and validity

Reliability and validity are the most important aspects of data assessment. Reliability refers to the regularity or consistency of the data, while validity refers to the accuracy of the measurement of data. In analysing the data from the respondents, the 'reliability' and 'validity' aspects of the survey data have been checked using relevant statistical tools from the Statistical Package for the Social Sciences (SPSS) software.

Cronbach's alpha, a statistical measure that evaluates the internal consistency and reliability of a questionnaire (Viladrich, Angulo-Brunet, and Doval, 2017) is used in the analysis of the data from the online survey.

Validity refers to the extent to which a research instrument accurately measures the construct it intends to measure. Cronbach's alpha contributes to validity by assessing the internal consistency of the items within the instrument (Vaske, Beaman and Sponarski, 2017). A high Cronbach's alpha value indicates that the items are measuring the same underlying construct consistently, thereby increasing confidence in the validity of the instrument's measurements.

Reliability, on the other hand, refers to the consistency and stability of the measurements obtained from a research instrument. Cronbach's alpha directly assesses the internal consistency reliability of the instrument. A high Cronbach's alpha value indicates strong internal consistency among the items, suggesting that the instrument yields consistent results over time and across respondents. This enhances the reliability of the

instrument's measurements, as it indicates that the observed scores are not due to random variability or measurement error.

To calculate Cronbach's alpha, researchers first combine responses to all items to create a total score for each respondent, representing their overall level on the construct being measured. Then, correlations between each item and the total score are computed to examine how well each item correlates with the overall construct. The alpha coefficient is derived from the average of all possible split-half correlations, resulting in a value that ranges from 0 to 1.

Higher values indicate greater internal consistency among the items, suggesting they consistently measure the same construct. Values closer to 1 indicate higher reliability, while values below 0.70 are typically considered questionable. By assessing the internal consistency of items within the instrument, Cronbach's alpha helps researchers confirm that the instrument accurately measures the intended construct (validity) and yields consistent results (reliability), thereby enhancing the overall quality of the research findings.

In this chapter, alpha will be used as the estimation of the inner consistency test with values ranging from 0 to 1. Table 3.1 shows the interpretation of internal consistency corresponding to Cronbach's alpha value, α .

Table 3.1 Interpretation of the coefficient of alpha corresponds to internal consistency

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 < \alpha$	Unacceptable

Cronbach's alpha is a widely used measure of internal consistency or reliability in survey research, ensuring that a set of items consistently measures the intended construct. However, the size of the group being studied can affect the reliability of the results. If the sample is too small, the results might not be accurate, sometimes making the reliability seem better or worse than it actually is. A larger sample generally gives a more stable and reliable score. As a rule of thumb, researchers should aim for at least ten people per question in the survey, though more may be needed for shorter questionnaires. Doing a power analysis can also help determine the right sample size for accurate results.

Another important factor is the mix of people in the study. If everyone in the sample thinks alike, the results might underestimate reliability, while if there is too much variation, reliability could be overstated. To avoid this, the sample should be balanced and representative of the larger group being studied. Missing responses can also create problems, so researchers should use methods like filling in missing answers with averages or other estimation techniques to ensure the data stays reliable.

Checking if the reliability score changes in different subgroups can also help identify potential issues with sample size.

While Cronbach's alpha is a useful tool, it assumes that all questions contribute equally to measuring the concept, which is not always true. If this assumption does not hold, researchers might get a more accurate measure of reliability using alternative methods like McDonald's Omega or Composite Reliability, which take into account differences in how much each question contributes to the final score. By using the right sample size, making sure the group is diverse enough, handling missing data properly, and considering other reliability measures when needed, researchers can ensure their findings are accurate and meaningful.

In this study, an online survey questionnaire was distributed to 1,000 individual stakeholders associated with or concerned about the water sector in the country, using purposive sampling. A total of 250 responses were received. Statistical analysis of the survey data yielded Cronbach's alpha values greater than 0.7, indicating a high level of internal consistency and supporting the reliability and validity of the instrument.

For a sample size of 250, Cronbach's alpha is considered effective in assessing reliability for several reasons.

Firstly, a sample size of 250 as respondents from this purposive sampling survey is generally considered adequate for calculating Cronbach's alpha, as it provides sufficient statistical power to estimate the true reliability of a survey instrument.

Secondly, Cronbach's alpha measures the degree to which items within a scale are correlated, indicating whether they reliably assess the same construct. For a sample of 250, the diversity of

respondents helps in identifying inconsistencies or variations in responses that may not be evident in smaller samples. This allows researchers to refine survey items by removing poorly performing questions, thereby improving the overall reliability of the instrument.

Additionally, Cronbach's alpha is particularly useful in IRBM stakeholder engagement surveys, where multiple Likert-scale items are used to measure perceptions, attitudes, and knowledge about river basin management. With a sample of 250, the test can still effectively determine whether the survey items are coherent and if they provide reliable insights for decision-making.

Hence, for a sample size of 250, Cronbach's alpha provides a reasonably robust and statistically sound measure of reliability, ensuring that survey results are consistent and can be confidently used for further analysis and policymaking.

3.3.5 Friedman test

The Friedman test is a non-parametric statistical test used to investigate whether groups of three or more repeated measurements differ from each other. It serves as an alternative to the one-way repeated measures ANOVA when certain assumptions, such as normality and homogeneity of variances, are violated, or when the data are measured on an ordinal scale. It is a valuable tool for assessing differences among group means when traditional parametric tests are not applicable (Sheldon, Fillyaw, and Thompson, 1996). The Friedman test will be useful where two or more related quantitative variables are measured from the same group at the same time; for example, responses to three related survey questions from the same group of individuals.

Its application can provide researchers with important insights into the effects of experimental conditions, facilitating informed decision-making and advancing knowledge in various fields.

To apply the Friedman test, the first step is to rank the data from each group separately, considering all observations across groups. In instances of tied ranks, the average rank is assigned to each tied observation. Next, the ranks for each observation within a group are summed, resulting in a total rank for each group. Subsequently, the Friedman test calculates a chi-square statistic based on the differences in the total ranks among the groups. This statistic is then compared to the critical value from the chi-square distribution with the appropriate degrees of freedom. If the calculated statistic exceeds the critical value, the assumption, indicating no differences among group means, is rejected, suggesting significant differences among the groups.

3.4 Results and discussion

3.4.1 Online survey respondents' profile – individual stakeholders

Figure 3.2 shows the composition of key respondents representing different sectors of society in Malaysia, while Figure 3.3 summarises their demographic profile. A wide diversity of stakeholders responded to the questionnaires, maximising the quality of the data collection within diverse perspectives in a river basin setting. The majority of respondents come from government-related agencies (29.6%), engineering consultants (22.8%), and academia or researchers (14.8%). Most of the respondents have higher academic qualifications: 21.6% are PhD holders, 29.2% have master's degrees, and 46.8% have

bachelor's degrees. Most of the respondents come from medium-sized organisations, with 35.2% of them having 11 to 50 employees in their organisations. As for designation level, 54.8% of the respondents are at the top management level, while 37.2% are in senior management. Hence, with this demographic, the data providers have sufficient knowledge and experience to provide sound judgment to the perception-based survey of this research.

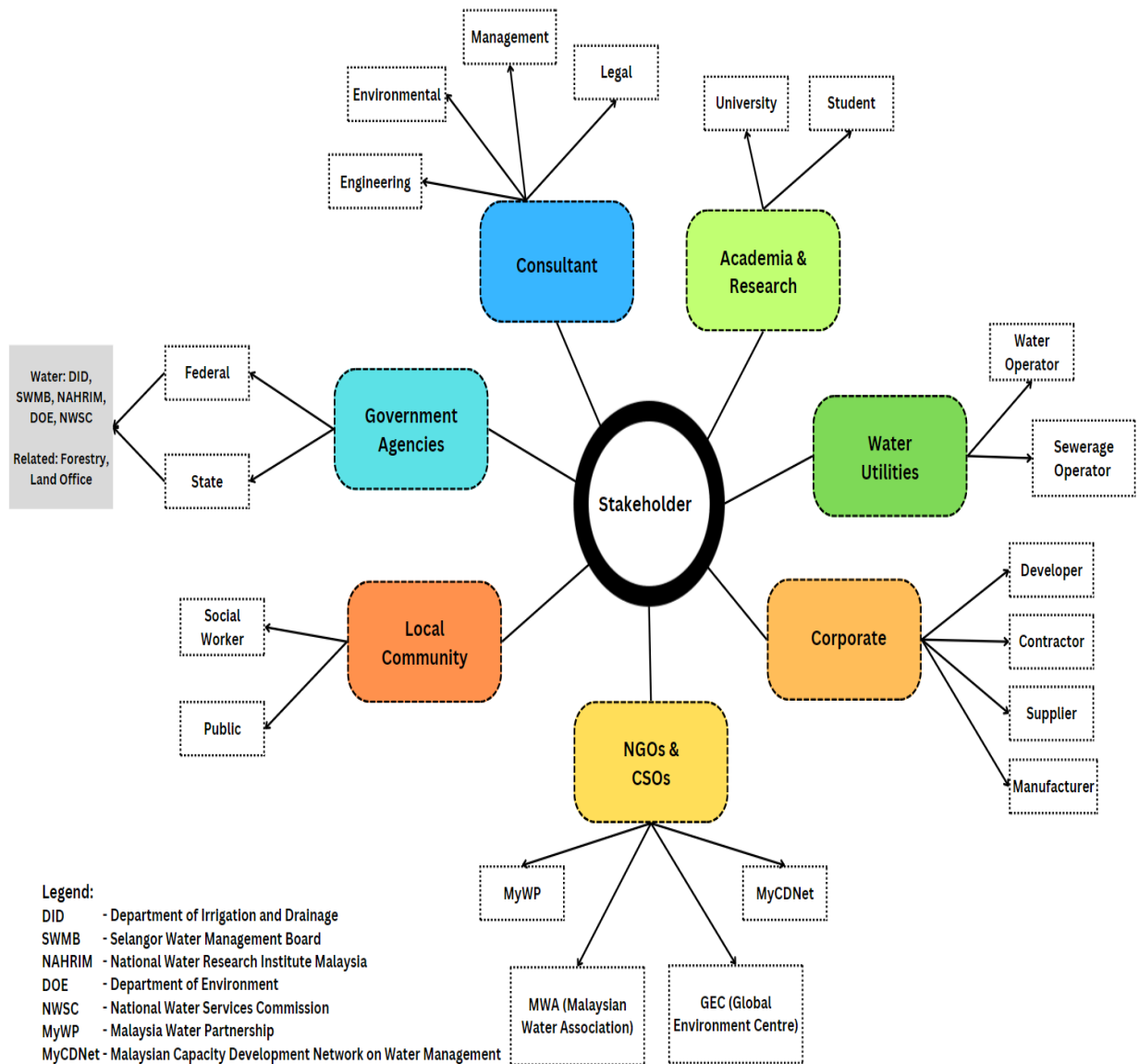


Figure 3.2 The key respondents for the online survey

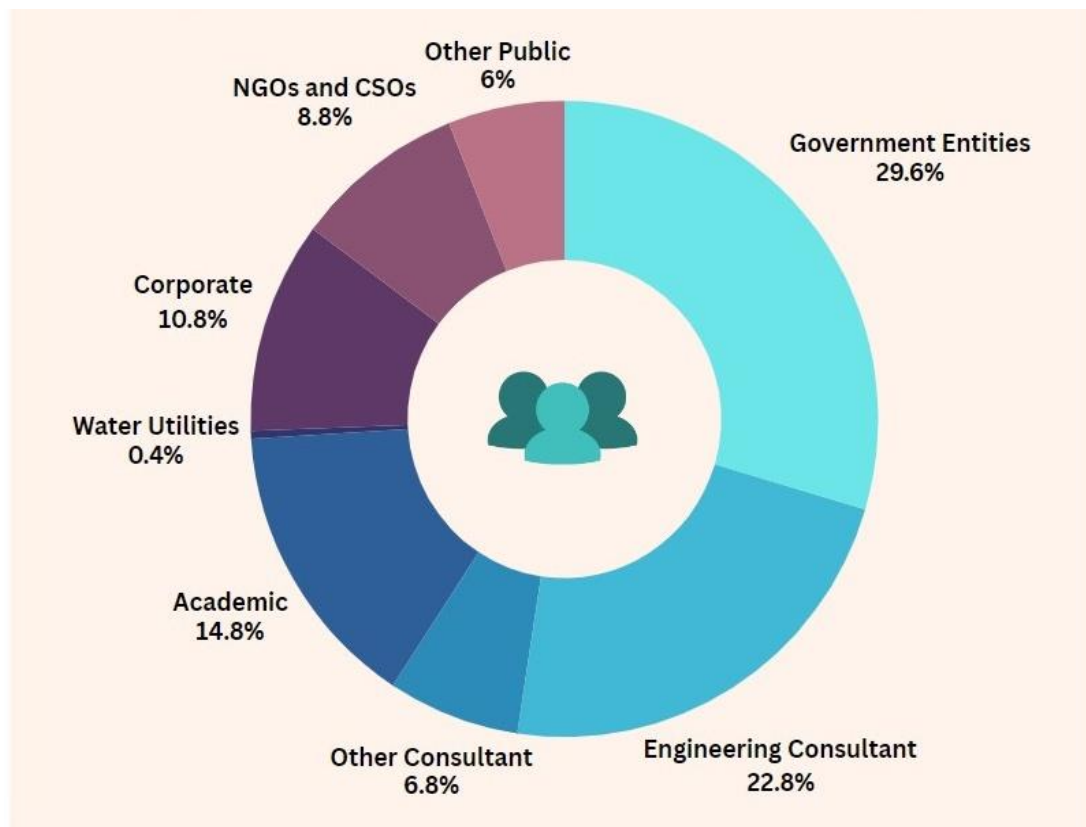


Figure 3.3 Demography of the survey respondents' profile

3.4.2 Data reliability analysis

Data reliability analysis was carried out using Cronbach's alpha, which is a reliability coefficient and a measure of the internal consistency of tests and measures. It assesses how well the set of items correlates with each other. A common rule of Cronbach's alpha suggests that a value of 0.7 or higher is acceptable for research purposes. The 95% confidence interval represents 95% confidence in the true parameters. Table 3.2 shows a lower bound of 0.864 and an upper bound of 0.902, both greater than the threshold of 0.7 and therefore reflect good internal consistency as required in Table 3.1. The data can therefore be interpreted with confidence.

Table 3.2 Scale reliability statistics for the 250 respondents

Estimate	Cronbach's α
Point estimate (overall total average)	0.884
95% CI lower bound	0.864
95% CI upper bound	0.902

Further reliability tests were carried out for individual items. Table 3.3 shows Cronbach's alpha values for all items related to the effectiveness of stakeholders' engagement in river basin management, ranging from 0.873 to 0.893. As the values are above the 0.7 range, this suggests a high level of internal consistency across the items. With a high level of internal consistency values, the questions in the survey measure a common underlying construct related to stakeholders' engagement in river basin management. As an example, the items "Three days' workshop", "Free from political interference", and "Multidisciplinary" stand out to have higher values of Cronbach's alpha, suggesting stronger reliability of these items.

Table 3.3 Individual item reliability statistics for the 250 respondents

Item	If item dropped
	Cronbach's α
Proper planning	0.873
Credible and legitimate	0.876
Flexible framework	0.875
Inclusive	0.877
Multidisciplinary	0.884
Enhance IRBM plan	0.877
Transparent	0.876
Three days' workshop	0.892
Willing to compromise	0.887
Willing to seek amicable solutions	0.877
Free from political interference	0.893
Collaborative among all sectors	0.877
Cultural respect	0.876
Organiser as the driving force	0.877
Structured and orderly workshop	0.873

	If item dropped
Item	Cronbach's α
Inclusion of ESG	0.878
Committed to implementation	0.873
Stakeholders' outcome of IRBM plan	0.874
Mechanism for monitoring progress	0.875

With such high Cronbach's alpha values, it suggests that the survey data can effectively capture the intended aspects of stakeholders' engagement in river basin management and able to draw a meaningful conclusion out of the survey results.

3.4.3 Summary of survey respondents' data

The complete results of the respondent's answers in Google Form format to the survey questionnaires can be found in Appendix 1. Table 3.4 summarises the responses collected from the 250 respondents which touch on the type and purpose of stakeholder engagement, the identification of key stakeholders, the criteria for selecting key stakeholders, and some important factors impacting stakeholder engagement. The 5-point Likert scale was available to the respondents as five answer options consisting of strongly agree, agree, neutral, disagree, and strongly disagree. This measures the opinions, attitudes, and beliefs of the respondents concerning the factors that contribute to effective

stakeholder engagement. As the responses may be subjected to bias due to social desirability, fatigue, recent experience, and other factors, the test for reliability and consistency of the results was performed in this study.

As explained in the methodology, the results of the questionnaire data analysis are arranged and presented in three sections, pre-engagement, during-engagement, and post-engagement, to systematically evaluate the flow of the stakeholder engagement processes in IRBM. The pre-engagement stage focuses on initial stakeholder preparation and outreach strategies, the during-engagement stage examines the effectiveness of the engagement activities and participation levels, and the post-engagement stage evaluates the outcomes of the engagement efforts and stakeholder satisfaction.

As can be seen from the summary of the responses in Table 3.4, the vast majority of the respondents strongly agree or agree with the questions related to proper planning, criteria for identifying relevant stakeholders, and factors that will significantly impact the effectiveness of stakeholder engagement.

Table 3.4 Summary of responses to the survey questionnaires

No.	Factors Impacting Stakeholder Engagement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Pre-engagement						
1.0	Proper planning	189	57	2	1	1
2.0	Credible and legitimate	165	83	1	0	1
3.0	Flexible arrangement for conducting engagement	154	90	4	1	1
4.0	Identifying relevant key stakeholders:					
4.1	Inclusive of all relevant and interested stakeholders	161	83	5	0	1
4.2	Stakeholders consist of multi-discipline	188	61	0	1	0
4.3	Have experience in IWRM	102	134	9	2	3
4.4	Have experience in IRBM	164	70	11	2	3
4.5	Ability to access and comprehend technical information	78	144	21	6	1
4.6	Local population within the river basin	141	102	6	1	0
5.0	Purpose of the engagement:					
5.1	Enhance IRBM Plan	178	67	5	0	0
5.2	To fulfill TOR of IRBM study	146	88	13	3	0
5.3	To fulfill water policy and legislation requirements	131	100	15	4	0
5.4	For formality	120	61	25	44	0
5.5	Contribute expertise and experience	160	81	9	0	0
6.0	Effective communication:					
6.1	Clear and concise TOR	178	66	6	0	0
6.2	Transparent of Organiser	181	65	4	0	0

No.	Factors Impacting Stakeholder Engagement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6.3	Trust between stakeholders and organiser	179	65	6	0	0
7.0	Competency:					
7.1	Facilitators/ consultants are independent and certified	100	121	27	2	0
8.0	Suitable duration of the stakeholder engagement/ workshop:					
8.1	Two days	46	130	46	24	4
8.2	Three days	108	51	50	33	8
9.0	Inclusion of environmental, social, and governance (ESG)	150	96	3	0	1
During engagement						
1.0	Characteristics of the stakeholders:					
1.1	Willing to compromise	44	133	43	28	2
1.2	Willing to seek amicable solutions acceptable to all parties	157	68	18	6	1
2.0	Free from political interference	131	99	13	6	1
3.0	Collaboration and coordination among all levels of sectors	153	79	15	2	1
4.0	Recognising cultural and religious values:					
4.1	Cultural respect	144	87	17	2	0
4.2	Religious tolerance and respect	148	69	26	7	0
5.0	Leadership role in engagement:					
5.1	Organiser	175	74	1	0	0
6.0	Management of the workshop:					
6.1	Structured and orderly manner	173	71	5	1	0
6.2	Productive discussion with a level playing field	170	74	5	1	0

No.	Factors Impacting Stakeholder Engagement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6.3	Resolve any conflict that arises	174	66	8	2	0
6.4	Accommodate multiple views	171	69	8	2	0
7.0	Whole of Government and Society	152	80	15	3	0
Post engagement						
1.0	Organiser is fully committed to implementing the outcome	186	60	2	2	0
2.0	The outcome is used to formulate the IRBM plan	177	65	8	0	0
3.0	A mechanism to monitor the effectiveness of stakeholder engagement	170	70	10	0	0

3.4.4 Pre-engagement stage

The pre-engagement phase requires a deep examination of interrelated parameters, such as the clarity of objectives, the legitimacy of the engagement process, the inclusivity of participation, the multidisciplinary nature of the discussions, and the establishment of trust among stakeholders. These parameters are not stand-alone; they are deeply interconnected and collectively shape the effectiveness of the engagement process. The duration of engagement is another critical factor, as it allows for the development of meaningful relationships and the establishment of trust, which are essential for successful stakeholder engagement. Certified personnel play a crucial role in facilitating this process, ensuring that the engagement is both professional and effective. Fulton et al. (2014) underscore the importance of these intertwined attributes - stakeholder composition, influence, knowledge, motivation, and actions - as they directly impact the outcomes of the engagement process.

3.4.4.1 Purpose of stakeholder engagement and motivation for participating in the engagement

Question 1 of Section B of the survey questionnaire looked at the purpose of the stakeholder engagement which may be due to the following: i) obtain feedback from participants to enhance the Integrated River Basin Management (IRBM) plan; ii) fulfill the requirements in the Terms of Reference (TOR) for the IRBM study; iii) fulfill the requirements of water policy and legislation; and iv) carry out by the organisation concerned for the sake of formality.

Where else Question 1 of Section C of the survey questionnaire focused on the reasons for participating in a stakeholder engagement which include: i) contributing expertise and experience; ii) willingness to share knowledge and information; iii) providing some influence on decision-making; iv) expecting to learn something new; v) opportunity for marketing; vi) opportunity for networking; vii) seeking recognition and/or monetary reward; viii) representing an NGO/CSO; and ix) representing a community. Table 3.5 shows the purpose of engagement and motivation for stakeholders participating in the river basin management study. The purpose and motivation of engagement were sorted in a descending manner to identify the purpose and reasons that will have a strong impact on the effectiveness of stakeholders' engagement. Across the various engagement purposes and motivations, there is generally a high agreement among the respondents. This is indicated by high mean values and low standard deviation and variance for reasons like enhancing the IRBM Plan, contributing expertise, fulfilling the requirements in the TOR, sharing information, fulfilling the requirements of water policy and legislation, learning something new, networking, and influencing decision-making. However, there are higher variations of respondents' perceptions when it comes to representing NGO/CSO, representing a community, marketing, seeking recognition, and as a formality, reflected by higher standard deviation and lower mean values. The findings highlight the need for engagement strategies and recognise the importance of common priorities when accommodating the diversity of opinions. The variability of opinions emphasises the importance of flexibility and tailored engagement strategies. Recognising this variation is crucial in fostering meaningful and effective stakeholder engagement in river basin management.

Table 3.5 Ranking of stakeholder engagement purpose and stakeholders' motivation in participating based on mean value

Purpose of engagement	Mean	Std. Deviation	Variance	Ranking
Enhance IRBM plan	4.692	0.504	0.254	1
Contribute expertise	4.604	0.559	0.312	2
Fulfill TOR	4.476	0.724	0.524	3
Share information	4.424	0.591	0.350	4
Fulfill Water Policy and Legislation	4.416	0.713	0.509	5
Learn new things	4.140	0.634	0.402	6
Networking	4.104	0.790	0.624	7
Influence decision making	4.068	0.944	0.891	8
Represent NGO/CSO	3.712	0.753	0.567	9
Represent a community	3.680	0.856	0.733	10
Marketing	3.368	0.927	0.860	11
Seeking recognition	2.908	1.039	1.080	12
Formality	2.556	1.467	2.151	13

3.4.4.2 The key stakeholders as driving forces for effective stakeholder engagement

Question 3 Section B of the survey questionnaire addressed the key stakeholders that provide the driving force for engagement which may include: i) the government organisations; ii) self-organised action by civil society organisations; iii) the private sector; iv) the academia; and v) the concerned public at large.

A statistical analysis was carried out to determine the key stakeholders that provide the main driving forces for stakeholder engagement in IRBM. Table 3.6 reveals an important aspect of factors to be considered for the effectiveness of stakeholders' engagement.

In the context of Malaysia, government organisations should include all water and environmental-related agencies, statutory bodies, and regulators at the national, state, and local authority levels. Civil society organisations should include relevant non-governmental organisations, while academia should include relevant research institutions. The public should include the local communities and individuals who are interested or have the expertise to enhance the engagement process. The private sector should amongst others encompass all that depend on the river as a source of water for their industries as well as those that need to discharge their effluent into the river.

Table 3.6 Ranking of key stakeholders providing driving force that impacts the effectiveness of stakeholders' engagement based on mean value

Driving force from key stakeholders	Mean	Std. Deviation	Variance	Ranking
Government Agencies	4.696	0.470	0.220	1
Civil Societies	3.924	0.716	0.512	2
Academia	3.820	0.725	0.526	3
Public	3.508	1.173	1.375	4
Private sectors	3.472	0.923	0.853	5

Strong commitment is necessary to ensure the success of the engagement and the driving forces from five different stakeholders have been initially identified as potential factors. From the survey results, all five obtained relatively high scores and are qualified to be considered as key stakeholders. However, in terms of ranking, the relevant government agencies with a mean value of 4.696, are perceived as the main key stakeholders providing the strongest driving force to ensure the success of stakeholder engagement. As shown in Figure 3.4, an immense majority of respondents, precisely 99.6%, concurred with the statement that government organisations must serve as the dominant driving force, with a substantial 70% strongly agreeing and 29.6% in agreement. Only 0.4% of respondents remained neutral in their assessment, while none registered disagreement or strong disagreement. These findings resoundingly illustrate the profound impact and driving influence exerted by the relevant government organisations, particularly the water and environmental-related agencies, statutory bodies, and regulators at the national (federal), state, and local authority levels.

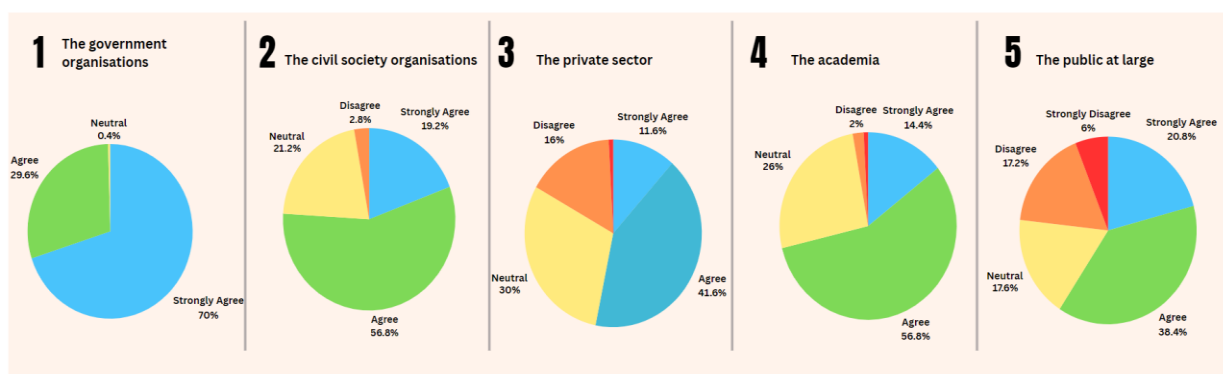


Figure 3.4 Respondents' data on the key stakeholders that provide the driving force

Civil society organisations (CSOs) can also play a notable role in driving change as a self-organised force. Based on survey responses, their influence was viewed quite favourably. A strong majority of respondents 19.2% strongly agreed and 56.8% agreed, thereby rating the impact of these non-governmental groups in a positive light. A more modest number, 21.2%, took a neutral stance on the issue, while just a small percentage, 2.8%, registered their disagreement with how civil society organisations contributed as an independent driving force. In short, three-quarters of respondents welcomed the self-directed actions taken by such membership-based organisations operating outside of formal government structures to help advance priorities in terms of IRBM. This finding augurs well with the directive of the UN Economic and Social Commission for Asia and the Pacific that all governments should facilitate the participation of CSOs and stakeholders in the official agenda of the nation and region (ESCAP, 2020). CSOs in Malaysia have recently contributed to the transformation of democracy through social movements, community activities, and participation in public administration. The involvement of CSOs during stakeholder engagement in public policymaking serves as one of the platforms that contribute to the democratic transition of Malaysia (Sarune Beh et al., 2020).

The findings showed that academic research also had considerable influence on the development of new ideas and technologies. Specifically, the survey found that 14.4% of respondents strongly agreed that academia can be a driving force behind stakeholder engagement in river basin management. An additional 56.8% of respondents agreed with that statement. Neutral responses accounted for 26% of the total, with only a

small combined percentage of 2.8% disagreeing or strongly disagreeing that universities and research institutions may impact stakeholder engagement. Overall, the results indicated that the majority of respondents recognise the significant influence of academia. This resonates well with the recent realisation that besides the three core missions of teaching, research, and technology transfer, a fourth mission has emerged, requiring universities to collaborate with civil society, industry, and government to ensure society's progression toward sustainable development (Lucchese et al. 2022). Universities have been encouraged to include Corporate Social Responsibility (CSR) and sustainability pillars into their curricula to equip future leaders and decision-makers to help drive the transition to a more sustainable society (Venturelli et al. 2021; Aversano et al. 2022). Higher education institutions have been forced to abandon the 'ivory tower' that had previously isolated them from external socioeconomic systems to increase their engagement with local, regional, and national communities and foster their economic prosperity, environmental integrity, and social equity (Di Tullio et al. 2021).

When surveyed about the role of public concern serving as an impetus for change, the data revealed the following breakdown: 20.8% of respondents strongly agreed that concerned citizens represent an influential driving force, while another 38.4% agreed with this stance. Approximately 17.6% of respondents reported being neutral on this issue. Conversely, 17.2% disagreed that widespread public concern is an effective catalyst, and 6% strongly disagreed. In short, the findings suggested that over half of those polled perceive engaged members of the community as an important factor that can enable or propel

progress, whereas roughly one-quarter hold differing or uncertain views on the public as the driving force for stakeholder engagement in river basin management. Overall, this finding concurs with the views of other researchers that the public, particularly the local community, should be involved in decision-making to determine access to clean and safe water, which is essentially the citizens' right to improve healthcare (Arthur et al., 2023). The inclusion of public actors, particularly disadvantaged citizens, in priority settings for universal health coverage is also enshrined in the guidelines from the World Health Organisation (WHO).

Of the five driving forces analysed for their influence on stakeholder engagement in river basin management, the private sector received the least response. Based on survey results, 53.2% of respondents agreed that the private sector impacts stakeholder involvement, while 30% took a neutral stance, and 16.8% disagreed that the private sector is an influential driving force. Compared to the other forces examined, the private industry sector garnered the least consensus in terms of its role in motivating engagement between stakeholders concerned with managing river systems. While a slim majority perceived that there is some level of impact from private companies, a sizeable portion were ambivalent or saw little effect, suggesting the true influence of private sector interests as a motivating factor remains an open question for those seeking to understand what compels involvement in river basin governance issues. The role of the private sector as a responsible corporate citizen within the river basin cannot be ignored. Furthermore, the Global Water Partnership considers the private sector a crucial ally in the sustainable management and governance of water. This

collaboration is fundamental for achieving Sustainable Development Goal (SDG) 6, which aims to ensure the availability and sustainable management of water and sanitation for everyone, as well as for reaching broader water-related objectives, including those pertaining to food, health, energy, employment, poverty reduction, climate recovery, education, and ecosystems, among others (GWP, 2018).

Hence, from the survey responses and statistical analysis, it can be deduced that, from the degree of importance and influence, the relevant key stakeholders to be engaged in the IRBM study or programme are the relevant government organisations, civil society organisations, academia, the public, and the private sector. However, it is important to acknowledge that each stakeholder can play a distinct role in the engagement process for the development of the IRBM plan (Yuan et al., 2024).

3.4.4.3 Ranking of selection criteria for key stakeholders

Statistical analysis to determine the mean, standard deviation, and variance was carried out to determine the selection criteria based on Question 2 in Section D of the questionnaires which include the following requirements: i) population within the river basin; ii) demographic characteristics of the local population; iii) status of women and youth; iv) economic livelihoods; v) social status and power dynamics; vi) levels of literacy and healthcare; and vii) ability to access and comprehend technical information.

Table 3.7 shows the ranking of selection criteria necessary to be applied to stakeholders for participation in IRBM stakeholder engagement, with mean values sorted in descending order.

Generally, there is a relatively high consensus among respondents, reflected by low standard deviation and variance. The highest mean value is associated with the local population, followed by the ability to access and comprehend technical information. This indicates the respondents' overwhelming agreement to consider the local population and the ability to access and comprehend technical information as among the crucial selection criteria. The low standard deviation of 0.568 and variance of 0.322 suggest a high level of agreement among respondents on their importance. The large majority of the respondents agreed with the need for local community participation; this is an important consideration that must be included in the host organisation's policy, as already suggested by Musonda et al. (2024).

Table 3.7 Ranking of stakeholders' selection criteria based on mean value

Selection criteria	Mean	Std. Deviation	Variance	Ranking
Local population	4.532	0.568	0.322	1
Access to info.	4.168	0.708	0.502	2
Local demographic	4.144	0.661	0.437	3
Economic livelihood	3.960	0.657	0.432	4

Literacy	3.876	0.715	0.511	5
Women and youth	3.856	0.809	0.654	6
Social status	3.808	0.814	0.662	7

Table 3.8 shows the results of the Friedman test on mapping the stakeholder selection criteria cluster for participating in stakeholder engagement in a river basin management study. The table provides the results which are the test statistic (χ^2) value ("Chi-square"), degrees of freedom ("df"), the significance level ("p"), and Kendall's W which is used to assess the trend of agreement among the respondents. A high value of chi-squared 307.860, suggests significant differences among the requirements related to mapping the selection criteria cluster, where the seven different requirements are being compared. The p-value of <0.001 reconfirms significant differences among the seven requirements within the cluster. However, Kendall's W value of 0.205 suggests a moderate level of agreement among the rankings of the requirements. Hence, there is some level of consistency in the ranking of the requirements for the selection of key stakeholders.

Table 3.8 Results of Friedman test on non-parametric stakeholder selection criteria cluster

Factor	Chi-squared	df	p	Kendall's W
Mapping selection criteria cluster	307.860	6	<.001	0.205

Various researchers have highlighted that factors such as the level of interest, power, influence, legitimacy, and urgency of the stakeholder are important for selecting key stakeholders (Mitchell et al., 1997). However, the results from the survey questionnaire indicate that respondents also consider practical and community-centered attributes such as local population, access and ability to comprehend technical information, local demographics, economic livelihood, literacy, women and youth, and social status to be equally crucial for consideration as key stakeholders for the development of IRBM plan. These community-centered attributes highlight the importance of local representativeness in the engagement process, ensuring that local communities' diverse needs and perspectives are adequately addressed.

3.4.4.4 Ranking of types of knowledge and experience of stakeholders

In the survey questionnaires, Question 2 of Section C sought the respondents' views on the appropriate knowledge stakeholders should possess to contribute effectively. The type of knowledge and experience amongst others could be: i) water resources management including Integrated Water Resources Management (IWRM); ii) river or river basin management including IRBM; iii) environmental flow and aquatic biodiversity; iv) water demand and allocation; v) water supply; vi) sewerage service; vii) irrigation; viii) hydropower generation; ix) natural resources management; x) land conservation; xi) pollution control and prevention; and xii) public outreach programmes.

Figure 3.5 reflects the views and perspectives of the respondents on the type of knowledge and skills that stakeholders should preferably possess. Based on survey results, there was a very strong consensus that some general knowledge of water resources management is crucial, particularly in areas related to IRBM, IWRM, river pollution, and environmental flow. With the diverse stakeholders involved in collaborative IRBM planning, having a baseline comprehension of IRBM principles helps maximise the productivity and problem-solving potential of multi-stakeholder river stewardship cooperation.

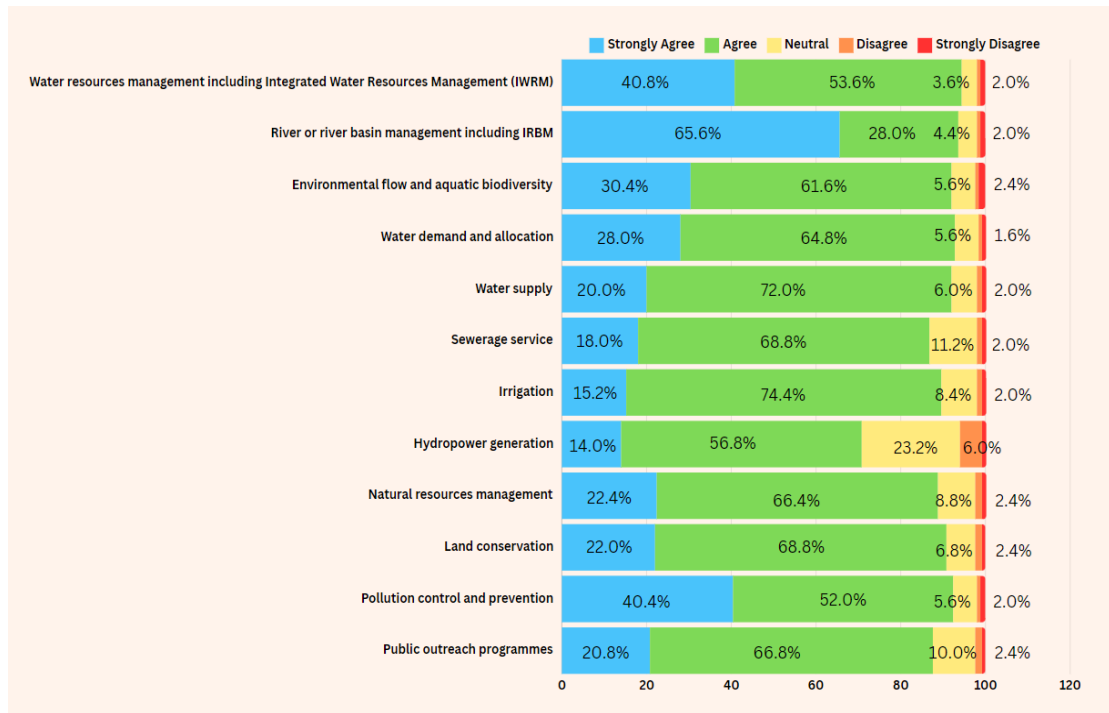


Figure 3.5 Respondents' views on the type of knowledge and skills that stakeholders should possess

Table 3.9 outlines the mean value of twelve types of knowledge related to river basin management. The mean values are sorted in descending order to allow ranking of each type of knowledge based on its impact on river basin management. The higher mean value signifies a higher rank. The overall mean value is generally positive, ranging from 3.780 to 4.560. This suggests that the respondents generally concurred that stakeholders should possess some knowledge about water resources management, as listed in the table. The standard deviations across the items range from 0.598 to 0.778, suggesting moderate agreement among the respondents.

Table 3.9 Ranking of the type of knowledge and experience that participants possess which can influence the effectiveness of engagement for river basin management, based on mean value

Type of knowledge	Mean	Std. Deviation	Ranking
IRBM	4.560	0.727	1
IWRM	4.320	0.695	2
Pollution control	4.296	0.717	3
Env. flow and Biodiversity	4.184	0.710	4
Water demand	4.184	0.639	5
Land conservation	4.096	0.645	6
Water supply	4.092	0.611	7
Natural resources	4.080	0.666	8
Public outreach	4.052	0.666	9
Sewerage service	4.020	0.643	10
Irrigation	4.020	0.598	11
Hydropower	3.780	0.778	12

As shown in Table 3.10, there is a significant difference among the types of knowledge associated with stakeholder engagement (Friedman Test, $P < 0.001$). Kendall's W shows the consistency of the responses in each of these components. The value of 0.199 suggests that there is a weak positive correlation. The low value may in part be due to the small sample size.

Table 3.10 Results of the Friedman test on the types of knowledge and experience

Factor		Chi-squared	df	p	Kendall's W
Type of knowledge		598.180	11	<0.001	0.199

There is hardly any literature or published works that look into the necessity or advantage for stakeholders to possess some knowledge and skills related to IRBM. Wehn et al. (2018) emphasised the importance of local knowledge and expertise in understanding local contexts, planning objectives, and policy measures, underscoring the value of incorporating community insights into the IRBM plan. The results from the survey questionnaires align with this view, highlighting that the respondents acknowledge the advantage of having some knowledge and experience in IRBM, IWRM, pollution control, environmental flow and biodiversity, water demand, land conservation, water supply, natural resources, public outreach, sewerage service, irrigation, and hydropower. These attributes, ranked by importance, indicate that practical expertise in specific areas of water management, particularly IWRM and IRBM, is crucial for effective contribution toward the engagement and decision-making processes in IRBM. It must be recognised that the ranking of these attributes may vary for different river basins. The survey results have shed new light on recognising and prioritising these specialised skills and experiences. The engagement process can be enriched with detailed, context-specific insights that enhance the planning, development, and implementation of the IRBM plan.

3.4.4.5 Factors impacting effective communication

Table 3.11 shows the ranking of factors that can impact communication, based on responses to the questionnaire. The respondents perceive transparency, trustworthiness, and clear and concise TOR as positive factors impacting communication in stakeholders' engagement for river basin management. These insights stress the importance of the organiser being clear in all communications, which will contribute to openness and build trust.

Table 3.11 Ranking of factors impacting effective communication in stakeholders' engagement based on mean value

Factors impacting communication	Mean	Std. Deviation	Variance	Ranking
Transparent	4.708	0.490	0.240	1
Trustworthy	4.692	0.512	0.262	2
Clear and concise TOR	4.688	0.514	0.264	3

Carr (2015) emphasised that public assurance is crucial, stating that their views must be genuinely considered in the decision-making process, which should be transparent and evidence-based rather than driven by political motivations. The survey results resonate with this principle, highlighting the importance of attributes such as transparency, trustworthiness, and clear

and concise Terms of Reference (TOR). Transparency ensures stakeholders can see how decisions are made and feel confident that their input is valued. Trustworthiness builds confidence in the process, making stakeholders more likely to engage meaningfully. A clear and concise TOR provides a well-defined framework for participation, ensuring that all parties understand their roles and the scope of the engagement. Together, these elements contribute to a stakeholder engagement process that is perceived as fair, open, and driven by genuine consideration of public input, aligning with Carr's emphasis on evidence-based and transparent decision-making.

The engagement phase is a critical juncture where the quality of communication can make or break the entire process. The exchange of information during this phase is not merely transactional; it is the lifeblood of the stakeholder engagement process, maintaining the support of key stakeholders while strategically addressing and reducing opposition from those who may be resistant. The effectiveness of communication is deeply influenced by the unique attributes of individual stakeholders. Bourne (2016) identifies key factors such as personality, culture, and gender, which collectively shape an individual's preferences for values, work ethics, leadership styles, and communication methods. Understanding these attributes is essential for tailoring communication strategies that resonate with stakeholders, ensuring that the exchange of information is both effective and meaningful.

3.4.4.6 Optimal duration for engagement workshops

Table 3.12 shows the ranking of workshop duration preferred by the respondents.

Table 3.12 Ranking of workshop duration as a factor impacting the effectiveness of stakeholders' engagement based on mean value

Workshop Duration	Mean	Std. Deviation	Variance	Ranking
Three days	3.872	1.199	1.437	1
Two days	3.760	0.917	0.842	2
More than three days	3.332	1.257	1.580	3
One day	2.500	1.243	1.544	4
Half a day	2.028	1.321	1.746	5

The optimal duration for engagement workshops in IRBM lacks comprehensive examination in the existing literature. However, survey results provide valuable insights, ranking three days as the most effective duration, followed by two days, more than three days, one day, and half a day. A three-day workshop appears to strike a balance between providing sufficient time for in-depth discussions, relationship building, and thorough exploration of complex issues without causing participant fatigue. Two-day workshops are also effective, though they might limit the depth of engagement compared to the three-day format. More than three days can lead to diminishing returns due to participant burnout and logistical challenges. One-day and half-day workshops, while more convenient, are often too brief to cover extensive IRBM topics comprehensively or to foster

meaningful stakeholder interactions. Thus, the survey suggests that a three-day duration is optimal for achieving productive and effective stakeholder engagement in IRBM workshops, allowing ample time for detailed discussions and collaborative problem-solving. Hence, for any IRBM study, planning for a total of three days of engagement is strongly recommended, either conducted in one workshop or split into two workshops at different stages of the IRBM study.

3.4.5 During engagement stage

3.4.5.1 Management strategies

Within Sections C and D of the questionnaire, five questions provide insights into the impact of management strategies on the success of engagement. Table 3.13 shows the five potential factors associated with the implementation of a stakeholder engagement strategy that can impact the effectiveness of the engagement. The findings reveal an overall positive perception of all five factors with a high mean rating. The low standard deviation suggests a relatively consistent opinion among the respondents, while the low variance implies the respondents are broadly in a high level of agreement. The highest preference goes to a structured and orderly engagement, followed closely by a level playing field, the need to resolve conflict, the ability to accommodate multiple views, and the skill to reconcile differences. This is in agreement with the high Cronbach's alpha value (0.873, Table 3.3) for structured and orderly engagement. Hence, from the respondents' perspectives, the most important task of the organiser is to manage the engagement in a structured and orderly manner and to manage all views and conflicts amicably.

Table 3.13 Ranking of management strategies impacting engagement effectiveness based on mean value

Management strategies	Mean	Std. Deviation	Variance	Ranking
Structured and orderly	4.664	0.537	0.288	1
A level playing field	4.652	0.540	0.292	2
Resolve conflict	4.648	0.584	0.341	3
Accommodate multiple views	4.636	0.587	0.345	4
Reconcilable	4.604	0.620	0.385	5

3.4.5.2 Facilitating the engagement process

Table 3.14 shows the factors facilitating stakeholders' engagement in river basin management during the engagement phase. The results drawn from the responses to questionnaires in Sections C and D reveal a high agreement among the respondents for the need for an organised and influential government organiser, followed by promoting collaboration among all sectors. Respondents also generally recognise the significance of the willingness to seek amicable solutions, the need to be free from political interference, and the willingness to compromise during the engagement phase. While there is a positive overall perception, the stakeholders' engagement during the river basin management engagement is not homogeneous. Recognising diverse opinions is crucial in fostering collaborative and successful engagement.

Table 3.14 Ranking of factors facilitating the stakeholders' engagement process based on mean value

Factors facilitating stakeholders' engagement process	Mean	Std. Deviation	Variance	Ranking
Government organiser as the driving force	4.696	0.470	0.220	1
Collaborative among all sectors	4.524	0.684	0.467	2
Willing to seek amicable solutions	4.496	0.767	0.588	3
Free from political interference	4.412	0.735	0.540	4
Willing to compromise	3.756	0.901	0.812	5

Table 3.15 shows the Friedman test's result on the factors related to the effectiveness of stakeholders' engagement during the engagement phase. The high Chi-squared value (334.988) signifies strong relationships among the 5 groups in the analysis. The p-value of less than 0.001 from the Friedman test indicates significant differences among the factors, while a Kendall's W of 0.223 shows moderate agreement on the ranked data. However, the analysis shows that respondents have some degree of consensus on the groups of factors.

Table 3.15 Results of the Friedman test on non-parametric factors facilitating the effectiveness of stakeholders' engagement during the engagement phase

Factor	Chi-squared	df	p	Kendall's W
Factors facilitating the effectiveness of stakeholders' engagement process	334.988	4	<.001	0.223

Bryson (2004) highlighted the critical role and responsibility of leaders in facilitating stakeholder engagement, emphasising the need for effective leadership to drive the process. The survey results reflect this perspective, ranking attributes such as the government organiser as a driving force, structured and orderly workshops, collaboration among all sectors, willingness to seek amicable solutions, freedom from political interference, and willingness to compromise. These attributes underscore the importance of a strong, proactive leader who can orchestrate the engagement process efficiently and inclusively. An organiser as a driving force ensures direction and momentum, while structured workshops promote clarity and productivity. Collaboration across sectors and a willingness to seek solutions and compromise highlight the necessity for a leader to foster a cooperative and adaptive environment. Maintaining political neutrality is essential for ensuring trust and impartiality among stakeholders. Together, these qualities of leadership facilitate effective stakeholder engagement, ensuring that diverse perspectives are integrated,

conflicts are minimised, and collective goals of stakeholder engagement in IRBM are achieved.

The survey results reinforce the perceptions that essential parameters such as the leadership qualities of the organiser, the willingness to accept amicable solutions by all parties, the absence of political interference, and the display of collaborative effort by all stakeholders will go a long way toward the success of the engagement process. These parameters together with the appropriate communication system are not merely checkboxes but are critical factors that influence the overall effectiveness of the stakeholder engagement in developing the IRBM plan.

3.4.5.3 Cultural and religious considerations

Table 3.16 shows the ranking of cultural-based factors that have an impact on the effectiveness of stakeholders' engagement. The cultural-based factors with "cultural respect" and "religious tolerance" stand out as crucial factors with high mean values of 4.492 and 4.432 respectively. The low standard deviation suggests a consensus among respondents in acknowledging the factors as critical in effectiveness engagement. The survey results underscore the priority to foster cultural respect and religious tolerance in the engagement process, especially in situations where racial and religious polarisation has reached troubling levels (Shad Saleem Faruqi, 2024). In addition, values and perceptions are moderately important for effective communication and collaboration. A tailored engagement strategy is required to address the differences and ensure inclusivity.

Table 3.16 Ranking of cultural-based factors that impact the effectiveness of stakeholders' engagement based on mean value

Cultural-based factors	Mean	Std. Deviation	Variance	Ranking
Cultural respect	4.492	0.660	0.436	1
Religious tolerance	4.432	0.790	0.624	2
Values and perception	4.124	0.612	0.374	3
Rites and ritual	3.560	0.796	0.633	4
Embracing multi-culture	3.452	0.969	0.939	5

3.4.6 Post-engagement stage

3.4.6.1 Factors impacting the effectiveness of stakeholders' engagement during the post-engagement phase

Table 3.17 shows the factors that can impact the effectiveness of stakeholders' engagement during the post-engagement phase. The overall findings suggest that there is a positive sentiment with the 3 key aspects. The respondents express the importance of the organiser's commitment to the implementation of the stakeholders' engagement outcome. To ensure the success of the implementation, there is a positive agreement to develop a mechanism for monitoring the progress.

The relatively low standard deviation and variance indicate shared understanding and consensus among respondents, which

bodes well for the successful execution of river basin management plans.

Table 3.17 Ranking of factors impacting the effectiveness of stakeholders' engagement during post-engagement based on mean value

Factors impacting the effectiveness of stakeholders' engagement	Mean	Std. Deviation	Variance	Ranking
Committed to implementation	4.720	0.516	0.267	1
Stakeholders' outcome of IRBM plan	4.676	0.533	0.284	2
Mechanism for monitoring progress	4.640	0.558	0.312	3

Table 3.18 shows the results of the Friedman test on factors related to the effectiveness of stakeholders' engagement during the post-engagement phase of the river basin management study. The low chi-squared of 19.507 and p of less than 0.001 suggest a strong relationship and significant differences among the 3 factors in the analysis. A low value of Kendall's W of 0.026 indicates a low level of agreement among the factors regarding the effectiveness of the post-engagement phase.

Table 3.18 Results of the Friedman test on non-parametric factors impacting the effectiveness of stakeholders' engagement at the post-engagement stage

Factor	Chi-squared	df	p	Kendall's W
Factors impacting the effectiveness of stakeholders' engagement in the post-engagement phase	19.507	2	<.001	0.026

The post-engagement phase, often overlooked in literature reviews, is critical for assessing the long-term effectiveness of stakeholder engagement in IRBM. The survey results emphasise three key attributes ranked by importance: commitment to implementation, stakeholders' outcomes integrated into the IRBM plan, and mechanisms for monitoring and progress, including evaluating the engagement's effectiveness. Commitment to implementation ensures that the plans developed during engagement are put into action, demonstrating accountability and dedication to the agreed-upon goals. Incorporating stakeholders' outcomes into the IRBM plan signifies that their contributions have a tangible impact, fostering continued engagement and trust. Effective mechanisms for monitoring progress and evaluation are essential for tracking the implementation of IRBM initiatives and making necessary adjustments. Monitoring the effectiveness of engagement and the implementation of its outcomes is critical for ensuring that the benefits of the engagement process are realised over the long term. Together, these attributes underscore the importance of a

comprehensive post-engagement strategy that reinforces stakeholders' trust, ensures accountability, and promotes sustainable outcomes.

Although research on stakeholder engagement has been emerging since the early 1990s (Kujala et al., 2022), there remains a significant gap in post-engagement studies, making this aspect a novel and valuable contribution to the field. By focusing on the often-overlooked post-engagement phase, this chapter provides new insights into the long-term impact of stakeholder engagement on IRBM initiatives, offering practical and sustainable recommendations for ensuring their success.

3.4.6.2 Inclusion of the elements of Environment, Social, and Governance (ESG)

The inclusion of environmental, social, and governance (ESG) elements and criteria highlights a holistic approach to river basin management. The responses to Question 8 in Section B of the survey questionnaires are shown in Figure 3.6.

The survey results demonstrate strong support for ESG considerations in stakeholder engagement approaches for Integrated River Basin Management (IRBM). A substantial majority, constituting 60% of respondents, strongly agreed with the statement that "*Stakeholder engagement in Integrated River Basin Management (IRBM) should include the essential elements of ESG.*" A further 38.4% of participants agreed with this sentiment. Neutral views accounted for 1.2% of responses. Very few respondents, only 0.4%, strongly disagreed that ESG elements should be core to IRBM stakeholder involvement. Taken together, these findings indicate widespread agreement among

those sampled that integrating ESG issues is a recommended practice for comprehensive stakeholder participation related to the development of the IRBM plan.

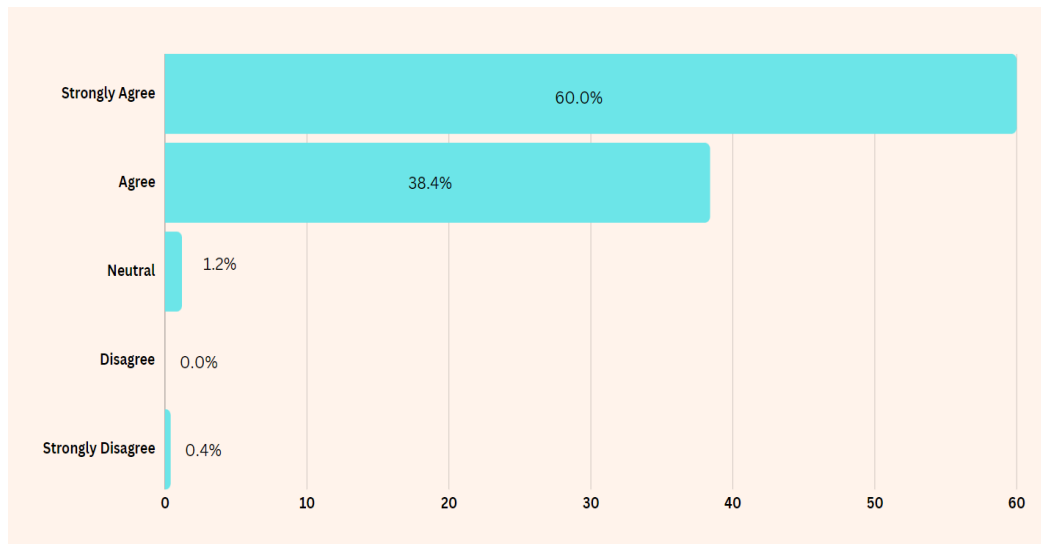


Figure 3.6 Respondents' views on the inclusion of the elements of ESG in the stakeholder engagement process

The survey result aligns with the current global practice of incorporating the three elements of ESG to enhance the stakeholder engagement process in water management (Andrades et al., 2023). Including ESG principles ensures that the engagement process and its outcomes are also aligned with broader sustainability goals. Garcia-Zavala, C., et al. (2023) have developed the indicators for the three elements of ESG. The environmental dimension includes i) the 2 Qs, namely water quantity or scarcity, and quality ii) ecosystem services, and iii) water-related hazards such as floods and landslides. The social dimension includes i) human interactions in surface and groundwater resources including river basin activities, ii) the importance of sustainable biodiversity, iii) cultural and religious

aspects, iv) involvement of indigenous in water management, v) the management of conflict over water, and vi) the management of media for fair media coverage on water-related issues. The governance dimension includes i) the enablers such as water policy and laws, ii) institutional arrangement for effective and efficient water management, and iii) the provision of financial and human resources for water-related infrastructures and programmes.

3.4.6.3 The whole of government and society approach

Question 9 in Section B of the survey questionnaires touched on the need to involve the whole of government and society (WGS) in the engagement process for the development and implementation of the IRBM plan. The data from the respondents is shown in the pie chart below (Figure 3.7).

The survey results strongly support a whole-of-government and society (WGS) approach to stakeholder engagement. Specifically, 61.2% of respondents strongly agreed with the statement "*Stakeholder engagement should be conducted based on the 'Whole of Government and Society' approach.*" An additional 31.6% of respondents agreed with this statement. Only a small minority, 6% of respondents, chose a neutral stance on this issue. The number of respondents who disagreed or strongly disagreed was negligible, totalling just 1.2% combined. Therefore, it is clear from these results that the vast majority, over 92%, of survey participants endorsed the involvement of both governmental and non-governmental stakeholders when conducting stakeholder engagement and public collaboration efforts.

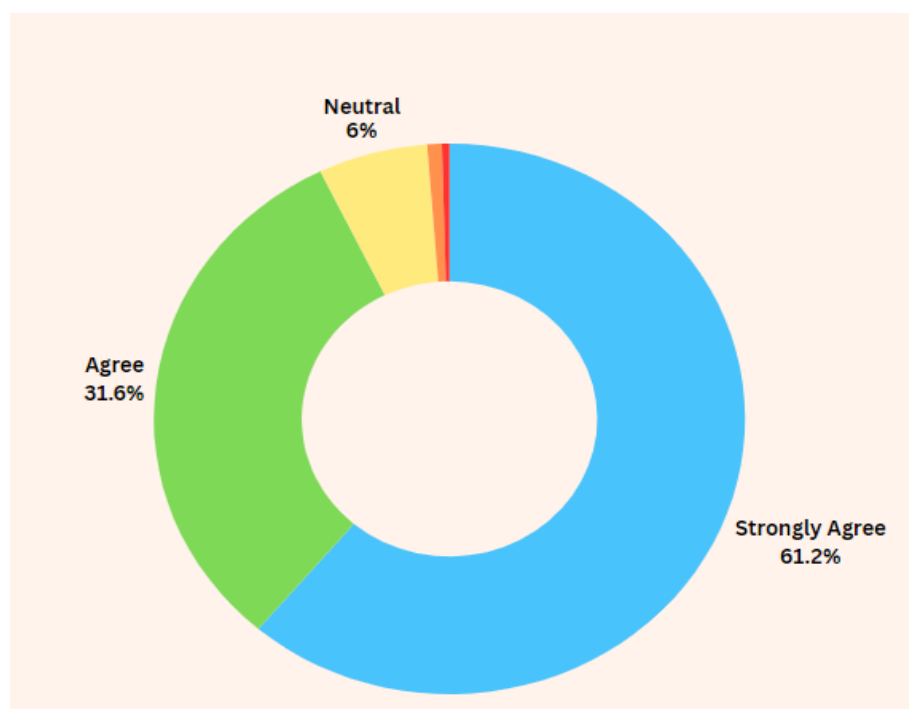


Figure 3.7 Respondents' views on the whole of government and society approach

This survey result resonates well with the recent calls by the United Nations and other international entities to adopt the whole of government and society approach in implementing national, regional, and global agendas. As committed by all countries in the 2030 Sustainable Development Agenda (United Nations, 2015), IWRM remains a primary framework for cross-sectoral coordination to be applied at all levels (SDG Target 6.5). IWRM at the river basin level is commonly referred to as Integrated River Basin Management (IRBM), and its approach is through the process of coordination, management, development, and conservation of water, land, and related resources covering various sectors regardless of administrative boundaries within a river basin. However, the term 'integration' must also be applied to the human system, whereby the government of the day, with

the public at large, should shoulder the shared responsibility to address the issues of water security and hazards.

The survey findings concur with the limited research publications on the whole of government and whole of society approaches. The combined WGS approach enables governmental and societal solidarity to tackle national and global issues such as pandemics, water crises, floods, and droughts. In addition to various ministries and government agencies, efficient engagement of academia, community stakeholders, private enterprises, and citizens is essential for the effective and integrated management of the river basin (Haghighat et al., 2023).

The whole of government approach applies to practically the whole government machinery at the national, state, and local levels, cutting across all agencies and authorities directly and indirectly related to the management and regulation of water, land, and environment. Examples of indirect contributions can be from, say, the Ministry of Communication and Multimedia to carry out the public outreach programme, and the Ministry of Education to promote to the staff and students the importance of water conservation and pollution control. In this respect, the full and unconditional commitment of the government and its associated political parties is paramount and key to success.

The whole of society approach has been proposed to foster meaningful participation in the 2030 Agenda (Karina Cázares-Grageda, 2018). The *OECD Public Integrity Handbook* (OECD, 2020) asserts that a whole-of-society strategy allows citizens, civil society, and the commercial sector to interact with public

authorities, shape the public agenda, and influence public choices.

In the case of water and sanitation services provision, for example, the concept of public-private partnership (PPP) needs to build upon cooperation that is beneficial to all stakeholders; the partners which could be the government and the private enterprise need to serve the public interest while providing a decent return to the service provider. In terms of river pollution, the United Nations Environment Assembly voted in 2017 to address the issue of conserving and restoring water-related ecosystems. This prompted the development of the World Water Quality Alliance (UNEP, n.d.), an open community of practice with many networks now in operation. Among them, the Social Engagement Platform 76 aims to foster open, multi-stakeholder water management procedures to bridge the gap between national-level policy and local governance and execution at the river basin level.

The whole of government and society approach to water governance therefore includes not just key government ministries, but all other supporting ministries, the commercial sector, civil society, and the local community. It emphasises the importance of a holistic and collaborative strategy that goes beyond typical siloed structures and brings together a diverse range of stakeholders to find shared solutions to complex water-related challenges (Petra Dobner and Hans-Georg Frede, 2016). Furthermore, the whole of government and society approach pushes for a change toward a more integrated and coordinated system, challenging the traditional division of labour in the water sector to ensure successful and long-term water governance.

Thus, there is a growing realisation that applying the whole of government and society approach at the early stage of planning, particularly during the stakeholder engagement of the IRBM study is crucial for the enhancement of the engagement process.

3.5 Conclusions

The stakeholders represented in this chapter comprised 250 respondents, reflecting a diverse cross-section of individuals involved in river basin management. These participants encompassed various ages, industries, educational backgrounds, and job designations, contributing to a comprehensive understanding of stakeholder dynamics within this context.

Through the data from the online survey, this chapter identified a spectrum of factors influencing the effectiveness of stakeholder engagement across various stages of the engagement process. These factors were categorised into three distinct stages: pre-engagement, during-engagement, and post-engagement. By systematically analysing these factors, this chapter aimed to uncover insights that could inform more strategic and impactful stakeholder engagement strategies in river basin management.

To ensure the robustness and reliability of the findings, rigorous statistical analysis techniques were employed. Cronbach's alpha values were calculated to assess the internal consistency of the identified factors, with values exceeding 0.7 indicating strong reliability. Additionally, Friedman tests were conducted to evaluate the significance of individual factors concerning stakeholder engagement effectiveness.

In the pre-engagement stage, the analysis underscored the need for a properly planned stakeholder engagement with an optimum duration of 3 days to obtain feedback from all relevant stakeholders to enhance the development of the IRBM plan. The results also indicate the critical importance of identifying key stakeholders, including their selection criteria, particularly the need to include multidisciplinary local actors, preferably with knowledge of IWRM and IRBM, for enriching the engagement process (Prebanić et al., 2023). Furthermore, the credibility and legitimacy of IRBM plans were identified as key factors influencing stakeholder acceptance and engagement. Facilitators for stakeholder engagement should be competent as this will lead to effective communication, thereby fostering transparency and trust between the organiser and the stakeholders, and among stakeholders. This aligns with findings from Malaysian studies on IRBM, where ineffective stakeholder selection and lack of local knowledge integration have been cited as major barriers to successful engagement.

During the engagement stage, inclusive participatory processes, initiated by the organiser, are essential for fostering collaborative discussions and developing shared visions among stakeholders. The display of strong leadership in managing structured and culturally respectful engagement workshops was highlighted as a facilitative tool for exploring collaborative and practical feedback (Jang et al., 2017). Similar findings in Malaysia have highlighted that stakeholder engagement efforts often fade due to weak leadership structures and a lack of culturally adaptive engagement models, resulting in limited participation from marginalized groups. The results also indicate the need for

stakeholders to be willing to seek amicable solutions, free from political interference, and acceptable to all parties.

As for the post-engagement stage, the findings reveal the necessity of implementing stakeholder requirements and feedback outlined during the engagement process and establishing mechanisms for monitoring progress to ensure the effectiveness of stakeholder engagement in river basin management initiatives. The Malaysian experience with IRBM suggests that post-engagement monitoring often lacks continuity, leading to ineffective long-term implementation of stakeholder recommendations. Addressing this issue through structured follow-up mechanisms could significantly improve stakeholder trust and long-term engagement.

The survey results also gave a positive response that stakeholder engagement in IRBM can be greatly enhanced with i) the adoption of the approach of the 'Whole of Government and Society' as strongly advocated for inclusive stakeholder engagement (Hidzir et al., 2021), and ii) the incorporation of the elements of ESG.

The findings of this chapter carry significant implications for the good practice of stakeholder engagement in river basin management. By integrating stakeholder perspectives and adopting more inclusive governance models, policymakers and practitioners can enhance the effectiveness of the engagement process and ultimately the sustainability of their initiatives contained in the IRBM plan. Furthermore, this chapter serves as a foundational step towards developing a comprehensive framework for measuring the effectiveness of stakeholder

engagement in integrated river basin management contexts in Malaysia.

The following chapter will explore the organisational viewpoints, to complement the individual stakeholders detailed in the present chapter.

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Chapter 4 Stakeholder Engagement in Integrated River Basin Management: Understanding Organisational Roles and Perspectives in Malaysia

4.1 Abstract

The role of the organiser in managing stakeholder engagement is crucial for its success. This chapter aimed to understand organisational roles and perspectives in stakeholder engagement in IRBM in Malaysia. It examines how their strategies, capabilities, and management practices influence the effectiveness of the engagement process. An online survey was distributed to 500 personnel from various government organisations and consultants that are involved in IRBM studies. The survey focused on i) the critical roles and responsibilities of the organisations as a host in conducting stakeholder engagement and what makes them successful in delivering these roles, and ii) what other factors the organisations themselves think will enhance the engagement process. The respondents fully acknowledged that, as the organisers of engagement, government agencies and their appointed consultants play a pivotal role in its success. This similar view has been expressed by stakeholders as described in the previous chapter. The respondents in this survey emphasised the importance of stakeholder engagement to obtain feedback, as stipulated by the water policy and related legislation for preparing the IRBM plan, and strongly denied that engagement was carried out simply for formality. Some similar questions concerning the identification of key stakeholders, the selection criteria, and their characteristics as contained in the previous chapter were also addressed to the organisations. For these, the views expressed by the

organisations resonate well with those of the stakeholders. However, from the organisations' perspectives, the individual representing a particular stakeholder organisation can be from any level if possessing the relevant expertise and experience, though preferably should be senior. In terms of the factors that contribute to effective engagement, there was a consensus among respondents that relevant data, information, and documents related to the river basin must be made available to the participants during the engagement sessions so that they can contribute effectively. As to the question of whether participants should be given appropriate incentives or rewards for taking part in the stakeholder engagement, only 34% responded positively - the majority remained neutral. From the survey, 78.5% of respondents indicated that the feedback from all the stakeholders/participants had been taken into consideration in the decision-making for the preparation of the IRBM plan. Besides the online survey, selective interviews were carried out with four government organisations that conduct stakeholder engagement in IRBM and water management studies in Malaysia. These provided valuable insights into the role and responsibilities of the organiser, besides validating some of the online survey findings. A significant point to emerge from the interviews was the lack of structured guidelines for stakeholder engagement and the mechanism for the monitoring and evaluation of the effectiveness of the stakeholder engagements.

4.2 Introduction

Effective water governance has become crucial to addressing the challenges of water security, with a particular focus on the necessity of preparing a comprehensive IRBM plan. The preparation of such an IRBM plan entails the process of

stakeholder engagement to obtain feedback from relevant stakeholders. The organisation concerned, as the engagement driver, plays a pivotal role in this process, as its structure, capabilities, and strategies significantly influence the success of stakeholder interactions.

This chapter delves into the critical role of organisations in stakeholder engagement, examining how their strategies, capabilities, and management practices influence the effectiveness of IRBM efforts. By leveraging organisational strengths and addressing potential weaknesses, stakeholders can foster more sustainable and resilient water management practices that effectively address the mounting pressures on the world's water bodies (Cano and Díaz, 2023).

Previous studies have highlighted that organisational strengths, such as robust leadership, clear communication channels, and strategic coordination, can greatly enhance stakeholder engagement, ensuring that diverse perspectives are integrated into water management practices (Tajuddin et al., 2023). On the other hand, organisational weaknesses, including inadequate coordination and lack of transparency, can impede progress and undermine the objectives of the IRBM plan (Krupa et al., 2020).

Theories on organisational behavior and management provide valuable insights into how organisations can optimise their structures and processes to support stakeholder engagement effectively. For example, adaptive management, organisational learning, and collaborative governance frameworks highlight the importance of flexibility, continuous improvement, and power-sharing in achieving successful stakeholder engagement (Carr,

2015). Organisations that adopt these principles are better equipped to organise stakeholder engagement, develop the river basin plan, manage the socio-ecological systems within river basins, and implement sustainable water management practices (Whitney et al., 2023).

River basin organisations (RBOs) can be platforms for fostering collaboration and coordination among various stakeholders involved in river basin management (Lim et al., 2023). By bringing together government agencies, local communities, indigenous groups, non-governmental organisations, and other relevant parties, RBOs facilitate inclusive participatory approaches to decision-making (Bouckaert et al., 2018). This departure from traditional top-down governance models allows for consultative and informative participation, aligning with the principles of modern IRBM. Through inter-organisational networks, RBOs promote coordination among different agencies and stakeholders, helping to streamline efforts and avoid duplication of resources. This collaborative approach fosters the efficiency and effectiveness of river basin management initiatives by seamlessly integrating scientific methodologies with local insights through mutual communication (Jongman and Padovani, 2006). Ultimately, it plays a pivotal role in promoting the sustainable utilisation of water resources. Moreover, with appropriate institutional arrangements in place, RBOs facilitate iterative social learning processes (Mostert et al., 2007). By engaging individuals at the local level and incorporating their knowledge and perspectives, RBOs contribute to a deeper understanding of the complexities of river basin management. This participatory approach reduces uncertainty and complexity for policymakers and stakeholders alike, fostering greater

transparency, accountability, and trust in decision-making processes (Walker et al., 2006).

Organising stakeholder engagement in river basin management is a complex and multifaceted task. The role and functions of the owner or organisation conducting the engagement, as well as the strengths they must possess and the pitfalls they must avoid, are crucial to the success of the engagement process and are listed below (IUCN, 2018). In general, some of the key roles and functions of organisations, the strengths an organisation should possess, and the pitfalls that the organisation must avoid are given in Tables 4.1 to 4.3 respectively.

Table 4.1 Roles and functions of organisations

Roles	Functions / Tasks
Planner	1. Set purpose - Set clear purpose and objectives for stakeholder engagement. 2. Identify key stakeholders - Ensure all internal and external stakeholders are identified, and relevant key stakeholders are selected. 3. Select methods - Decide on the most appropriate methods of engagement, either virtual or physical workshops. 4. Decide place, frequency, and dates - Determine the suitable place, frequency, and dates for the engagements.

Roles	Functions / Tasks
	5. Prepare adequate resources - Ensure sufficient budget, staffing, competent facilitators, and necessary tools.
Facilitator	1. Organise meetings - Schedule and organise meetings, workshops, and public consultations whichever is appropriate. 2. Mediate discussions - Act as a neutral party to mediate discussions among stakeholders with diverse interests. 3. Ensure inclusivity – Make sure all relevant stakeholders are represented and have a voice.
Communicator	1. Disseminate information - Provide stakeholders with timely and accurate information regarding the river basin management plans, policies, and decisions. 2. Collect feedback - Collect and document feedback and opinions from stakeholders and ensure they are considered in decision-making processes. 3. Ensure transparency - Maintain transparency in all

Roles	Functions / Tasks
	communications and decision-making processes to build trust.
Coordinator	1. Manage resources - Manage financial, human, and technical resources efficiently. 2. Promote collaboration - Foster collaboration between different stakeholder groups, including government agencies, local communities, businesses, and NGOs. 3. Monitor and Evaluate - Develop and implement mechanisms to monitor and evaluate the progress and impact of stakeholder engagement activities.
Advocator	1. Promote awareness - Raise awareness about the importance of river basin management and the need for stakeholder engagement. 2. Influence adoption of policy - Advocate for policies and practices that support sustainable river basin management based on stakeholder input.

Table 4.2 Strengths that the organisation must possess

Strengths	Characteristics
Strong Leadership	1. Vision and Direction - Provide clear vision and direction for the stakeholder engagement process. 2. Decision-Making - Make informed and timely decisions that balance diverse stakeholder interests.
Excellent Communication Skills	1. Clarity - Convey complex information in an accessible and understandable manner. 2. Listening - Actively listen to stakeholder concerns and feedback.
Conflict Resolution Skills	1. Negotiation - Negotiate between conflicting interests to find mutually acceptable solutions. 2. Mediation - Mediate conflicts and disputes effectively to maintain a constructive dialogue.
Project Management Expertise	1. Planning - Develop comprehensive engagement plans with clear timelines and milestones. 2. Execution - Execute plans efficiently and adapt to changing circumstances.
Technical Knowledge	1. Subject Matter Expertise - Understand the river basin management principles, practices, and challenges, IWRM and IRBM. 2. Data Analysis - Ability to analyse and interpret scientific and technical data to inform decision-making.

Table 4.3 Pitfalls that the organisation must avoid

Pitfalls	Features
Exclusion of Key Stakeholders	1. Ignoring Stakeholders - Failing to identify and include all relevant stakeholders can lead to mistrust and opposition. 2. Underrepresentation - Giving insufficient attention to the concerns of less vocal or marginalised groups.
Lack of Transparency	1. Opaque Processes - Conducting decision-making processes without transparency can erode stakeholder trust. 2. Incomplete Information - Withholding or providing incomplete information can lead to misunderstandings and conflict.
Ineffective Communication	1. Overcomplicating Information - Providing information that is too technical or complex for stakeholders to understand. 2. Infrequent Updates - Failing to keep stakeholders regularly informed about progress and changes.
Inflexibility	1. Rigidity - Sticking rigidly to plans without adapting to new information or stakeholder feedback. 2. Resistance to Change - Being resistant to changing strategies or approaches when necessary.
Insufficient Resources	1. Underfunding - Not allocating enough financial resources to

Pitfalls	Features
	support comprehensive stakeholder engagement. 2. Lack of Expertise - Not having the necessary technical or human resources to effectively manage the process.
Poor Conflict Management	1. Avoidance - Avoiding conflicts rather than addressing them can lead to unresolved issues festering. 2. Bias - Showing bias towards certain stakeholder groups can lead to perceptions of unfairness and further conflict.

By understanding these roles, strengths, and pitfalls as listed above, the organisation can better navigate the complexities of stakeholder engagement in river basin management, leading to more sustainable and accepted outcomes. The organisation responsible for conducting the stakeholder engagement must at the very onset of the planning stage establish a clear objective and goals for the stakeholder engagement (Potthoff et al., 2023). The involvement of key project stakeholders is essential to ensure the sustainability of any project; thus, identifying all relevant key stakeholders underscores the success and effectiveness of the engagement process (Prebanić et al., 2023). Published works have suggested that selected stakeholders should preferably possess expertise or some understanding of river basin management principles (Pahl-Wostl et al., 2007), and the ability to analyse and interpret scientific and technical data to inform decision-making (Ison et al., 2007). As the organiser, the organisation must prepare for adequate resources such as a

sufficient budget, staffing, competent facilitators, and necessary engagement tools (Ministry of Water and Environment Uganda, 2021). In situations where the stakeholder engagement process is outsourced, the organisation must select an experienced facilitator, preferably with the appropriate certification (Belinda et al., 2024). Good facilitation ensures all relevant stakeholders are represented and have a voice (OECD, 2015). Moreover, a good facilitator can maintain transparency in all communications, effectively mediate conflicts and disputes, and foster collaboration between stakeholders, including government agencies, local communities, businesses, and NGOs (World Bank, 2006).

One notable example of successful organisational engagement in IRBM is the River of Life (ROL) project in Malaysia. This initiative, led by the government in collaboration with NGOs such as the Global Environment Centre (GEC), corporate partners such as ASPEC, and local communities, aimed to restore and rejuvenate Klang River, which was previously heavily polluted. The project serves as a benchmark for effective stakeholder collaboration in river basin management.

Prior to the project, the Klang River was classified as Class III-IV under Malaysia's National Water Quality Standards, indicating severe pollution levels that rendered the river unsuitable for recreational or potable use. Recognising the urgency of the situation, the ROL project integrated various stakeholder engagement strategies to address pollution and enhance river health. NGOs like GEC played a crucial role in mobilising local communities through community-based river care programmes,

which promoted sustainable waste disposal practices and citizen-led river monitoring initiatives.

Additionally, the project successfully engaged private sector entities, such as developers and water utilities, to contribute to infrastructure improvements. These included riverbank stabilisation efforts, enhanced wastewater treatment facilities, and CSR programmes aimed at maintaining river cleanliness. The government's role was pivotal in driving regulatory reforms, enforcing stricter environmental laws, and strengthening wastewater management policies to reduce illegal dumping into the river.

The impacts of the ROL project demonstrate the effectiveness of a multi-stakeholder approach in IRBM. Before the initiative, the Klang River suffered from excessive domestic and industrial pollution, low community participation, and weak enforcement mechanisms. Following project implementation, river pollution levels significantly declined, community awareness and participation increased, and several sections of the river were transformed into recreational spaces. Notably, some stretches of Klang River improved to Class IIB status, making them suitable for body-contact recreation.

This case study highlights the importance of structured stakeholder engagement in IRBM, showcasing how coordinated efforts between government agencies, NGOs, corporate entities, and local communities can lead to tangible environmental improvements. The success of the ROL project provides a valuable reference for other river basin management initiatives,

emphasising the need for inclusivity, long-term planning, and active participation from all stakeholders.

This chapter will address a significant gap in the existing literature on stakeholder engagement in IRBM, where much attention has been given to the perspectives of individual stakeholders (Rojas et al., 2020), but much so on the organisational roles and perspectives that can impact the success of the engagement process. Understanding how organisations perceive and approach stakeholder engagement is crucial for developing effective policies and frameworks (Motu'apuaka et al., 2015) that promote collaboration, transparency, and accountability in water management (Lacroix and Megdal, 2016). By providing new insights into organisation roles and perspectives, this chapter will provide valuable perceptions into the challenges, priorities, and strategies of key institutions involved in IRBM studies. Specifically, the chapter explores how the organisation identifies key stakeholders and what factors contribute to effective engagement from the organisation's perspective. It also deals with issues of inclusiveness, engagement strategies, the incorporation of stakeholders' feedback into the decision-making, the challenges encountered, and suggestions for future improvement to the engagement process.

4.3 Methodology

4.3.1 Data collection

A multifaceted approach, combining questionnaires and interviews, was adopted. This approach not only facilitates a

holistic examination but also reduces systematic error through careful design (Hox, de Leeuw and Klausch, 2017).

The survey questionnaires based on the study Objective (d) as mentioned in Chapter 1 were divided into 4 sections covering essential elements as described below:

Section A – The stakeholder's personal information, such as gender, type, and size of the organisation, role in the organisation, and level of education.

Section B – The purpose and type of engagement, the frequency of engagement sessions needed, and the social learning aspect.

Section C - Identifying key stakeholders and selection criteria, examining stakeholder characteristics, and management of conflict.

Section D - Factors contributing to effective engagement, such as resources, the consideration of the socio-economic, cultural, and religious aspects of participants, the leadership of the organiser, the appropriate total duration of engagement, the availability of relevant information, the need for providing rewards, and incorporating feedback in the decision-making.

There are also three open-ended questions: the tools and approaches used to encourage full participation from each participant, the means of communication employed, and the mechanisms for monitoring and evaluating the impact of stakeholder engagement. The complete set of survey

questionnaires for the organisation and their responses can be found in Appendix 2.

The target groups for the online survey were selected to ensure a comprehensive and multifaceted perspective on the research topic. However, as the focus was on organisations that conduct IRBM and water management studies, the number of organisations involved is relatively small, confined to a few government agencies and various consultants that are engaged to carry out the IRBM studies. Government agencies are generally responsible for policy formulation, implementation of development programmes, and regulatory functions. Engineering consultants bring practical and technical expertise; environmental consultants offer knowledge on sustainability and environmental impact; legal consultants ensure compliance with regulatory frameworks; management consultants contribute strategic and organisational insights. In some cases, the consultant may be the academia and members of NGOs/CSOs. Generally, these consultants also act as facilitators during the stakeholder engagement process. Given the above, the online survey was conducted by sending questionnaires to 500 personnel consisting of top management and senior staff of the agencies and organisations engaged in IRBM studies through email and WhatsApp®.

4.3.2 Data validity and reliability, and Friedman test

As described in the previous chapter, both Cronbach's alpha and the Friedman test were also applied in the analysis of the online survey data (Viladrich, Angulo-Brunet, and Doval, 2017).

4.3.3 Interview approach and analysis of responses

There are only four categories of government entities that are involved with both IRBM studies and water resources management studies in Malaysia, namely i) the river basin management and implementation agency which is only the Department of Irrigation and Drainage Malaysia (DID), ii) the water research agency which is only the National Water Research Institute Malaysia (NAHRIM), iii) the state water management authorities such as the Selangor Water Management Authority (SWMA), and iv) the state water regulatory bodies such as the Penang State Water Regulatory Division (WRDPP). Hence, the four selected agencies for this research interview are DID, NAHRIM, SWMB, and WRDPP.

The interviews for all four selected interviewees consisted of a set of 25 semi-structured questions, which were designed to include the various factors and challenges that can impact the effectiveness of stakeholder engagement in IRBM from the organisational perspective. The views of the interviewees will be useful in validating the findings of the survey and, at the same time, provide further insights into the effectiveness of stakeholder engagement in IRBM in Malaysia.

The four closed interviews were conducted within 2 months in 2023, each one on a separate date. No audio-visual recording was carried out. The interviews were with i) the Director General of NAHRIM, ii) the former Director General of DID, iii) the Head of the River Basin Management Division of SWMA, and iv) the Head of the Water Regulatory Division of Pulau Pinang State (WRDPP). Each interview lasted approximately an hour, with notes taken down for the response to each question.

Transcriptions were then prepared, capturing the key statements of the interviewees. The draft transcriptions were later passed to the respective interviewees for their checking and validation. In all cases, their final versions were fully edited and expanded with additional information and explanations by the interviewees. The complete sets of interview questions with the edited version of the responses from all four interviewees can be found in Appendix 3. These transcripts represent the official views of their respective agencies.

The responses to the interviews were analysed qualitatively and are presented under various sub-headings according to the interview questions. The responses were used to validate some of the survey findings as well as providing additional insights from the organisers' perspectives (as per Ramanadhan et al., 2021). For ease of comparison, a general summary of the interview findings has also been prepared.

The interview responses were then analysed using thematic analysis to identify recurring patterns and insights related to stakeholder engagement in IRBM. The analysis involved several steps: familiarisation with the data, systematic coding of significant statements, identification of themes, and refinement of categories. Thematic patterns were manually derived through an iterative review of interview transcripts, ensuring that key insights were consistently captured. The analysis revealed several critical themes, including the importance of inclusive stakeholder representation, the role of trust and transparency in engagement processes, challenges in balancing top-down and bottom-up decision-making, and the necessity of continuous monitoring and evaluation. These themes provided a structured

understanding of stakeholder expectations, barriers to participation, and opportunities for enhancing engagement frameworks in IRBM.

4.4 Results and discussion of online survey for organisations

4.4.1 Online survey respondents' profile - organisations

Organisations for the survey and interviews were selected using purposive sampling to ensure representation across key sectors involved in IRBM. The selection criteria included (i) the organisation's level of involvement in IRBM activities, (ii) its role in decision-making, policy implementation, or advocacy, (iii) sectoral representation to ensure diverse perspectives, and (iv) experience in stakeholder engagement related to water resource management.

Organisations were categorized into four main groups: (i) government agencies and government-linked companies (GLCs) responsible for policy formulation, regulation, and infrastructure development, (ii) private sector entities, including water utilities, consultants, and developers, (iii) NGOs and CSOs engaged in advocacy, environmental conservation, and community-based water initiatives, and (iv) academia and research institutions contributing scientific and technical expertise.

For the online survey, although eighty (80) responses were received, only fifty-six (56) were valid for analysis, due to incompleteness. The small number of responses can be attributed to the relatively small number of water-related agencies and consultants involved in IRBM and water management studies in

Malaysia, so the sample is considered to provide representative data.

Table 4.4 summarises the demography of the 56 respondents. The demographic data offers insights for engaging institutional stakeholders in IRBM initiatives. Analysis reveals a diverse representation, each contributing through its role and responsibility toward effective stakeholder engagement.

Table 4.4 Demography of the survey respondents' profile

Parameter	Categories	Male	Female	Total	Frequency (%)
Organisation	Academia or researcher	4	2	6	10.7
	Consultant – Engineering	8	2	10	17.9
	Consultant - Environment	0	2	2	3.6
	Consultant - Legal	1	1	2	3.6
	Consultant - Management	1	0	1	1.8
	CSO/NGO	2	1	3	5.3
	Government agencies	21	8	29	51.8
	Statutory Bodies	2	1	3	5.3

The significant number of respondents from government agencies and statutory bodies (57.1%) underscores the pivotal role of public institutions in IRBM. Their involvement is critical for policy formulation, resource allocation, and regulatory enforcement within river basin management frameworks. Furthermore, engagement with engineering consulting firms (17.9%) and academia (10.7%) is also vital, given their expertise in water infrastructure development and environmental engineering. Most of these consultants and academics are usually engaged by government agencies to conduct and manage the stakeholder engagement processes. Engaging and collaborating with these entities ensures the incorporation of technical knowledge and innovative solutions into IRBM plans and/or programmes.

4.4.2 Data reliability analysis

Table 4.5 shows the scale reliability statistics of the 56 respondents. Cronbach's α is a measure of internal consistency reliability, assessing how closely related a set of items are as a group. The point estimate of Cronbach's α being 0.884 suggests that the questionnaire items are highly correlated, indicating that they are measuring the intended construct effectively. A value above 0.7 is generally considered acceptable for research purposes, and the estimated α of 0.884 exceeds this threshold, indicating strong internal consistency.

Table 4.5 Scale reliability statistic for 56 respondents

Estimate	Cronbach's α
Point estimate	0.884

95% CI lower bound	0.864
95% CI upper bound	0.902

The 95% confidence interval provides additional information about the precision of the estimate. The lower bound of 0.864 and the upper bound of 0.902 indicate the range within which we can be 95% confident that the true value of Cronbach's α lies. The narrow width of the confidence interval suggests a high level of precision in the estimate. Overall, the high point estimate of Cronbach's α and the narrow confidence interval provides strong evidence of the reliability of the questionnaire.

Table 4.6 presents individual item reliability statistics, measured through Cronbach's α coefficient, for a questionnaire administered to 56 respondents. These statistics assess the internal consistency of each item within the questionnaire, reflecting the extent to which respondents' answers to each item correlate with each other.

Table 4.6 Individual item reliability statistics for 56 respondents

Item	If item dropped Cronbach's α
Ensure success of IRBM Plan	0.846
To fulfill Water Policy	0.844
To fulfill legislation requirements	0.843
As an input to drafting IRBM Plan	0.844
Inclusive participation	0.845
Social learning	0.841
Work inter-related	0.843

Item	If item dropped Cronbach's α
Relevant experience	0.843
Subject matter expert	0.842
Representative of sector	0.841
Willingness to share	0.845
Reputable in society	0.841
Seniority	0.846
Any level	0.842
Service to nation	0.846
Sharing knowledge	0.842
Opportunity to network	0.837
Beneficial	0.851
Dominated by stronger participants	0.839
Achieving amicable solution	0.839
Limited financial resources	0.845
Time constraints	0.844
Poor facilitation process	0.850
Numbers of session	0.852
Resort to remove conflicting parties	0.871
Social economic status	0.849
Cultural differences	0.849
Religious differences	0.848
2 Days	0.844
3 Days	0.838
More than 3 days	0.849
Low participation	0.862

Overall, the results indicate a generally high level of internal consistency across most question areas. Those such as "Ensure the success of IRBM Plan," "To fulfill Water Policy," and "As an input to drafting IRBM Plan" exhibit strong reliability, with α values around 0.844. Similarly, items like "Reputable in society," "Service to nation," and "Sharing knowledge" also demonstrate high internal consistency, with α values ranging from 0.842 to 0.846.

However, some areas show slightly lower reliability coefficients. For instance, "Opportunity to network" and "3 Days" have α values of 0.837 and 0.838, respectively. While these values indicate somewhat lower internal consistency compared to others, they still suggest reasonable reliability.

4.4.3 Summary of responses from organisations on factors impacting stakeholders' engagement

Table 4.7 presents the organisations' responses to the questionnaires related to factors influencing stakeholder engagement in Integrated River Basin Management (IRBM). The survey included opinions on various aspects such as the purpose and principles of engagement, selection criteria, reasons for engagement, challenges faced, and the optimum duration of engagement sessions. This survey set, though slightly like the one for individual stakeholders (in Chapter 3), was intended to obtain the views and perspectives of the organisations that conduct the engagement.

Table 4.7 Survey questionnaire responses from organisations on the impacting factors of stakeholder engagement in river basin management

No.	Factors Impacting Stakeholder Engagement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.0	The clear purpose of the engagement					
1.1	Ensure the success of the IRBM Plan	45	6	1	0	0
1.2	To fulfill the water policy	48	8	0	0	0
1.3	To fulfill legislation requirements	45	10	0	1	0
1.4	As an input to the drafting of the IRBM Plan	48	8	0	0	0
1.5	As a formality	3	7	2	7	37
2.0	Principles for engagement					
2.1	Inclusive participation	41	15	0	0	0
2.2	Social learning	21	32	3	0	0
		Twice		More than twice		
2.3	Number of engagement sessions	16		40		
3.0	Selection criteria					
3.1	Their work is inter-related	30	24	1	0	1
3.2	Have relevant experience	43	12	0	0	1
3.3	Subject matter expert	43	10	2	1	0
3.4	Representative of different sectors	35	17	4	0	0
3.5	Willingness to share knowledge	41	15	0	0	0
3.6	Reputable and well-respected in society	14	30	11	1	0
3.7	Senior with relevant experience	32	22	2	0	0
3.8	Any level with experience	37	17	2	0	0
4.0	Reason for engagement					
4.1	Service to nation	38	18	0	0	0
4.2	Sharing knowledge	39	17	0	0	0

No.	Factors Impacting Stakeholder Engagement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
4.3	Opportunity to network	31	21	4	0	0
4.4	Beneficial	10	39	7	0	0
4.5	Paid	3	5	25	16	7
5.0	Challenges in conducting engagement					
5.1	Dominated by stronger participants	34	20	2	0	0
5.2	Resort to remove conflicting parties	2	5	11	27	11
5.3	Achieving amicable solution	40	11	3	0	2
5.4	Limited financial resources	22	28	5	1	0
5.5	Time constraints	31	24	1	0	0
5.6	Poor facilitation process	18	23	9	6	0
5.7	Low participation	21	17	2	16	0
5.8	Social economic status	7	41	8	0	0
5.9	Cultural differences	7	39	9	1	0
5.10	Religious differences	4	25	23	4	0
6.0	Duration of engagement					
6.1	Half day	8	4	5	5	34
6.2	1 day	7	5	4	26	14
6.3	2 days	12	30	9	1	4
6.4	3 days	32	6	5	9	4
6.5	More than 3 days	14	11	12	12	7

Several key findings emerge from the data. Firstly, there is strong agreement among respondents regarding the importance of having a clear purpose for engagement, with high levels of agreement across factors such as ensuring the success of developing IRBM plans, fulfilling water policy and legislation

requirements, and providing input for drafting IRBM plans. Principles for engagement, particularly inclusive participation and social learning, were also well-supported, though to a lesser extent than the clear purpose of engagement. Respondents generally agreed on the importance of selecting stakeholders based on their inter-related work, relevant experience, subject matter expertise, and willingness to share knowledge. All these findings from the organisations' perspectives coincide with those from the individual stakeholders in the previous chapter, underscoring the narratives that organisational commitment is very crucial to the effectiveness and success of stakeholder engagement in developing the IRBM plan.

The reasons and benefits for engagement were mostly perceived positively, with respondents agreeing that engagement serves the nation, facilitates knowledge sharing, and provides networking opportunities. However, there were mixed responses regarding engagement being beneficial, possibly indicating varying perceptions among stakeholders. Challenges in conducting engagement were identified, including dominance by stronger participants, the need to remove conflicting parties, and difficulties in achieving amicable solutions. Limited financial resources and time constraints were also noted as challenges, along with issues related to poor facilitation processes, low participation, and the considerations of socio-economic, cultural, and religious differences.

Regarding the duration of engagement, responses varied with different preferences; the majority strongly agreed with 3 days though 2 days may be acceptable due to financial and time constraints. Ideally, organisations may consider conducting the

first engagement during the inception stage, the second during the interim stage, and the final one during the draft final stage of the IRBM study.

In summary, the data suggests that organisations recognise the importance of a clear purpose, inclusive principles, and appropriate selection criteria for engagement in IRBM. While there is general agreement, there is a need for a clear distinction between the benefits of engagement and the challenges in overcoming various constraints.

4.4.4 Motivations for engagement: views from organisations

The survey investigates the motivation for stakeholder engagement from the organisations' perspective. The question from Section B of the questionnaires addressed this aspect by asking whether stakeholder engagement is intended to fulfill the requirement of the water policy or legislation, to obtain feedback for preparing the IRBM plan, or for the sake of formality.

Table 4.8 provides insights into the ranking of purposes for stakeholders' engagement in river basin management, highlighting their perceived importance based on mean values and standard deviations.

Table 4.8 Ranking of purpose in conducting stakeholder engagement according to the mean value

Purpose of Engagement	Mean	Std. Deviation	Ranking
Input for drafting IRBM Plan	4.857	0.353	1

Purpose of Engagement	Mean	Std. Deviation	Ranking
To fulfill the Water Policy	4.804	0.519	2
Ensure the success of the IRBM Plan	4.786	0.456	3
To fulfill legislation requirements	4.768	0.539	4
As a formality	1.786	1.289	5

Topping the list is the significance of stakeholder involvement as an input to drafting the IRBM plan, indicating a recognition of stakeholders' essential role in shaping management strategies. This underscores the belief that collaborative planning processes are crucial for effective water resource management.

Following closely is the emphasis on fulfilling the existing water policy objectives through stakeholder engagement. Organisations acknowledge the interconnectedness between their involvement and broader policy frameworks governing water management, recognising the need for alignment with policy goals. Additionally, organisations prioritise their engagement in ensuring the success of the IRBM plan, underscoring the importance of the active participation of key stakeholders in the implementation efforts to achieve the management objectives and mission of the organisations.

Meeting legislative requirements ranks high in organisational priorities, reflecting an awareness of the legal obligations associated with stakeholder engagement in river basin management. Compliance with relevant laws and regulations is

considered essential for legitimacy and accountability. Conversely, engagement perceived solely as a formality ranks lowest in importance, indicating that organisations value meaningful dialogue and collaboration over superficial involvement and are committed to so.

The findings highlight the multifaceted role of stakeholder engagement in river basin management, ranging from informing planning processes and policy alignment to legal compliance and fostering genuine collaboration. Effective engagement strategies should prioritise meaningful involvement that aligns with planning objectives, policy frameworks, and legal requirements, ensuring a holistic approach to sustainable water resource management.

The Friedman test results in Table 4.9 indicate that there are statistically significant differences among the respondents' rankings of the purposes of engagement in river basin management. This means that respondents perceive some purposes as more important or relevant than others when it comes to engaging in river basin management initiatives.

Table 4.9 Results of the Friedman test on the non-parametric purpose of engagement

Factor	Chi-squared	df	p	Kendall's W
Purpose of Engagement	160.570	4	< 0.001	0.717

The high chi-squared value and low p-value indicate that the observed differences in rankings are highly unlikely to have occurred by random chance alone. In other words, the variations in how respondents rank the purposes of engagement are meaningful and not simply due to randomness.

Kendall's W coefficient of concordance provides insight into the degree of agreement among stakeholders' rankings. In this case, the coefficient of 0.717 suggests a relatively strong level of agreement among respondents in how they rank the purposes of engagement. This indicates that respondents generally concur on which purposes they consider to be more important or relevant in the context of river basin management.

Table 4.10 shows Conover's Post Hoc comparisons to provide further insights into the relationships between different factors related to stakeholders' engagement in river basin management. The results reveal the statistical significance of differences between pairs of factors, shedding light on nuanced distinctions that may not have been evident from the initial analysis. Starting with the comparison between "Ensure the success of IRBM Plan" and "To fulfill Water Policy," the test indicates a lack of statistically significant difference ($T\text{-Stat} = 0.291$, $p = 0.772$). This suggests that the respondents perceive similar importance in these two purposes of engagement when it comes to river basin management initiatives.

Table 4.10 Conover's Post Hoc comparisons for factors related to stakeholder engagement in river basin management

		T-Stat	p
Ensure the success of the IRBM Plan	To fulfill the Water Policy	0.291	0.772
	To fulfill legislation requirements	0.042	0.967
	As an input to drafting IRBM Plan	0.623	0.534
	As a formality	9.796	< .001
To fulfill the Water Policy	To fulfill legislation requirements	0.332	0.740
	As an input to drafting the IRBM Plan	0.332	0.740
	As a formality	10.087	< .001
To fulfill legislation requirements	As an input to drafting the IRBM Plan	0.664	0.507
	As a formality	9.755	< .001
As an input to drafting the IRBM Plan	As a formality	10.419	< .001

Similarly, the comparison between "Ensure the success of IRBM Plan" and "To fulfill legislation requirements" also shows no significant difference (T-Stat = 0.042, p = 0.967). Respondents seem to view these purposes as equally important in the context of engaging stakeholders for river basin management. However, a stark contrast emerges when examining the comparison between "Ensure the success of IRBM Plan" and "As a formality."

Here, the test reveals a highly significant difference (T-Stat = 9.796, $p < .001$), indicating that respondents perceive engagement aimed at ensuring the success of the IRBM Plan as fundamentally distinct from engagement perceived merely as a formality.

With respect to "To fulfill Water Policy" and "As a formality," a similar pattern emerges with a significant difference (T-Stat = 10.087, $p < .001$). This highlights the stark contrast between engagement efforts aligned with water policy objectives and those viewed as mere formalities by respondents. The comparisons between "To fulfill legislation requirements" and "As a formality" and between "As an input to drafting IRBM Plan" and "As a formality" also yield highly significant differences (T-Stat = 9.755, $p < .001$ and T-Stat = 10.419, $p < .001$, respectively). These findings underscore the importance of distinguishing between engagement efforts driven by substantive objectives, such as drafting IRBM plans or fulfilling legislative requirements, and those perceived as superficial or tokenistic in nature.

Tan et al. (2010) suggested that stakeholder engagement in IRBM enhances understanding of water-related issues and facilitates informed discussions on development challenges and opportunities. The survey questionnaire results align with this suggestion, ranking the purposes of engagement as follows: as input to drafting the IRBM Plan, to fulfill water policy, to ensure the success of the IRBM Plan, to fulfill legislative requirements, and not as a formality. Both Tan's suggestion and the survey findings underscore the importance of stakeholder input in drafting the IRBM Plan, as this ensures a comprehensive and representative approach. The emphasis on fulfilling water policy

and ensuring plan success reflects the necessity of aligning stakeholder engagement with policy goals and practical implementation. While Tan et al. (2010) highlight the general benefits of stakeholder engagement, the survey results provide a deeper understanding of its specific purposes, emphasising legal compliance and avoiding engagement as a mere formality. This comparison reveals a shared recognition of the critical role of stakeholder engagement in IRBM, with both sources advocating for meaningful and strategic involvement to achieve the development of a sound IRBM plan for sustainable water management outcomes.

4.4.5 Strategic insights: strengthening the stakeholder engagement process

Table 4.11 shows the ranking of principles for effective stakeholder engagement in river basin management. Firstly, the high ranking of the principle of inclusive participation underscores the importance of institutions ensuring the active involvement of diverse stakeholders in engagement processes. Organisations can use this insight to prioritise inclusive practices, such as involving community representatives, local authorities, NGOs, relevant experts, and even politicians in decision-making forums and consultations.

Table 4.11 Ranking of principles for effective stakeholder engagement according to mean value

Principles of Engagement	Mean	Std. Deviation	Ranking
Inclusive participation	4.732	0.447	1
Social learning	4.321	0.575	2

Number of sessions	1.714	0.456	3

Firstly, the results show that by actively engaging a wide range of stakeholders, organisations can foster a sense of partnership, collaboration, legitimacy, and trust with the key stakeholders in river basin management initiatives.

Secondly, the emphasis on the principle of social learning highlights the importance of knowledge exchange and collaborative problem-solving in engagement processes. Institutions can facilitate opportunities for stakeholders to learn from one another, share experiences, and co-create solutions to complex water resource challenges. This may involve organising future workshops, study tours, or working groups where stakeholders can exchange insights, build relationships, and develop innovative approaches to river basin management.

The lower ranking of the principle related to the number of engagement sessions suggests that respondents prioritise quality over quantity when it comes to engagement processes. organisations can use this insight to focus on organising meaningful and impactful engagement sessions rather than simply increasing their frequency. By ensuring that engagement sessions are well-designed, participatory, and conducive to dialogue and learning, organisations can maximise the effectiveness of stakeholder engagement efforts.

The analysis highlights the importance of organisations adopting a participatory and learning-oriented approach to stakeholder engagement in river basin management. By prioritising principles such as inclusive participation and social learning, organisations

can foster collaboration, build trust, and promote sustainable decision-making processes. This, in turn, can lead to more effective and equitable outcomes in river basin management, benefiting both the environment and the communities that depend on it.

The results of the Friedman test in Table 4.12 on the principles of engagement in river basin management indicate statistically significant differences among the principles. This suggests that respondents perceive varying levels of importance among the principles guiding engagement processes. From an organisational viewpoint, these findings are crucial for designing effective engagement strategies that prioritise the principles valued most highly by stakeholders. For example, the high ranking of inclusive participation suggests that institutions should focus on ensuring the active involvement of diverse stakeholders in decision-making processes. This might involve implementing inclusive practices, such as stakeholder mapping, consultations, and participatory workshops, to ensure that a wide range of perspectives are considered in river basin management initiatives.

Table 4.12 Results of Friedman test on non-parametric principles of engagement

Factor	Chi-squared	df	p	Kendall's W
Principles of Engagement	102.167	2	<0.001	0.912

Similarly, the significance of social learning highlights the importance of creating opportunities for stakeholders to learn from one another. Organisations can facilitate knowledge exchange through collaborative platforms, capacity-building programs, and networking events, fostering a culture of shared learning and innovation in river basin management. The findings underscore the need for organisations to align their engagement strategies with the principles valued most by stakeholders.

Table 4.13 shows Conover's post hoc comparison between pairs of principles guiding stakeholders' engagement in river basin management. From an organisational perspective, these findings guide how organisations involved in such initiatives can refine their engagement strategies to better meet stakeholders' preferences and priorities. Firstly, the comparison between inclusive participation and the number of sessions reveals a significant difference, emphasising respondents' prioritisation of quality over quantity in engagement processes. Organisations should heed this insight, focusing on ensuring meaningful and inclusive participation of diverse stakeholders in decision-making processes rather than unnecessarily increasing the frequency of engagement sessions.

Table 4.13 Conover's Post Hoc comparisons for factors related to principles of stakeholders' engagement for river basin management

		T-Stat	p
Inclusive participation	Numbers of session	9.608	<0.001
	Social learning	2.044	0.043
Numbers of session	Social learning	7.564	<0.001

Similarly, the comparison between inclusive participation and social learning highlights a slight difference in respondents' perceptions, with inclusive participation being slightly more valued. Organisations can leverage this understanding by prioritising inclusive practices that foster dialogue, collaboration, and knowledge exchange among stakeholders while also recognising the importance of creating opportunities for social learning. Furthermore, the significant difference between the number of sessions and social learning underscores the need for organisations to strike a balance between session frequency and the emphasis on knowledge exchange and collaborative problem-solving. Organisations should design engagement sessions that not only occur regularly but also facilitate meaningful dialogue and learning among stakeholders to address complex water resource challenges effectively. By aligning engagement strategies with these preferences and prioritising inclusive participation, social learning, and meaningful dialogue, organisations can foster more effective collaboration, trust, and sustainable outcomes in river basin management initiatives.

Wehn et al. (2018) emphasise that the principle of stakeholder engagement is social learning, which facilitates knowledge co-creation between government agencies and citizens, fostering mutual recognition and respect while working towards shared objectives. This understanding aligns with the survey questionnaire results, which rank the principles of stakeholder engagement as inclusive participation, social learning, and the number of sessions. Inclusive participation, ranked highest, underscores the importance of involving a diverse array of stakeholders to ensure all voices are heard and considered, which is foundational for social learning. Social learning, recognised as

crucial by both Wehn et al. (2018) and the survey respondents, highlights the process of collective knowledge-building and mutual understanding. The number of sessions, while ranked last, still indicates the value placed on the frequency and continuity of interactions to build relationships and reinforce learning. Together, Wehn's perspective and the survey results underscore that meaningful and repeated stakeholder engagement, rooted in inclusivity and social learning, is essential for effective collaboration and achieving common goals in IRBM.

4.4.6 Organisation's view on stakeholder selection criteria

To obtain the organisation's view on the stakeholder selection criteria, the sets of questions under Section C of the survey questionnaires included the various characteristics stakeholders must possess and the criteria to be adopted if stakeholders are from different divisions of the same organisation.

The selection criteria for stakeholder engagement in IRBM by the organiser can significantly influence the outcome by considering individual characteristics such as willingness to share relevant experience, subject matter expertise, and societal reputation. Engaging stakeholders who are willing to share their knowledge and perspectives fosters open communication and collaborative problem-solving. Those with relevant experience and subject matter expertise contribute valuable insights and practical solutions based on their deep understanding of the river basin's dynamics. Ensuring representation from various sectors and levels of seniority, including both grassroots and senior leaders, ensures a comprehensive approach that considers both strategic and operational viewpoints. Stakeholders who are interrelated in

their work can facilitate coordinated actions and resource sharing, while those who are reputable in society can enhance the legitimacy and public acceptance of IRBM initiatives. By carefully selecting stakeholders based on these characteristics, the IRBM process becomes more inclusive, effective, and sustainable, ultimately leading to better engagement outcomes.

The ranking of selection criteria for stakeholder engagement in river basin management, as in Table 4.14, offers valuable guidance for organisations involved in such initiatives. The ranking analysis shows that willingness to share is the top criterion and underscores the importance of fostering a culture of open communication and active participation among stakeholders. This highlights the need to create platforms and mechanisms that encourage stakeholders to share their insights, perspectives, and knowledge openly. Organisations can facilitate workshops, forums, and collaborative platforms where stakeholders feel empowered to contribute their expertise and engage in meaningful dialogue.

Table 4.14 Ranking of selection criteria for stakeholders to be engaged according to the mean value

Selection criteria	Mean	Std. Deviation	Ranking
Willingness to share	4.732	0.447	1
Relevant experience	4.714	0.653	2
Subject matter expert	4.696	0.630	3
Any level	4.625	0.558	4
Representative of sector	4.554	0.630	5
Seniority	4.536	0.571	6

Work inter-related	4.464	0.713	7
Reputable in society	4.018	0.726	8

High in the ranking order include other criteria such as relevant experience and subject matter expertise, suggesting that organisations should prioritise engaging individuals with practical knowledge and specialised skills related to river basin management. Stakeholders with such knowledge will certainly enrich the discussion during the engagement process. Organisations can identify and involve stakeholders who possess expertise in areas such as hydrology, ecology, policy analysis, or community development, ensuring that decision-making processes are informed by a deep understanding of the complexities involved within the river basin. This may involve engaging and collaborating with academic institutions, research organisations, or industry experts to access relevant expertise.

Additionally, the criterion of inclusivity highlights the importance of engaging stakeholders at all levels within organisations or communities. Organisations should ensure that engagement processes are accessible and inclusive, allowing individuals from diverse backgrounds and roles to participate meaningfully. This may involve adopting inclusive practices such as stakeholder mapping, consultations, and participatory decision-making approaches that empower stakeholders to contribute regardless of hierarchical positions or formal roles. Recognising the value of sector representation underscores the importance of engaging stakeholders from a diverse range of sectors, including government, industry, academia, and civil society. Organisations can collaborate with sector-specific entities and stakeholders to

ensure that decision-making processes are informed by sector-specific expertise and perspectives. This may involve forming multi-stakeholder platforms or advisory committees that represent a broad spectrum of interests and sectors relevant to river basin management.

The ranking of selection criteria for stakeholder engagement emphasises the importance of fostering inclusive, collaborative, and informed decision-making processes. By prioritising criteria such as willingness to share, relevant experience, subject matter expertise, inclusivity, and sector representation, organisations can ensure that decision-making processes are informed by a diverse range of perspectives and expertise, leading to more effective and sustainable outcomes in river basin management initiatives.

The results of the Friedman test on selection criteria for stakeholder engagement in Table 4.15 indicate statistically significant differences among the criteria. These findings offer valuable insights into organisations' perceptions and priorities regarding the selection of stakeholders for engagement processes.

Table 4.15 Results of Friedman test on non-parametric selection criteria for stakeholders

Factor	Chi-squared	df	p	Kendall's W
Selection criteria	86.144	7	< 0.001	0.220

The significant chi-squared value ($\chi^2 = 86.144$) and associated p-value (<0.001) indicate that there are substantial differences in how organisations rank the selection criteria. This suggests that organisations perceive varying levels of importance among the criteria, highlighting the need for them to carefully consider these differences when designing engagement strategies. Kendall's W coefficient of concordance ($W = 0.220$) indicates a moderate level of agreement among organisations regarding the rankings of the selection criteria. While there may be some consensus on the relative importance of certain criteria, there are also notable variations in their perceptions.

These findings underscore the importance of adopting a tailored approach to stakeholder engagement. Organisations should consider the diverse perspectives and priorities of stakeholders when selecting participants for engagement processes. By understanding which criteria stakeholders value most highly, organisations can ensure that engagement processes are inclusive, representative, and effective in addressing the complex challenges of river basin management. Organisations can use these findings to inform the development of transparent and equitable selection processes that prioritise the criteria most valued by stakeholders. This can help build trust and legitimacy in engagement processes, ultimately leading to more successful outcomes in river basin management initiatives. The results of the Friedman test provide organisations with valuable insights into the priorities regarding the selection criteria for engagement in river basin management.

The Conover's post hoc comparison in Table 4.16 offers further valuable insights for organisations engaged in river basin

management by elucidating nuanced differences between various selection criteria for stakeholder engagement. These findings hold significance in refining engagement strategies to better align with organisations' perceptions and priorities.

Table 4.16 Conover's Post Hoc comparisons for factors related to selection criteria for stakeholders

		T-Stat	p
Work inter-related	Relevant experience	3.010	0.003
	Subject matter expert	2.458	0.014
	Representative of sector	0.608	0.544
	Willingness to share	2.347	0.019
	Reputable in society	4.805	< .001
	Seniority	0.166	0.868
	Any level	1.519	0.130
Relevant experience	Subject matter expert	0.552	0.581
	Representative of sector	2.403	0.017
	Willingness to share	0.663	0.508
	Reputable in society	7.816	< .001
	Seniority	2.845	0.005
	Any level	1.491	0.137
Subject matter expert	Representative of sector	1.850	0.065
	Willingness to share	0.110	0.912
	Reputable in society	7.263	< .001
	Seniority	2.292	0.022
	Any level	0.939	0.348

		T-Stat	p
Representative of sector	Willingness to share	1.740	0.083
	Reputable in society	5.413	< .001
	Seniority	0.442	0.659
	Any level	0.911	0.363
Willingness to share	Reputable in society	7.153	< .001
	Seniority	2.182	0.030
	Any level	0.829	0.408
Reputable in society	Seniority	4.971	< .001
	Any level	6.324	< .001
Seniority	Any level	1.353	0.177

The comparison reveals that certain criteria, such as work inter-relatedness, relevant experience, and subject matter expertise, are perceived differently by respondents. Hence, organisations need to recognise and accommodate these distinctions when selecting stakeholders for engagement processes. For instance, while relevant experience and subject matter expertise may be closely related, organisations might prioritise one over the other based on the specific context of river basin management initiatives. Organisations should acknowledge and address these nuances to ensure that engagement processes benefit from a diverse range of expertise and perspectives.

Moreover, the comparison highlights the importance of reputation in society as a selection criterion, differentiating between individuals with a reputable societal standing and those without. Organisations can leverage this insight by actively involving respected individuals in engagement processes,

enhancing the credibility and legitimacy of decision-making outcomes. Collaborating with reputable stakeholders can facilitate broader community acceptance and support for river basin management initiatives.

Additionally, the comparison underscores the significance of willingness to share as a criterion for stakeholder engagement. While stakeholders may value expertise and reputation, they also prioritise active participation and open communication among stakeholders. Organisations should foster environments that encourage stakeholders to share their insights, experiences, and concerns openly. This might involve creating inclusive platforms for dialogue, where stakeholders feel empowered to contribute meaningfully to decision-making processes.

The comparison also highlights the importance of considering seniority and sector representation in stakeholder engagement. While these criteria may not always significantly differ from others, they still play crucial roles in ensuring that decision-making processes are inclusive and representative of diverse interests and perspectives. Organisations should carefully consider these factors when designing engagement strategies, aiming to involve stakeholders from various sectors and hierarchical levels to achieve balanced and comprehensive decision-making outcomes. By acknowledging and accommodating the nuanced differences in selection criteria, organisations can foster more inclusive, credible, and effective stakeholder engagement processes, ultimately leading to more sustainable outcomes in river basin management initiatives.

Although literature reviews often emphasise the importance of interest and influence for stakeholder engagement, they typically

overlook other critical aspects of participant selection criteria. Survey results pertaining to ranking the criteria for effective stakeholder engagement highlight this gap, with the willingness to share as the top priority, emphasising the need for open communication. Relevant experience and subject matter expertise are equally important, indicating that knowledgeable participants are crucial for informed decision-making. The inclusion of stakeholders from any management level and representatives of various sectors ensures diverse perspectives and comprehensive planning. Seniority in the organisation and work inter-relatedness ranked lower but can play roles in facilitating coordination and leveraging influence. While ranked last, reputation in society remains important for legitimacy and public trust. These findings suggest that carefully selecting participants based on these criteria can enhance the effectiveness of stakeholder engagement, ensuring that diverse, knowledgeable, and collaborative individuals contribute to the success of the development of the IRBM plan.

4.4.7 Understanding stakeholders' willingness to participate

To understand stakeholders' willingness to participate in engagement during an IRBM study, Question 5 in Section C of the survey questionnaires was formulated to check whether the reasons could be due to the following: i) providing service and contribution to the nation; ii) sharing knowledge and information; iii) looking for opportunity to network; iv) bringing benefits to their organisations; and v) seeking monetary or in-kind reward.

The ranking of the reasons to participate in engagement based on mean values is shown in Table 4.17 which provides valuable

insights into the factors that drive stakeholder involvement. Understanding these reasons can help organisations tailor their approaches to engagement, enhance stakeholder satisfaction, and achieve organisational objectives more effectively.

Table 4.17 Ranking of the reasons to participate in stakeholder engagement according to mean value

Reason be stakeholder	Mean	Std. Deviation	Ranking
Sharing knowledge	4.696	0.464	1
Service to nation	4.679	0.471	2
Opportunity to network	4.482	0.632	3
Beneficial	4.054	0.553	4
Paid	2.661	0.996	5

At the top of the list is "Sharing knowledge," which received the highest mean value. This indicates that stakeholders highly value opportunities to exchange information, insights, and expertise within the organisational framework. Organisations can capitalise on this by fostering environments that promote knowledge-sharing initiatives, such as workshops, seminars, and collaborative projects. By facilitating knowledge exchange, organisations can enhance stakeholder engagement and contribute to collective learning and growth.

Following closely behind is "Service to Nation." This suggests that stakeholders are motivated by a sense of duty or commitment to contribute to the betterment of society or their nation. Organisations can leverage this motivation by aligning their goals and initiatives with broader societal or national objectives. By framing engagement opportunities as meaningful contributions

to societal welfare, organisations can inspire stakeholders to participate more actively and passionately in their endeavors.

"Opportunity to network" ranks third in the list of reasons for engagement. This implies that stakeholders value the chance to expand their professional connections and build relationships within their field or community. Organisations can facilitate networking opportunities through events, conferences, and online platforms, enabling stakeholders to connect, collaborate, and leverage each other's expertise and resources. By nurturing a robust network of stakeholders, organisations can foster a sense of community and create synergies that drive innovation and growth.

The fourth-ranked reason for engagement is "Beneficial," indicating that stakeholders are motivated by the perceived benefits or value they receive from their engagement with the organisation. Hence, organisations can enhance stakeholder engagement by clearly communicating the benefits and outcomes associated with participation, such as skill development, recognition, or personal fulfillment. By demonstrating the tangible benefits of engagement, organisations can incentivise stakeholders to actively contribute to organisational goals and initiatives.

"Paid" ranks fifth in the list of reasons for engagement, with a significantly lower mean value compared to the other reasons. This suggests that while financial incentives may play a role in motivating stakeholder engagement, they are not as influential as other factors such as knowledge-sharing, service to nation, networking opportunities, and perceived benefits. However,

organisations may consider supplementing financial incentives with non-monetary rewards and recognition to enhance stakeholder engagement and foster long-term commitment and loyalty. By understanding and addressing these motivations, organisations can design more effective engagement strategies, cultivate stronger relationships with stakeholders, and achieve their organisational objectives more successfully.

The core values of the International Association for Public Participation (IAP2) emphasise that public participation is a fundamental right and a crucial part of decision-making processes, focusing on genuine influence, inclusivity, respect, and transparency. The survey results align with these values to some extent; sharing knowledge reflects the IAP2 value of mutual learning and influence, while service to the nation supports the idea of participation as a civic duty. However, the opportunity to network and be paid highlights more transactional motivations, diverging from IAP2's emphasis on the principled and ongoing nature of engagement. Although beneficial to the organisation and aligned with practical aspects of participation, it contrasts with IAP2's ideal of participation driven by collective goals and respect. Overall, while the survey acknowledges practical motivations, it also reflects elements of IAP2's principles of meaningful and inclusive engagement.

4.4.8 Possible challenges in conducting stakeholder engagement

The survey questionnaires under Question 6 of Section C, and Questions 1 and 2 of Section D, attempt to look into the type of challenges that organisations may face in carrying out the engagement processes. The possible challenges could be conflicts

among stakeholders, limited financial resources, time constraints, poor facilitation of the engagement process, low participation, socioeconomic status, and differences due to cultural and religious differences.

Table 4.18 provides valuable insights into the challenges organisations face when conducting engagement activities, as ranked by mean values. Understanding these challenges is crucial for organisations to effectively address barriers to engagement and foster meaningful participation by stakeholders.

Table 4.18 Ranking of challenges in conducting engagement according to mean value

Challenges in engagement	Mean	Std. Deviation	Ranking
Dominated by stronger participants	4.571	0.568	1
Achieving amicable solution	4.554	0.893	2
Time constraints	4.536	0.538	3
Limited financial resources	4.268	0.700	4
Social economic status	3.982	0.522	5
Poor facilitation process	3.946	0.961	6
Cultural differences	3.929	0.599	7
Low participation	3.768	1.236	8
Religious differences	3.518	0.738	9
Remove conflicting parties	2.286	1.004	10

At the top of the list is "Dominated by stronger participants," with a mean value of 4.571. This suggests that one of the most significant challenges organisations may encounter is the

imbalance of power dynamics during engagement processes. Stronger participants may exert undue influence, overshadowing the voices of other stakeholders and hindering inclusive decision-making. From an organisational perspective, addressing this challenge requires strategies to level the playing field, promote equity, and ensure that all stakeholders have an equal opportunity to contribute and be heard.

Following closely is "Achieving amicable solution," with a mean value of 4.554. This indicates that finding consensus and resolving conflicts amicably is another major challenge faced by organisations during engagement processes. Conflicting interests, diverse perspectives, and entrenched positions can make it difficult to reach mutually acceptable solutions. Organisations must employ effective negotiation, mediation, and conflict resolution techniques to facilitate constructive dialogue and overcome impasses, ultimately fostering cooperation and collaboration among stakeholders.

"Time constraints" ranks third in the list of challenges, highlighting the pressures organisations face in managing limited time resources during engagement activities. Tight timelines can strain the effectiveness of engagement processes, leading to rushed decision-making, incomplete discussions, and disengagement from stakeholders. To address this challenge, organisations need to prioritise efficient time management, set realistic deadlines, and allocate sufficient time for meaningful deliberations and consultations with stakeholders.

"Limited financial resources" is another significant challenge, ranked fourth on the list. Insufficient funding can restrict the

scope and scale of engagement initiatives, limiting organisations' ability to implement comprehensive and inclusive engagement strategies. Organisations must explore creative funding sources, leverage partnerships, and prioritise resource allocation to support meaningful engagement activities that yield impactful outcomes.

Other challenges, such as "Social-economic status," "Poor facilitation process," "Cultural differences," and "Low participation," underscore the complex and multifaceted nature of engagement processes. Organisations must adopt inclusive approaches that accommodate diverse socioeconomic backgrounds, improve facilitation techniques, promote cultural sensitivity, and address barriers to participation to ensure that engagement processes are equitable, effective, and inclusive for all relevant stakeholders.

"Religious differences" and "Resort to remove conflicting parties" round out the challenges, highlighting the intricacies of navigating religious diversity and managing conflicts effectively during engagement activities. Organisations must promote tolerance, respect religious beliefs, and employ conflict resolution mechanisms that foster understanding, reconciliation, and consensus-building among stakeholders.

The ranking of challenges in conducting engagement provides organisations with valuable insights into the obstacles they face and the areas that require attention and intervention. By understanding and addressing these challenges, they can enhance the effectiveness, inclusiveness, and impact of their engagement efforts, ultimately fostering stronger relationships,

promoting shared decision-making, and achieving sustainable outcomes for all stakeholders involved.

The Friedman test in Table 4.19 is a non-parametric statistical test used to analyse differences between groups when the dependent variable is ordinal, and the independent variable is nominal with two or more levels. In this case, the factor being analysed is "Challenges in engagement," and the test has yielded significant results with a chi-squared value of 212.243 and a p-value of less than 0.001, indicating that there are significant differences between the groups.

Table 4.19 Results of Friedman test on non-parametric reason for engagement

Factor	Chi-squared	df	p	Kendall's W
Challenges in engagement	212.243	9	< .001	0.421

These results suggest that there are varying challenges in engagement across different categories or factors being examined. The high chi-squared value indicates substantial variability among the groups, while the low p-value indicates that this variability is unlikely to have occurred by chance. The Kendall's W statistic, which measures the strength of the relationship between the different levels of the nominal variable, is 0.421. This indicates a moderate to strong degree of association between the challenges in engagement and the different groups being compared.

These findings are crucial as they highlight areas where engagement might be particularly challenging. Understanding these challenges can inform strategic planning, resource allocation, and policy development aimed at addressing these issues. It can also guide the implementation of targeted interventions or initiatives to improve engagement in areas where it is lacking.

Further analysis, such as post-hoc tests or subgroup analyses, may be necessary to identify specific factors contributing to the observed differences in engagement challenges. Additionally, qualitative research methods could provide deeper insights into the nature and underlying causes of these challenges, allowing organisations to develop more effective solutions tailored to their unique contexts.

The Conover's Post Hoc comparisons in Table 4.20 offer a nuanced examination of the challenges in engagement, shedding light on the complex interplay between various factors. Organisations rely on such analyses to inform decision-making processes, policy formulation, and resource allocation strategies aimed at enhancing engagement across diverse stakeholder groups.

Table 4.20 Conover's Post Hoc comparisons for factors related to challenges in engagement

		T-Stat	p
Dominated by stronger participants	Resort to remove conflicting parties	10.426	< .001
	Achieving amicable solution	0.519	0.604

		T-Stat	p
Resort to remove conflicting parties	Limited financial resources	2.200	0.028
	Time constraints	0.232	0.816
	Poor facilitation process	3.952	< .001
	Low participation	4.042	< .001
	Social economic status	4.435	< .001
	Cultural differences	4.954	< .001
	Religious differences	7.118	< .001
	Achieving amicable solution	10.945	< .001
	Limited financial resources	8.226	< .001
	Time constraints	10.194	< .001
Achieving amicable solution	Poor facilitation process	6.474	< .001
	Low participation	6.384	< .001
	Social economic status	5.991	< .001
	Cultural differences	5.472	< .001
	Religious differences	3.308	0.001
	Limited financial resources	2.718	0.007
	Time constraints	0.751	0.453
	Poor facilitation process	4.471	< .001
	Low participation	4.560	< .001

		T-Stat	p
Limited financial resources	Social economic status	4.954	< .001
	Cultural differences	5.472	< .001
	Religious differences	7.636	< .001
	Time constraints	1.967	0.050
	Poor facilitation process	1.753	0.080
	Low participation	1.842	0.066
	Social economic status	2.235	0.026
	Cultural differences	2.754	0.006
	Religious differences	4.918	< .001
	Poor facilitation process	3.720	< .001
Time constraints	Low participation	3.809	< .001
	Social economic status	4.203	< .001
	Cultural differences	4.721	< .001
	Religious differences	6.885	< .001
	Low participation	0.089	0.929
Poor facilitation process	Social economic status	0.483	0.629
	Cultural differences	1.001	0.317
	Religious differences	3.165	0.002

		T-Stat	p
Low participation	Social economic status	0.393	0.694
	Cultural differences	0.912	0.362
	Religious differences	3.076	0.002
Social economic status	Cultural differences	0.519	0.604
	Religious differences	2.683	0.008
Cultural differences	Religious differences	2.164	0.031

One noteworthy finding is the significant difference between situations where one party dominates over others and resorts to removing conflicting parties. This highlights the importance of power dynamics in engagement processes, suggesting that addressing imbalances of power is crucial for fostering inclusive and constructive dialogue within organisational settings. The comparison between achieving an amicable solution and limited financial resources reveals a subtle yet significant association. This underscores the impact of financial constraints on the ability to reach mutually beneficial outcomes, emphasising the need for organisations to consider resource availability when designing engagement initiatives.

Similarly, the relationship between time constraints and poor facilitation processes underscores the importance of effective leadership and facilitation in managing engagement efforts. Organisations must invest in training and capacity-building

programs to equip facilitators with the necessary skills to navigate complex discussions and manage time effectively. The absence of a significant difference between poor facilitation processes and low participation rates suggests that improving facilitation alone may not be sufficient to address challenges related to participation. Organisations must adopt a multifaceted approach that addresses underlying barriers to engagement, such as lack of trust, accessibility issues, and competing priorities.

The findings on socio-economic status, cultural differences, and religious differences highlight the interconnectedness of these factors within the engagement landscape. While there may not be direct causal relationships between these variables, they intersect in complex ways that influence engagement dynamics. Organisations must adopt a culturally responsive approach that acknowledges and respects diverse perspectives and experiences.

The Conover's Post Hoc comparisons provide valuable insights into the multifaceted nature of challenges in engagement from an organisational viewpoint. By understanding the relationships between various factors and their implications for engagement processes, organisations can develop more effective strategies for promoting inclusivity, collaboration, and meaningful participation across diverse stakeholder groups.

While much of the literature on stakeholder collaboration, such as Nigel (2004), focuses on organisational frameworks and processes, such as addressing issues like direction setting, collaboration structure, and the desired outputs and outcomes,

these frameworks often overlook the impact of engagement environments. The survey questionnaire results reveal that environmental factors such as domination by stronger participants, time constraints, limited financial resources, and poor facilitation processes significantly affect collaboration outcomes. These factors reflect practical challenges that go beyond Nigel's organisational framework by highlighting how the engagement environment itself can hinder effective collaboration. For example, domination by stronger participants and poor facilitation processes directly impact the quality of interactions and the fairness of the engagement process, whereas Nigel's framework focuses more on structured processes and outputs. Achieving amicable solutions and cultural differences also emphasise the importance of creating a conducive environment for collaboration, which Nigel's approach does not fully address. Although Nigel's emphasis on organisational aspects is crucial for setting up collaboration frameworks, the survey results reveal that engagement environments and external factors play a critical role in determining the success or failure of collaborative efforts. Thus, while Nigel (2004) provides a valuable organisational perspective, the survey highlights that understanding and improving the engagement environment are equally essential for achieving successful collaboration and outcomes.

4.4.9 Duration of engagement: optimising workshop effectiveness

Table 4.21 presents rankings based on the duration of engagement, offering valuable insights from an organisational perspective. At the top of the rankings is the category of engagements lasting three days, with a mean value of 3.946,

indicating the highest level of perceived effectiveness. This suggests that longer-duration engagements spanning multiple days are favored by participants, potentially allowing for more in-depth discussions, relationship-building, and exploration of complex topics. Organisations may interpret this ranking as an indication of the value placed on extended periods of engagement for achieving meaningful outcomes and fostering collaboration.

Table 4.21 Ranking on the duration of engagement according to the mean value

Duration	Mean	Std. Deviation	Ranking
3 days	3.946	1.407	1
2 days	3.804	1.034	2
More than 3 days	3.232	1.375	3
1 day	2.375	1.301	4
Half a day	2.054	1.519	5

Following closely behind are engagements lasting two days, ranked second with a mean value of 3.804. While slightly lower than three-day engagements, this ranking still signifies a high level of perceived effectiveness. Organisations may view two-day engagements as a practical compromise between depth and time constraints, offering significant interaction and outcomes within a manageable timeframe.

Surprisingly, engagements lasting more than three days are ranked third, with a mean value of 3.232. While still above average, this ranking suggests that excessively long

engagements may face diminishing returns or practical challenges such as participant availability or fatigue. Organisations should carefully consider the balance between duration and engagement objectives when planning extended events to ensure sustained participant engagement and effectiveness.

While existing literature often overlooks the optimal duration for IRBM engagement workshops, the survey results suggest that three days is the most optimum duration, followed by two days, more than three days, one day, and half a day. Coincidentally, the findings from the respondents in Chapter 3 align with the survey result in this chapter indicating that a three-day workshop strikes an ideal balance, providing sufficient time for in-depth discussions, relationship building, and thorough exploration of administrative issues, which is not thoroughly addressed in the literature, which generally focuses on broader frameworks rather than specific durations. Two-day workshops are effective but may not allow as much time for detailed engagement as the three-day format, while more than three days can cause participant burnout and logistical challenges. Conversely, one-day and half-day workshops are often too brief for comprehensive discussions and meaningful interactions.

4.4.10 Leadership role of the organisation

A similar question from Chapter 3 on the importance of leadership was repeated to solicit a response from the organisations' perspective. The results of the survey are shown in Figure 4.1. According to the respondents, 85.7% viewed that the most crucial requirement of leadership is to plan properly and oversee the whole implementation of the engagement process.

Additionally, 12.5% of respondents rated this aspect of the leadership as important.

This finding resonates well with the provisions of the guidelines on stakeholder engagement from the Doughty Centre, Cranfield School of Management (Neil Jeffery, 2009). According to the guidelines, the first 3 stages of the engagement process to be undertaken by the organisation are the most crucial and they are as follows:

Stage 1 Planning - Identify the basic objectives, issues to address, and the key stakeholders (Durham et al., 2014).

Stage 2 Understand your stakeholders - Identify the urgency they feel about their issues, the legitimacy of their interests, and the power they have to impact on your organisation.

Stage 3 Preparing internally to engage - Dedicate appropriate time and resources to identify possible commonalities between the organisation and the stakeholders and identify appropriate engagement methods and means of communication.

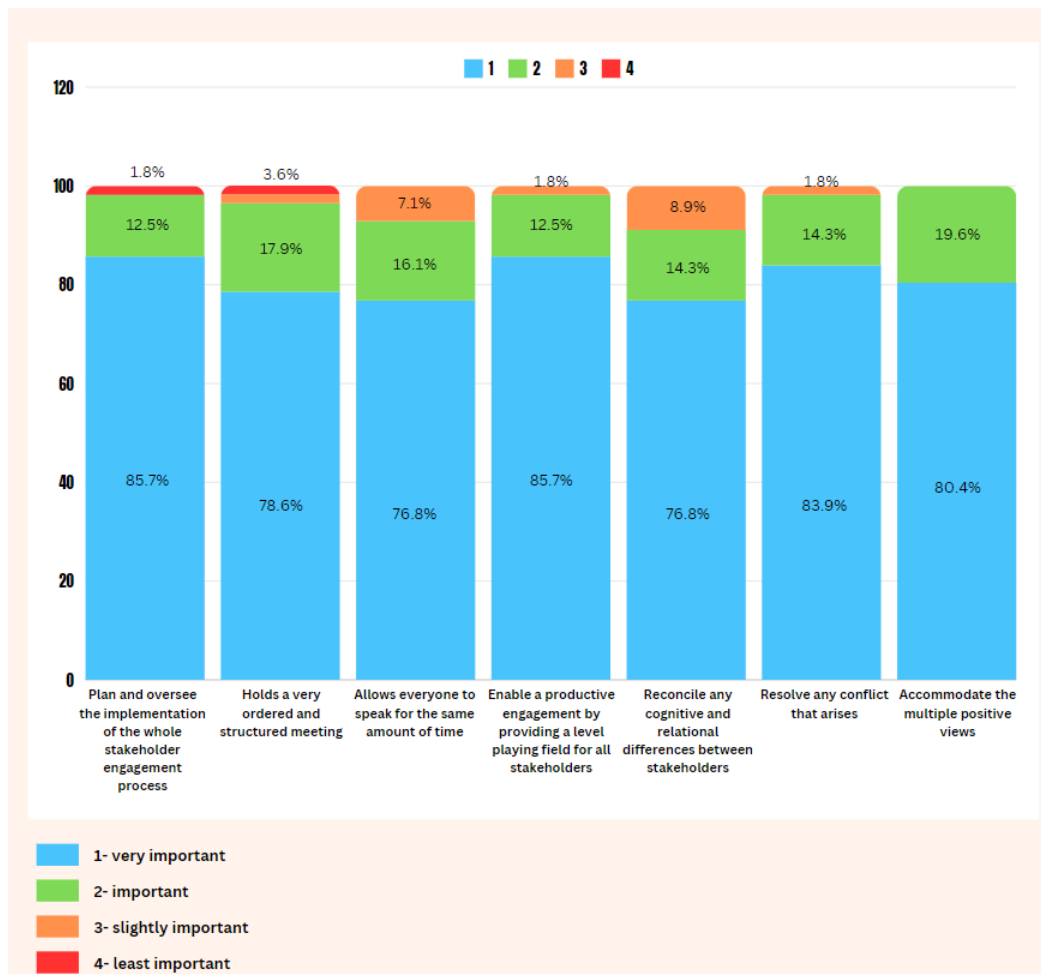


Figure 4.1 The leadership role of the organisation

According to the survey, 78.6% of the vast majority of respondents deemed maintaining a highly organised and structured meeting as a very important function of the chairman. A further 17.9% viewed this as important, though not the top priority. Keeping the meeting orderly and on track through its established agenda was identified by over three-quarters of respondents as paramount. This allows for productive discussions where all stakeholders can have their voices heard in an efficient yet inclusive manner. It also helps advance the planning process by systematically working through each agenda item and topic of discussion. Organising a structured or principle-based meeting helps to reduce conflict and is thus integral to the chairperson's

role in leading meaningful and effective stakeholder engagement (Mayer, 2012). The role of the chairperson or facilitator in leading stakeholder engagement meetings or workshops for Integrated River Basin Management planning is vital to ensuring productive discussions.

Everyone must have an equal opportunity to contribute and be heard during these important exchanges. This would encourage all participants to discover common areas and agree on a shared way forward (Mott Lacroix et al., 2016). Based on survey results from the respondents, allowing each individual the same allotted time to speak is considered the most critical responsibility of the person in charge. Specifically, 76.8% of respondents deemed this aspect as extremely important, and another 16.1% as important, though not a high priority. By carefully managing the contributions of all involved parties, the chairperson can help yield meaningful collaboration and move the planning process forward in a fair, inclusive, and efficient manner. Equitable treatment of all stakeholders' viewpoints is key to developing a comprehensive management strategy that addresses everyone's needs and garners the widest possible support.

Again, based on survey data collected from respondents, enabling a level playing field for all stakeholders during engagement sessions was overwhelmingly identified as the most crucial function of the chairperson or facilitator. Specifically, 85.7% of respondents rated this aspect as most important, and a further 12.5% deemed it as important. The survey demonstrates strong consensus among stakeholders that impartial and balanced facilitation is essential to these planning discussions. When engaging with diverse stakeholders, the

organiser needs to “level the playing field,” that is, develop partnerships with the participants based on equal participation and shared responsibilities (Capacity Building Center for States, 2018). By allowing each participant an equal voice, regardless of background or position, the chairperson can foster an open exchange of ideas, integration of diverse perspectives, and development of inclusive solutions supported by all interested parties. The fair and neutral stewardship of the chair helps to enhance engagement and buy-in toward a fruitful discussion during the meeting or workshop.

One other aspect of the role of an effective chairperson or facilitator is to reconcile any cognitive and relational differences that exist between diverse stakeholders. Based on survey data collected from respondents familiar with integrated river basin management, over three-quarters (76.8%) rated this reconciliatory aspect as the most important function of the chairperson or facilitator. Additionally, 14.3% of respondents viewed it as an important role and 8.9% deemed it slightly important. The vast majority see enabling common understanding and cooperation between stakeholders as the foremost duty of the individual overseeing engagement sessions. Only through respectful and inclusive discussion can a shared vision for sustainable river basin usage and protection be developed. The chairperson or facilitator helps ensure all stakeholders, regardless of backgrounds or perspectives, feel heard and have an opportunity to meaningfully contribute. This fosters the necessary trust for stakeholders to work collaboratively on an integrated management plan that balances economic, social, and environmental needs within the watershed.

The role of an effective chairperson or facilitator in leading stakeholder engagement meetings or workshops for Integrated River Basin Management planning is paramount. They must be able to resolve any conflict that arises productively. Based on survey data collected from 56 respondents regarding the qualities sought in a chairperson, 83.9% deemed the ability to resolve conflicts as one of the most important attributes. Appointing an individual well-versed in facilitation and mediation techniques and possessing the temperament to defuse tensions will be critical to the success of the stakeholder engagement process and the development of a comprehensive river basin management plan with buy-in from all interested parties.

As the individual tasked with leading stakeholder meetings and workshops, the chairperson or facilitator takes on the vital role of accommodating diverse perspectives constructively. Survey results from planning participants indicate the significance of this function. When asked to rate the importance of the aspects of accommodating the multiple positive views, 80.4% of respondents deemed this aspect as very important, and a further 19.6% deemed this as important. Bringing together stakeholders from varied backgrounds and with an array of interests related to river development and conservation poses inherent challenges. However, through respectful and solutions-focused facilitation, common understanding and collaborative solutions can be achieved. The chair's impartial and inclusive approach will set the tone, allowing for an open exchange that taps into the wealth of the rich experience and knowledge of the multi-disciplinary stakeholders.

4.4.11 Relevant data and information for stakeholders

Question 5 under Section D of the survey questionnaires relates to the need to provide stakeholders with relevant data, information, and documents to enrich their participation.

The survey results demonstrate the importance of providing relevant data, information, and documents to stakeholders and participants in river basin engagement sessions as indicated in Figure 4.2.

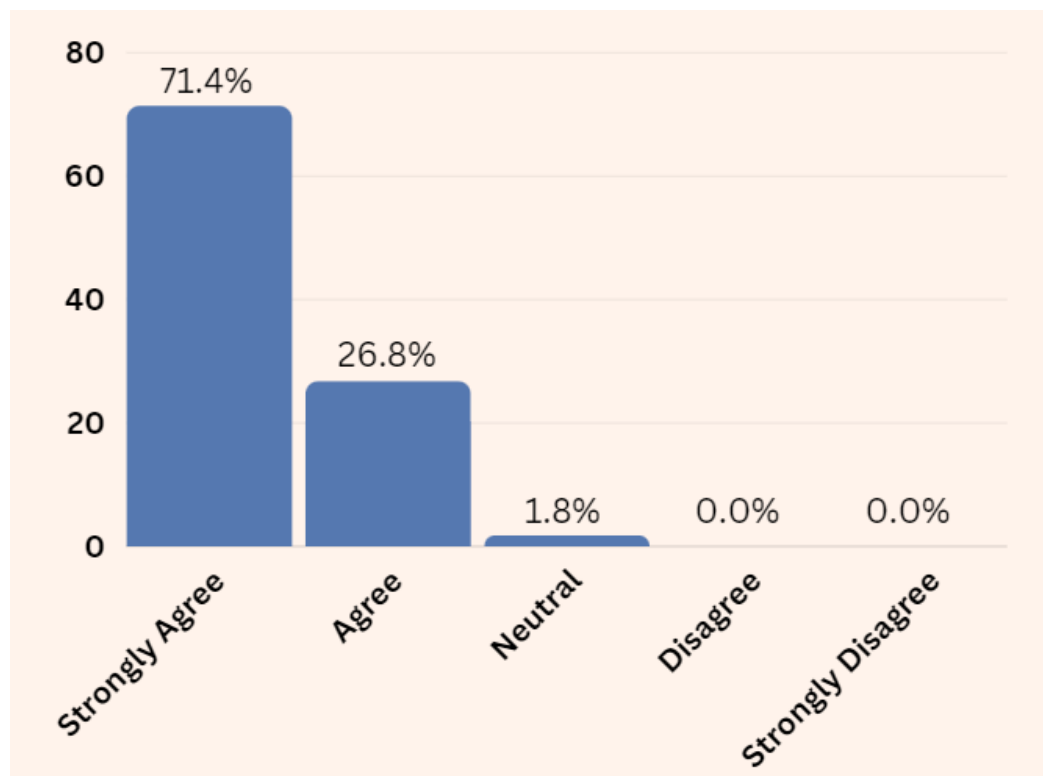


Figure 4.2 Providing relevant data and information to stakeholders

A strong majority (71.4%) of respondents strongly agreed that accessing such materials is necessary for effective contribution. Another 26.8% of respondents agreed with this statement. Only a small percentage of 1.8% remained neutral on the topic.

Overall, the data indicate that nearly all participants believe stakeholders should be given related facts and figures as a baseline for informed participation in these important consultative processes. The organiser should be transparent by providing all relevant and comprehensive information on time for participants to refer to before the engagement session (World Bank, 2017). Ensuring the availability of relevant materials related to the river basin concerned will help maximise valuable input from all interested parties as decisions are made regarding water resource management and environmental protection for the river basin.

4.4.12 Incorporating feedback for decision-making in the preparation of the IRBM plan

Question 7 in Section D of the survey questionnaires enquired about the degree of feedback from all stakeholders for consideration in decision-making for preparing the IRBM plan.

The survey results indicate varying degrees of feedback for consideration in developing the IRBM's strategic plan. A small minority, representing only 1.8% of respondents, felt that 21-40% of the feedback was ultimately considered. More than 7.1% of respondents thought 41-50% of stakeholders' comments and suggestions were considered. About 12.5% believed that 51-60% of feedback had been considered, while 19.6% estimated it could be 61-80%. The largest group, representing 58.9%, felt that more than 81% of the feedback had contributed to the IRBM strategic planning process. In other words, most organisations recognise that stakeholders' diverse views play a prominent role in crafting the strategic direction of the IRBM plan.

Having collected feedback from stakeholders, there is a need to analyse and synthesise them to identify the main themes, patterns, gaps, and opportunities. Various techniques may be deployed, such as coding, categorising, sorting, ranking, scoring, and visualising to organise and interpret the feedback data. It is also beneficial to compare and contrast the feedback from different stakeholder groups to understand their similarities and differences and to identify any areas of agreement or disagreement. All positive and pragmatic feedback shall be selected, if possible, by an appropriate committee for incorporation into the IRBM plan (AccountAbility, 2015).

The final step of incorporating feedback from stakeholders is to share and act on the feedback. It is essential to share the feedback results and findings with the stakeholders who provided the feedback, as well as with other relevant internal and external participants. By sharing and acting on feedback, the organisation can demonstrate its accountability, responsiveness, and commitment to learning and improvement.

4.4.13 Tools and approaches for encouraging full participation

Several tools and best practices have been employed to maximise stakeholder participation and involvement during the engagement process. To encourage active discussion and input from attendees at stakeholder meetings and workshops, modern electronic devices have been deployed. This allowed for wider participation as stakeholders were able to easily share perspectives and ideas using familiar digital technology. Email also emerged as a core method of communication, with most information disseminated through electronic mailings. Relying

heavily on email ensured an accessible and convenient approach for keeping all engaged stakeholders connected throughout the engagement activities. Overall, leveraging digital tools appeared key to fostering an open exchange of views representing the full range of interests involved.

Several approaches were proposed by the respondents to facilitate a productive discussion during the workshop and engagement sessions, and they are as listed in Figure 4.3 below.

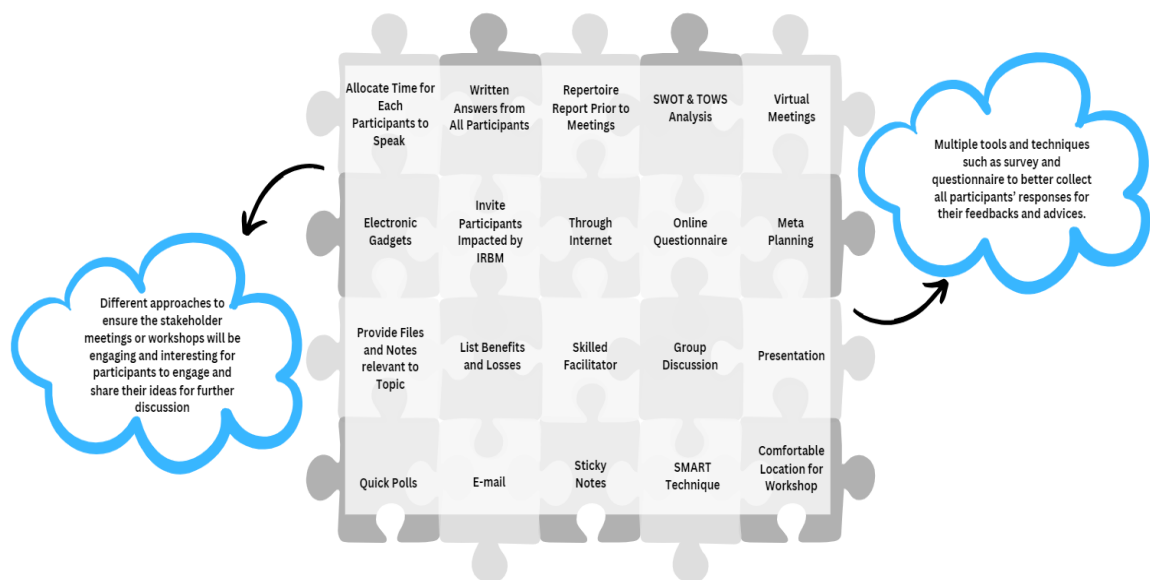


Figure 4.3 Tools and approaches to encourage full participation of stakeholders

4.4.14 Means of communication

In responding to the open-ended question on means of communication, most of the respondents indicated that the way organisers communicate with stakeholders and participants forms a crucial aspect of the stakeholder engagement process. As noted in Figure 4.4, various communication methods have

been utilised and further proposed by the respondents in three distinct phases, which include before, during, and after stakeholder meetings or workshops. Given the diverse spectrum of stakeholders, it is sometimes worthwhile to adopt a structured approach to communication, particularly where a large group is involved (Amir W. Al-Khafaji et al., 2010).

Gomes et al. (2024) highlighted the critical importance of communication management, which serves as a vital bridge for relaying information and fostering understanding between stakeholders. Effective communication is essential for value creation and ensuring stakeholder engagement and satisfaction. The survey findings align with those of Gomes et al. (2024), underscoring the pivotal role of communication management in adopting a strategic and integrated approach to addressing the complex challenges of stakeholder engagement.

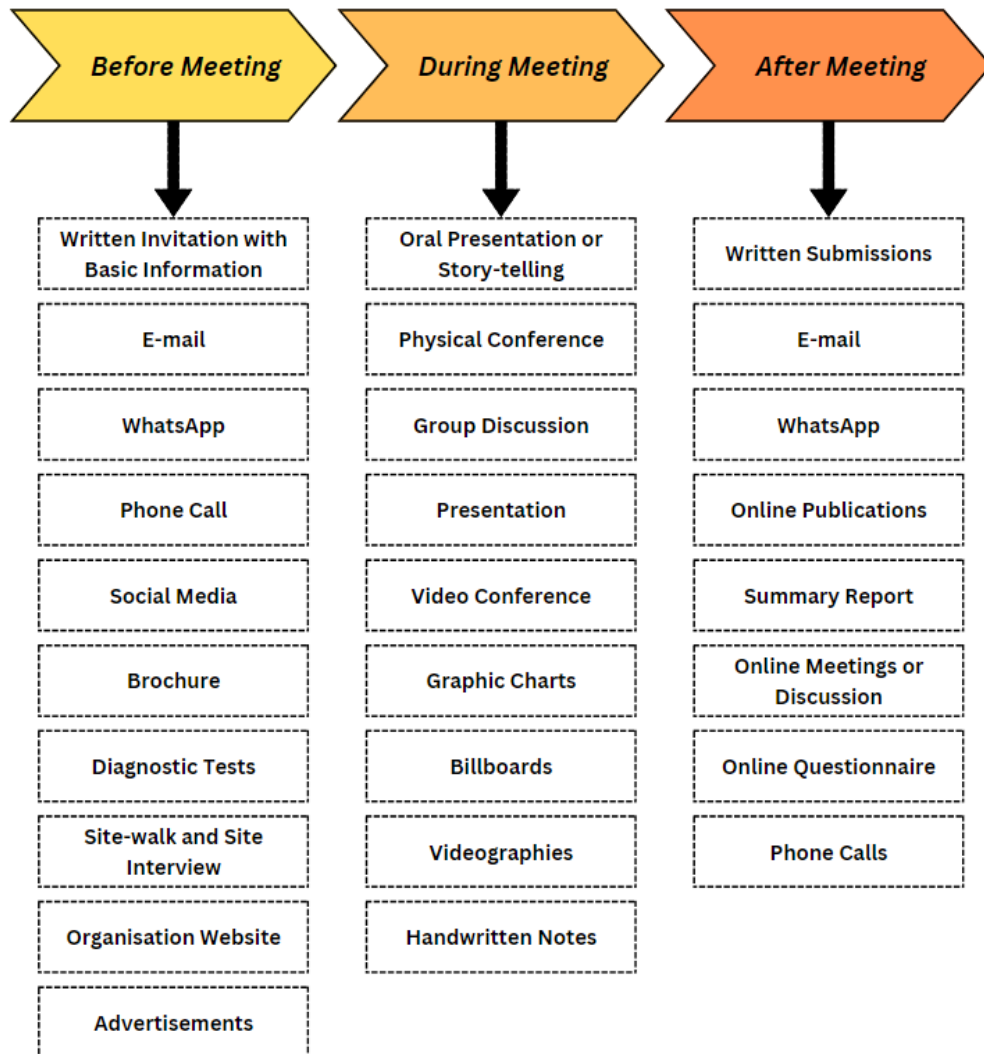


Figure 4.4 Suggested various means of communication

Implementing diverse forms of communication for stakeholder engagement allowed participants to stay up to date with information and updates regarding the subject matter. It also enabled stakeholders to better visualise and comprehend the issues being discussed through visual aids like graphic charts and videos. Feedback was also collected to facilitate improvements and recommendations, permitting the organiser to refine their efforts for subsequent meetings. Communicating through multiple channels at different stages of the process helped ensure

stakeholders remained actively engaged throughout each engagement or discussion session.

4.4.15 Mechanisms for monitoring and evaluation of the effectiveness of stakeholder engagement

There was limited response to this open-ended question, as many admitted that monitoring and evaluation of stakeholder engagement has not been practiced in Malaysia. However, it was generally agreed that there should be a mechanism to monitor and evaluate the effectiveness of stakeholder engagement. Figure 4.5 represents some of the suggestions made by the respondents for future consideration by the organisers.

There are two main reasons for monitoring and evaluating the effectiveness of stakeholder engagement; the first is for the continuous improvement of the organisation concerned, and the second is for the stakeholders' satisfaction and recognition of their contribution to the development of the IRBM plan. This can be done through a variety of methods, such as surveys, focus groups, or one-on-one interviews. Therefore, organisations, especially water-related agencies, must establish the appropriate mechanisms for monitoring and evaluating stakeholder engagement in IRBM. The critical outcomes of the evaluation process are the meaningful lessons learned (UNESCAP, 2018).

Stakeholder engagement monitoring, like any other type of monitoring, must meet basic requirements such as establishing goals and objectives, setting targets and trajectories, committing financial contributions, and training and holding personnel accountable for their duties. Monitoring may take place at various time intervals, such as i) monitoring of the engagement process

itself may be implemented after the engagement process itself, and ii) monitoring outputs, which can be undertaken after the completion of the IRBM study (Larson S. and Williams L.J., 2009). The learning will be greatly enhanced if the system allows for the monitoring of unintended consequences, as well as the expected ones.

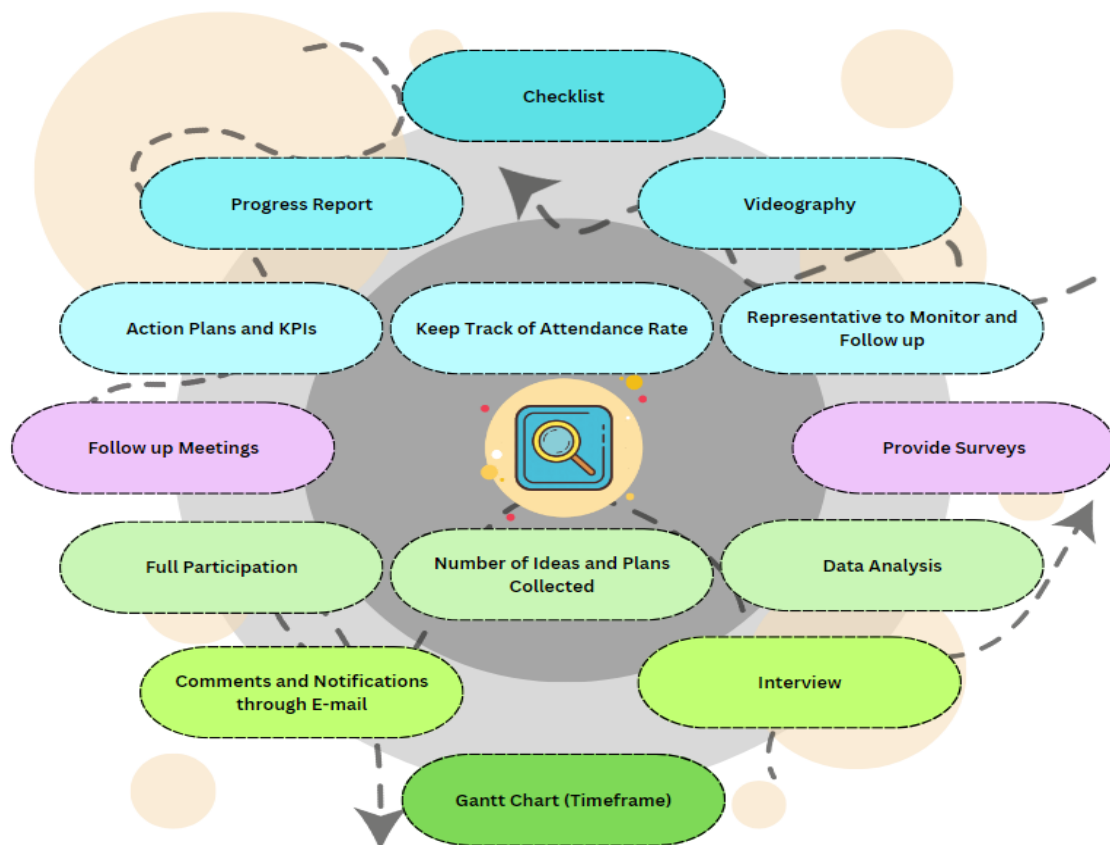


Figure 4.5 Suggested monitoring and evaluation mechanisms for stakeholder engagement

4.5 Results and discussion of interviews with water-related organisations

The number of organisations involved in water management at the river basin level is relatively small in Malaysia. Hence, all four

major government agencies were selected for study: the Drainage and Irrigation Department Malaysia (DID), the National Water Research Institute of Malaysia (NAHRIM), the Selangor Water Management Authority (SWMA), and the Water Regulatory Division of the Pulau Pinang State Government (WRDPP).

The largest agency is DID which is tasked with planning, implementing, operating, and maintaining irrigation, urban drainage, flood mitigation, coastal erosion protection, and river improvement works across Malaysia. One of the most important functions of DID involves the custodian role for the 189 major river basins in the country, i.e., 74 in Peninsular Malaysia, 75 in Sabah, and 40 in Sarawak (Figure 4.6 and Table 4.22, DID Website, 2024). To date, 27 river basins have been studied and their IRBM Plans have been developed, 31 studies are in progress, and another 12 are under the planning stage as approved under the 12th Malaysia Plan (DID, 2024) (refer to Appendix 4 for a detailed list). The development of IRBM plans for all these major river basins entails an essential stakeholder engagement process to get feedback from stakeholders, thus ensuring their concerns and ideas on managing water and land resources in the river basin are considered.

The Selangor Water Management Authority (SWMA) is the other agency that also conducts IRBM studies, but only for the three main rivers in the state of Selangor, namely the Selangor River, the Klang River, and the Langat River. As a research organization, the National Water Research Institute of Malaysia (NAHRIM) is often involved in studies on specific aspects of water management at the river basin level. The Water Regulatory Division of the Pulau Pinang State Government (WRDPP), on the

other hand, as a state regulatory entity, is very much involved in the coordination of any water-related studies by other agencies in the state of Penang, such as the Penang Water Authority, which is a water supply entity.

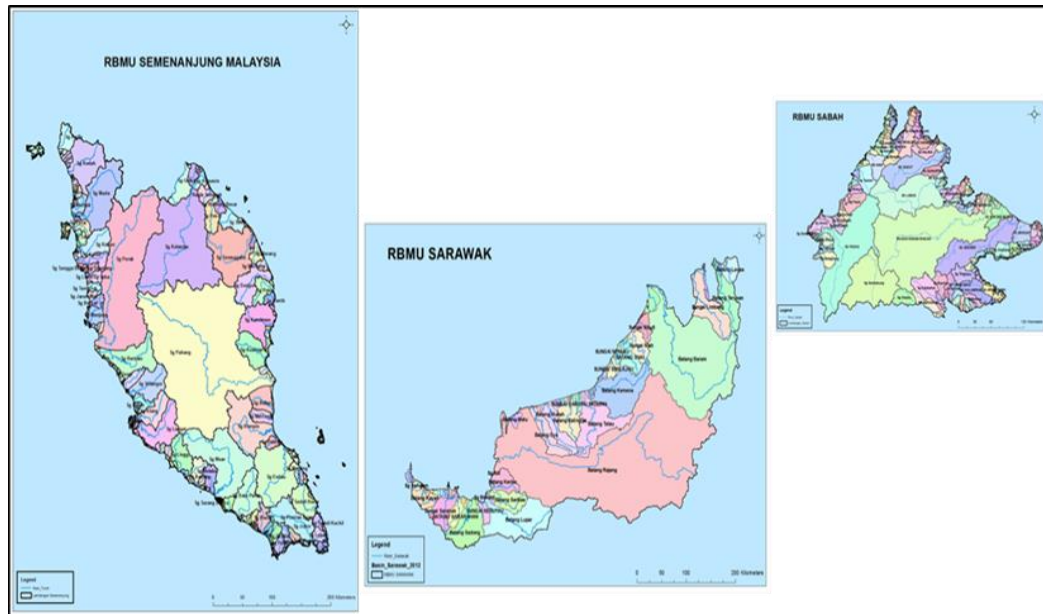


Figure 4.6 Major River Basins of Malaysia (DID, 2024 Website)

Table 4.22 Number of River Basins in Malaysia (DID, 2024 Website)

Area	Main Basin (>80km²)	Small Basin	No. of Basins/Area
Peninsular Malaysia	74	1,161	1,235
Sabah	75	1,393	1,468
Sarawak	40	243	283
Total	189	2,797	2,986
Total Area	312,864	15,034	327,898
% Total Area	95%	5%	100%

A summary of the comparative responses to the semi-structured questions from all four interviewees is presented in Table 4.23 below. The various parameters summarised include the purpose of engagement, related legislation and policy, stakeholder identification, collaboration and partnerships, transparency, implementation strategies, and examples of successes and challenges.

Table 4.23 Comparative analysis of water-related agencies' practices for stakeholder engagement in river basin and water management studies in Malaysia

PARAMETERS	NAHRIM	SWMA	WRDPP	DID
Purpose of SE	• To gather data, feedback, and views. • Integrate into decision-making. • Minimising the risk of potential conflicts.	• To gather data, feedback, and views. • To instill an understanding of individual roles and responsibilities.	• To obtain feedback for water-related studies. • Identify new water resources and best practices.	• To gather feedback, concerns, and ideas. • To gain stakeholders' support. • Identify practical practices.
Legislation, Policy on SE	• Adopts international and national best practices and standards. i.e. Climate Change Policy & SDG 2030.	• Available state policies. • Mandatory SE.	• Not mandatory. • Efforts to improve water governance.	• National Water Resources Policy and other relevant federal laws. • Recognise state water enactments.

PARAMETERS	NAHRIM	SWMA	WRDPP	DID
Stakeholder Identification	• Identify and categorise based on individuals, groups, or organisations. • No proper stakeholder mapping.	• Categorisation based on department roles & functions. • Stakeholder mapping.	• Identify based on involvement at different levels. • No proper stakeholder mapping.	• Categorise based on representatives of departments and agencies, industry players, and local communities. • No proper stakeholder mapping.
Collaboration, Partnerships	• Organisations and agencies with common goals • Joint initiatives and projects	• R&D academia • CSOs • NGOs • Corporate sectors • Politicians	• State and federal water agencies • R&D academia • CSOs • NGOs	• R&D organisation • academia • CSOs • NGOs • Local communities
Transparency	• Open and honest dialogue • Showcasing SE feedback shaping project decisions	• Implementation Committee's meeting • Data is available to the public upon request	• Data sharing is conditional and subject to the purpose of data usage	• Subject to the accessibility of reports and whether it's classified or vice versa.

PARAMETERS	NAHRIM	SWMA	WRDPP	DID
Implementation Strategies	• Promotes capacity building. • Prioritise conflict resolution and mediation. • Address environmental concerns	• Activity Guidelines • IRBM Plans. • Consulting relevant religious stakeholders. • Subject to financial constraints.	• Regulated based on the DOE Act. • Incorporating ESG principles into SE • Regulate cultural and heritage based on legal frameworks.	• Engagement through diverse methods and communication. • Promotes capacity building through on-the-job training. • Subject to financial constraints.
Successes & Challenges	• SPAH and Efficient Water Choice. • Action plan for the Bertam catchment area.	• Friends of River programs • Early planning, and harmonious discussions. • Adapting to changing stakeholder dynamics.	• Joint committees between Kedah-Penang and Perak-Penang	• Not available

4.5.1 Purpose of stakeholder engagement

All four interviewees expressed similar responses that stakeholder engagement (SE) is an integral part of river basin and water resources management studies, serving as a mechanism to gather feedback from stakeholders and as a platform for stakeholders to channel their concerns, views, and needs. According to Arnstein's typology of citizen participation, the purpose of such engagement could be considered as a consultation that falls under rung 4 of the eight ladder levels (Arnstein R., 1969).

The following quotes reflect their acknowledgment of the benefits of conducting SE:

"A SE is carried out to collect feedback from the stakeholders who will be beneficiaries of the IRBM. The SE facilitates the channeling of their concerns and ideas as to how their water and land resources should be managed and also commits to their role in ensuring sustainability. SE is very important because IRBM impacts citizens. For stakeholders to buy into an IRBM plan and its implementation, they must have a say."

– Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"SE makes sure that the decision-making process is based on a full understanding of the views, needs, and concerns of all parties, such as environmental groups, businesses, local communities, and government agencies. Stakeholders bring different skills and points of view to the table. By involving them, NAHRIM can get a fuller picture of the complicated problems that come up when managing rivers and water, which leads to better

and more complete answers. Getting different people's opinions into the decision-making process makes it better and all-rounded."

- Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

"To obtain data, feedback, and views from all relevant agencies and stakeholders on matters related to policy, strategies, and progress of action plans as proposed in the previous IRBM Master Plan. Obtain written comments from agencies for Inception and Interim Reports, and feedback during the workshop for Draft Final Report of IRBM study."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"SE is important to obtain feedback and contribution to any water-related studies. To develop a deeper understanding of the stakeholder operations and solutions that fit their needs based on the study."

- Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

The views of the four interviewees are in alignment with the study conducted by Toriman et al. (2012), which emphasised that the ultimate goal of SE is to ensure sustainable development because of the contributions from all relevant stakeholders. As in all water-related programmes and initiatives, all four interviewees concur that SE aims to gather ideas, feedback, and concerns from stakeholders; a view that resonates with the works of Conallin et al. (2016).

SWMA and NAHRIM however offer additional insights. SWMA sees SE not just as a method for gathering input but as a potential platform for social learning since there will be knowledge exchange and collaborative problem-solving through their respective roles and responsibilities as spelled out in the IRBM plan, which in the case of SWMA is updated every 5 years.

Quote: "...Very important so that all relevant agencies and stakeholders will understand and play their respective roles and responsibilities in carrying out the tasks as spelled out in the action plans of the IRBM Master Plan..."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

Toriman et al. (2012) further argued that social learning involves collaborative processes beyond mere information sharing and consultation. It facilitates stakeholder co-designing and co-deciding, which helps bridge gaps in meaningful decision-making and reduces uncertainty, thus serving as a form of risk mitigation for possible conflicts. This insight is reflected in the following response by NAHRIM:

"...Risk Mitigation: Involving stakeholders early in the process helps find possible problems or conflicts so that effective steps can be taken to solve them... makes the study and actions that follow more legitimate."

- Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

The interview findings are consistent with the online survey on organisations as presented in Table 4.8, which outlines that the

primary purposes of engagement are to gather input for drafting the IRBM plan and to ensure its successful implementation. Furthermore, these interview responses validate the survey findings (refer to Table 4.11) which ranked social learning as one of the foundation principles of stakeholder engagement, highlighting its role in facilitating effective collaboration and informed decision-making.

4.5.2 Compliance with policy and regulatory requirements

In their study, Delipinar and Karpuzcu (2017) emphasised the importance of the IRBM plan through legal and institutional adaptations, promoting integration, participation, coordination, and collaboration in developing a governance structure. Their study underscored the critical role of legal and institutional arrangements in fostering effective coordination and equitable collaboration between state institutions and other stakeholders. However, this study diverged from these expectations, as reality did not always align with literature. Of the four interviewees, only one organisation had comprehensively stated the application of mandatory legal requirements for engaging stakeholders in the river basin and water resources management. This can easily be identified by the response as follows:

"...The SWMA approach is based on applying the principles of IWRM since the establishment of SWMA in 1999 under the 8th Malaysian Plan. Application of IWRM is also one of the strategies and components of the thrust on sustainability which includes the implementation of IRBM as spelled out in the Selangor State Plan - 1 (RS1) 2021-2025... Based on section 6(e) of LUAS Enactment 1999 one of the functions of LUAS is to coordinate the action of the various state agencies and encourage their cooperation and

coordination on the various functions and usages of water resources... Under section 46(d) of the LUAS Enactment 1999, the Board can establish local management committees and interest groups that will cooperate with the Board for the implementation of the IRBM Plan... The development of the IRBM Plan is in line with Section 46 of the LUAS Enactment 1999 and its implementation by LUAS is prescribed in the Integrated River Basin Management Regulations. ...The task of engagements and negotiations between agencies and stakeholders is one of the scopes in the Terms of Reference for Consultants employed for the development of the IRBM Plan."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

In contrast, three of the interviewees reported that they do not have any mandatory legal requirements guiding their stakeholder engagement practices. Despite this, they recognise the importance of SE, as reflected in their responses as follows:

"...we still working on the new water enactment to empower our water governance. The existing Enactment for Water Supply 1998; however, we are working to develop a revised water enactment for Penang..."

- Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"...DID is always guided by the national water resources policy and the Water Services Industry Act which are federal laws. DID also acknowledges that the successful implementation of IRBM plans depends on the buy-in and commitment of the state authorities, particularly the state water authorities. The state water authorities are usually engaged very early in the IRBM Plan

study and play a custodian role as entrenched in the state water enactments. These engagement efforts are purely public best practices and are not necessarily supported by any specific legislation..."

– Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"...NAHRIM makes sure that water policies are followed by making sure that the way it engages stakeholders is in line with the policies that govern managing river basins (national and regional policies) and integrating their principles into stakeholder engagement...NAHRIM adopts international and national best practices and standards related to stakeholder engagement in water management. Such as Climate Change Policy and SDG 2030..."

– Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

Both DID and NAHRIM recognised the requirements of SE as stipulated in the existing National Water Resources Policy of Malaysia. Table 4.8 shows that the survey ranking of fulfilling water policy is second while fulfilling legislation requirements is fourth. Hence, the findings from these interviews validate and reaffirm the findings in the survey questionnaire as two of the organisations, namely DID and NAHRIM conduct SE based on the requirement of existing water policy even though there are no specific legislative requirements.

Moreover, NAHRIM emphasises the adoption of international and national best practices and standards related to stakeholder engagement in water management. Drawing from initiatives such as the Climate Change Policy and the Sustainable Development

Goals (SDGs) for 2030, NAHRIM incorporates globally recognised practices into its engagement efforts, ensuring alignment with contemporary standards and expectations. Furthermore, the principles of IWRM shape NAHRIM 's approach to stakeholder engagement, emphasising holistic and integrated water resource management practices. Climate change considerations are also pivotal, with initiatives like the UNFCCC Paris Agreement and the Malaysia Climate Change Policy driving NAHRIM 's efforts to incorporate climate change resilience into its engagement activities. Insights from the Intergovernmental Panel on Climate Change (IPCC) assessment reports inform NAHRIM 's strategies regarding climate change impacts on research in water resources and management. Additionally, the Five-Year Malaysia Plan outlines strategic priorities and development goals, influencing NAHRIM's stakeholder engagement strategies to align with national development objectives.

Blackstock et al. (2012) highlighted the effectiveness of the Water Framework Directive (2000/60/EC) (WFD), a wide-ranging piece of European environmental legislation that became law in Scotland at the end of 2003 through the Water Environment and Water Services (Scotland) Act 2003 (WEWS Act). The WFD and the WEWS Act require statutory objectives to be delivered through River Basin Management Planning (RBMP) in Scotland. According to Dickey and Ballesteros (2021), the International Council for the Exploration of the Sea's (ICES) principles, policies, and strategic plan require stakeholder engagement and analytical efforts were conducted i) to determine how they affect ICES's credibility, legitimacy, and saliency and ii) to advance theoretical developments on stakeholder roles in science and policy advice. The need for

stakeholder engagement as required by water-related policy and legislation will go a long way toward full compliance by agencies involved in water and river basin management.

From both the survey and interview findings, it can be deduced that government organisations' commitment toward SE could be greatly enhanced if there are mandatory requirements to do so as spelled out in any water-related policy and legislation.

4.5.3 Stakeholders' identification and inclusiveness

IRBM impacts multiple sectors across the communities within a catchment, making it essential to conduct thorough stakeholder identification to ensure inclusivity and mitigate potential risk. Walker et al. (2008) emphasised that stakeholder identification, management, and engagement are critical project management skills, requiring both intuition and a strong capacity for analysis. Most literature stresses the importance of precise stakeholder mapping to achieve inclusivity by determining the level of interest and influence, resulting in the development of a matrix for key stakeholder selection (Styk and Bogacz, 2021). However, while the findings of the online survey rank inclusive participation as the top principle of engagement (Table 4.11), all the government organisations interviewed have only broadly identified stakeholders but failed to conduct comprehensive stakeholder mapping exercises. The following interview responses reflect the omission of the stakeholder mapping exercise.

"The identification is based on related planning, development, monitoring, enforcement, and waste management to the environment, especially for water. For the time being BKSA didn't have the mapping exercise, and it could be carried out

accordingly in the future...but we will look into this based on the needs from time to time..."

– Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"Stakeholders can be broadly classified as government agencies, industry representatives, NGOs, and local communities...before SEs are carried out, stakeholders are pre-identified, and their expected contribution is assessed. The state DID and water authorities will be able to identify specific interest groups in the state or the study area, whilst DID HQ will normally pre-identify other federal agencies or departments that are potential stakeholders...There is often a tendency to engage only the most active and well-known NGOs."

– Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"...Based on the role of the department and the functions as prescribed by the law related to the department concerned...for all the related State and Federal agencies (including DBKL), and they are as listed in the Action Plan for the Langat River/ Selangor River/Klang River IRBM Plans...in line with the requirement of LUAS Enactment 1999, the Strategies and Action Plans as contained in the IRBM Plan involved the commitment of all stakeholders such as relevant agencies, NGOs, and local communities."

– Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"...NAHRIM conducts stakeholder analysis to identify and categorize relevant stakeholders. This involves identifying individuals, groups, or organisations that may be affected by or

have an impact on the river basin or water resources management study. Stakeholders can include local communities, government agencies, non-governmental organisations (NGOs), businesses, researchers, and others. NAHRIM categorises stakeholders based on their interests, influence, and level of involvement in the water management context... No stakeholder mapping..."

– Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.4 Roles and contributions from various non-state key stakeholders

4.5.4.1 Research organisation and academia

The responses from the interviewees reveal both shared and divergent views on the role of research organisations and academia in water and river basin management. All four institutions recognise the significant contributions of academic institutions and research organisations. However, there are notable differences in emphasis. NAHRIM's response is broader, covering a range of activities including scientific studies, data analysis, innovative technologies, and public awareness initiatives, reflecting a comprehensive approach to integrating research into water management. In contrast, SWMA provided specific examples of academic involvement in projects, highlighting individual contributions to particular studies. DID focused more on the administrative aspect of research contributions, advocating for the deposit of research with them. WRDPP emphasised the practical application of research outputs to address local water issues in Penang. These varying perspectives illustrate the diverse ways in which research and

academia contribute to water management, from specific studies and administrative practices to broader technological and policy advancements.

The following responses provide further insights into these contributions and the diverse approaches taken by each institution.

"...Based on their study and research output related to solving water issues in Penang..."

– Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"...Research organisations and academia can contribute by depositing copies of any work or research they have conducted with DID..."

– Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"...Academics have been involved in water management studies under the responsibility of SWMA. For example, the Klang River IRBM Study 2022-2030 was by USM Penang, while the previous Klang River IRBM Plan was developed by the National University Malaysia (NUM) Consulting Services. University Malaya (UM) was also involved in the implementation of Citizen Science / People Science with the Friend of River (FoR) Community for the Selangor River..."

– Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"...Academia has participated by i) Conducting in-depth scientific studies to understand the hydrological, ecological, and

environmental aspects of river basins (basic and applied research together with models and simulations development); ii) Carrying out data collection and analysis of large datasets related to water resources, climate, land use, and other relevant factors, providing valuable into trends, patterns, and correlations, which inform evidence-based decision-making in water management; iii) Conducting policy-oriented research to inform the development of effective water policies and regulations; iv) Raising public awareness about the importance of sustainable water management through outreach programs and educational initiatives. eg: Friends of Sungai Langat; and v) Communicating research findings to the public to foster informed decision-making and community engagement..."

– Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.4.2 Civil society organisations and non-governmental organisations

Among the four interviewees, there is strong agreement on the importance of community engagement and advocacy by civil society organisations (CSOs) and non-governmental organisations (NGOs) in river and water resource management. WRDPP, DID, and SWMA emphasised the role of these organisations in mobilising local communities through platforms such as 'Friends of Rivers', which focus on river conservation and awareness programmes. NAHRIM built on this by highlighting how CSOs and NGOs empower communities with knowledge and skills, enabling active participation in decision-making. Additionally, both DID and NAHRIM noted the advocacy and monitoring roles of NGOs, ensuring transparency and adherence to environmental standards in water management projects.

Public awareness and education are also highlighted as key functions, with SWMA focusing on community-based programs and NAHRIM emphasising workshops and campaigns to build support for sustainable practices.

However, the interviewees differ in their emphasis. WRDPP focuses on CSOs providing local information and acting as intermediaries between communities and authorities, while NAHRIM takes a broader view, emphasising national-level advocacy, capacity building, and legal advocacy. Their examples of successful initiatives also vary, with DID and SWMA highlighting 'Friends of Rivers' programs, and NAHRIM offering a wider range, including the Global Environment Centre's National River Care Activity and WWF's wetland conservation efforts. NAHRIM's focus on policy alignment and legal frameworks further distinguishes its perspective, framing NGOs as not only community advocates but also critical actors in shaping national water management policies. These perspectives were captured through the following responses:

"...To help in giving local information related to the issues on the river basin/water resources. Help to link with local communities..."

– Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"...CSOs and NGOs provide a non-state and presumably unbiased viewpoint toward the IRBM plans and decisions. They are usually protective of communities and their economic activities. NGOs such as 'The Friends of Rivers' have successfully promoted community river cleaning programs in the Klang Valley and are frequently called upon to advise on creating community

awareness amongst river communities. The Global Environment Centre (GEC) has the National River Care Fund to provide seed money to support local communities in caring for the rivers throughout the country..."

– Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"...In the State of Selangor, the Community-Based Programme is also one of the components in the River Conservation Plan for the Selangor State which recognised the need for active involvement of NGOs/CSOs in organising local communities towards supporting and sustaining the conservation of rivers..."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"...The roles of CSOs and NGOs include i) serving as advocates for various stakeholder groups, including local communities, environmental organisations, and marginalised populations; ii) empowering communities with knowledge, skills, and resources; iii) monitoring the implementation of water management policies and projects; iv) collaborating with research institutions to strengthen the evidence base for advocacy efforts, allowing these institutions to make informed arguments in favour of sustainable water management practices..."

– Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.4.3 Corporate sector

The four interviewees share a common view on the vital role of the corporate sector in participating in stakeholder engagement. They all acknowledge that corporate contributions, whether through active participation, financial support, or in-kind donations, are important for advancing environmental projects and improving water management.

However, their perspectives diverge in terms of specifics and emphasis. One interviewee highlighted the alignment of corporate actions with regulatory frameworks, while another focused on practical contributions like beach cleaning and river pollution control. There is also a distinction in the level of detail regarding engagement methods: some interviewees provide concrete examples of collaborative projects and their impacts, while others discuss the general role of corporate support without delving deeply into how stakeholder feedback is incorporated. While there is consensus on the importance of corporate contributions, the methods and effectiveness of these contributions can vary. These differing viewpoints are reflected in the responses provided by the interviewees as follows:

"...Their research and current state-of-the-art technology can be used in certain government agencies, apart from providing funds and support in-kind for river care programmes..."

– Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"...Corporate sectors via their respective foundations have been supportive through their CSR funding initiatives related to river pollution control and beautification programmes. Some of these active corporate sectors are invited to take part in the

stakeholder engagement exercise, and they contribute sound and pragmatic feedback. The 'One State One River Programme' initiated by DID has been supported by many various corporate sectors such as local banks, and government linked companies. The Sg Way River has been rehabilitated from Class V to Class III by a local private company located beside the river..."

– Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"...The Corporate Sector can play an important role in Water Resources Management. Among the initiatives that can be implemented are CSR programs of the Company which generally involve the community and related agencies in providing awareness of the importance of water resources via activities such as tree planting, plogging, etc ..."

– Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"...Engaging with corporate stakeholders helps align corporate interests with broader societal and environmental goals via their Corporate Social Responsibility (CSR) initiatives..."

– Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.4.4 Local communities

The responses from the four interviewees highlight the significant role of local community participation in effective stakeholder engagement. Recognising that involving local residents is essential for the success of water and environmental projects, each institution highlights different strategies to integrate community input and support. The WRDPP underscores the importance of engaging with community-initiated activities, reflecting a more passive approach to involvement. In contrast, the DID adopts a structured method, leveraging NGOs and local government representatives to connect with key community members, exemplified by projects such as the River of Life Project. SWMA demonstrates a proactive engagement strategy by recruiting through a volunteer group known as 'Friends of Rivers' (FoRs) and collaborating with academic institutions and other NGOs. Meanwhile, NAHRIM focuses on Community-Based Participatory Research (CBPR) and capacity-building efforts, emphasising direct community participation in research and decision-making processes, as seen in project like the development of Integrated Lake Basin Management Plan. These diverse institutional approaches highlight the varying degrees of community engagement, from passive to highly interactive, reflecting the institutions' commitment to integrating local perspectives in river basin management. These perspectives are reflected by the following responses:

"...WRDPP's engagement (with local communities) by participating in related activities/programs initiated by them..."

– Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"...DID will always seek the help of established NGOs to identify existing villages or residents' associations in the vicinity. Sometimes these communities are approached directly through the local government and their elected representatives who know local issues better. The key personalities from the community are sometimes engaged separately for focused discussions or clarifications..."

– Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"...Every FoR program will be reported in SWMA's webpage...Every FoR also has a LUAS representative who acts as a caretaker or facilitator for program implementation. Examples of community engagement that has a positive impact: a) FoR for Langat River where there is a close collaboration with NUM, b) FoR Taman Melawati for Klang River which is involved in the Selangor River People's Science Programme..."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"...Implement community-based participatory research approaches that involve local residents in the research process...Collaborate with communities to collect data, analyse findings, and jointly develop solutions to water-related challenges...Conduct educational programs and capacity-building initiatives to enhance the understanding of local communities about water management practices, for example the Participatory Ecosystem Service Shared Value Assessment for the Chenderoh and Bukit Merah Lake, and Integrated Lake Basin Management Plan (ILBMP) for Semberong and Durian Tunggal Lake ..."

- Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.4.5 Political involvement

The responses from the four interviewees reveal a complex and nuanced understanding of the role of politicians in stakeholder engagement related to river basin and water management. There is a consensus on the positive aspects of involving politicians, such as their ability to provide support, influence policy, and mobilise public participation. For example, one interviewee notes that politicians can offer valuable support in the State Assembly or Parliament and help in seeking corporate sectors' support in enhancing water security and environmental protection.

However, the perspectives diverge in terms of their approach and potential challenges. One interviewee emphasises that politicians can boost participation in large-scale events and ensure commitment from government agencies at the regional or state level, but also cautions that their presence in small group discussions might hinder open discourse due to political sensitivities. In contrast, another interviewee views politicians as essential for securing political support and commitment, believing their involvement enhances the success of community programs and policy implementation. Another perspective highlights the importance of political involvement in shaping policies, resource allocation, and conflict resolution, suggesting that their inclusion ensures that public interests are represented and that water management strategies align with legislative. However, one interviewee cautioned against inviting politicians for the stakeholder engagement.

These varied viewpoints illustrate a shared recognition of the importance of political involvement while also acknowledging potential limitations and challenges. The perspectives are supported by the following responses:

"...It depends on their understanding of the issues; they can provide positive input...Politicians can support all water security and environmental protection initiatives. They can also provide support at the State Assembly or Parliament. In addition, they may help to seek corporate support..."

– Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"...Politicians are crowd-pullers and can persuade their constituents to participate in numbers, especially for town-hall-type engagements at the local level. At the regional level or state level, they can ensure that government agencies under their portfolio commit and contribute towards the IRBM. On the side of caution, the presence of politicians in small group discussions may not always be conducive to open and objective discourse, either due to the political sensitivities of the time or the deference of government officials towards their political leaders...No, politicians should not be invited as stakeholders because it might shift the focus of the IRBM SE to a complaint forum."

– Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"...The involvement of politicians in the implementation of the program will give added value to the success of the program, involving the community and ensuring political support and commitment towards the effective management of water resources...Yes, politicians should be the invited stakeholders because politicians can set a good example for awareness

programs, especially those organized by the Government and the community. It's also a commitment to ensure that the Government's policies are implemented smoothly."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"Yes, Politicians should be included as the invited stakeholders because: i) Representation of Public Interests: Politicians represent the public and including them as stakeholders ensures that the interests and concerns of the broader community are considered in decision-making processes; ii) Policy Influence: Politicians have the authority to influence policies and regulations. Including them in stakeholder engagement provides an opportunity to align water management strategies with political priorities and legislative frameworks; iii) Communication Channels: Politicians serve as key communication channels between government institutions and the public. Involving them ensures effective communication and coordination in water-related initiatives; iv) Conflict Resolution: Politicians can play a role in resolving conflicts and mediating disputes. Their inclusion as stakeholders can contribute to smoother conflict resolution processes, v) provide the "Political Will" especially at the state level where we have many IRBM developed by JPS but have not been implemented..."

- Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

The findings from this sub-section reveal how various societal segments -such as the research community, academia, CSOs, NGOs, corporate sectors, local communities, and politicians – can play distinct roles and hold specific responsibilities that influence

and are affected by different stages of IRBM programmes, particularly the stakeholder engagement process. For instance, researchers and academia contribute technical knowledge and policy recommendations, while CSOs and NGOs often serve as mediators between the public and government agencies, advocating for environmental justice and sustainable practices. The corporate sector, typically involved in infrastructure development or resource utilisation, can have a significant impact on project outcomes, both positive and negative, depending on their level of engagement and compliance with environmental standards. Local communities, as direct beneficiaries or affected parties, provide crucial on-the-ground insights and participate in stewardship roles, while politicians shape policy and regulatory frameworks that could either enable or hinder the IRBM project's progress.

This multi-stakeholder involvement aligns with the earlier discussion on the importance of stakeholder identification and inclusiveness as foundational elements in ensuring the success of IRBM initiatives. As Reed (2008) and Pennington (2008) emphasise, effective stakeholder participation in environmental and water management enhances decision-making processes by incorporating diverse perspectives, leading to more sustainable and adaptive outcomes. Pahl-Wostl et al. (2007) further reinforce this, arguing that adaptive water management is most successful when stakeholders from different sectors actively engage in social learning, thus promoting collaboration and innovation throughout the project life cycle. Inclusiveness ensures that all relevant voices are heard, particularly those of local communities and marginalised groups, and is essential for equitable and sustainable water resource management at the river basin level.

As to the question of whether politicians should be included in a stakeholder engagement, the ethical concern as expressed by DID is that, in practice, politicians may pay most attention to those stakeholders with the power and urgency to assert their influence for personal benefits and overlook the concerns of those with a legitimate interest (Nigel and Lorissa, 2010). However, since the other three interviewees responded positively to the inclusion of politicians, it appears incumbent upon the host agency to harmonise the engagement process fairly and equitably.

The findings of the interviews also reveal that the timing of stakeholder involvement is critical, as the influence of the diverse groups varies across different project phases, from the initial planning and design stages to implementation, monitoring, and evaluation. Early and continuous engagement fosters stronger partnerships, builds trust, and reduces conflicts, which are crucial to long-term project sustainability. These findings reflect broader literature on stakeholder theory, which emphasises that inclusive engagement helps to balance the competing interests of various groups and mitigates the risks of project failure due to social, environmental, or political challenges (Freeman and McVea, 2005; Newig and Fritsch, 2009).

4.5.5 Engagement strategies

4.5.5.1 The need for formal guidelines or a checklist

The interviewees consistently highlight the use of SE strategies such as group discussions, workshops, town halls, and media outreach to engage diverse groups in river and water governance. While these methods are commonly employed, all

agree that there is no formal guideline or checklist to standardise SE practices, leaving much of the approach to the discretion of agencies or their consultants. This insight suggests that while SE strategies are crucial for river basin and water resource management, their effectiveness is often constrained by stakeholder conflicts and the absence of structured guidelines, echoing Alqaisi's (2018) findings on the need for clearer SE frameworks in complex projects. These points are supported by the following responses:

"So far, there is no guideline or checklist. We are still working to develop new water enactments, policies, and strategies to strengthen our water Governance and Operating Procedures, including guidelines for SE."

- Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"DID employs town halls, focus-group discussions, technical workshops, and interviews to engage diverse stakeholder groups... No, not that I know of any guidelines or checklists."

- Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"There is no Guideline or Checklist (for SE) but based on the scope and TOR of the consulting work."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"Basically, the consultant doesn't get involved in SE...there is no guidelines or checklist."

- Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.5.2 Ensuring transparency

On the question of how the organisation ensures transparency and openness during its engagement processes, DID does not see this as an issue, as all the engagements are officially conducted and the IRBM plans are not considered classified documents. Meanwhile, the rest of the interviewees have their own ways, such as explaining clearly the objective of the SE, the recording of the engagement process, the opportunity to voice their respective opinions and feedback, and the access to river basin information.

The following quotes from the interviewees illustrate these positions:

"This is a non-issue unless the SE is done through private interviews and the IRBM Plan is made a classified document."

- Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"The whole process during the implementation of the SE, including every stakeholder's feedback, will be recorded, and the summary will be presented to the Implementation Committee's Meeting. Each agency and stakeholder will be allowed to voice their respective opinions and feedback, and where appropriate, will be incorporated in the decision-making process for the development of the IRBM Plan."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"By ensuring transparent stakeholder engagement begins with clear and accessible communication. Moreover, NAHRIM strives

for inclusive participation, making efforts to involve a diverse range of stakeholders.

Transparency is enhanced when information is easily accessible to the public. Establishing clear feedback mechanisms allows stakeholders to provide input, express concerns, and seek clarification.”

- Dato’ Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

“Depends on the study and approach adopted. We will explain our objectives, expectations, and limitations depending on the situation.”

- Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

4.5.5.3 Involvement of the whole of government and society

DID emphasised the importance of collaboration across government sectors, noting the necessity of a ‘whole of government’ approach to preventing conflicting policies, while cautious about the ‘whole-of-society’ approach, which may not yet be practical across the country. SWMA and WRDPP acknowledge that a ‘whole of government and whole of society’ approach is an effective strategy to be adopted for SE, but it is time-consuming with so many agencies and non-state actors. Moreover, a lot of public awareness is still needed in Malaysia due to varying levels of public understanding, and extra budget will also be required. NAHRIM also acknowledges the potential of such approach but points out its limitations in balancing government objectives and public opposition.

These points are supported by the following responses:

"Can, the 'Whole of Government and Whole of Society' approach may be a practical and effective strategy to be adopted for SE, but it is time-consuming with so many agencies and non-state actors. Moreover, a lot of awareness through the media is needed"

- Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"The whole of Govt approach is needed to ensure policies & decisions across sectors are not counterproductive. A whole-of-society approach may not yet be practical across the country due to i) the current state of IRBM understanding amongst the public, and ii) the limited time given for an IRBM study."

- Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"The involvement and cooperation between the two parties, either the Government or the Community, is very important in ensuring the management of water resources and river basins in a holistic manner and that all strategies and action plans are successfully implemented. Extra time and budget may be needed to adopt such an approach."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"In the context of river basin and water resources management, the 'Whole of Government and Whole of Society' approach is practical and may be partially effective. For example, an incinerator project is good for protecting the river basin ecosystem, but is objected to by the community. Thus, this strategy might be unable to satisfy everyone, both from the Government and Society."

– Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.5.4 Communication and data sharing

The interviewees provide a range of insights into the communication and data-sharing practices within stakeholder engagement for IRBM. All interviewees emphasise the use of multiple channels such as meetings, emails, workshops, and forums to facilitate engagement. For instance, WRDPP and DID highlight formal modes like meetings, workshops, letters, and reports, while SWMA and NAHRIM focus on structured stakeholder interactions through workshops and public forums. Transparency and accessibility of information are commonly regarded as essential. The use of the latest appropriate information and communication technologies can further enhance transparency and access to information for stakeholders (Katherin, A., 2023).

However, there are variations in how openly information is shared. DID mentions that IRBM reports are available upon request, often stored in libraries, and occasionally in digital formats. In contrast, NAHRIM emphasises proactive participation in open data initiatives and digital dissemination, demonstrating a progressive approach toward public access. This aligns with the literature's emphasis on the importance of multiple communication modes and the growing shift toward transparency in environmental governance (Reed, 2008; Wesselink et al., 2011; Lovrić, 2021).

The four institutions also diverge in their perspectives on regulatory clarity and the accessibility of data. WRDPP expresses

uncertainty regarding specific data-sharing restrictions, while SWMA and NAHRIM highlight structured mechanisms like the Selangor State Freedom of Information Enactment and MOUs for data sharing. NAHRIM also raises a potential conflict between making flood risk maps accessible to the public and the potential negative impact on property development and business interests, reflecting concerns in the literature about balancing transparency with stakeholder risks (Castelló et al., 2016). These responses suggest that while data sharing is generally encouraged, organisational approaches and the perceived risks associated with open data vary. This variation supports findings in broader studies that indicate differences in stakeholder engagement approaches across organisations and the challenges of managing sensitive environmental data (Jang, 2022). The quotes below provided by the interviewees serve as evidence to further validate these findings.

"We facilitate communication and collaboration through meetings, official letters and event notices. Depends on the study and approach adopted, we will explain our objectives, expectations, and limitations."

"It depends on the purpose of data usage. Generally, okay for SE. Not sure if there is any regulation that restricts data sharing of IRBM studies."

– Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"SE is being done through various modes, not to mention workshops, and via letters and emails."

"DID's IRBM reports are made available to the state authorities where the basin lies. DID study reports are usually available to the public in hard copy at the department library. Digital versions

are also available, but usually only upon request. There is no written policy against the sharing of IRBM information. IRBM study reports are not classified as far as I know."

– Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"Communication and collaboration are done through workshops or group brainstorming sessions among stakeholders. Follow-up correspondence after the SE can be through email. The whole process during the implementation of the SE, including every stakeholder's feedback, will be recorded, and the summary will be presented to the Implementation Committee's Meeting."

"Stakeholders can apply to LUAS for the data and available information, which will be reviewed and considered by the LUAS Information Officer on the intended usage of such data and information. Data sharing can also be made available via MOUs signed with the relevant agencies or parties. As for the public, data or information sharing will be subject to the conditions of the Selangor State Freedom of Information Enactment."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"Communication and collaboration among diverse stakeholders are done through regular meetings to provide updates on the progress of studies, share relevant information, and gather feedback. Public forums and workshops to engage with a broader audience, including local communities, businesses, and NGOs. NAHRIM employs various channels to disseminate information to stakeholders. This may include conferences, technical talks, seminars, technical reports, and annual reports."

"Concerning the willingness to share information and data, NAHRIM publishes reports, studies, and findings on its website or through other public platforms. NAHRIM participates in open data initiatives, making non-sensitive datasets publicly available. There is a need to consider the information/data available in the flood risk/hazard map, to think of the setback of this information given direct access to the public, which may harm property development/business. At this moment no policy/law that restricts the use of the information/data if the data/information is publicly available and complies with the National Data Sharing Policy (NDSP)."

– Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.5.5 Capacity building and skills training

The interview responses from various agencies reveal both differing views and consensus on capacity building, skills training, conflict management (Table 4.18, rank 2), and the integration of SE with decision-making, monitoring, and evaluation. For instance, WRDPP emphasises the current lack of formal assessment tools for SE but notes that engagement efforts are generally acceptable within the department. In contrast, DID acknowledges a gap in assessing consultants' competency in SE and identifies the need for specific training, mainly to be provided by NGOs like MyCDNet and GEC. This discrepancy highlights varying levels of SE institutionalisation across agencies. SWMA, on the other hand, has a more structured approach, involving regular monitoring, feedback sessions, and technical visits to ensure IRBM objectives are met. NAHRIM integrates continuous professional development and proactive inclusivity, focusing on building public trust and ensuring stakeholder feedback is

meaningfully incorporated into decision-making. This comprehensive approach aligns with literature emphasising participatory governance in water management (Pahl-Wostl, 2009), which identifies capacity building as essential for effective SE.

Supporting these perspectives, both DID and NAHRIM highlight the value of early involvement and collaboration in conflict resolution, with NAHRIM focusing on feedback loops and continuous improvement. This reflects the Arnstein ladder of citizen participation, where effective engagement depends on power redistribution and incorporating stakeholder input into planning. SWMA's use of established indicators to measure SE effectiveness adds another layer of accountability, aligning with the literature advocating for structured mechanisms in SE (Reed, 2008). These differences provide further insights into the survey findings, suggesting that while agencies agree on the importance of SE, their levels of integration and capacity-building strategies differ, with some still developing formal training programs and others having more advanced mechanisms in place.

These reflections on capacity building, integration, and conflict management in SE processes are supported by the following quotes:

"Ways to increase staff competency to facilitate SE are through formal training and on-the-job training."

– Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"Assessment of the consultant's competency for stakeholder engagement has not been done on a proper or objective basis."

The focus has usually been on project delivery. Staff competency is also an area for improvement. In general, training is more on the job rather than through skills training. DID does not conduct specific training for stakeholders. This has been taken up by NGOs such as the Malaysian Water Partnership (MWP), the Malaysia Capacity Development Network for Sustainable Water Management (MyCDNet), and the Global Environment Centre (GEC)."

"Conflicts are addressed through workshop discussions. In matters that deal with policy, the affected parties are usually asked to formally record their stand or position on the matter for resolution at a higher level."

"All stakeholders' feedback is accepted as is as long as their points do not contravene existing laws or encroach on the rights of others. Stakeholder input essentially informs DID if anyone's rights are being violated and if a particular aspect has been overlooked. The IRBM plan will then address these issues in the deliberations and propose the way forward with respect to designing the plan. The plan is shaped through consensus. The merits of each element are weighed against the best use of water resources and land use."

– Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"SWMA staff are highly trained and skilled officers concerning the development of the IRBM Plan, including the facilitation process. Regular discussions between Consultants and LUAS staff during the development of IRBM studies ensure that the study objectives are achieved. SWMA officers will also be appointed as facilitators together with the Consultants during the SE sessions."

"In cases of conflicts, bilateral discussions with stakeholders to seek compromise solutions within the provision of existing legislation to ensure the benefits and objectives of IRBM are achieved."

"Positive feedback is generally accepted as long as they are in line with the provisions of the existing legislation in force and does not violate the LUAS Enactment 1999. Stakeholders with strong and practical input will have a great influence, and their input can be considered if it provides common benefits in the management of water resources."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"Assessment and enhancement for staff's competency in stakeholder engagement through training programs, skill assessments, participation in workshops and seminars, and frequently invited to give a talk/to be a panel."

"In cases where conflicts arise, using open communication channels and providing a platform for dialogue helps in the early identification of conflicts and prevents escalation. Facilitate discussions where stakeholders work together to identify common goals and develop solutions that address the concerns of all parties involved."

"Stakeholder input is likely a critical factor in identifying priorities, and informed decision-making, particularly if there is alignment with national and international aspirations. Stakeholder input may guide decisions to ensure compliance with relevant regulations and legal frameworks. Considering stakeholder input enhances public trust and credibility."

"Implementing structured feedback mechanisms allows NAHRIM to collect input from stakeholders on their experience with the

engagement process. Tracking the levels of participation in engagement activities over time helps NAHRIM understand the evolving dynamics of stakeholder involvement. Continuous improvement and learning from past engagements contribute to overall effectiveness.”

– Dato’ Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.6 Incorporating the elements of environmental, social, and governance

Environmental, Social, and Governance (ESG) is sometimes used interchangeably with sustainability reporting and refers to a combination of characteristics that define corporate responsibility. Amongst others, the ‘Environment’ component involves evaluating the organisation's efforts to mitigate environmental impact, protect biodiversity, promote sustainable resource management practices, and reduce carbon footprint. The ‘Social’ part of ESG is about an organisation's impact and treatment of its stakeholders, including employees, communities, customers, and suppliers. It focuses on the social well-being, human rights, labour practices, diversity and inclusion, product safety, and community involvement of an organisation. ‘Governance’ refers to the way a company is directed, controlled, and managed its operations. Good governance focuses on promoting ethical behaviour, transparency, accountability, and effective decision-making processes within an organisation. It aims to ensure that the interests of shareholders, employees, local communities, and other stakeholders are adequately represented and protected. On the question of whether stakeholder engagement in IRBM should include the essential elements of Environment, Social, and Governance (ESG), the

interview responses highlight a consensus on the importance of integrating ESG principles. WRDPP emphasises adherence to laws and regulations related to environmental concerns before proceeding with decisions during the SE, aligning with existing environmental policy. Similarly, DID recognises SE as part of the broader ESG agenda, acknowledging its significance in addressing environmental, social, and governance components, though it has yet to formalise a sustainability plan. Both SWMA and NAHRIM further emphasise environmental integration into ESG, with SWMA discussing the inclusion of green incentives and eco-tourism, and NAHRIM incorporating climate adaptation strategies into their SE processes. These perspectives are supported by the literature, which underscores the importance of ESG in water resource management, especially in addressing sustainability, climate adaptation, and community resilience (Colvin et al., 2015). Several examples of interview responses serve to illustrate these points and perspectives:

“Environmental concerns referring to the DOE Act and regulation... Possible to integrate ESG framework, since the goal is the same. During the SE workshop, include the various dimensions of ESG.”

- Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

“On environmental concerns and sustainability, these issues are part of the briefings before or during IRBM SE. Prevention, mitigation, and enforcement issues are typical topics. The SE is expected to reveal the action plans of the relevant departments in tackling those issues and to see if their plans are aligned with the common goals. IRBM SE can be considered an action plan

under the DID ESG agenda. However, DID has yet to draft and formalise its sustainability plan.”

- Dato’ Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

“Yes, ESG should be included in the related water resources roadmap plan, where engagement directly with stakeholders and NGOs related to ESG, particularly on climate change projection data dissemination through ESG Impact Assessments, ESG Reporting and Disclosure, and Collaboration with ESG Professionals.”

- Dato’ Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

“Implementation of SE activities involving management components of water resources, and their protection are naturally integrated as one of the components in the ESG framework. It can be enhanced by incorporating various green incentives in water infrastructures.”

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

4.5.7 Consideration of cultural and religious aspects

As to the question of whether stakeholder engagement in IRBM should take into consideration the aspects of cultural and religious sensitivity, particularly for a multi-racial and multi-religious society in Malaysia, all the interviewees concur on their importance during the SE process (Table 4.18, rank 7 and Table 4.18, rank 9). WRDPP emphasises adherence to laws and guidelines related to cultural or religious matters, aligning with existing national unity frameworks. However, NAHRIM diverges

slightly by noting that cultural aspects do not apply to its projects, though it does acknowledge the relevance of spiritual and religious considerations in specific river basin contexts.

DID's approach to addressing cultural conflicts, especially in cases involving relocation, aligns with the literature on managing cultural heritage in water projects, which emphasises consultation and respect for local communities (Soini and Birkeland, 2014). LUAS and NAHRIM extend this by highlighting the need for continuous consultation with religious groups to ensure that practices and rituals are not compromised by water management activities. NAHRIM, despite its limited direct involvement in cultural heritage, acknowledges the importance of religious values in decision-making for river basin management, reflecting findings in the literature that call for more inclusive governance structures that accommodate spiritual and cultural values (Bakker, 2012). These reflections give further insights into the survey findings, particularly in highlighting how different agencies incorporate cultural heritage into SE and validating that religious and cultural factors are important considerations in effective river basin and water resource management. These perspectives are supported by the following quotes:

"BKSA refers to the enactment, law, and regulation related to culture, heritage, and religions before getting the consideration from the State Exco." – Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"In the Malaysian context of River Basin Management projects, respect for the cultural and heritage values of all citizens has always been duly protected. However, in the course of

implementing physical projects, there have been conflicts, especially when it involves relocation. DID has always adhered to the rule of law, and where grey areas exist, consultation with the relevant authorities and community is held."

"Yes, religious and spiritual interest groups are often engaged/consulted to understand their practices. Many places of worship are located on riverbanks, which is considered auspicious to their followers. Where possible, such locations are preserved."

– Dato' Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

"The relevant components of the protection of historic and cultural places, such as fishing villages are accounted for in the preparation of the State of River Report as well as the development of the IRBM Plan for a basin. The aspect of ecotourism is also given due attention such as the firefly sites at Kg Kuantan along the Selangor River. Where any location or section of the river has been designated for religious ceremonies, it is appropriate that the relevant religious stakeholders be consulted together to ensure that the activities carried out do not affect the quality and quantity of water resources."

– Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"In areas where rivers hold cultural or religious significance, religious and spiritual considerations can indeed play a crucial role in stakeholder engagement for river basin and water resources management. The inclusion of religious and spiritual aspects is important for fostering understanding, respect, and collaboration among diverse stakeholders."

- Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.8 Monitoring and evaluating the effectiveness of stakeholder engagement

Only NAHRIM carries out monitoring and evaluation of the effectiveness of the stakeholder engagement process. SWMA has a monitoring system to monitor and evaluate the progress of the strategies and action plans that are contained in the previous IRBM plan, but this does not evaluate the success of the engagement. The following quotes reflect their views:

"Using 2 existing platforms i.e. i) Monitoring Committee for Selangor, Langat, and Klang River IRBM Plan; and ii) Committee for Implementation of Selangor River Conservation. These committees will carry out the necessary periodic monitoring of the success of the action plans, which indirectly evaluates the impact and effectiveness of stakeholder engagement carried out."

- Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

"Implementing structured feedback mechanisms allows NAHRIM to collect input from stakeholders on their experience with the engagement process."

Tracking the levels of participation in engagement activities over time helps NAHRIM understand the evolving dynamics of stakeholder involvement. An increase in participation may indicate growing trust and interest in the engagement process."

- Dato' Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.9 Challenges and constraints

The four interviewees presented several key challenges and constraints to SE, with financial constraints being the most recurring issue. This concurred with the questionnaire findings where 'limited financial resources' ranked fourth (Table 4.18) in the list of constraints. WRDPP emphasises that relying on state approval for finances restricts its ability to reach all stakeholders effectively. This aligns with DID's view that while funds are allocated for physical infrastructural works, budget constraints for SE limit the duration and extent of participation, particularly in focus group discussions. Similarly, LUAS and NAHRIM highlight the importance of adequate budgeting to ensure proper stakeholder engagement. NAHRIM further elaborates that a lack of resources affects every aspect of SE, from data collection and training to communication and monitoring. The consensus on financial constraints is supported by literature that emphasises the importance of sufficient funding to enable broad stakeholder participation and engagement. Limited financial resources can inhibit SE efforts by restricting the scope of involvement, as noted by (Reed, 2008), who argue that inclusive SE requires both adequate time and funding.

Beyond financial constraints, each interviewee also highlights unique non-financial challenges. WRDPP mentions the need for legislative reforms to update old enactments and policies, which hinder more effective SE. DID and SWMA point to the challenge of data sharing and differences in knowledge among stakeholders, which can prevent consensus during discussions. Additionally, SWMA raises concerns about the effectiveness of SE when lower-level government staff participate, as they may not have the authority or knowledge to contribute meaningfully.

NAHRIM expands on these issues by highlighting a wide array of challenges, such as power imbalances, resistance to change, political interference, and legal complexities. These challenges align with the survey findings, which also identified limited stakeholder knowledge and technical capacity as significant constraints to effective SE. Furthermore, the interviews provide deeper insights into these constraints, particularly by expanding on the diversity of stakeholder interests and environmental uncertainties, which add complexity to decision-making processes.

As noted by Arnstein, (1969), overcoming power imbalances and communication barriers is key to achieving effective participatory engagement. The following responses reflect the perspectives of this analysis:

"We are still under the state secretariat office and financially restricted to that state approval. Yes, the limited budget may not be sufficient to reach all relevant stakeholders. Besides finance, old enactments and policies need to be revised to strengthen the WRDPP."

– Ir. Najwa, Water Regulatory Division Pulau Pinang (WRDPP).

"DID never fails to allocate funds for physical works, however financial constraints limit the extent and duration of SE activities. Focus group discussions may require transport and lodging costs for participants; hence participation would be limited to the budget available. Besides finance, data sharing is a huge challenge. Business entities are typically hesitant to share data openly due to service agreements that demand confidentiality."

– Dato’ Ir. Nor Hisham, Department of Irrigation and Drainage (DID).

“An adequate budget is certainly important to ensure that the necessary number of engagements can be carried out with proper planning to include all relevant stakeholders. Besides finance, the understanding and knowledge of stakeholders about water and rivers may differ greatly, especially with water-related agencies. This will make it difficult to come to a consensus or agreement on the best options for river basin management.

As for government agencies invited as stakeholders, the low-level staff attending the SE may not be able to contribute effectively.”

– Ir. Haslina, River Basin Management Division, Selangor Water Management Authority (SWMA).

“It will affect and impact the accuracy and certainty of the IRBM study carried out due to the limited: i) frequency and scale of engagement events, ii) use of engagement tools, iii) traveling and logistics, iv) capacity building and training programmes, v) mechanism for monitoring and evaluation.”

– Dato’ Ir. Zaki, National Water Research Institute of Malaysia (NAHRIM).

4.5.10 Validation of survey findings and insights from interviews

Table 4.24 gives a summary of the interview findings that validate the findings from both the survey from the stakeholder perspectives and the survey findings from the organisation perspectives, including new insights which are not covered in the surveys. In general, most of the surveys’ findings are in

alignment with the views from the interviewees, though there could be some reservations about certain findings.

Table 4.24 Interview responses: Validation of surveys' findings from stakeholder and organisational perspectives, and new insights

Stakeholder Engagement Parameters	Survey Findings from Stakeholder Perspectives	Survey Findings from Organisation Perspectives	Validation from Interviews	New Insights from Interviews
1. Purpose of Stakeholder Engagement				
The primary objectives of stakeholder engagement (SE) are to gather input for developing the Integrated River Basin Management (IRBM) plan and to ensure its effective implementation.	The findings (Table 3.5) indicate that enhancing the IRBM plan is the top motivation for participation in engagement activities.	The findings (Table 4.8) rank input for drafting the IRBM Plan as the highest.	All interviewees' responses validate the findings of both stakeholders and organisations that SE is to prioritise the enhancement of the IRBM plan.	SE is not just a method for gathering input but a potential platform for social learning for the key stakeholders since there will be knowledge exchange and collaborative problem-solving through their respective roles and responsibilities. There is a need to align stakeholder engagement strategies more closely with collaborative principles to optimise outcomes.
2. Compliance with Policy and Regulatory Requirements				
Stakeholder engagement in river basin management could be conducted because of the mandatory policy and legal requirements but should not for the sake of formality.	The findings (Table 3.5) show that fulfilling engagement motivated by water policy and legislation is ranked fifth, while formality ranks thirteenth which is the last.	The findings (Table 4.8) indicate that fulfilling water policy requirements is ranked second, meeting legislative requirements ranks fourth, and formality is last.	Among the four interviewees, only one agency has comprehensive state policy and mandatory legal requirements for stakeholder engagement in river basin and water resources management. All interviewees concur that SE should not be carried out as a formality.	There is a discrepancy between stakeholders and organisational priorities regarding policy and compliance. With or without legislation, organisations value fulfilling the water policy more highly than stakeholders, highlighting the need for clearer communication about policy objectives, limitations, and their significance in stakeholder engagements.

Stakeholder Engagement Parameters	Survey Findings from Stakeholder Perspectives	Survey Findings from Organisation Perspectives	Validation from Interviews	New Insights from Interviews
3. Stakeholder Identification and Inclusiveness				
IRBM impacts multiple sectors across communities within a river basin, making thorough stakeholder identification and selection essential to ensure inclusivity and mitigate potential risks.	The findings (Table 3.7) rank the selection criteria for stakeholders in river basin management based on factors such as local population, access to information, demographics, economic livelihood, literacy, representation of women and youth, and social status.	The findings (Table 4.11) rank inclusive participation as the top principle of engagement.	All four interviewees recognise the importance of inclusive participation, particularly the commitment of all relevant government agencies, local communities, and CSOs & NGOs.	The process of detailed stakeholder mapping is necessary to address the issue of inclusiveness. Enhancing the stakeholder identification process by incorporating the criteria of interest and influence can improve inclusivity and the overall effectiveness of IRBM initiatives.
3.1 Role of Research Organisations and Academia				
Research and academic institutions can play a crucial role in providing multi-disciplinary expertise, including state-of-art knowledge.	The findings (Table 3.6) rank academia's participation as the third most important. Table 3.9 shows the ranking of the types of multi-disciplinary knowledge and experience as contributing factors for effective engagement in river basin management.	The findings (Table 4.14) rank the importance of subject matter experts in third place.	All four agencies generally acknowledge the contributions that can be provided by academic institutions and research organisations.	Academic institutions' participation in SE is relatively low; hence strengthening the integration and greater involvement of academic research and expertise could greatly enhance stakeholder engagement and improve decision-making processes in IRBM.

Stakeholder Engagement Parameters	Survey Findings from Stakeholder Perspectives	Survey Findings from Organisation Perspectives	Validation from Interviews	New Insights from Interviews
3.2 Role of Civil Society Organisations and Non-Governmental Organisations (CSOs and NGOs)				
CSOs and NGOs can play a significant role by providing the link between government agencies and the local community, engaging and advocating the importance of water resource management at the basin level.	The findings (Table 3.6) rank NGOs and CSOs' participation as second.	The findings (Table 4.14) list representatives from the sector including civil societies, in fifth place.	All interviewees agree on the complementary role of CSOs and NGOs in helping to mobilise local communities through platforms such as 'Friends of Rivers', which focus on river conservation and awareness programmes.	Although there is a recognition of the role of CSOs and NGOs as stakeholders, government organisations rank their representation relatively low. Increasing the involvement and visibility of CSOs and NGOs within organisational frameworks can enhance community engagement, advocacy, and sustainability efforts in the river basin and water resource management.
3.3 Role of Corporate Sector				
The corporate sector's contributions through their CSR programme such as financial support, in-kind donations, or active participation are essential for advancing environmental and river basin projects for improving water management.	The findings (Table 3.6) rank private sector participation at fifth place which is the last.	The findings (Table 4.14) also rank representatives from the sector including corporate representatives as fifth.	The four interviewees share a common view on the vital role of the corporate sector in stakeholder engagement to support river management plans and water resource management initiatives.	Both stakeholders and organisations recognise the corporate sector's contributions but rank them moderately. Leveraging corporate partnerships more effectively through strategic engagement and collaboration can provide additional resources and innovations for IRBM initiatives.

Stakeholder Engagement Parameters	Survey Findings from Stakeholder Perspectives	Survey Findings from Organisation Perspectives	Validation from Interviews	New Insights from Interviews
3.4 Role of Local Communities				
Involving local residents is seen as critical to the success of river basin and environmental projects, with water-related agencies highlighting various strategies to integrate community input and support.	The findings (Table 3.5) rank the local population as the top criterion for stakeholder participation.	The findings (Table 4.14) also rank representatives from the sector which includes local communities as fifth.	All interviewees emphasise the significant role of local communities in effective stakeholder engagement for developing an IRBM related to river management initiatives.	While stakeholders see local communities as critical, organisations rank them lower in representation. Government agencies shall seriously prioritise greater and consistent community involvement as this will increase local ownership and the long-term sustainability of IRBM projects.
3.5 Role of Politicians				
While it is generally felt that SE should be free from political interference, there could be advantages of involving politicians to harness greater support from the public.	The findings (Table 3.14) rank the need for engagement free from political interference at the fourth place.	The findings (Table 4.14) place representatives from the sector which includes politicians at fifth.	The survey findings from both stakeholders and organisations may not be aligned with the findings from the interview. There is a consensus among interviewees on the advantages of involving political figures, including their ability to support policy and legislation, influence regulations, and mobilise public participation.	While political involvement can be beneficial, concerns about political interference are significant. Striking a balance between leveraging political support and maintaining the independence of stakeholder engagement processes could mitigate these risks.

Stakeholder Engagement Parameters	Survey Findings from Stakeholder Perspectives	Survey Findings from Organisation Perspectives	Validation from Interviews	New Insights from Interviews
4. Engagement Strategies				
There is no formal guideline to standardise stakeholder engagement (SE) practices, leaving the approach to the discretion of consultants or the host agencies.	The findings (Table 3.13) rank the need for structured, orderly workshops second, which could be a matter of concern.	The findings (Table 4.18) highlight domination by stronger participants as a major issue, with the problem of poor facilitation which ranked sixth.	The findings of both surveys are validated by the responses from the interviewees who concur that the effectiveness of SE strategies is often constrained by stakeholder conflicts and the absence of structured guidelines.	The lack of formal engagement guidelines leads to inconsistent practices. Developing structured SE frameworks and ensuring equal participation could help prevent dominant voices from overshadowing others, ensuring all views are heard, thus improving overall outcomes.
4.1 Effective Communication				
Effective communication is a very important component that ensures the success of SE. Transparency, and trustworthiness as perceived by stakeholders are important factors that can impact sound communication during stakeholder engagement in river basin management.	The findings (Table 3.11) rank transparency as the top priority in communication, followed by trustworthiness, and clear and concise terms of reference (TOR) for the SE.	Regarding the open-ended question on communication, the findings reveal that several digital tools have been employed to maximise stakeholder participation and involvement during the engagement process. Different methods may be employed during three distinct phases; before, during, and after stakeholder workshops.	The interview findings generally agree with that of the surveys, and reveal that correspondence can be through emails, official letters, and event notices; depending on the study and approach adopted, the host agencies will explain the objectives, expectations, and limitations of the SE which are usually conducted through workshops or group brainstorming sessions among stakeholders. The whole engagement process including every stakeholder's feedback will be recorded.	The insights from the interviewees stress the importance of the organiser being clear in all communication, including explaining SE objectives which will contribute toward openness and building of trust amongst all parties.

Stakeholder Engagement Parameters	Survey Findings from Stakeholder Perspectives	Survey Findings from Organisation Perspectives	Validation from Interviews	New Insights from Interviews
4.2 Data Sharing				
Data sharing by the host organisation and amongst the stakeholders underscores the importance of building trust and transparency in any SE.	The findings (Table 3.5) rank the sharing of information as fourth, implying the general view of stakeholders that this is a relatively important ingredient for soliciting all necessary and relevant information for preparing a comprehensive IRBM plan.	The findings rank willingness to share (Table 4.15) and sharing of knowledge (Table 4.17) as the highest priority.	All the interview responses validate the essential need for the accessibility of information, though there are variations in how openly information is shared.	There is strong consensus on the importance of transparency and knowledge sharing, however, agencies remain cautious of the potential negative impact on certain business and industry interests. Building a secure, transparent data-sharing framework could address these concerns while fostering collaboration and informed decision-making.
4.3 Capacity Building and Skills Training				
The skill of the host agency and facilitator in conducting SE is essential to ensure effective contribution by all stakeholders smoothly and efficiently, with maximum collaboration and minimum conflicts.	The findings (Table 3.13) rank the following skills such as maintaining a level playing field second, resolving conflicts third, accommodating multiple views fourth, and reconciliation fifth; and the skill in promoting collaboration among all sectors (Table 3.14) ranks second.	The findings (Table 4.18) on challenges in conducting engagement identify handling dominating participants, achieving amicable solutions, and poor facilitation of SE as of great concern.	Interviewees generally validate the findings of the surveys but express varying views on enhancing capacity building, skills training, conflict management, and integrating SE feedback with decision-making.	Capacity building is recognised as vital but lacks uniformity across agencies. Improving capacity-building programmes for facilitators, focusing on conflict resolution and sector-wide collaboration, could enhance the effectiveness of stakeholder engagement and decision-making in IRBM.

Stakeholder Engagement Parameters	Survey Findings from Stakeholder Perspectives	Survey Findings from Organisation Perspectives	Validation from Interviews	New Insights from Interviews
5. Incorporating Elements of ESG				
The application of the IRBM principles entails the strong involvement of the elements of environment, social, and governance (ESG) in the river basin; hence the need to be incorporated during the engagement process.	The findings from the survey indicate that 98.4% voted in favour.	No findings are available as there is no question on ESG in this set of surveys for the organisation.	All the interviewees agree on the importance of integrating Environmental, Social, and Governance (ESG) principles into stakeholder engagement for river basin and water resource management.	There is a recognition that SE is part of the broader ESG agenda. The significance of addressing environmental, social, and governance components, has to be formalised in the IRBM plan. This realisation underscores the importance of ESG in water resource management, especially in addressing sustainability, climate adaptation, and community resilience within the river basin.
6. Consideration of Cultural Heritage, and Religious Aspects				
In a multi-racial and multi-religious society like Malaysia, respect for cultural heritage and religious sentiments must be high on the agenda when conducting public engagements.	The findings (Table 3.16) rank cultural respect first, religious tolerance second, rites and rituals fourth, and embracing multiculturalism fifth. The survey results underscore the priority of fostering cultural respect and religious tolerance in the engagement process, especially in situations where there are signs of racial and religious polarisation.	The findings (Table 4.18) rank cultural differences seventh and religious differences ninth as challenges in conducting SE, a concern to be addressed.	All interviewees concur on the importance of integrating cultural heritage, and religious considerations into stakeholder engagement for river basin and water resource management.	The host agency must adopt approaches that promote cultural sensitivity, racial tolerance, respect religious beliefs, and address barriers to participation to ensure that engagement processes are equitable, effective, and inclusive for all and at the same time employ conflict resolution mechanisms that foster understanding, reconciliation, and consensus-building among stakeholders.

Stakeholder Engagement Parameters	Survey Findings from Stakeholder Perspectives	Survey Findings from Organisation Perspectives	Validation from Interviews	New Insights from Interviews
7. Involving the 'Whole of Government and Society'				
There is a recent call by the United Nations and other international entities to adopt the 'Whole of Government and Society' approach in implementing national, regional, and global agendas related to the 2030 Sustainable Development Agenda, including water resources management.	92.8% of the survey results indicate strong support for a 'Whole of Government and Society' approach to stakeholder engagement.	From the findings concerning challenges faced (Table 4.18), the host organisation has singled out the fear of low participation, implying the need for full participation from all related as well as partially related government agencies, and much wider participation from society at large.	Generally, all interviewees acknowledge the potential of the adoption of the 'Whole of Government and Society' approach, noting the necessity of preventing conflicting policies among agencies, besides providing full support and commitment.	There are views that the 'Whole of Government and Society' approach is time-consuming with so many agencies and non-state actors and may not yet be practical across the whole country as a lot of public awareness is still needed in Malaysia due to varying levels of public understanding, and an extra budget will also be required. Moreover, its limitation could also be in balancing government objectives and public opposition.

Stakeholder Engagement Parameters	Survey Findings from Stakeholder Perspectives	Survey Findings from Organisation Perspectives	Validation from Interviews	New Insights from Interviews
8. Need for Monitoring and Evaluation of SE				
There are two main reasons for monitoring and evaluating the effectiveness of stakeholder engagement; the first is for the continuous improvement of the organisation concerned, and the second is for the stakeholders' satisfaction and recognition of their contribution towards the development of the IRBM plan.	The findings (Table 3.17) indicate a strong necessity for a mechanism to monitor and evaluate the effectiveness of stakeholder engagement.	There was limited response to this open-ended question, as many admitted that monitoring and evaluation of stakeholder engagement has not been practiced in Malaysia. However, it was generally agreed that there should be a mechanism to monitor and evaluate the effectiveness of stakeholder engagement.	All interviewees concur on the importance of monitoring and evaluating the effectiveness of SE. However, only two of them have some ways of monitoring the engagement process, but no established mechanism or indicators to measure the actual effectiveness of SE and the stakeholders' satisfaction.	Implementing a structured feedback mechanism allows the host organisation to collect input from stakeholders on their experience with the engagement process and must meet basic requirements such as establishing goals and objectives, setting targets and trajectories, committing financial contributions, and training and holding personnel accountable for their duties.
9. Challenges and Constraints				
Conducting SE may encounter various constraints and have to be resolved with proper planning.	There is no specific mention of financial issues from stakeholder perspectives.	The findings (Table 4.18) rank financial limitations as a challenge to SE.	Most of the interviewees admit that an adequate budget and sufficient timeframe are important to ensure that the necessary number of engagements can be carried out with proper planning to include all relevant stakeholders. Besides finance, the understanding and knowledge of stakeholders about water and rivers may differ greatly, especially with water-related agencies.	Financial constraints are a major obstacle for organisations and must be addressed at the early stage of project planning. Besides finance, there should be a commitment for government agencies invited as stakeholders to send staff who are knowledgeable and of sufficient seniority to contribute effectively during the SE.

4.6 Conclusions

The findings of this chapter have several implications. Firstly, they highlight the diverse perspectives and priorities among organisations involved in river basin management studies. Understanding these differences is crucial for designing inclusive and effective engagement strategies that address the needs and concerns of all organisations, particularly water-related agencies. The findings are aligned with what Bouckaert et al. (2018) advocated; the need to facilitate inclusive participatory approaches by bringing together government agencies, local communities, academia, non-governmental organisations, and other relevant corporate parties to the decision-making process. Secondly, the results can inform decision-making processes by identifying which purposes of engagement organisations prioritise the most. For example, if the organisations consistently rank one purpose higher than others, it may indicate that resources and efforts should be directed toward fulfilling that particular purpose. The findings reflect the work of many researchers on the importance of having a clear purpose with objectives, preferably set before initiating any engagement activity for ensuring the desired outcomes of any stakeholder engagement (Potthoff et al., 2023).

The findings also underscore the importance of ongoing dialogue and collaboration between organisations and their stakeholders in river basin management. By recognising and respecting stakeholders' differing perspectives and priorities, it becomes possible for the organiser to build consensus, foster trust, and ultimately achieve more sustainable and equitable outcomes in river basin management initiatives.

In exploring stakeholder engagement within the Malaysian context of IRBM initiatives, this chapter analysed fifty-six (56) responses received from surveys distributed to 500 personnel from organisations involved in IRBM and water resources studies. The findings unveiled a diverse representation across sectors, with government agencies emerging as pivotal players in policy formulation and regulatory enforcement. Additionally, the survey revealed a need for a multidisciplinary expertise base, emphasising the importance of varied knowledge, expertise, or some understanding of river basin management principles that selected stakeholders should preferably possess (Pahl-Wostl et al., 2007)

The online survey for the organisation provides valuable insights into the challenges, priorities, and strategies of key institutions involved in developing the IRBM plan. It is directly aligned to analyse the organisational roles and perspectives that contribute to effective stakeholder engagement in IRBM. By understanding how organisations perceive and approach stakeholder engagement, the survey analysis can identify and rank suitable parameters for engagement from an organisational perspective. This approach not only addresses the objective of filling the knowledge gap regarding effective stakeholder engagement but also reinforces the foundation for developing a comprehensive conceptual framework for effective engagement initiatives. Besides, through this alignment, the aim ensures that the survey's outcomes are not only informative but also actionable, facilitating the development of evidence-based policies and frameworks that promote collaboration, transparency, and accountability in river basin and water resources management.

Examining organisational perspectives on engagement factors, this chapter highlighted a consensus on the importance of clear purposes and inclusive participation. Statistical analyses, including the Friedman test and Conover's Post Hoc comparisons, underscored significant differences in stakeholders' rankings for engagement purposes. While some purposes were deemed crucial, engagement perceived as mere formalities ranked lower, emphasising the need for substantive efforts aligned with overall water policy and organisational roles as proposed by Howell et al. (2022). Emphasising high inclusivity, well-planned organisational strategies, and substantive involvement can foster trust, collaboration, and ownership among stakeholders, enhancing the legitimacy and effectiveness of the engagement process for river basin management initiatives.

The results of the selective interviews with the four water-related agencies reinforced and validated most of the findings from the online survey. Besides, the interview findings also provide some valuable new insights such as the need to address the financial constraint at the planning stage of the project and the cost of stakeholder engagement could therefore be considered as an investment in the overall IRBM's success (FasterCapital, 2024).

There is also the need to strike a balance between leveraging political support and maintaining the independence of stakeholder engagement (Esper et al., 2024), and the cautious adoption of the 'Whole of Government and Society' approach which is time-consuming with so many agencies, and non-state actors (Pauna et al., 2023).

This chapter, looking from the organisations' perspective, together with Chapter 3, lays the groundwork for the next chapter, which attempts to formulate a conceptual stakeholder engagement framework in integrated river basin management, with the outcome of developing the IRBM plan.

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Chapter 5 Conceptual Framework for Effective Stakeholder Engagement in Integrated River Basin Management in Malaysia

5.1 Abstract

To successfully execute stakeholders engagement (SE) in Integrated River Basin Management (IRBM), it is important to pay attention to all the key factors that are required but have typically been neglected, disregarded, or omitted. Based on the findings from earlier chapters, this chapter identifies five essential independent variables for successful engagement: stakeholder inclusiveness, stakeholder characteristics, engagement strategies, organisational factors, and cultural and religious aspects. These variables help organisations to structure their engagement efforts in line with broader goals and regulatory frameworks. Additionally, the chapter highlights the inclusion and application of three enhancers for SE: multi-stakeholder platforms, environmental social governance principles, and a whole-of-government and society approach, all of which promote inclusivity, sustainability, and comprehensive collaboration. These three enhancers will greatly improve the outcome of the three desired dependent variables, namely, knowledge transfer, decision impact, and stakeholders' satisfaction. The interactions and linkages of the independent variables, the enhancers, and the dependent variables provide the basis for a novel framework for measuring stakeholder engagement effectiveness, supporting best practice for a structured method for documenting, monitoring , and evaluating the engagement process. This framework enhances stakeholder communication by establishing clear objectives, goals, and expectations, facilitating informed decision-making, and early

identification of potential issues through stakeholder feedback. Its adoption will help ensure more sustainable outcomes in water resource management at the river basin level.

5.2 Introduction

The Sustainable Development Goals (SDGs), particularly SDG 6 and its Target 5, emphasise the importance of cultivating Integrated Water Resources Management (IWRM) at all levels. A critical component of IWRM is Integrated River Basin Management (IRBM), which addresses the administrative challenges posed by geographical and political boundaries and, in doing so, improves catchment and river management. IRBM is designed as a management tool to create an enabling environment for essential water transformations (Basco-Carrera et al., 2018). By extending beyond traditional boundaries, IRBM fosters a better understanding of the complex dynamics within a river basin, addressing the challenges of managing these areas under multilayered administrative conditions (Sreeja et al., 2012). A fundamental aspect of IRBM is the active involvement of stakeholders. The Global Water Partnership strongly supports this approach, advocating for coordinated development and management of water, land, and related resources in a way that safeguards ecosystem viability (van Rijswijk et al., 2014). This policy is endorsed by various international declarations (Huffman, 2009).

Active stakeholder participation, especially from non-state actors, is crucial for the successful implementation of river basin management plans (Blackstock and Richards, 2007). Civil society plays an influential role in shaping public preferences and can

independently drive programs (Paul, Thompson and Farrelly, 2024). However, responsibility and leadership from government agencies are essential, as they possess the necessary expertise and legal authority to protect stakeholder interests during implementation. This collaborative relationship formalizes the interdependencies among various actors involved in policy formation and implementation, thereby enhancing governance. The integration of stakeholders is further strengthened through adaptive legal frameworks, as well as transdisciplinary and trans-governmental networks (Khalid et al., 2018). Effective institutional arrangements and robust legal frameworks are particularly important for managing fragmented administrative landscapes (Riazi et al., 2023).

In Malaysia, the importance of stakeholder engagement in water management began to gain recognition only after 2000. Initially, engagement was limited to related federal and state agencies, and efforts were often constrained by limited resources and time. In 2014, a systematic study under the Academy of Sciences Malaysia's (ASM) river management program assessed the state of IRBM implementation in Malaysia, identifying both progress and critical areas needing improvement. The study's objectives included ensuring sufficient and clean water, reducing flood risks, and enhancing environmental conservation, thus laying a foundation for more effective IRBM practices.

The findings from ASM's study were organised into thirteen thematic focus areas, including policy, legislation, institutional arrangements, finance, water assessment and allocation, pollution control, flood management, drought management, river basin and land use planning, information systems, research and

development (R&D), river basin monitoring, and stakeholder participation (ASM, 2014). The report highlighted the need for a stronger commitment to stakeholder engagement, emphasising that it should be considered an essential component rather than a mere formality.

To advance this goal, a conceptual framework is proposed to guide water management agencies in enhancing their stakeholder engagement practices. This framework, depicted in Figure 5.1, illustrates the reinforced relationships between independent and dependent variables through specific enhancers, offering a structured path for more effective stakeholder engagement in IRBM. The study contributed to existing literature by providing a comprehensive analysis of stakeholder engagement within the IRBM context, merging theoretical insights with practical observations. However, significant challenges remain, such as financial constraints, limited resources, and acceptance barriers. Overcoming these requires adaptive engagement strategies that incorporate multi-stakeholder interaction techniques, including dialogues, public consultations, citizen panels, focus groups, and joint model-building exercises (Huntjens, Lebel and Furze, 2017).

This chapter aims to develop a model framework for effective stakeholder engagement in IRBM that organisations in Malaysia can adopt, enhancing collaboration across diverse actors and driving sustainable water management at the river basin level. It starts by presenting the framework in its diagrammatic form and then, in subsequent sections (5.2 to 5.6 inclusive), provides the rationale for each of the elements present within the framework.

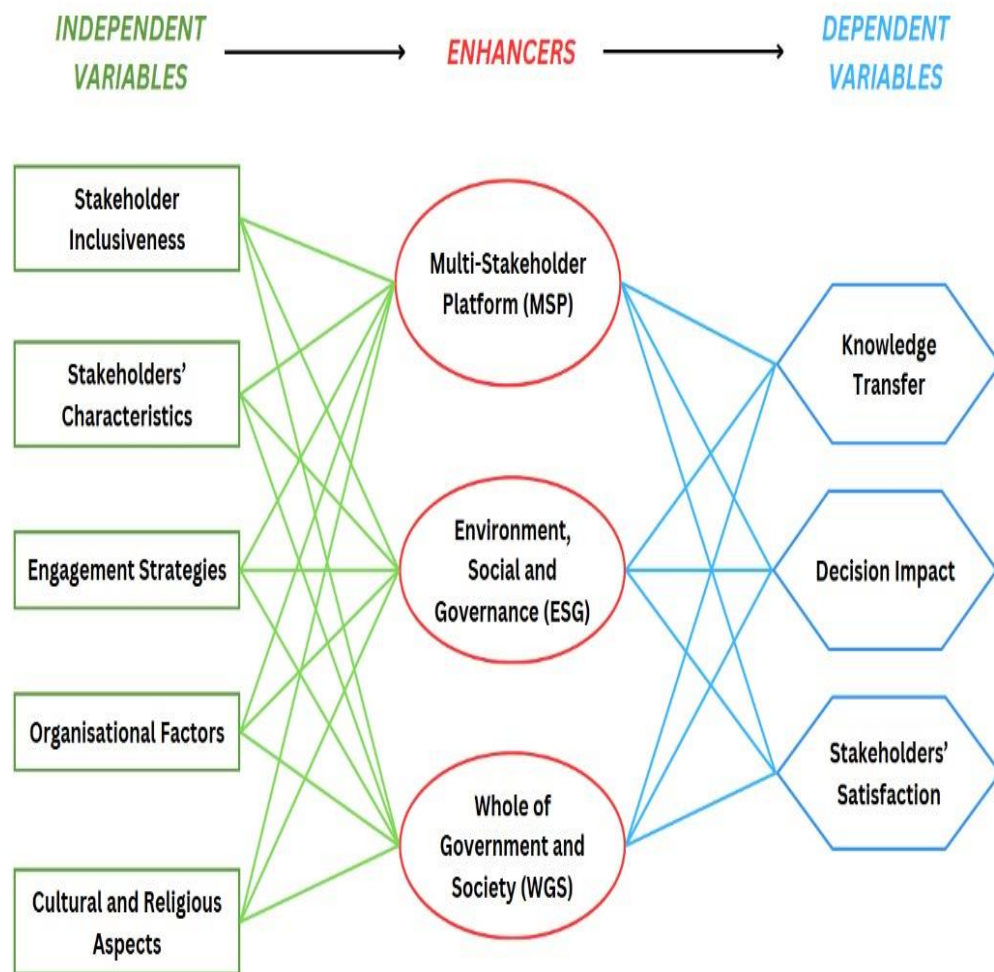


Figure 5.1 The proposed conceptual framework for effective stakeholder engagement in IRBM for Malaysia

5.3 Overview of existing guidelines, policies, and legislation related to stakeholder engagement

Document screening was carried out to determine the existence of documented requirements and instructions for implementing stakeholder engagement. A range of documents consisting of guidelines, policies, and legislation related to stakeholder engagement in general and specifically to its application in river or water management were screened, with some of the most relevant ones highlighted below. The complete list of documents

that have been screened can be found in Appendix 5.

5.3.1 Global documents

A global entity known as AccountAbility has a vision for the world in which people must have a say in the decisions that impact them, and where organisations act on and are transparent about the issues that matter to humanity. Among various useful documents produced by AccountAbility is the '*AA1000 Stakeholder Engagement Standard (SES) (2015)*' to establish the benchmark for good-quality stakeholder engagement based on inclusivity, materiality, and responsiveness principles.

Another respected entity known as the Organisation for Economic Co-operation and Development (OECD) has produced a document specifically focusing on water management entitled '*Stakeholder Engagement for Inclusive Water Governance (2015)*' aimed at helping organisations to assess the impact of stakeholder engagement in water-related decision-making and policy implementation, and to provide guidance to policymakers on how to set up the appropriate framework conditions for successful engagement. The analytical framework suggested in this document is organised around five components: i) detecting drivers to understand the forces and levers for actions; ii) mapping stakeholders in terms of their roles, responsibilities, influence, motivations, level of connectivity, and scale; iii) diagnosing obstacles and mitigating related risks to integrity, accountability, and sustainability; iv) identifying mechanisms that are fit for purpose; and v) fostering evaluation to point out areas of improvement and trade-offs needed.

The U.S. Environmental Protection Agency (EPA) has also produced a document entitled '*Engaging Stakeholders in Your Watershed (2013)*' which is a guide intended for federal, state, tribal, and local agency personnel, as well as non-governmental organisations, that are involved in watershed management activities and are building a stakeholder group. The guide can also help private organisations interested in recruiting and involving stakeholders in local or regional watershed efforts. The guide provides detailed information on each of the following six steps of outreach: i) define the driving forces, goals, and objectives, ii) identify and analyse the target audience, iii) create the message, iv) package the message, v) distribute the message, and vi) evaluate the outreach campaign.

In the Water Europe Vision, one of the four key components is enabling inclusive multi-stakeholder governance, which advocates the adoption of governance models that manage the availability of water for all sectors and purposes, based on the true value of water, and using fit-for-purpose governance mechanisms (Water Europe, 2017). Moreover, the need for the participation of stakeholders is clearly stated in Article 14 of the EU Water Framework Directive which clearly states that every Member State shall encourage the active involvement of all interested parties in the implementation of this Directive, especially in the production, review and updating of the river basin management plans (WFD, 2000). In many European countries through the Water Framework Directive (WFD), public participation is mandatory to ensure the successful implementation of IWRM at the river basin level by bringing together different views in the negotiation process thereby achieving an amicable solution to any water issue (Allan and

Rieu-Clarke, 2010 and Antunes et al., 2008).

In the UK for instance, to manage the programme under WFD, the Environment Agency is aware that they must develop new ways of managing the inter-dependencies and complexities due to different initiatives and research projects. They also recognise the need to ensure that all catchment science programmes include the development of an integrated catchment modeling framework within a social learning process (Collins and Ison, 2010). In planning their engagement work, stakeholders are divided into four different categories: stakeholder regulators (co-deliverers); professional organisations; civil society organisations; and members of the public (Paula Orr et al., 2006). Published official reports of stakeholder engagement must document all participatory sessions, showing the degree to which the participants are attracted or invited, including their level of engagement (Maria Elena, 2014).

The Alliance for Water Stewardship (AWS) has strongly advocated the concept of Water Stewardship. This is an action and result-oriented resource management framework that aims to improve social-ecological governance whereby there will be an equitable allocation and sustainable use of shared water resources (AWS, 2021). The twin goals of stewardship are ecosystem resilience and human well-being, as achieved through the integration of ecological and social processes (Chenoweth et al., 2018). As such, much work has been focused on water management practices related to water use efficiency and pollution prevention, as well as catchment management. The AWS Standard highlighted the message that the use of water must be socially equitable, environmentally sustainable, and

economically beneficial, achieved through a stakeholder-inclusive process that involves catchment-based actions.

The International Association for Public Participation (IAP2) Spectrum of Public Participation is another good source of reference for implementing stakeholder engagement. According to this document, the various key principles that should be incorporated into any framework for effective stakeholder engagement in river basin management include inclusivity, transparency, equity, flexibility, timeliness, respect, and sustainability.

5.3.2 Malaysian documents - policy

In Malaysia, the only official document related to public engagement published by the government is a guideline entitled '*The Guideline on Public Consultation Procedures (2014)*' developed by the Malaysian Productivity Corporation (MPC) under the Ministry of International Trade and Industry (MITI). However, as this guideline is intended for agencies within MITI that engage with the corporate sector on matters related to international trade regulations, most of the basic engagement strategies do not apply to water-related agencies.

A document closely related to water is the official '*National Water Resources Policy of Malaysia (NWRP)*' (NRE, 2012) which states that "*The security and sustainability of water resources shall be made a national priority to ensure adequate and safe water for all, through sustainable use, conservation, and effective management of water resources enabled by a mechanism of a shared partnership involving all stakeholders*". This policy provides the fundamental national directive to all water-related

agencies to conduct stakeholder engagement when implementing any water or river management studies and initiatives. Hence, in the NWRP, there is a clear provision on the need for partnerships and to engage with the relevant stakeholders and the public.

Such collaboration can be achieved through the formulation of strategic thrusts, targets, strategies, and strategic action plans which have been elaborated in detail in the NWRP. In terms of partnerships, two strategic thrusts have been formulated, namely Thrust 7 and Thrust 8. Thrust 7 focuses on *Stakeholder Inclusiveness and Engagement* while Thrust 8 focuses on *Shared Water Resources Governance*. For each of these thrusts, their respective target, strategy, and strategic action plan have also been established.

The NWRP therefore serves as a reference and guide to all stakeholders in the governance of water resources, including IRBM studies, whether at the federal or state levels.

5.3.3 Malaysian documents - legislation

From the legislative perspective, the Selangor State Water Management Authority Enactment 1999 (Amended 2022) provides some form of legal mandate for engaging with the public and stakeholders. In this enactment, this provision can be found in Section 6 (1) and (2) as described below:

Section 6 - Functions and powers of the Authority

(1) The functions of the Authority shall be to nurture, maintain, and facilitate the sustainable development, efficient use, and conservation of water sources for public purposes in respect of which it is established, and to coordinate multi-agency

relationships in the State and promote cooperation and coordination for multi-functional uses of water sources.

(2) The Authority shall have the power to do all things reasonably necessary for or incidental to the discharge of its functions and to coordinate the activities of public authorities, stakeholder organizations, and any person on matters pertaining to the efficient management, sustainable use, and conservation of water sources.

Another example is the provision under Clause 35 of the Sabah Water Resources Enactment (1998) that touches on stakeholder engagement or public involvement:

Clause 35 - Procedure for development of catchment management plans

(1) (a) require the Director to consult with any public authority, industry group, or other party potentially affected by the proposed plan, and

(6) Where the Council identifies a lack of progress in the implementation of a catchment management plan, it may require a public authority to take the action necessary to implement the plan.

5.4 Status and general issues related to stakeholder engagement in IRBM in Malaysia

In Malaysia, the water-related and environmental agencies such as the Department of Irrigation and Drainage (DID), the National Water Research Institute (NAHRIM), Selangor Water Management Authority, the National Water Services Commission

(SPAN), the Division of Water Supply of the Ministry of Minister of Energy Transition and Water Transformation (PETRA), and the Department of Environment (DOE) carry out policy formulation and various water-related studies including preparation of Integrated River Basin Management (IRBM) Plans. The DID has an annual budget to carry out IRBM studies for Malaysia's 189 major river basins. The output of such a study is the IRBM plan which contains the necessary strategies and action plans for the effective management of water resources within the river basin concerned. Most of the time, these studies are outsourced to consultants who are invariably responsible for conducting the necessary stakeholders' engagement as stipulated in the studies' terms of reference (TOR).

Despite so many IRBM studies and plans being developed in Malaysia, it is observed that water-related issues such as flooding and river pollution still exist on the ground. This gives rise to the general perception that certain key stakeholders, including the private sectors and the affected local communities, may not be effectively represented among the invited stakeholders, or their views may not have been sufficiently considered in the decision-making process. From the public perspective, in most instances, such engagements could have been carried out as a 'formality' without adequate planning and resources by the agency concerned.

As such, the effectiveness of the stakeholder engagement could be impaired, impacting the quality and legitimacy of the IRBM plans. The ineffectiveness of the engagement can be attributed to some of the weaknesses and shortfalls as summarised below:

- i) From the list of past attendance of the workshops, the invited stakeholders are not inclusive as almost all the participants were from the government or state-owned agencies, and hardly from experts, academicians, or NGOs/CSOs;
- ii) From the record, all the agencies concerned with river basin studies do not carry out stakeholder mapping;
- iii) Most of the government staff who attended the workshops were relatively junior and could not contribute much, and their views may not necessarily reflect those of their agencies;
- iv) The participants were not supplied before the workshop with the necessary information such as the engagement objectives, the river basin background, and their expected contributions;
- v) The Consultant who was engaged for the IRMB study has to play the role of the engagement facilitator, a task that the Consultant is not qualified to perform effectively;
- vi) The Terms of Reference (TOR) for the IRBM study are too general on the need for stakeholder engagement, as there was no mention of guidelines or requirements that should be complied with, and without spelling out how, when, and the number of times stakeholder engagement must be carried out;
- vii) Generally, top management was too busy, did not give much attention and commitment to stakeholder engagement, which was left to the division head or senior officers;
- viii) There was no monitoring and evaluation mechanism to determine the success and effectiveness of the stakeholder

engagement; and

- ix) The documentation of the engagement process is generally weak and scan.

The differentiation of the proposed framework with existing models can be described below -

a) Comparison with existing IRBM Engagement Models: Existing IRBM models vary in governance and stakeholder inclusion (refer to Table 5.1). Command-and-control models (e.g., early Murray-Darling Basin Plan) rely on centralised decision-making, often neglecting social and cultural dimensions. Collaborative models, like the European Water Framework Directive (WFD), ensure stakeholder participation but lack structured ESG integration. Adaptive management models, such as the Mekong River Commission's approach, emphasize flexibility but remain ecologically focused rather than balancing governance, social equity, and cultural factors.

b) Key Innovations of the Proposed Framework:

This framework explicitly integrates ESG principles, ensuring that governance and social factors are prioritised alongside environmental sustainability. It uniquely incorporates cultural values and indigenous knowledge, addressing a gap in many existing models. Unlike conventional participation methods, it leverages GIS, remote sensing, and participatory mapping for transparent, real-time stakeholder engagement. Designed to be adaptive and context-sensitive, it

enables region-specific solutions that align with environmental and socio-political conditions.

Table 5.1 Comparison of the proposed framework with existing IRBM engagement models

Criteria	Existing Models	IRBM	Proposed Framework
Governance Approach	Often top-down, agency-driven		Integrates multi-level governance, including local communities
Stakeholder Engagement	Focused on institutional stakeholders		Broader engagement, including local and indigenous communities
Inclusion of ESG Factors	Limited or absent		Explicit integration of ESG principles in decision-making
Consideration of Culture	Generally, not a priority		Recognizes cultural values and traditional knowledge
Technology & Data Use	Limited digital integration		Utilises GIS, remote sensing, and participatory mapping
Flexibility & Adaptability	Often rigid and standardised		Adaptive and context-sensitive

5.5 Methodology

Earlier chapters identified the key variables influencing stakeholder engagement within the context of IRBM. The study involves a systematic literature review, online surveys, interviews, and document screening (see Figure 5.2 for the study flow chart). This included two online surveys (one for individual stakeholders and another for organisations) and in-depth interviews with four individuals holding high-ranking positions within the country's main water management agencies. The interviews were designed to provide a deeper and more robust

understanding of the findings obtained from the survey questionnaires.

The findings from both the survey questionnaires, the interview responses, and the results of the document screening are synthesised in this chapter to develop a proposed conceptual framework for effective stakeholder engagement in IRBM.

In developing the framework, the first step is to identify and categorise the important independent variables and dependent variables that are to be considered in the stakeholder engagement process. However, to improve the effectiveness of the engagement process, the application of suitable enhancers has been explored and incorporated into the framework.

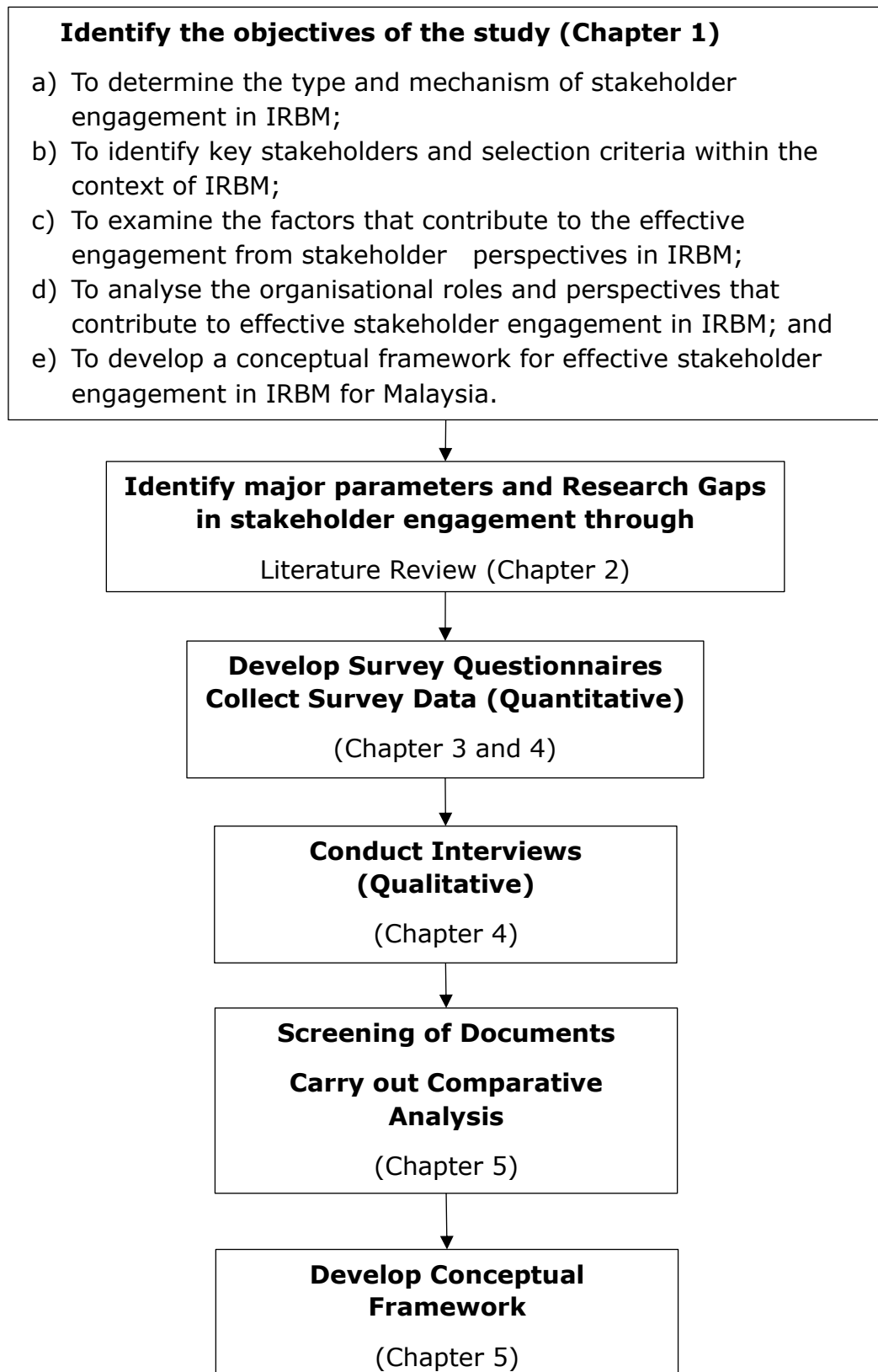


Figure 5.2 Flow chart for a stakeholder engagement study aligned with pre-defined objectives

5.6 Towards effective stakeholder engagement

This section deals with the three important elements that contribute to effective stakeholder engagement, (i) the independent variables, (ii) the dependent variables, and (iii) the enhancers. The independent variables form the foundation for successful stakeholder engagement initiatives. These variables guide organisations in structuring their engagement efforts, ensuring that they are aligned with broader goals and regulatory frameworks. Enhancers such as the Multi-Stakeholder Platform, ESG principles, and a Whole-of-Government and Society approach further enhance the effectiveness of stakeholder engagement by promoting inclusivity, sustainability, and comprehensive collaboration. These enhancers provide platforms for dialogue, integrate ethical considerations into decision-making processes, and encourage collaboration across different sectors and levels of government. As a result, they contribute to optimising three key dependent variables: knowledge transfer, decision impact, and stakeholders' satisfaction, which are essential for achieving successful and sustainable outcomes in water resource management within the river basin.

The discussion in the sub-sections below integrates across all previous parts of the thesis, including empirical findings and existing literature. The discussion therefore sets the foundations for developing the proposed conceptual framework as illustrated in Figure 5.1.

5.6.1 The five independent variables impacting stakeholder engagement in Malaysia

5.6.1.1 Stakeholder inclusiveness

Stakeholder inclusiveness involves a comprehensive approach to identifying and engaging all relevant parties who may be impacted by or have an interest in a project or initiative. This process typically includes broad inclusion, ensuring a wide range of relevant stakeholders from different sectors such as government, industry, academia, NGOs, CSOs, local communities, and the marginalised or underrepresented groups. Proper stakeholder mapping is essential to identify specific roles, interests, and the potential impact on each stakeholder group. This detailed mapping ensures that all relevant voices are heard, fostering a more inclusive and effective engagement process.

Concerning the involvement of politicians in stakeholder engagement, the survey data and the interview responses agreed that politicians should be encouraged to take part in the engagement since they represent the public; including them as stakeholders ensures that the interests and concerns of the broader community are considered in decision-making processes. Moreover, politicians have the authority to influence policies and regulations, hence including them in stakeholder engagement provides an opportunity to align water management strategies with political priorities and other legislative frameworks. However, caution is advised that their presence may at times hinder open and objective discourse in stakeholder engagements, potentially shifting the focus away from constructive dialogue.

5.6.1.2 Stakeholders' characteristics

Understanding the characteristics of stakeholders is crucial for effective engagement. Stakeholders can vary significantly regarding their backgrounds, expertise, interests, and influence. Clearly defining each stakeholder's roles and responsibilities helps facilitate better collaboration and understanding. Stakeholders can be involved at different levels, from high-level decision-making to grassroots participation. Recognising these diverse characteristics allows for tailored engagement strategies that can address each stakeholder group's unique needs and contributions.

Stakeholders can be classified under 5 types of characteristics. First, there is the 'unaware' type who has low power and low interest and has likely been pulled from his day job to attend the engagement. Such a stakeholder may not be able to contribute, but there is no harm done. Next is the 'actively unsupportive' type. This stakeholder is a danger to the engagement process as he can undermine the morale of other stakeholders and contribute to a lack of success. Then, there is the 'ambivalent' type who is neutral, neither supportive nor unsupportive, and may be damaging to the engagement process. On the positive side, there is the 'supportive' type who is well aware that participating in the stakeholder engagement will bring benefits to his organisation. Finally, there is the 'actively engaged' type. Such a kind of stakeholder can be a mixed blessing. On the one hand, he can be enthusiastically supportive due to his high power and high interest and can provide strong leadership. On the other hand, because he is accustomed to making quick decisions, he sometimes over-exerts himself during the engagement.

Mapping stakeholders with their respective characteristics and

credentials will be beneficial when selecting the stakeholders who can contribute and enrich the engagement. Mapping tools such as 'Multi-Dimensional Stakeholder Mapping' can help to assign the score for 6 key attributes i.e., influence, impact, interest, criticality, effort, and position.

5.6.1.3 Engagement strategies

Effective engagement strategies are vital for meaningful stakeholder involvement. Utilising diverse communication methods such as meetings, workshops, surveys, and digital platforms ensures that different stakeholders can be reached in ways that are most accessible and effective for them. Depending on the circumstances, the engagement process should be flexible and adaptable to changing conditions and stakeholder needs, including the necessity to engage at the early stage of the IRBM study or programme.

Timeliness is an aspect that must be considered in the planning process. It is essential to ensure that stakeholders are engaged in a timely manner and that they have sufficient time to provide feedback and input. This would include the considerations for the number of engagements necessary and the appropriate duration for each engagement session.

Transparency is a key component in the engagement process, involving open and honest dialogue, having access to relevant information about river basin, and sharing information about how stakeholder feedback influences the decision-making.

Equity is another component that is very important to ensure that all stakeholders have an equal opportunity to participate in the

engagement process and that their voices are heard and considered. And the organiser should ensure that all stakeholders are treated with respect and that their contributions are valued.

Additionally, promoting capacity building through training and development programmes enhances stakeholders' ability to participate effectively, fostering a more knowledgeable and engaged community.

Finally, sustainability is an aspect that is often overlooked. It is very important to ensure that the engagement process is sustainable over time and that stakeholders remain engaged and committed to the river basin management process, with proper monitoring and evaluation mechanisms.

5.6.1.4 Organisational factors

The organisation, as the host, plays a significant role in influencing stakeholder engagement. Adherence to national and international best practices, standards, and relevant policies and laws provides a framework for structured and compliant engagement activities. The availability of financial and competent human resources is critical in supporting these activities, ensuring that there are sufficient means to engage stakeholders effectively. An organisational structure that includes dedicated teams for stakeholder engagement enhances the effectiveness of these efforts, promoting a coordinated and systematic approach.

From the perspective of river basin management, the findings showed that leadership is very important, particularly at the initiating stage of any engagement process. Based on the review,

many works of literature were related to business ethics and management. Bryson (2004) has discussed the prominent role and responsibility of a leader in stakeholder engagement. However, it has been observed that there is a marked difference in the public sector involving the aspect of water resources management where the term 'leader' is almost absent, and the leadership of the engagement process is unnoticed and not apparent. This may be due to the research bias of the literature on water and environment management, which only touches on the outcomes and factors that contribute to the success of a process.

It cannot be overemphasised that during the initial planning and decision-making stages, the role and commitment of the top leadership, though not visible, is the most vital. One of the main tasks of a public sector leader in water management is to plan and implement the whole stakeholder engagement process effectively and in a structured manner and to reconcile any differences among stakeholders if any. Moreover, there is also a need for the leader to ensure a level playing field for all stakeholders in any engagement process (Reed, M.S., 2008).

5.6.1.5 Cultural and religious aspects

Considering cultural and religious aspects is essential for respectful and effective stakeholder engagement. Understanding and respecting cultural differences can help design engagement processes that are culturally appropriate and inclusive. Engaging with relevant religious stakeholders and incorporating religious perspectives where applicable enhances the acceptance and support for the project or initiative. Adhering to cultural and heritage regulations and incorporating these into stakeholder

engagement strategies ensures compliance and respect for local customs and traditions. By addressing these aspects, organisations can foster a more inclusive and harmonious engagement process, which is crucial for the success and sustainability of their initiatives in the context of river basin management.

5.6.2 Optimising stakeholder engagement through three comprehensive approaches

5.6.2.1 Structured engagement through multi-stakeholder platform

Integrating diverse stakeholders in river basin management has been the essence of sustainable water resources management. Water-related problems are interlinked and can be addressed only by interactions among diverse scientific disciplines and stakeholders through multi-stakeholder platforms. Since the early 2000s, the concept of a multi-stakeholder platform (MSP) has gained traction in several sectors, including water (Warner, J.F., 2006). The concept adapts different names across sectors, including multi-stakeholder forums, multi-stakeholder processes or partnerships, and multistakeholder initiatives. Multi-Stakeholder Platform has been recognised as an effective partnership arrangement as reflected in SDG 17.16 and 17.17, which stipulate the need for multi-stakeholder partnerships that enhance collaborations between the public sector, private sector, and civil societies (UN, 2015). The EU Water Framework Directive initiated a range of efforts to establish stakeholder involvement through the formation of advisory groups to bring organised stakeholders into the planning and implementing processes (Nicolas W. Jager et al., 2016).

Essentially, this concept entails collective or 'collaborative' governance, an innovative and solutions-oriented model focusing on public value. This is where diverse stakeholders can collaborate to improve public resources and deliver public services. The critical tenet of these platforms lies in bringing together government, civil society, and the private sector to address complex water-related challenges that no one party alone has the capacity, resources, and know-how to do so more effectively (Dentoni, D. et al., 2018). In addition, the uniqueness of the platform is the presence of social learning and available feedback mechanisms.

Thus, a multi-stakeholder platform is essentially a structured arrangement for stakeholder engagement, and it complements the role of governments in bringing together diverse groups to collaboratively address common issues and promote joint decision-making. From past experiences, it was observed that the application of MSP for IRBM has been very encouraging in many countries, particularly with i) the greater participation of women and civil society organisations, and ii) the top leadership commitment of the private sector. By fostering inclusive participation, an MSP enhances transparency and trust, which are crucial for successful IRBM studies and initiatives as has been practiced by the Selangor Water Management Authority; and is strongly advocated for adoption for the whole of Malaysia.

5.6.2.2 Enhancing stakeholder engagement through the incorporation of Environmental, Social, and Governance (ESG) framework

The application of the Environmental, Social, and Governance (ESG) framework and principles goes beyond the core function of

an organisation to a more sustainable, holistic view of performance. The ESG platforms encompass how an organisation manages its environmental concerns and footprint, social inclusiveness and relationships, and transparent and accountable governance. Doing so will contribute to the organisation's alignment with the broader societal values and expectations.

The prospective advantages of enhanced stakeholder engagement in IRBM through the ESG framework can be substantial. Eccles et al. (2018) found that organisations with strong sustainability practices apply the principles and tools of ESG to increase transparency and foster collaboration among diverse stakeholder groups, thereby fostering long-term, sustainable growth. Besides, by incorporating ESG principles, organisations, including government agencies conducting SE in IRBM, can manage risks better, enhance their reputation, and foster trust and mutual respect among stakeholders, thus contributing positively to stakeholder engagement effectiveness by ensuring that stakeholders' feedback is considered and their input incorporated into decision-making processes.

The intersection of the ESG framework and stakeholder engagement is vital in today's modern world. With its focus on the organisation's environmental, social, and governance impact, the ESG framework can directly attract and influence stakeholder engagement and relations. Firstly, the ESG framework serves as a valuable tool for communication with stakeholders. It provides a structured approach for organisations to share information about their environmental, social, and governance efforts. Through ESG reporting, the organisation can demonstrate its commitment to sustainability and ethical practices, fostering

open dialogue with stakeholders. Such transparency can significantly enhance stakeholder engagement, as stakeholders are more likely to engage with entities that openly discuss their impacts and accountability efforts.

Furthermore, the ESG framework and principles can enhance corporate reputation and stakeholders' trust. In today's environmental concern for a river basin, stakeholders indicate a heightened interest in supporting organisations prioritizing sustainability and responsible practices. By committing to ESG principles and demonstrating progress in these areas, the organisation, particularly a government entity, can enhance its reputation and gain public support and stakeholders' trust.

Lastly, the ESG framework and principles provide the pathways for improving corporate responsibility and accountability. By adhering to ESG standards, the organisation can address potential issues proactively, mitigate risks, and drive continuous improvement in its performance. This proactive approach can enable increased stakeholder confidence and improved relations, thereby contributing to the organisation's long-term success.

The ESG principles significantly influence various stakeholders, and understanding this impact can help the organisation shape its strategies more effectively. Employees, for instance, value organisations that show concern for the environment, contribute positively to society and exhibit good governance. A strong ESG performance can boost employee morale, attract talent, and reduce staff turnover, leading to a more productive and engaged workforce.

In terms of governance, organisations such as government entities should be guided by sound policies such as the national water policy and be strengthened by necessary water legislation and regulations to provide the legal mandate when conducting any stakeholder engagement.

The survey data from the stakeholders and the indication from all the interviewees give an overwhelming response to the need for applying the framework and principles of ESG in the stakeholder engagement process when developing the IRBM Plan.

5.6.2.3 Total support via the whole of government and society approach

The whole of government and society (WGS) approach emphasises the coordinated efforts of all government agencies and the participation of the whole segment of society to tackle complex challenges and achieve interrelated goals such as the SDGs. The whole of government (WoG) component is defined as an approach in which public agencies work across portfolio boundaries to develop integrated policies and programmes towards the achievement of shared or complementary, interdependent goals. The whole of society (WoS) component represents a broader approach, moving beyond public authorities and engaging 'all relevant stakeholders, including individuals, families and communities, intergovernmental organisations, religious institutions, civil society, academia, the media, voluntary associations, and the private sector and industry' (WHO, 2016). The whole-of-society approach has been adopted to foster meaningful participation in the 2030 Agenda (Cázares-Grageda, 2018). Moreover, the OECD Public Integrity Handbook

(OECD, 2020) asserts that a whole-of-society approach enables individuals, civil society, and companies to interact with public officials, play a critical role in setting the public agenda, and influence public decisions.

In short, the WGS approach involves everyone or entities, either directly or indirectly, wholly or partially. These terms are also used interchangeably without rigid demarcation, with terms like 'multisectoral', 'intersectoral', or 'cross-sectoral'. This may be regarded as a national noble approach, demanding the total involvement of all diverse stakeholders, such as every government department, industry players, trade unions, academia, CSOs and NGOs, politicians, and local communities, in the engagement process. This comprehensive strategy ensures that policies and initiatives are holistic and responsive to the needs of all stakeholders. By leveraging the strengths and resources of the entire society, this approach encourages policy coherence, reduces duplication of efforts, and promotes innovative solutions.

Engaging multiple levels of government and including non-governmental actors ensures that IRBM Plans and initiatives are more effective and resilient, addressing multifaceted issues such as sustainable development, water security, and public health comprehensively. When a stakeholder engagement related to IRBM is conducted, the organiser must include as wide as possible all government entities at the federal, state, and local levels, including all relevant sectors of society within the river basin.

All the interviewees and the respondents from the online survey concur that the WGS approach should be the way forward, though it could be time-consuming with the involvement of so many agencies and non-state actors. However, it is acknowledged that a lot of public awareness through the media is constantly needed.

5.6.2.4 Feasibility of implementing Multi-Stakeholder Platform (MSP), Environmental, Social, and Governance (ESG), and Whole of Government and Society (WGS)

Implementing a Multi-Stakeholder Platform (MSP) can enhance decision-making by fostering collaboration among government agencies, private sector entities, NGOs, and local communities. However, several barriers can hinder its adoption. One of the primary challenges is resistance from government agencies, as bureaucratic silos and overlapping mandates often create competition rather than cooperation. Agencies may be reluctant to engage in MSPs due to concerns over losing authority or control over resources. Additionally, the absence of clear institutional frameworks can make MSPs difficult to implement, as their legitimacy and enforcement mechanisms may be weak. Stakeholder conflicts can also arise, particularly when industries, environmental groups, and communities have differing priorities, making consensus-building a slow and complex process. Furthermore, MSPs require strong technical expertise, financial support, and data-sharing mechanisms, which may be limited in some regions. Despite these challenges, MSPs can be successfully implemented with well-defined governance structures, legally binding agreements, and technology-driven engagement strategies such as participatory GIS mapping.

The integration of Environmental, Social, and Governance (ESG) principles into decision-making can improve sustainability and accountability in water and natural resource management. Practical ESG implementation requires systematic approaches across all three pillars. From an environmental (E) perspective, enforcing strict environmental impact assessments (EIA), promoting pollution control, encouraging renewable energy adoption, and restoring ecosystems are critical steps. The social (S) aspect focuses on ensuring community participation in resource management, protecting indigenous rights, enhancing water security for vulnerable populations, and promoting ethical labor practices. Meanwhile, governance (G) strengthens institutional transparency, enforces corporate accountability, and encourages public-private partnerships to align policies with global sustainability frameworks such as the UN Sustainable Development Goals (SDGs). A strong example of ESG integration can be seen in Norway's aquaculture industry, where stringent environmental regulations, worker safety measures, and transparent corporate governance have positioned it as a global leader in sustainable fisheries.

A notable example of the Whole of Government and Society (WGS) approach in practice is the Dutch Water Governance System. The Netherlands has successfully implemented WGS in water resource management through cross-government coordination, public participation, and data-driven decision-making. The Dutch model ensures that local, regional, and national agencies collaborate under an integrated policy framework, allowing for a seamless and coordinated response to water challenges. Public participation is a key feature, with citizens actively engaged through water boards, giving

communities a direct role in water management decisions. Furthermore, public-private partnerships have played a crucial role in financing and implementing climate adaptation strategies, ensuring that businesses and civil society organizations are actively involved. The Netherlands also leverages advanced technologies such as remote sensing and predictive modeling to support adaptive and evidence-based policymaking. This model demonstrates how Malaysia can enhance its WGS approach by fostering inter-agency collaboration, increasing public involvement, and utilising technology for better governance.

5.6.2.5 Enhancing the feasibility of policy recommendations for IRBM stakeholder engagement in Malaysia

To ensure the successful implementation of policy recommendations for stakeholder engagement in Integrated River Basin Management (IRBM), it is essential to address potential barriers and outline strategies to overcome them. One of the primary challenges is the lack of legal enforceability in existing IRBM guidelines, leading to inconsistent adoption across different states. While the National Water Resources Policy (2012) provides a broad framework, its non-binding nature limits effective enforcement. A solution to this challenge is to amend the Water Services Industry Act (2006) and update the IRBM Guidelines to clearly define the legal obligations of stakeholders. Additionally, the formation of River Basin Organisations (RBOs) should be encouraged and granted greater decision-making authority to ensure their role extends beyond advisory functions.

Another key issue is fragmented governance and coordination among multiple agencies, including the Department of Irrigation and Drainage (DID), the Department of Environment (DOE), and

state water authorities. Overlapping jurisdictions often result in inefficiencies and delays in decision-making. To address this, an Inter-Agency IRBM Council, chaired by the National Water Council (NWC), should be established to improve coordination and streamline policy implementation. Furthermore, a centralised data-sharing platform should be developed to integrate hydrological, land use, and environmental data across agencies, enabling real-time decision-making.

Financial sustainability poses another significant challenge, as IRBM initiatives in Malaysia are heavily dependent on government funding, with limited private sector involvement. To address this, Public-Private Partnership (PPP) models should be introduced to encourage corporate investment in river restoration projects. Additionally, an IRBM Sustainability Fund, supported by a combination of water tariffs, corporate social responsibility (CSR) programmes, and environmental levies, could provide long-term financial stability for stakeholder engagement initiatives.

A further challenge lies in stakeholder participation, where engagement has traditionally been top-down, with limited involvement of local communities in decision-making. To promote a more inclusive approach, Participatory River Basin Management Plans (PRBMPs) should be developed, ensuring that local communities, NGOs, and industry players have a formal role in governance. This should be accompanied by capacity-building programmes to equip stakeholders with the knowledge and skills needed to contribute meaningfully to IRBM processes.

Finally, technological gaps and the lack of standardised hydrological data hinder proactive decision-making. Malaysia has made progress in adopting GIS, LiDAR, and hydrological

modelling (e.g., iRIC, HEC-RAS), but data integration remains a challenge. To address this, open-access hydrological databases should be mandated for research and policy use, while AI-driven flood forecasting and real-time water quality monitoring should be expanded. Agencies such as the Malaysia Remote Sensing Agency (MYSA) and the National Disaster Management Agency (NADMA) can play a crucial role in enhancing data accessibility and technological adoption.

The successful implementation of these policy recommendations requires the involvement of multiple government agencies. The Ministry of Energy Transition and Water Transformation should take the lead in driving legal amendments and institutional reforms, working closely with the Attorney General's Chambers, DID, and state governments. Governance and coordination improvements should be led by the National Water Council (NWC), supported by DID, DOE, PlanMalaysia, and local authorities. Financial mechanisms should be overseen by the Ministry of Finance (MoF) and the Economic Planning Unit (EPU), in collaboration with private sector partners. Stakeholder participation initiatives should be managed by DID and local authorities, with support from NGOs and universities, while technological integration efforts should be spearheaded by DID, MYSA, and NADMA, alongside private technology firms.

By addressing these feasibility concerns—ranging from legal amendments and institutional coordination to financial sustainability and technological integration—Malaysia can strengthen its IRBM stakeholder engagement framework and move towards a more inclusive, data-driven, and financially sustainable approach to river basin management.

5.6.3 Evaluating the effectiveness of stakeholders' engagement with three dependent outcomes

5.6.3.1 Knowledge transfer

Knowledge transfer refers to the process of sharing information, expertise, and best practices among stakeholders. In the context of stakeholder engagement, effective knowledge transfer ensures that relevant stakeholders are well-informed and equipped to contribute meaningfully to decision-making processes. The initial factors outlined in the table, such as the purpose of stakeholder engagement and collaboration strategies, directly influence knowledge transfer. For instance, institutions like NAHRIM, SWMA, WRDPP, and DID emphasise gathering data, feedback, and views from stakeholders to integrate into decision-making processes. Additionally, collaboration and partnerships with diverse entities facilitate the exchange of knowledge and expertise, leading to informed decision-making and improved project outcomes. Moreover, the enhancers discussed, such as multistakeholder platforms and capacity building, play a crucial role in promoting knowledge transfer and social learning by providing platforms for dialogue and training opportunities to enhance stakeholders' understanding and skills. In other words, stakeholder engagement can be an opportunity for social learning where water users can better understand scientific and technical issues, acquire new knowledge and skills, and reconcile their views with others (Lawrence, S. et al., 2012).

5.6.3.2 Decision impact

Decision impact refers to the extent to which stakeholder engagement influences the decision-making process and

outcomes. The initial factors, including legislation, policy on stakeholder engagement, stakeholder identification, and implementation strategies, directly impact decision-making processes. For example, adherence to national and international best practices and standards, as highlighted by NAHRIM, ensures that decisions are informed by relevant policies and regulations. Furthermore, effective stakeholder identification and engagement strategies enable organisations to consider diverse perspectives and interests, leading to more inclusive and well-informed decisions. Additionally, the enhancers discussed, such as multi-stakeholder platforms and ESG integration, enhance decision impact by promoting transparency, accountability, and collaboration, thereby increasing the likelihood of decisions that address stakeholder needs and contribute to sustainable outcomes.

5.6.3.3 Stakeholders' satisfaction

Stakeholders' satisfaction refers to the degree to which stakeholders feel valued, respected, and engaged throughout the stakeholder engagement process. The initial factors outlined in the table, such as stakeholder inclusiveness, engagement strategies, and organisational factors, directly influence stakeholders' satisfaction. Organisations that prioritise stakeholder inclusiveness and employ transparent and participatory engagement strategies are more likely to foster positive relationships and satisfaction among stakeholders. For instance, organisations like SWMA and WRDPP categorise stakeholders based on roles and involvement levels, demonstrating a commitment to recognising and involving diverse stakeholders. Additionally, factors such as transparency,

open dialogue, and responsiveness to stakeholder feedback contribute to stakeholders' satisfaction. Moreover, the enhancers discussed, such as a multi-stakeholder platform and a whole-of-government and society approach, enhance stakeholders' satisfaction by providing opportunities for meaningful engagement, collaboration, and collective problem-solving, thereby fostering trust and support among stakeholders as well as between government and society.

Stakeholders who have devoted their time to attending the engagement sessions or workshops want to be sure that the legitimate aim of the engagement is ultimately fulfilled, and not in the end feel that the engagement is merely a tokenism. The responses from all interviewees emphasised the necessity of conducting stakeholder engagement in a manner that transcends mere formality.

The following quotes reflect the general sentiments of the interviewees:

"Formality can happen if the discussion of the engagement only involves a one-way direction, and the scope is not related to the background of the participant." WRDPP

"The SE is carried out not for formality but based on the need to obtain feedback so that the IRBM Master Plan that is developed will be comprehensive, taking into consideration all sectors and interests for the holistic management of the water resources and river basin." SWMA

"If properly conducted, an SE will reveal information that may not be obvious and will lead to a more practical and implementable IRBM Plan." DID

"Partially true if not properly planned and carried out." NAHRIM

5.6.4 Conceptual framework for effective stakeholder engagement in IRBM for Malaysia

SE in water resource management is a multifaceted process influenced by various factors and strategies aimed at fostering effective collaboration and decision-making. The study identified five independent variables—stakeholder inclusiveness, stakeholder characteristics, engagement strategies, organisational factors, and cultural and religious aspects—as foundational to successful stakeholder engagement initiatives, with the detailed processes illustrated in Figure 5.3. These variables guide organisations in structuring their engagement efforts to align with broader goals and regulatory frameworks.

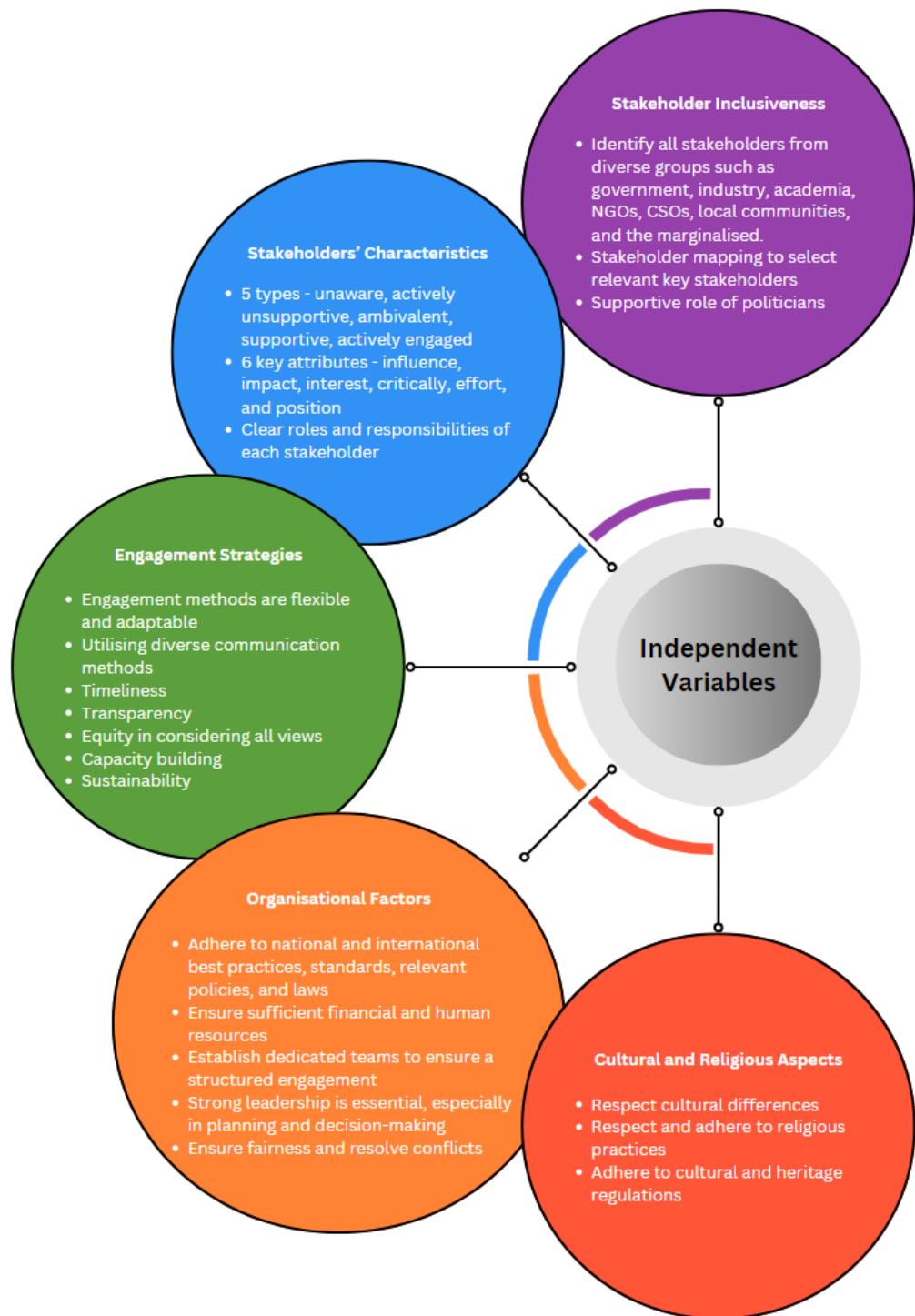


Figure 5.3 The 5 independent variables - stakeholder inclusiveness, stakeholder characteristics, engagement strategies, organisational factors, and cultural and religious aspects

Enhancers such as the multi-stakeholder platform, ESG framework, and the whole-of-government and society approach further enhance SE effectiveness by promoting inclusivity, sustainability, and comprehensive collaboration as illustrated in Figure 5.4. These enhancers, acting as influencers and mediators, can facilitate dialogue, integrate ethical considerations into decision-making processes, and encourage cross-sector and multi-level government collaboration.

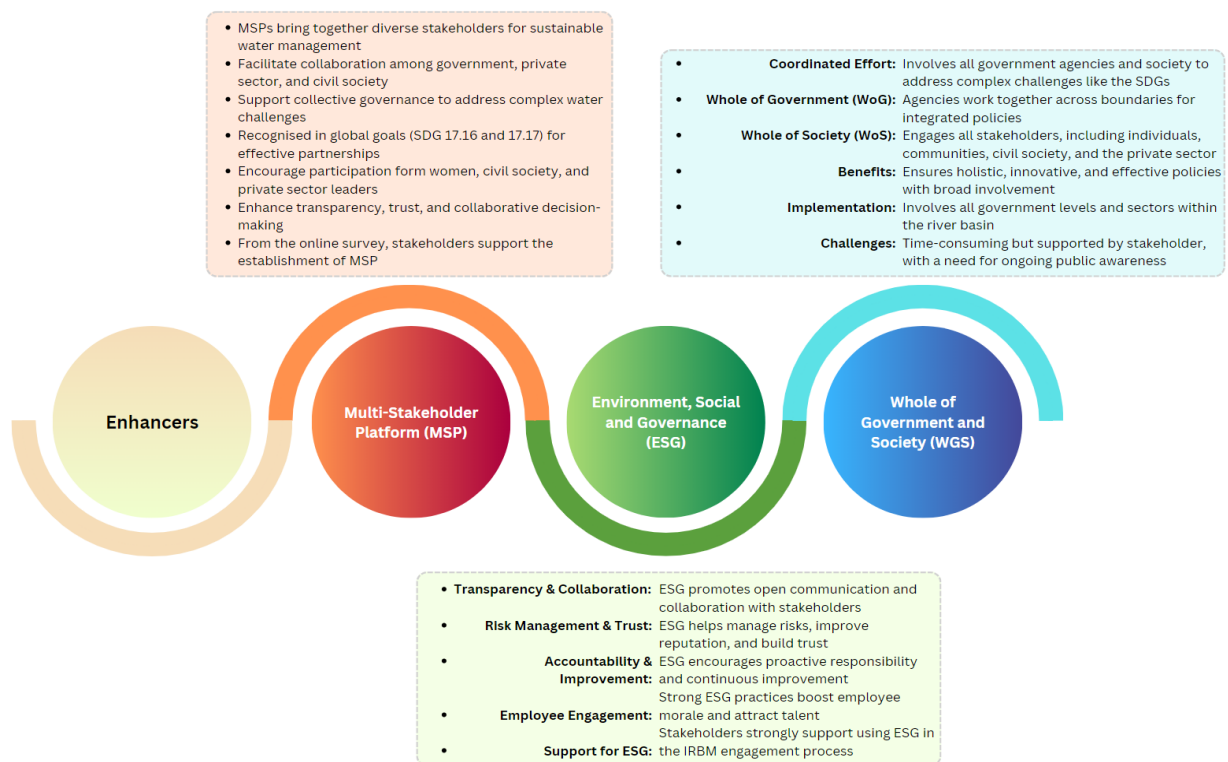


Figure 5.4 The 3 Enhancers - multi-stakeholder platform, ESG elements, and whole-of-government and society approach

Consequently, they contribute to optimising three key dependent variables: knowledge transfer, decision impact, and stakeholder satisfaction, which are essential for achieving successful and effective outcomes in stakeholder engagement, as illustrated in Figure 5.5.

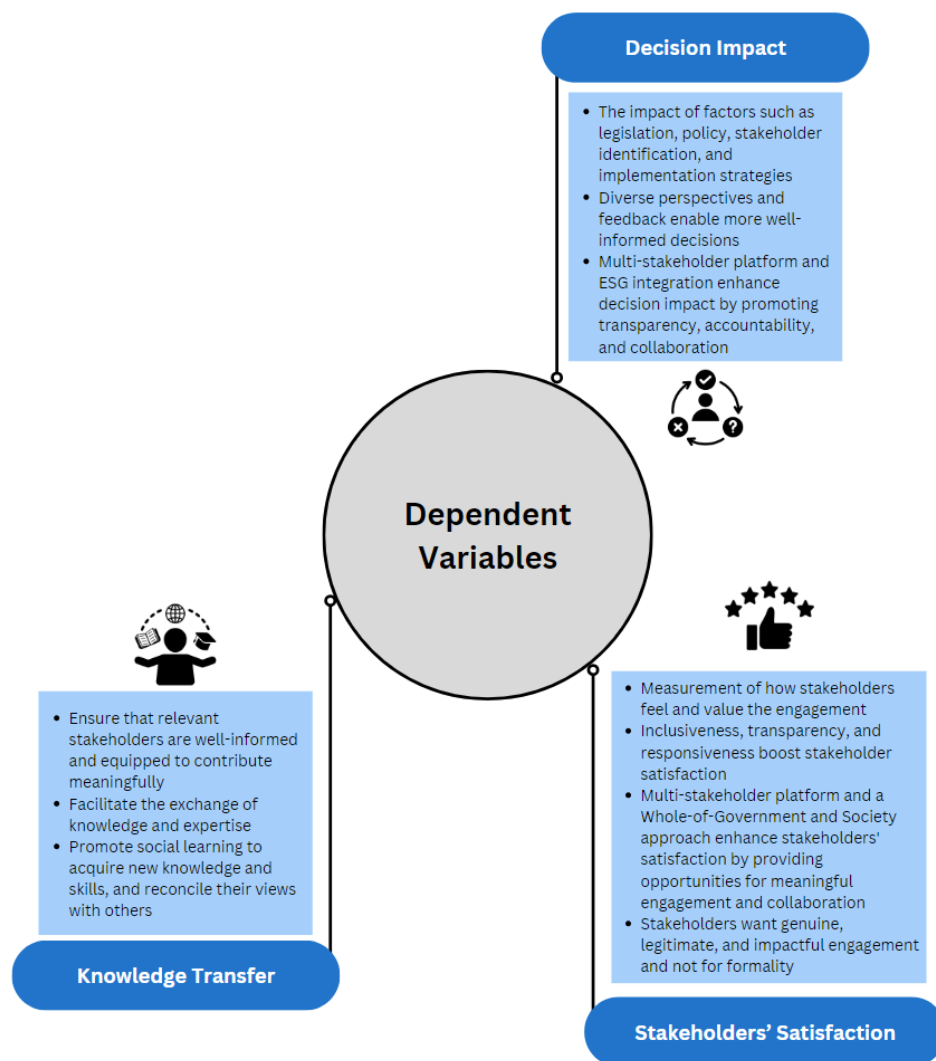


Figure 5.5 The 3 key dependent variables - knowledge transfer, decision impact, and stakeholder satisfaction

5.7 Summary

This study introduces a novel conceptual framework to enhance stakeholder engagement (SE) effectiveness in Integrated River Basin Management (IRBM) for Malaysia. The framework identifies three key desirable outcomes—knowledge transfer, decision impact, and stakeholder satisfaction—each influenced by five critical variables: stakeholder inclusiveness, stakeholder characteristics, engagement strategies, organisational factors, and cultural and religious aspects. These variables serve as the foundation for a structured SE process, ensuring that engagement efforts are aligned with policy objectives and stakeholder needs. Additionally, the study incorporates three fundamental enhancers—multi-stakeholder platforms, environmental, social, and governance (ESG) principles, and a whole-of-government and society approach, which further strengthen engagement by promoting inclusivity, sustainability, and collaboration. This structured approach provides a systematic method for documenting, monitoring, and evaluating SE, ensuring continuous improvement in engagement strategies.

A key novelty of this study is the explicit recognition of the post-engagement phase as essential for assessing the effectiveness of SE efforts. While traditional models often focus on pre-engagement planning and active consultation processes, this study highlights the importance of follow-through mechanisms to measure whether engagement efforts have led to meaningful changes in decision-making and governance. The framework establishes that true SE effectiveness is not merely about participation rates or consultative meetings but rather about tangible impacts, such as how well stakeholder inputs are incorporated, how knowledge is disseminated and applied, and whether long-term trust and collaboration are fostered. This

perspective shifts SE from being a procedural requirement to a dynamic, outcome-driven process that strengthens institutional accountability and stakeholder relationships.

Another significant contribution of this study is the integration of enhancers into the conceptual framework. Traditional SE models often focus solely on stakeholder involvement without explicitly considering mechanisms that enhance engagement quality. By incorporating multi-stakeholder platforms, ESG principles, and a whole-of-government and society approach, this study presents a more holistic framework that aligns with Malaysia's governance structures, policy frameworks, and socio-cultural context. Multi-stakeholder platforms provide structured spaces for dialogue, ensuring that diverse voices—including those of marginalised groups—are heard and considered in decision-making. The adoption of ESG principles strengthens the governance aspect of SE by embedding sustainability, ethical considerations, and corporate responsibility into engagement processes. Meanwhile, a whole-of-government and society approach ensures that SE is not isolated within specific agencies but integrated across various levels of government, civil society, and private sector actors, fostering a shared responsibility for sustainable water management.

The framework also uniquely considers the cultural and religious dimensions of SE in Malaysia, acknowledging that these factors influence how communities interact with governance institutions and environmental policies. Malaysia's diverse socio-cultural fabric necessitates engagement strategies that respect local customs, traditions, and belief systems to ensure genuine participation. For instance, religious values often play a role in shaping environmental stewardship attitudes, making it essential for SE efforts to align with these perspectives to gain broader

acceptance and cooperation. The framework, therefore, highlights the need for culturally sensitive engagement strategies that facilitate trust-building and long-term collaboration among stakeholders.

Malaysia's complex governance landscape further reinforces the need for a well-structured SE framework. IRBM involves multiple government agencies with overlapping jurisdictions, which can lead to fragmented decision-making and inefficiencies. The framework addresses these challenges by advocating for an integrated and transparent approach, ensuring that SE is not conducted in silos but as a coordinated effort involving all relevant stakeholders. Embedding SE within national water policies, legislative frameworks, and institutional structures is vital for ensuring long-term sustainability. Clear mandates, legal backing, and institutional accountability mechanisms are necessary to prevent engagement from being a superficial exercise and instead make it a fundamental part of water governance.

Despite these advancements, the study acknowledges several limitations. The findings are context-specific, making generalisability beyond Malaysia's IRBM context challenging. The study's sample size and representation, while comprehensive, may not fully capture the diversity of stakeholder perspectives, particularly in regions with differing governance models or environmental conditions. Methodological constraints, such as balancing qualitative and quantitative data, potential biases in data collection, and the evolving nature of engagement practices, also pose challenges. Additionally, external variables such as political changes, economic shifts, and climate-related uncertainties could influence SE effectiveness over time.

To address these limitations, future research should expand to diverse cultural and geographic settings, allowing for broader applicability of the framework. Increasing sample diversity and employing mixed-method approaches can provide deeper insights into SE dynamics. Longitudinal studies are essential to track engagement effectiveness over time, ensuring that strategies remain relevant and responsive to changing conditions. Establishing clear metrics for measuring SE success, incorporating ethical and cultural sensitivity, and fostering continuous feedback mechanisms will further strengthen the framework's impact. By refining and adapting SE approaches in IRBM, this study contributes to more sustainable water resource management, improved policy implementation, and stronger stakeholder relationships in Malaysia and beyond.

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Chapter 6 Conclusions and Recommendations

6.1 Conclusions

This research set out to address the persistent challenge of ineffective stakeholder engagement in IRBM in Malaysia. Despite the recognition of stakeholder participation as a crucial element in water governance, existing engagement efforts often lack structure, inclusivity, and measurable impact. Many IRBM initiatives struggle with fragmented collaboration due to unclear engagement strategies, limited stakeholder inclusiveness, and insufficient mechanisms for monitoring effectiveness. In response to these gaps, this study aimed to develop a conceptual framework for effective stakeholder engagement in IRBM, providing a structured approach to enhance collaboration, transparency, and decision-making in water resource management.

The study employed a mixed-methods approach, incorporating a systematic literature review, stakeholder surveys, and interviews with key agencies involved in IRBM. This combination allowed for a comprehensive understanding of stakeholder engagement dynamics, ensuring that the proposed framework is grounded in both theoretical insights and empirical evidence.

To achieve this objective, the study was guided by several key research questions: (1) What are the critical factors influencing stakeholder engagement in IRBM? (2) How do different stakeholder groups perceive and prioritise engagement processes? (3) What organisational perspectives and challenges influence the effectiveness of engagement initiatives? and (4) How can a structured framework be developed to optimise stakeholder participation in IRBM? Through a combination of

systematic literature review, empirical surveys, and selective interviews with key water-related agencies, this research identified essential elements that contribute to effective engagement, including stakeholder inclusiveness, engagement strategies, and organisational factors.

The findings show that successful stakeholder engagement in IRBM requires early and continuous participation, access to information, and strong leadership in governance. Chapter 2 examined the importance of structured engagement frameworks and identified gaps in existing research. Chapter 3 explored individual stakeholder perspectives, emphasising the significance of pre-engagement planning, transparent communication, and post-engagement implementation. Chapter 4 considered organisational viewpoints, highlighting the critical role of government agencies in policy enforcement and coordination, as well as the need for multidisciplinary expertise and financial planning to support engagement efforts. Chapter 5 integrated these findings into a conceptual framework, introducing independent variables—stakeholder characteristics, engagement strategies, and organisational factors—enhanced by multi-stakeholder platforms, ESG principles, and the Whole-of-Government and Society approach to maximise engagement outcomes.

A key contribution of this study is its emphasis on Malaysia's unique socio-cultural, religious, and governance contexts in shaping stakeholder engagement. The country's diverse ethnic and religious composition necessitates engagement strategies that are culturally sensitive, ensuring inclusivity across different societal groups. Religious values, particularly those associated with environmental stewardship in Islam, Buddhism, Christianity, and Hinduism, play a vital role in shaping attitudes towards water

resource management. Leveraging these religious principles can enhance public support for conservation initiatives and sustainable IRBM practices. Additionally, Malaysia's decentralised governance structure, with responsibilities divided across federal, state, and local governments, requires stakeholder engagement strategies that align with multi-tiered decision-making processes. Effective engagement must navigate jurisdictional overlaps and integrate local governance mechanisms, particularly in states with significant autonomy over water resources.

This study presents two key novelties. First, it highlights the importance of post-engagement evaluation to measure the effectiveness of stakeholder involvement. Unlike many existing models that focus primarily on pre-engagement planning and active engagement phases, this research stresses the need for systematically assessing whether stakeholder engagement has achieved its intended objectives. The study demonstrates the importance of clear mechanisms to monitor engagement outcomes, such as knowledge transfer, decision impact, and stakeholder satisfaction. By institutionalising post-engagement evaluation, IRBM practitioners can refine engagement strategies, strengthen long-term stakeholder trust, and ensure that participatory processes lead to tangible improvements in water governance.

Second, this study introduces the concept of "enhancers" into the adaptive stakeholder engagement framework, an element that has been largely overlooked in previous IRBM models. These enhancers—including multi-stakeholder platforms, ESG principles, and the Whole-of-Government and Society approach—serve as critical components that optimise engagement effectiveness. By promoting inclusivity, sustainability, and collaboration, these enhancers strengthen the impact of

stakeholder engagement processes. The incorporation of these elements into the conceptual framework provides a more holistic approach to engagement, ensuring that stakeholder interactions are not only well-structured but also continuously improved and adapted to evolving governance needs.

The significance of this research extends beyond theoretical contributions, offering practical insights for improving IRBM governance in Malaysia. By aligning stakeholder engagement with national water policies and climate adaptation goals, the proposed framework provides policymakers and practitioners with a structured approach to enhancing participatory decision-making. Furthermore, the study contributes to the broader framework of IWRM by reinforcing the necessity of inclusive, transparent, and adaptive engagement strategies to achieve sustainable water governance.

While this study presents a structured engagement framework, future research should validate its applicability across various catchments and drainage basins in Malaysia. Testing the model in different hydrological and socio-political contexts will help refine its adaptability and effectiveness. A suitable catchment to test could be the Muda River Basin, which is shared between two states in Malaysia. Additionally, continuous monitoring and iterative feedback mechanisms will be essential for strengthening stakeholder collaboration and ensuring long-term policy success. Ultimately, this study highlights the critical role of culturally and contextually sensitive engagement in achieving resilient and sustainable river basin management in Malaysia.

6.1.1 Stakeholder engagement in integrated river basin management

The first part of the study, conducted via a literature review that was presented in Chapter 2, examined the importance of stakeholder engagement in IRBM for addressing water-related challenges. A systematic bibliometric analysis was conducted to identify trends, patterns, and research gaps in stakeholder engagement frameworks. The analysis revealed a lack of an effective and practical framework for stakeholder engagement in IRBM, highlighting the need for further research at the river basin level within the context of water resources management. The literature highlighted factors contributing to effective stakeholder engagement including the methods and approaches employed, inclusiveness of stakeholders, involvement of stakeholders in early stages, access to information, incorporation of local knowledge, and allocation of time and resources. It also emphasises the importance of social learning and knowledge transfer through stakeholder engagement, which yields more benefits compared to one-off public consultation. The review also highlighted that leadership in water management should focus on planning and implementing stakeholder engagement processes effectively, including mechanisms for monitoring and evaluation. However, there was a lack of clarity and perception regarding the mechanism and implementation framework for stakeholder engagement in many developing countries. Overall, the review helped highlight the factors that need to be considered when developing a framework for stakeholder engagement, and in turn, the questions that need to be included as part of the empirical component of this research (i.e., the questionnaires and interviews).

6.1.2 Individual stakeholder perspectives on public engagement and participation in integrated river basin management

Chapter 3 aimed to develop evidence-based policies and strategies for stakeholder engagement in water management practices within IRBM in Malaysia. It gathered insights from stakeholders to identify key engagement factors and ensure that the resulting policies are grounded in real-world experiences and needs. The study emphasised the importance of these policies in addressing current engagement challenges and enhancing resilience and adaptability in water management amidst climate change.

The study involved a diverse group of stakeholders, including 250 respondents representing various ages, industries, educational backgrounds, and job designations, contributing to a comprehensive understanding of stakeholder dynamics in river basin management. By combining existing literature with the survey results, this chapter identified factors influencing the effectiveness of stakeholder engagement across pre-engagement, during-engagement, and post-engagement phases.

Key findings of the chapter include the critical importance of stakeholder selection including local community (Musonda et al., 2024), credibility in IRBM plans for effective pre-engagement, the necessity of transparent and participatory processes during engagement to foster collaborative discussions, and the importance of implementing stakeholder requirements and monitoring progress in the post-engagement phase.

6.1.3 Stakeholder engagement in integrated river basin management: understanding organisational roles and perspectives in Malaysia

Exploring organisational roles and perspectives on stakeholder engagement in IRBM, particularly in Malaysia, Chapter 4 aimed to provide insights into the challenges, priorities, and strategies of key organisations involved in IRBM studies in Malaysia, particularly regarding stakeholder engagement. It analysed the 56 responses from surveys distributed to 500 personnel from organisations involved in water management and the four selective interviews with agencies involved in water management and IRBM studies. These revealed the significance of government agencies in policy formulation and regulatory enforcement, hence contributing a critical leadership role in stakeholder engagement. Additionally, the survey and interviews highlighted the multidisciplinary expertise base required for effective river basin management, emphasising the need for varied knowledge in this field.

Organisational perspectives on engagement factors underscored the importance of clear purposes and inclusive participation, with statistical analyses revealing significant differences in stakeholders' rankings of engagement purposes. The study emphasised the critical importance of purpose-driven, inclusive stakeholder engagement strategies aligned with policy objectives and stakeholder needs for achieving sustainable water resource management goals. The findings advocate for collaborative, transparent, and accountable approaches in river basin management, aiming to foster trust, collaboration, and ownership among stakeholders. The interview findings suggested the need to strike a balance between leveraging political support

and maintaining the independence of stakeholder engagement (Esper et al., 2024).

6.1.4 Conceptual framework for effective stakeholder engagement in integrated river basin management in Malaysia

Chapter 5 bridged the significant gap in understanding and implementing effective SE in IRBM in Malaysia by addressing all the essential variables or elements that have been largely overlooked. It sought to construct a robust conceptual framework for effective stakeholder engagement in IRBM practices, bridging the gap between theory and practice and offering valuable insights and practical recommendations.

This chapter identified five independent variables foundational to successful stakeholder engagement initiatives: stakeholder inclusiveness, stakeholder characteristics, engagement strategies, organisational factors, and cultural and religious aspects. Enhancers such as multi-stakeholder platforms, ESG principles, and a whole-of-government and society approach further enhance engagement effectiveness by promoting inclusivity, sustainability, and collaboration. These enhancers optimise three key dependent variables: knowledge transfer, decision impact, and stakeholder satisfaction, crucial for achieving successful outcomes in water resource management at the river basin level.

This chapter introduced a novel approach to measuring stakeholder engagement effectiveness through a structured framework, facilitating communication, understanding, and informed decision-making. This contributes to building trust and increasing stakeholder satisfaction through transparency,

accountability, and continuous improvement. However, it faces limitations such as context-specific findings, small sample sizes, and methodological constraints.

6.2 The significance of stakeholder engagement in IRBM in Malaysia

The significance of stakeholder engagement in IRBM in Malaysia cannot be overstated, as it lies at the heart of effective river basin and water resource management practices in the country. With Malaysia facing various challenges such as river pollution, floods, droughts, and ecological water allocations, the need for robust stakeholder engagement frameworks is paramount. Stakeholders, including government agencies, local communities, industries, academia, and civil society, possess invaluable knowledge, expertise, and perspectives essential for addressing these complex issues. By actively involving stakeholders in decision-making processes, IRBM initiatives can benefit from a diverse range of insights and experiences, leading to more informed and equitable outcomes.

Furthermore, stakeholders' engagement fosters a sense of ownership and accountability among all parties involved in water management, thereby promoting transparency and trust. In a country like Malaysia, where water resources are critical for various sectors such as agriculture, industry, and urban development, collaborative approaches to river basin management are indispensable. Through meaningful dialogue and collaboration, stakeholders can work together to reconcile competing interests, prioritise sustainable practices, and collectively address water-related challenges. Moreover, stakeholder engagement enhances the legitimacy and

acceptance of IRBM plans and policies, as decisions are made in consultation with those directly impacted by them.

In summary, stakeholders' engagement is integral to the success and sustainability of IRBM initiatives in Malaysia. By embracing inclusive, transparent, and participatory approaches, policymakers and practitioners can harness the collective wisdom and resources of stakeholders to achieve more effective and equitable water management practices. This study sheds light on the importance of stakeholder engagement in IRBM and offers valuable insights and recommendations for enhancing engagement efforts in Malaysia's water resource management landscape.

6.3 Practical recommendations for policymakers and practitioners

Effective stakeholder engagement is paramount for policymakers and practitioners involved in IRBM initiatives, particularly in addressing the multifaceted challenges of water resource management in Malaysia. Policymakers must ensure that a diverse range of perspectives is considered in decision-making processes, leading to more equitable and sustainable outcomes. By embracing the following recommendations, policymakers and practitioners can enhance stakeholder engagement efforts and drive more sustainable outcomes in IRBM initiatives.

Enhance stakeholder inclusivity: Policymakers and practitioners should prioritise the serious involvement of diverse stakeholders in decision-making processes concerning IRBM in Malaysia. This entails ensuring representation from various sectors, communities, and interest groups, including women

(Sahoo A. and Rath N., 2025). It's imperative to implement mechanisms that solicit input from traditionally marginalized or underrepresented stakeholders, thus fostering inclusivity and equity in decision-making processes.

Develop clear engagement objectives: It is essential to establish clear objectives and purposes for stakeholder engagement activities within the context of IRBM. This clarity ensures alignment with broader goals and regulatory frameworks. Policymakers and practitioners should institute transparent and participatory processes that enable stakeholders to understand their roles, responsibilities, and expected outcomes from engagement efforts.

Implement effective engagement strategies: Policymakers and practitioners should employ a variety of engagement strategies tailored to the specific needs and contexts of stakeholders involved in IRBM. These strategies may encompass both traditional and innovative approaches, such as multi-stakeholder platforms, participatory workshops, and digital platforms. Such strategies facilitate meaningful dialogue, collaboration, and knowledge sharing among stakeholders.

Foster organisational support: It is crucial to secure organisational commitment and support for stakeholder engagement initiatives related to IRBM. Policymakers and practitioners should allocate adequate resources, provide training, and offer capacity-building opportunities for staff engaged in these activities. Cultivating a culture of openness, transparency, and accountability within organizations further facilitates effective engagement with stakeholders.

Promote multi-stakeholder platform (MSP): Policymakers and practitioners should encourage collaboration and coordination among government agencies, civil society organisations, academia, and the private sector in addressing complex water management challenges. Establishing MSP through partnerships and networks enables the leveraging of collective expertise, resources, and influence toward achieving shared water management goals.

Incorporate environmental, social, and governance (ESG) principles: Policymakers and practitioners should integrate ESG principles into stakeholder engagement practices within IRBM initiatives. This involves considering environmental and social impacts, ethical considerations, and long-term sustainability in decision-making processes. It ensures the equitable distribution of benefits and minimises adverse effects on communities and ecosystems.

Adopt a whole-of-government and society approach (WGS): Policymakers and practitioners should adopt a holistic and collaborative approach to water management that involves all levels of government, stakeholders, the local community, and society at large (Yuan et al., 2024). Fostering dialogue, cooperation, and mutual respect among stakeholders builds trust, consensus, and collective ownership of water management initiatives.

Facilitate monitoring mechanism and social learning: Establishing mechanisms for monitoring, evaluation, and social learning is crucial for assessing the effectiveness of stakeholder engagement efforts within IRBM initiatives. Policymakers and

practitioners should collect feedback from stakeholders and incorporate lessons learned into future engagement activities to continuously improve and enhance engagement processes and outcomes.

6.4 Effective stakeholder engagement framework for IRBM in Malaysia

In essence, this study illuminates the critical role of effective stakeholder engagement within IRBM activities in Malaysia (see Figure 5.1). Through an exploration of organisational perspectives, the research delves into the nuances of challenges, priorities, and strategies, offering profound insights for policymakers and practitioners alike. The findings underscore the necessity of inclusive, transparent, and collaborative engagement strategies to effectively address the intricate challenges of water resource management, particularly in the context of river pollution, floods, droughts, and ecological water allocations.

Embracing the study's recommendations can lead to a transformative shift in how stakeholders are involved in decision-making processes, fostering a more holistic and sustainable approach to water management. By prioritising inclusivity and transparency, policymakers can ensure that all voices are heard and considered in the development and implementation of IRBM initiatives. Furthermore, adopting MSP, ESG's principles, and the WGS approach into the stakeholder engagement practices can help mitigate environmental and social impacts, ensuring that integrated river basin management practices are not only effective but also environmentally and socially responsible.

In conclusion, this study serves as a cornerstone for future IRBM studies in Malaysia and beyond, highlighting the importance of stakeholder engagement in driving sustainable water management practices. By embracing the novel conceptual framework for stakeholder engagement and the recommendations outlined in this research, policymakers and practitioners can pave the way for more effective, equitable, and resilient water management practices, ultimately ensuring the long-term health and sustainability of our river basins and ecosystems. This conceptual framework could be the model framework for stakeholder engagement when developing IRBM plans and should be embedded in the organisation's operation of all concerned government agencies.

6.5 Limitations of the study and knowledge gaps

Despite the comprehensive exploration of stakeholder engagement in Integrated River Basin Management (IRBM), this study has several limitations. First, the context-specific findings, primarily focused on Malaysia, may not be generalisable to other geographical or cultural settings, thereby limiting the broader applicability of the conclusions. Additionally, the reliance on a small sample size for the survey conducted among organisations may affect the robustness and representativeness of the findings. Methodological constraints, such as the exclusive use of three scientific search engines for the literature review, may have restricted the scope of the bibliometric analysis, potentially overlooking relevant studies and reports from other sources. Furthermore, the studies' cross-sectional nature limits the ability to capture the dynamic and evolving nature of stakeholder engagement over time, emphasising the need for longitudinal

research (Riza et al., 2025). The study acknowledges a lack of clear rubric metrics for measuring stakeholder engagement effectiveness, which hinders the ability to assess and compare every engagement initiative across different contexts systematically.

This study faces some challenges when conducting online surveys. One major limitation is the issue of representativeness, as digital engagement often excludes key stakeholders such as local communities in rural areas, indigenous groups, and those with limited internet access. This can lead to an overrepresentation of urban-based or more technologically literate stakeholders, skewing the findings and reducing the inclusivity of decision-making processes.

Responses during an online survey may come predominantly from individuals with strong opinions or vested interests, rather than a balanced representation of all affected parties. Additionally, online surveys cannot facilitate real-time discussions or clarifications, making it difficult to probe complex concerns related to river basin management, such as land use conflicts, pollution control, or flood mitigation strategies. Without direct interaction, responses may be superficial, failing to capture the depth of stakeholder perspectives essential for effective IRBM planning.

Technical constraints also pose a challenge, as poor internet connectivity, particularly in remote areas, can hinder participation. Moreover, concerns over data security and anonymity may discourage some stakeholders from providing honest or detailed feedback, especially when discussing sensitive governance or policy matters. The absence of mechanisms to verify respondent identities further raises the risk of duplicate or

fraudulent responses, potentially undermining the credibility of the collected data.

6.6 Recommendations for future study

Future studies on stakeholder engagement in IRBM should aim to address the identified limitations by adopting a more inclusive and diverse approach. Expanding the geographical scope of studies to include various cultural and regional contexts will enhance the generalisability of the findings and provide a more comprehensive understanding of stakeholder engagement dynamics. Increasing sample sizes and incorporating a wider range of stakeholder groups representing organisations will improve the representativeness and reliability of the results. Longitudinal studies are recommended to capture the temporal aspects of stakeholder engagement, offering insights into how engagement practices and outcomes evolve. Additionally, developing and validating clear, standardised rubric metrics for measuring stakeholder engagement effectiveness will facilitate better assessment and comparison of engagement initiatives. Interdisciplinary collaborations that integrate perspectives from environmental science, social science, and policy studies can provide a more holistic understanding of the complexities of IRBM. Future research should also explore institutional viewpoints and dynamics to further enrich understanding and address complex challenges associated with water management and climate change adaptation. Finally, incorporating qualitative methods, such as in-depth interviews and case studies, will enrich the quantitative findings and offer deeper insights into the motivations, perceptions, and experiences of stakeholders in IRBM activities.

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Appendix 1 Online Survey Questionnaires - For Targeted Individual Stakeholders

This set of online surveys is meant for any individual stakeholder from all sectors of society who is concerned, involved, or has an interest in the management of a river or river basin. The answers to the prepared set of online questionnaires shall reflect your personal view.

Introduction

The survey is part of a Ph.D. research project that aims to improve integrated river basin management (IRBM) in Malaysia. Stakeholder engagement is recognised as key to the successful implementation of IRBM, so the survey focuses on understanding how stakeholder engagement can be made more effective in the future. The survey explores who the stakeholders are, and the ways in which they are engaged, and seeks your views on best practices for effective engagement.

Data Protection

All data and information collected will be kept confidential and used solely for the academic purposes of this research.

Note of Appreciation

The survey will take approximately 15 minutes to complete. I greatly appreciate all your help and sincerely wish to thank you for your time and willingness to support me in this online survey.

If you have any questions or concerns relating to the survey, please do not hesitate to contact me at +6012-7854350, or email me at evxcl6@nottingham.edu.my or limchowhock@gmail.com

Section A: Background of the Respondent

1. Your email: **(confidential for 250 respondents, 1 was for testing)**

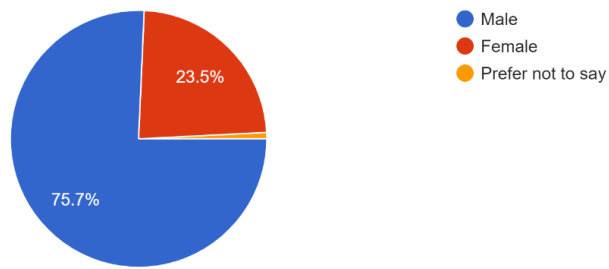
2. What is your gender?

Male

Female

Prefer not to say

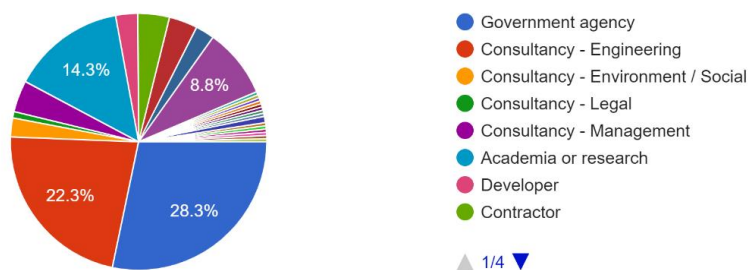
2. Gender
251 responses



3. How would you classify your organisation?

- Government Agency
- Consultancy - Engineering
- Consultancy – Environment / Social
- Consultancy - Legal
- Consultancy – Management
- Academia or research
- Developer
- Contractor
- Manufacturer
- Supplier
- CSO / NGO
- Other:

3. How would you classify your organisation?
251 responses



4. What is your role in the organisation?

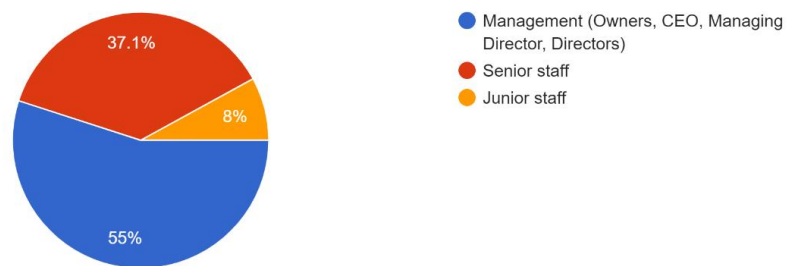
Management (Owners, CEO, MD, Directors)

Senior Staff

Junior Staff

4. What is your role in the organisation?

251 responses



5. What is the highest education level that you have achieved?

Diploma

Degree

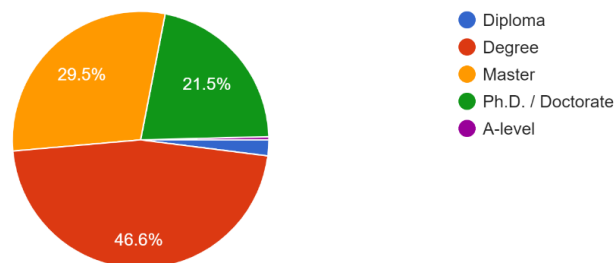
Master

Ph.D. / Doctorate

Other

5. What is the highest education level that you have achieved?

251 responses



6. How many numbers of employees are there in your office?

Less than 5

5 to 10

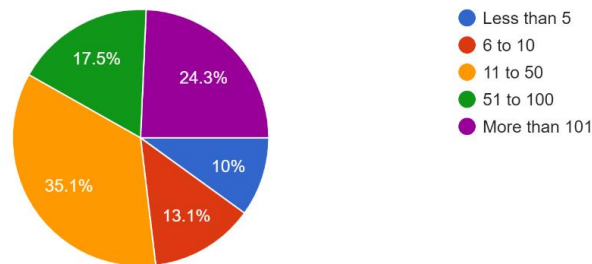
10 to 50

50 to 100

More than 100

6. How many employees are there in your office?

251 responses



Section B: Purpose and Nature of Stakeholder Engagement

1. From the stakeholder's viewpoint, the purpose of stakeholder engagement may be due to the following: [Table]

(i) Obtain feedback to enhance the Integrated River Basin Management Plan (IRBM Plan)

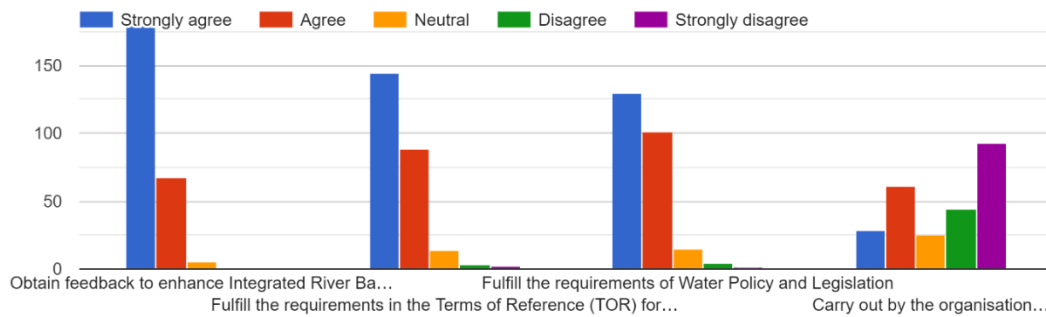
(ii) Fulfill the requirements in the Terms of Reference (TOR) for the study on Integrated River Basin Management

(iii) Fulfill the requirements of Water Policy and Legislation

(iv) Carry out by the organisation concerned for the sake of formality

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

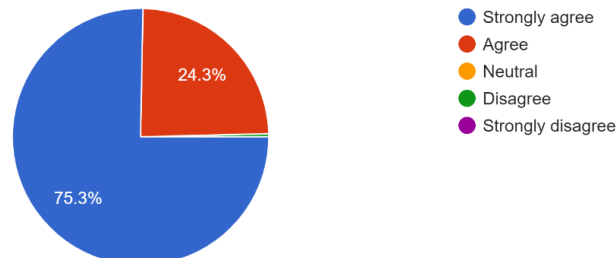
1. From the stakeholder's viewpoint, the purpose of the stakeholder engagement may be due to the following:



2. Integrated River Basin Management (IRBM) requires multi-disciplinary participation and input.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

2. Integrated River Basin Management (IRBM) requires multi-disciplinary participation and input.
251 responses

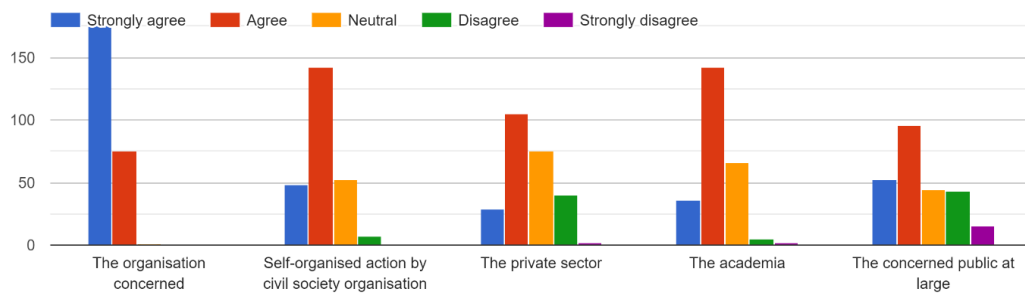


3. Who are the key stakeholders that provide the driving force behind the stakeholder engagement in river basin management? [Table]

- (i) The government organisations
- (ii) Self-organised action by civil society organisations
- (iii) The private sector
- (iv) The academia
- (v) The concerned public at large

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

3. The driving force behind a stakeholder engagement in river basin management could be from the following:

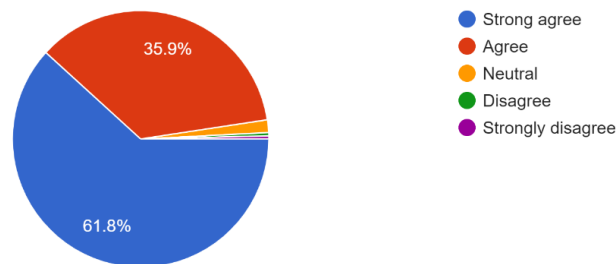


4. The scope and framework for stakeholder engagement should be flexible to adapt to different types/characteristics of the river basins.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

4. The scope and framework for stakeholder engagement should be flexible to adapt to different types/ characteristics of the river basins.

251 responses

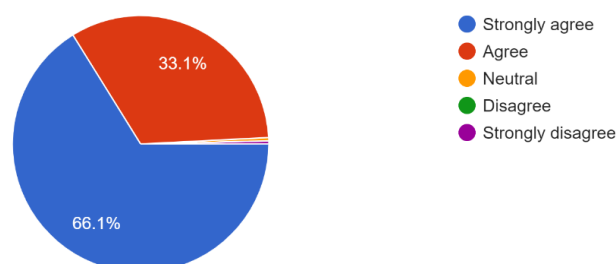


5. From the stakeholder's viewpoint, the stakeholder engagement carried out should be credible and legitimate.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

5. From the stakeholder's viewpoint, the stakeholder engagement carried out should be credible and legitimate.

251 responses

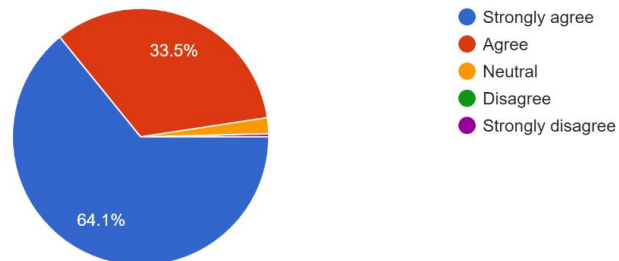


6. It is important that stakeholder engagement carried out should be inclusive.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

6. It is important that the stakeholder engagement carried out is inclusive.

251 responses

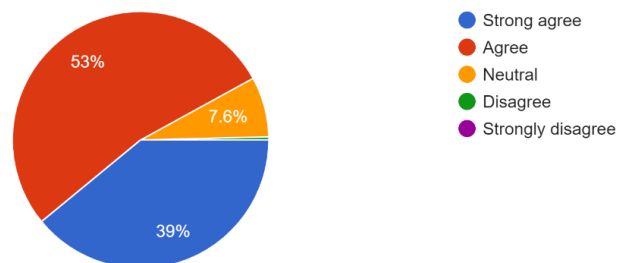


7. Stakeholder engagement must incorporate the element of social learning, i.e., learning by observing and imitating the behaviour of others.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

7. Stakeholder engagement must incorporate the element of social learning (i.e. Learning by observing and imitating the behavior of others)

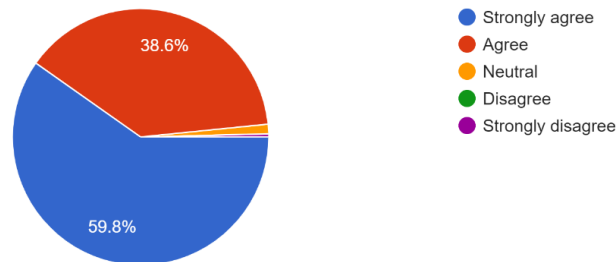
251 responses



8. Stakeholder engagement in Integrated River Basin Management (IRBM) should include the essential elements of Environmental, Social, and Governance (ESG), i.e., the environmental impact on the river basin, the social impact on the community within the river basin, and the governing/management practices of the organisation responsible for the river basin.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

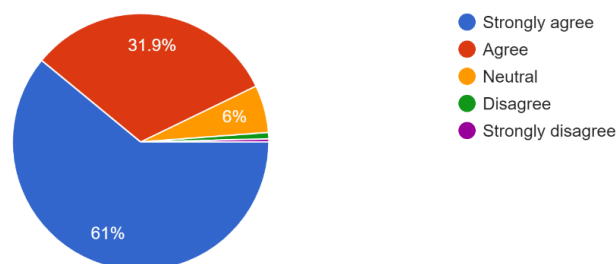
8. Stakeholder engagement in Integrated River Basin Management (IRBM) should include the essential elements of 'Environment Social Governanc... the organisation responsible for the river basin).
251 responses



9. Stakeholder engagement should be conducted based on the 'Whole of Government and Society' approach, i.e., a strategy that involves collaboration and coordination among all levels of government, as well as with non-governmental organisations, private sector, and citizens, to achieve the common goal of good river basin management.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

9. Stakeholder engagement should be conducted based on the 'Whole of Government and Society' approach (i.e., a strategy that involves collabora...e the common goal of good river basin management).
251 responses



Section C: Identifying Key Stakeholders and their Behaviour

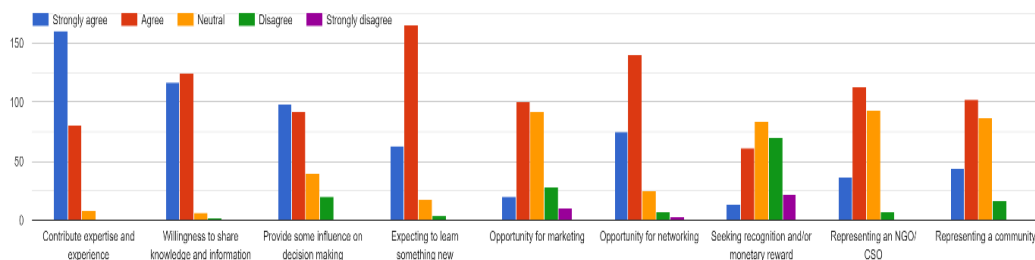
1. As a stakeholder, the reasons for participating in the stakeholder engagement are: [Table]

- (i) Contribute expertise and experience
- (ii) Willingness to share knowledge and information
- (iii) Provide some influence on decision making

- (iv) Expecting to learn something new
- (v) Opportunity for marketing
- (vi) Opportunity for networking
- (vii) Seeking recognition and/or monetary reward
- (viii) Representing an NGO/CSO
- (v) Representing a community

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

1. As a stakeholder, the reasons for participating in a stakeholder engagement are:

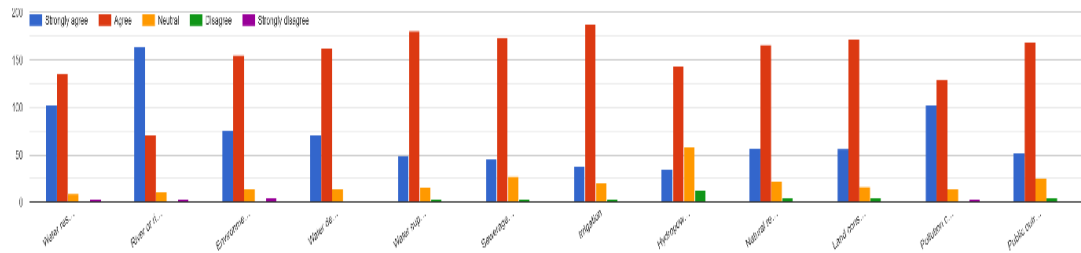


2. For a stakeholder engagement in IRBM, participants should possess among others the following type of knowledge and experience: [Table]

- (i) Water resources management including Integrated Water Resources Management (IWRM)
- (ii) River or river basin management including IRBM
- (iii) Environmental flow and aquatic biodiversity
- (iv) Water demand and allocation
- (v) Water supply
- (vi) Sewerage service
- (vii) Irrigation
- (viii) Hydropower generation
- (ix) Natural resources management
- (x) Land conservation
- (xi) Pollution control and prevention
- (xii) Public outreach programmes

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

2. For a stakeholder engagement in IRBM, participants should possess, among others, the following type of knowledge and experience:



3. In terms of total duration necessary for participating in the stakeholder engagement meeting/workshop for river basin management, the following would be the most appropriate: [Table]

(i) Half a day

(ii) 1 day

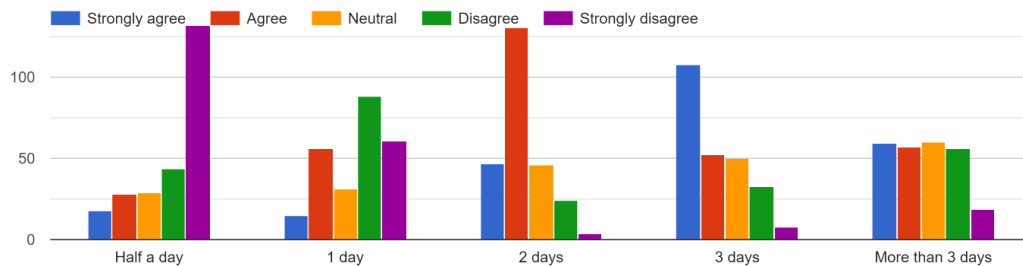
(iii) 2 days

(iv) 3 days

(v) More than 3 days

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

3. In terms of total duration necessary for participating in the stakeholder engagement meeting/ workshop for river basin management, the following would be most appropriate

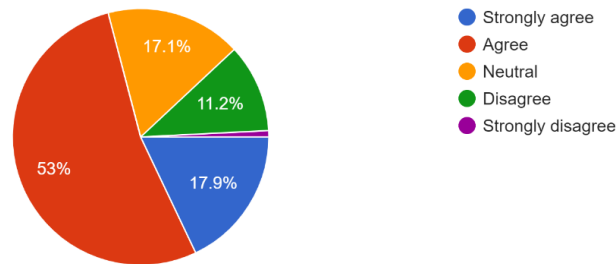


4. When your ideas are challenged during the stakeholder engagement meeting/workshop, you should be willing to compromise.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

4. When your ideas are challenged during the stakeholder engagement meeting/ workshop, you should be willing to compromise.

251 responses

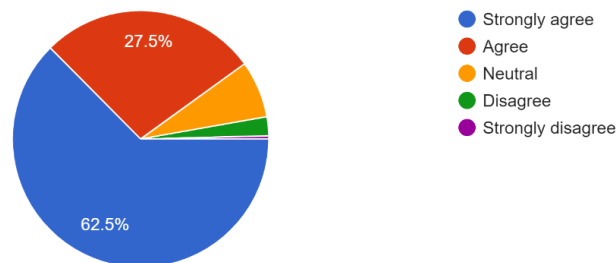


5. When you get involved in a conflict during the stakeholder engagement meeting/workshop, it is necessary that you seek an amicable solution acceptable to all parties.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

5. When you get involved in a conflict during the stakeholder engagement meeting/ workshop, it is necessary that you seek an amicable solution acceptable to all parties.

251 responses



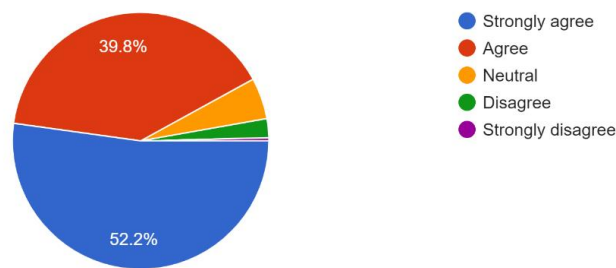
Section D: Factors that Contribute to Effective Stakeholder Engagement

1. Stakeholder engagement should be completely free from any political interference.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

1. Stakeholder engagement should be completely free from any political interference.

251 responses

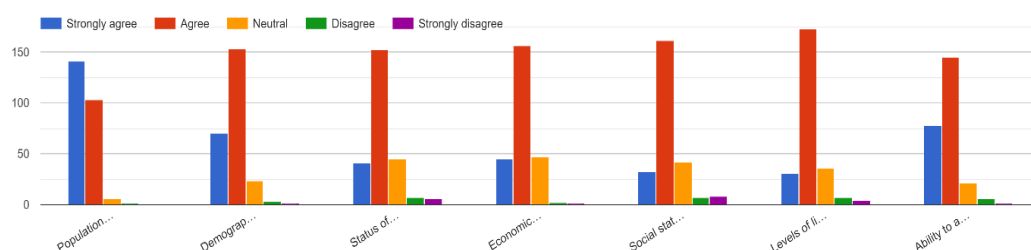


2. When making the decision about which stakeholders to select for engagement, the following social-economic factors should be considered: [Table]

- (i) Population within the river basin
- (ii) Demographic characteristics of the local population
- (iii) Status of women and youth
- (iv) Economic livelihoods (permanent, seasonal, migrant labour, unemployment)
- (v) Social status and power dynamics
- (vi) Levels of literacy and healthcare
- (vii) Ability to access and comprehend technical information

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

2. When making the decision about which stakeholders to select for engagement, the following social-economic factors should be considered:



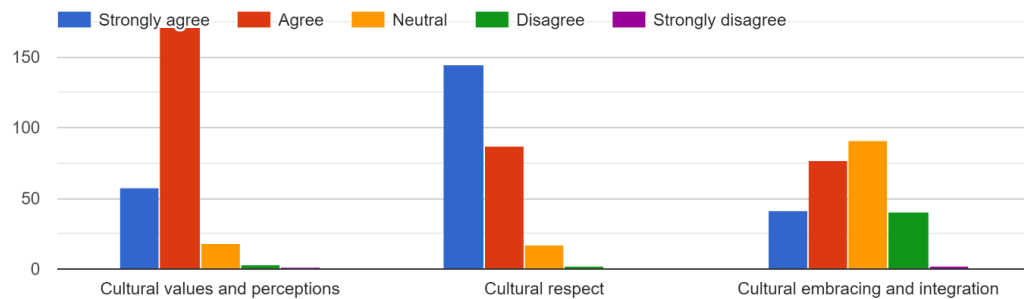
3. The cultural factors that need to be considered when conducting a stakeholder engagement

should include: [Table]

- (i) Cultural values and perceptions
- (ii) Cultural respect

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

3. The cultural factors that need to be considered when conducting a stakeholder engagement should include:



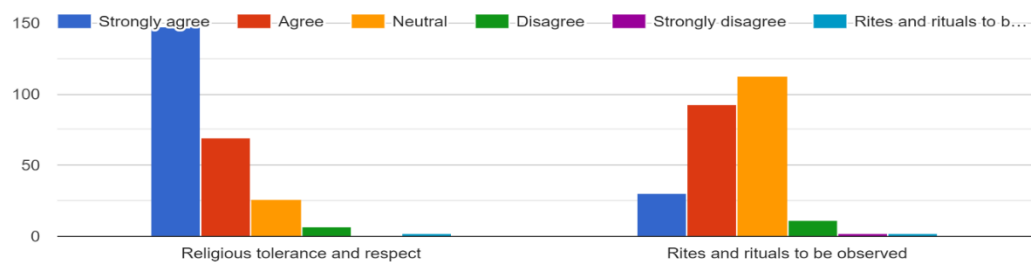
4. The religious factors that need to be considered when conducting a stakeholder engagement should include: [Table]

(i) Religious tolerance and respect

(ii) Rites and rituals to be observed

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

4. The religious factors that need to be considered when conducting a stakeholder engagement should include:



5. To ensure the effectiveness of stakeholder engagement, the organisation concerned must carry out the following tasks: [Table]

(i) Involve in the proper planning of stakeholder engagement

(ii) Fully committed to the implementation of the stakeholder engagement process

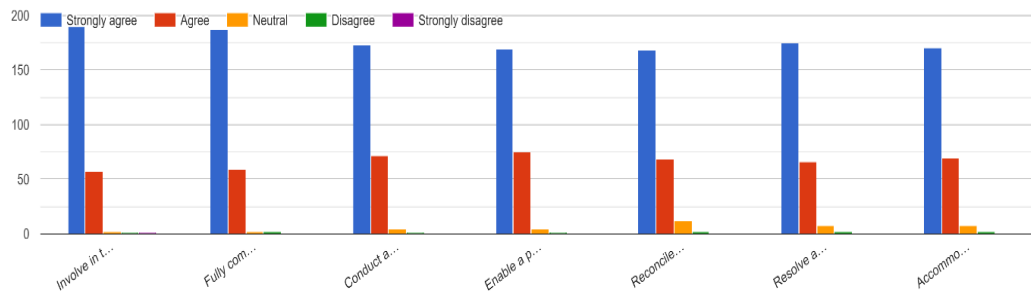
(iii) Conduct an orderly and structured meeting/workshop

(iv) Enable a productive collaboration/engagement by providing a level playing field for all stakeholders

- (v) Reconcile any cognitive and relational differences between stakeholders
- (vi) Resolve any conflict that arises during the stakeholder engagement
- (vii) Accommodate the multiple positive views in the decision-making

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

5. To ensure the effectiveness of stakeholder engagement, the organisation concerned must carry out the following tasks:

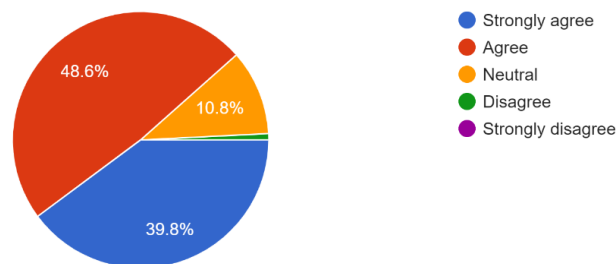


6. In situations where facilitators/consultants are engaged for conducting stakeholder engagement, they must be independent, and with certified competency.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

6. In situations where facilitators/ consultants are engaged for conducting stakeholder engagement, they must be independent and with certified competency.

251 responses

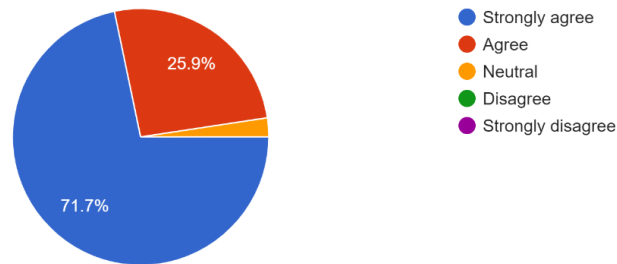


7. During the whole stakeholder engagement process, the element of trust between the stakeholders and the organisation concerned is very important.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

7. During the whole stakeholder engagement process, the element of trust between the stakeholders and the organisation concerned is very important.

251 responses

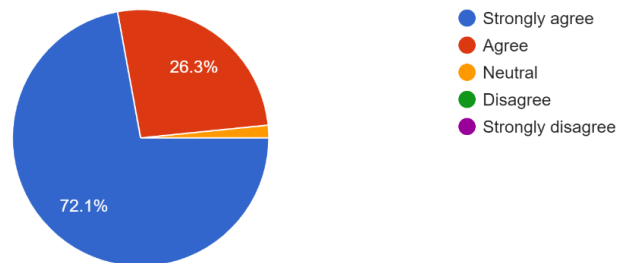


8. From the stakeholder's viewpoint, the transparency of the organisation conducting the stakeholder engagement is an important ingredient.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

8. From the stakeholder's viewpoint, the transparency of the organisation conducting the stakeholder engagement is an important aspect.

251 responses

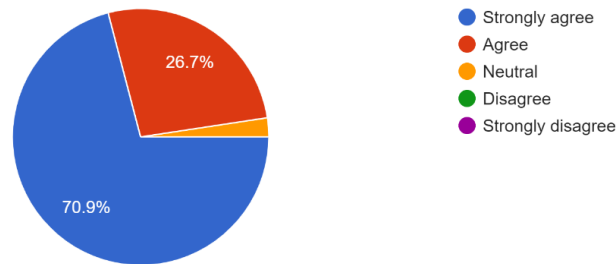


9. To play an active role as a participant, the Terms of Reference (TOR) for stakeholder engagement must be clear, comprehensive, and well communicated.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

9. To play an active role as a participant, the Terms of Reference (TOR) for stakeholder engagement must be clear, comprehensive, and well communicated.

251 responses

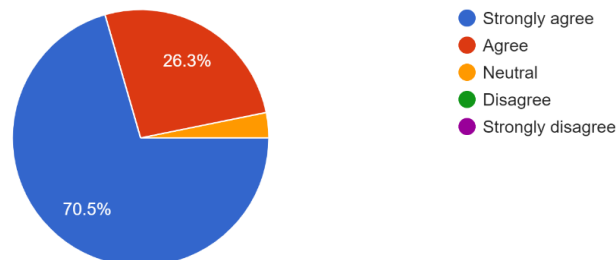


10. The final agreements of the stakeholder engagement meeting/workshop should be reflected in the decision for the Integrated River Basin Management (IRBM) Plan.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

10. The final agreements of the stakeholder engagement meeting/ workshop should be reflected in the decision for the Integrated River Basin Management (IRBM) Plan.

251 responses

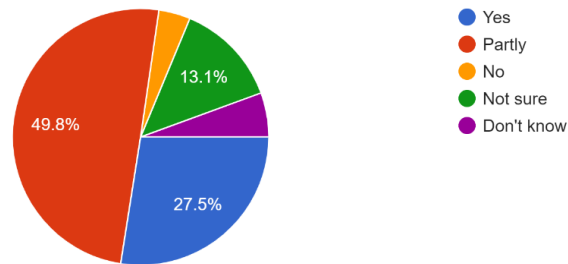


11. From your experience, has the organisation conducting the stakeholder engagement taken into consideration your views/feedback/comments?

Yes / Partly / No / Not sure / Don't know

11. From your experience, has the organisation conducting the stakeholder engagement taken into consideration your views/ feedback/ comments?

251 responses

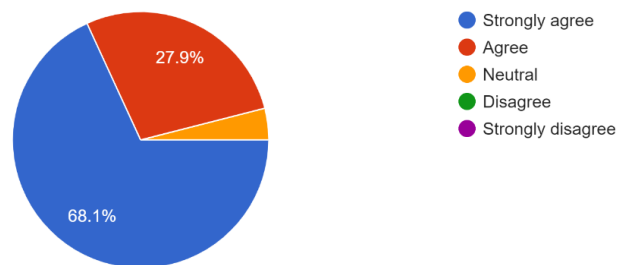


12. There should be a mechanism for monitoring and evaluating the impact of the stakeholder engagement.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

12. There should be a mechanism for monitoring and evaluating the impact of the stakeholder engagement.

251 responses



13. From your experience, please indicate the challenges that you face and suggest how

stakeholder engagement activities can be further improved to reflect the needs of all parties.

[Please list down challenges]

[Please list suggestions for improvement]

Appendix 2 Online Survey Questionnaires - For Targeted Organisations

This set of online surveys is meant for any organisation that conducts or may in the future conduct stakeholder engagement as part of a river management study. The following set of questions can be answered by more than one person from the same organisation that is involved in conducting the stakeholder engagement.

Introduction

The survey is part of a Ph.D. research project that aims to improve integrated river basin management (IRBM) in Malaysia. Stakeholder engagement is recognised as key to the successful implementation of IRBM, so the survey focuses on understanding how stakeholder engagement can be made more effective in the future. The survey explores who the stakeholders are, and the ways in which they are engaged, and seeks your views on best practices for engagement.

Data Protection

All data and information collected will be kept confidential and used solely for the academic purposes of this research.

Note of Appreciation

The survey will take approximately 10-15 mins to complete. I greatly appreciate all your help and sincerely wish to thank you for your time and willingness to support me in this online survey.

If you have any questions or concerns relating to the survey, please do not hesitate to contact me at +6012-7854350, or email me at evxcl6@nottingham.edu.my or limchowhock@gmail.com

Section A: Background of the Respondent

1. Your email: **Confidential for the 56 respondents**

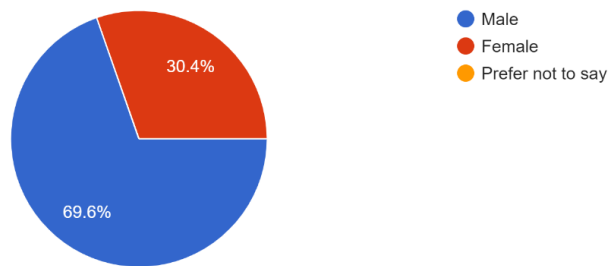
2. What is your gender?

Male

Female

Prefer not to say

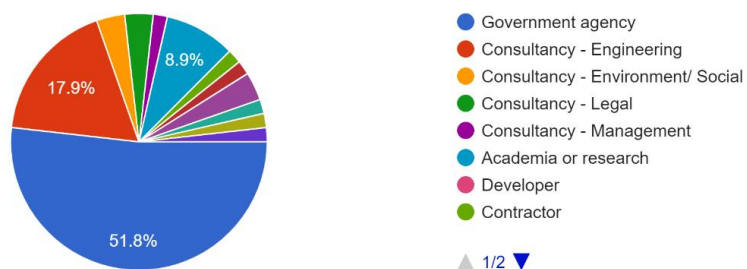
2. Gender
56 responses



3. How would you classify your organisation?

- Government Agency
- Consultancy - Engineering
- Consultancy – Environment / Social
- Consultancy - Legal
- Consultancy – Management
- Academia or Research
- Developer
- Contractor
- Manufacturer
- Supplier
- CSO / NGO
- Other:

3. How would you classify your organisation?
56 responses



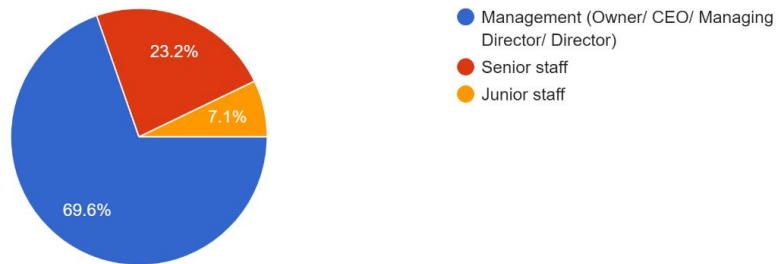
4. What is your role in the organisation?

Management (Owners, CEO, MD, Directors)

Senior Staff

Junior Staff

4. What is your role in the organisation?
56 responses



5. What is the highest education level that you have achieved?

Diploma

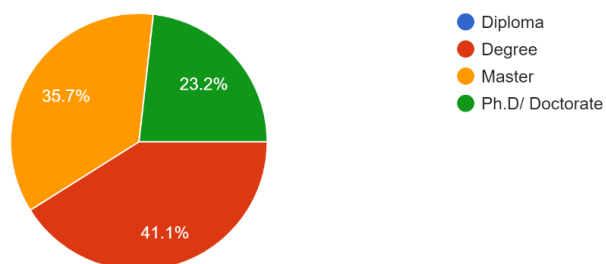
Degree

Master

Ph.D. / Doctorate

Other:

5. What is the highest education level that you have achieved?
56 responses



6. How many employees are there in your office?

Less than 5

5 to 10

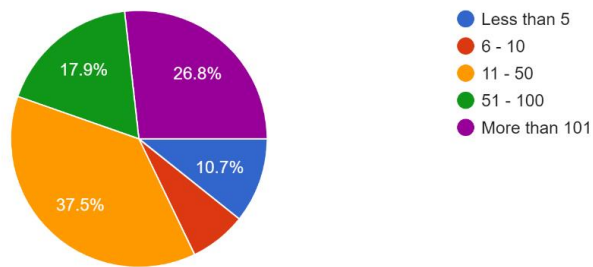
10 to 50

50 to 100

More than 100

6. How many employees are there in your office?

56 responses



Section B: General Questions

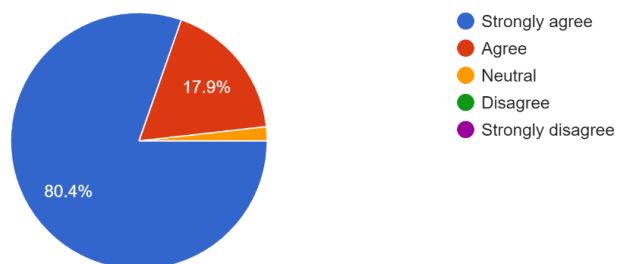
1. Stakeholder Engagement is fundamental to ensuring the success of an Integrated River Basin

Management (IRBM) Plan.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

1. Stakeholder Engagement is fundamental to ensuring the success of an Integrated River Basin Management (IRBM) Plan.

56 responses



2. Stakeholder engagement is essential to: [Table]

i. Fulfill the requirement of the Water Policy

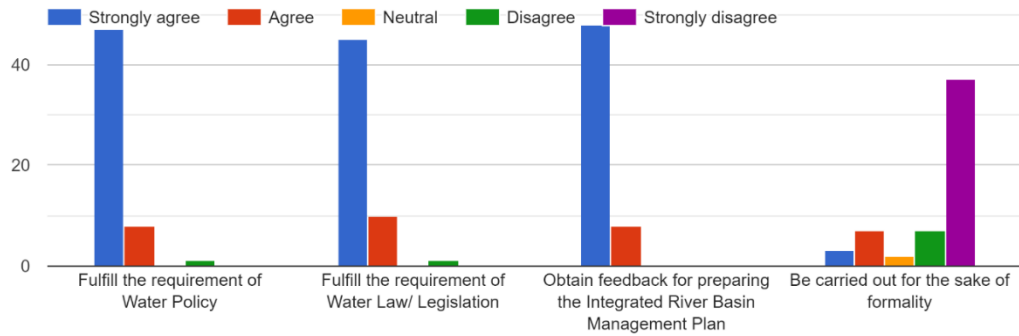
ii. Fulfill the requirement of Water Law / Legislation

iii. Obtain feedback for preparing the Integrated River Basin Management Plan

iv. Be carried out for the sake of formality

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

2. Stakeholder engagement is essential to:

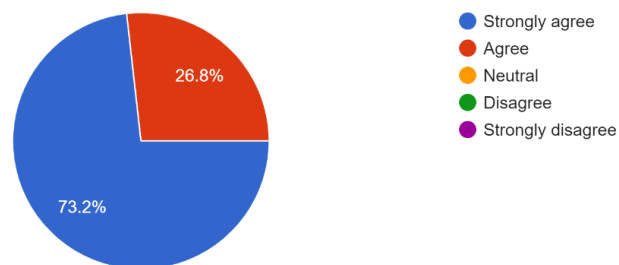


3. Stakeholder Engagement should be 'People Centred', i.e., attaining input from all relevant parties for developing an action plan.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

3. Stakeholder engagement should be 'people centred' (i.e. obtaining input from all relevant parties for developing an action plan)

56 responses



4. In your opinion, how many engagement sessions are needed for a typical IRBM study? [Box]

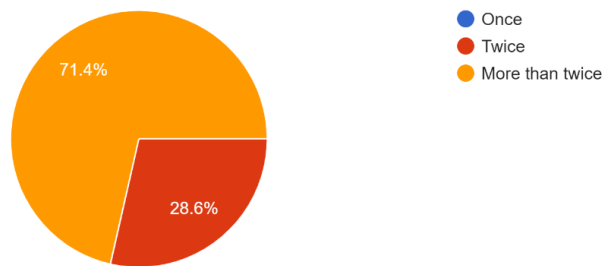
[Please tick one of the following]

Once

Twice

More the twice

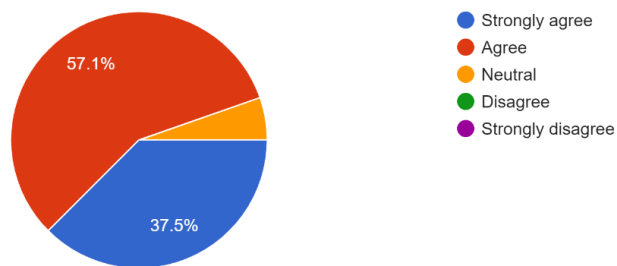
4. In your opinion, how many engagement sessions are needed for a typical IRBM study?
56 responses



5. Social learning, i.e., learning by observing and imitating the behaviour of others is an important aspect of Stakeholder Engagement.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

5. Social learning (i.e. learning by observing and imitating the behavior of others) is an important aspect of stakeholder engagement
56 responses



Section C: Identifying Key Stakeholders and their Behaviour

1. In terms of relevance to your organisation, how would you rank the following four general criteria used for inviting stakeholders to take part in IRBM planning:
[Box]

Please answer all questions by typing: 1 for the most relevant criterion, 2 for the relevant criterion, 3 for the slightly relevant criterion, and 4 for the least relevant criterion.

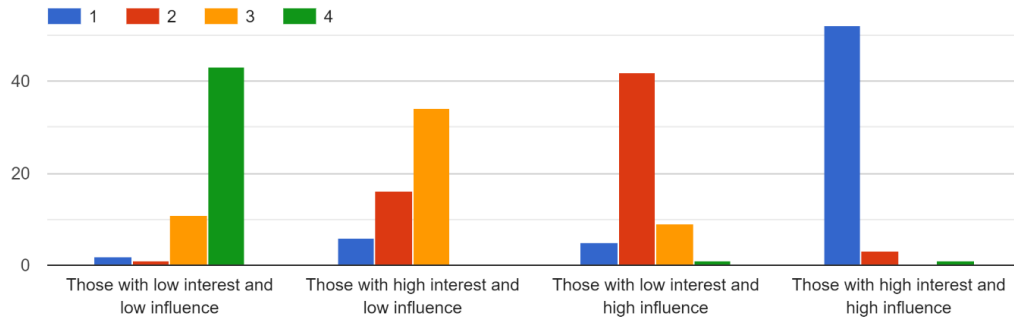
(i) Those with low interest and low influence []

(ii) Those with high interest and low influence []

(iii) Those with low interest and high influence []

(iv) Those with high interest and high influence []

1. In terms of relevance to your organisation, how would you rank the following four general criteria used for inviting stakeholders to take part in IRBM... do not repeat the same ranking for any statement)



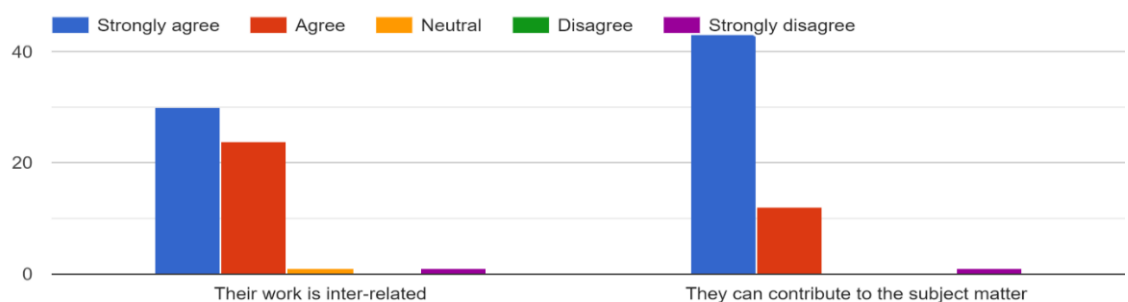
2. Stakeholders from different divisions of the same organisation should be invited because: [Table]

(i) Their work is inter-related

(ii) They can contribute to the subject matter

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

2. Stakeholder from different divisions of the same organisation should be invited because:



3. Stakeholders must possess the following characteristics: [Table]

(i) Have the relevant expertise and experience

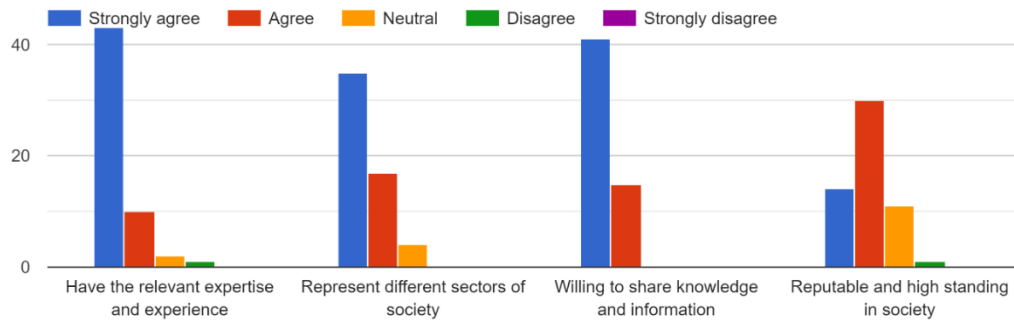
(ii) Represent different sectors of society

(iii) Willing to share knowledge and information

(iv) Reputable and high standing in society

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

3. Stakeholders must possess the following characteristics:



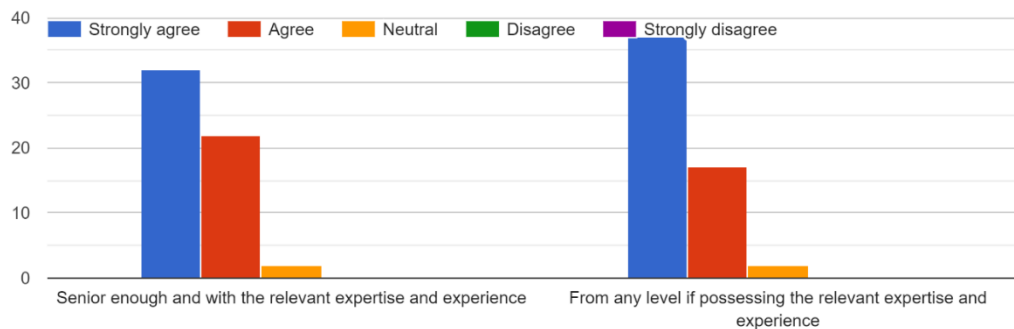
4. The individual invited to represent a particular stakeholder organisation must be: [Table]

(i) Senior enough and with the relevant expertise and experience

(ii) From any level if possessing the relevant expertise and experience

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

4. The individual invited to represent a particular stakeholder organisation must be:



5. Stakeholders are willing to participate in IRBM because of the engagement: [Table]

(i) Represents a service and contribution to the nation

(ii) Allows them to share knowledge and information

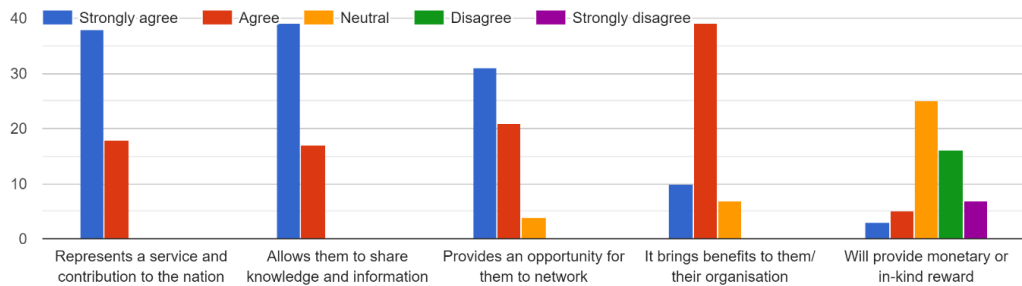
(iii) Provides an opportunity for them to network

(iv) It brings benefits to them/their organisation

(v) Will provide monetary or in-kind reward

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

5. Stakeholders are willing to participate in IRBM because the engagement:



6. Conflicts between stakeholders may arise and need to be controlled by: [Table]

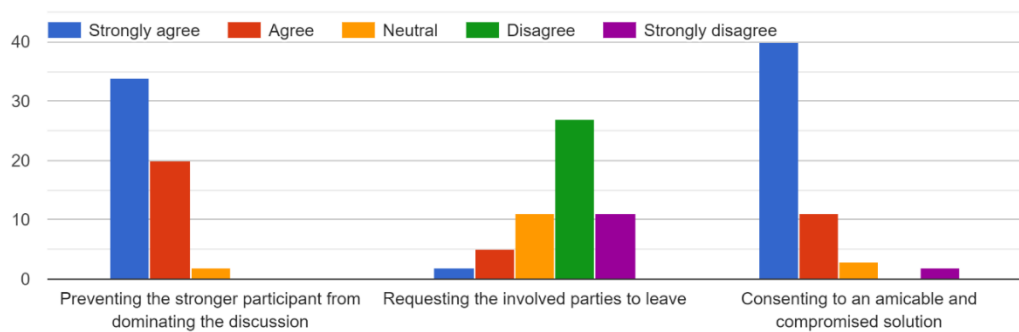
(i) Preventing the stronger participant from dominating the discussion

(ii) Requesting the involved parties to leave

(iii) Consenting to an amicable and compromised solution

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

6. Conflicts between stakeholders may arise and need to be controlled by:



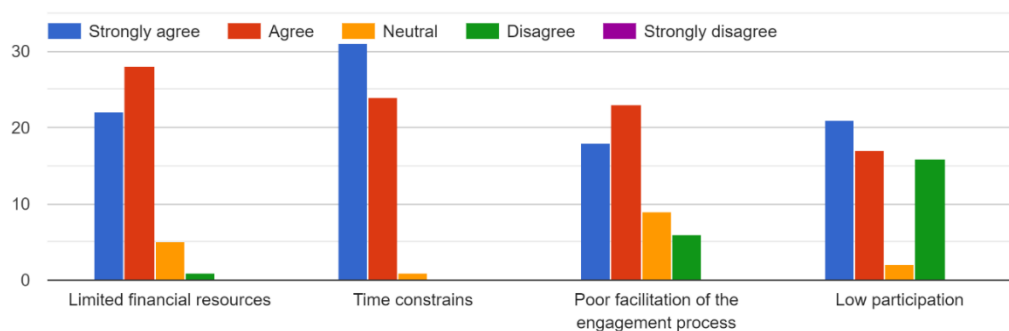
Section D: Factors that contribute to effective engagement

1. The major challenges encountered during a stakeholder engagement are:
[Table]

- (i) Limited financial resources
- (ii) Time constraints
- (iii) Poor facilitation of the engagement process
- (iv) Low participation

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

1. The major challenges encountered during a stakeholder engagement are



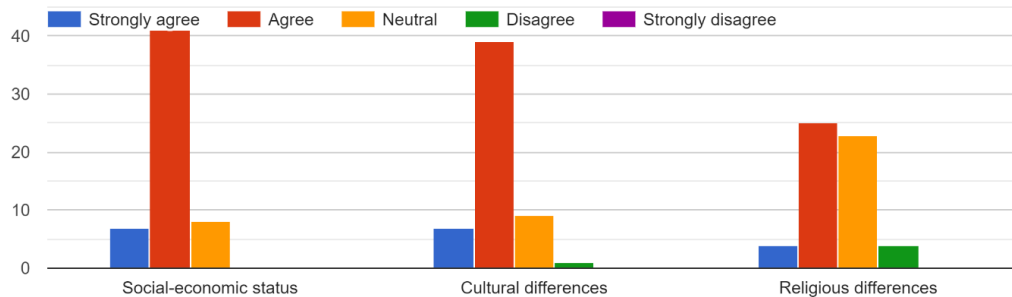
2. When planning for stakeholder engagement meetings or workshops, the following conditions of

the participants should be taken into consideration: [Table]

- (i) Social-economic status
- (ii) Cultural differences
- (iii) Religious differences

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

2. When planning for stakeholder engagement meetings or workshops, the following condition of the participants should be taken into consideration:

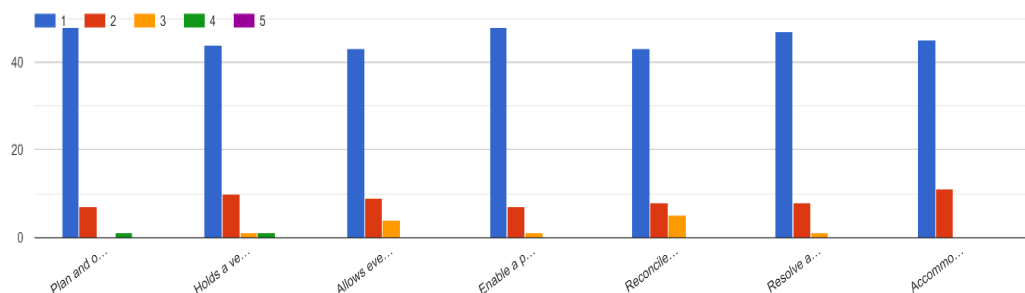


3. Indicate the importance of each of the following aspects of the role of a chairperson leading an engagement meeting/workshop: [Table]

On a scale of 1 to 5, please tick 1 for very important and 5 for least important

- (i) Plan and oversee the implementation of the whole stakeholder process
- (ii) Holds a very ordered and structured meeting
- (iii) Allows everyone to speak for the same amount of time
- (iv) Enable a productive engagement by providing a level playing field for all stakeholders
- (v) Reconcile any cognitive and relational differences between stakeholders
- (vi) Resolve any conflict that arises
- (vii) Accommodate the multiple positive views in the decision-making

3. Indicate the importance of each of the following aspects of the role of a chairperson leading an engagement meeting/ workshop (On a scale of 1 to 5, please select 1 for very important and 5 for least important)



4. The appropriate total duration for conducting the stakeholder engagement meeting/workshop should be: [Table]

(i) Half a day

(ii) 1 day

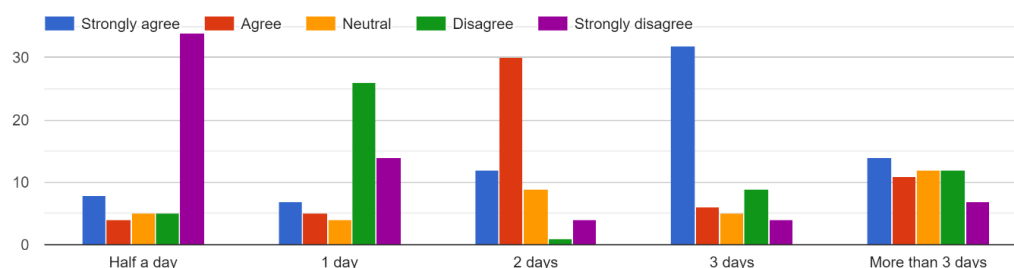
(iii) 2 days

(iv) 3 days

(v) More than 3 days

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

4. The appropriate total duration for conducting the stakeholder engagement meeting/ workshop should be:



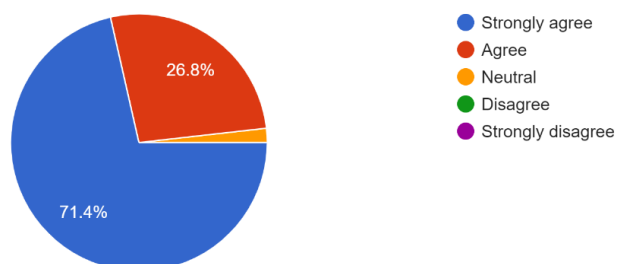
5. Relevant data, information, and documents related to the river basin concerned are necessary

for the stakeholders/participants during the engagement sessions so that they can contribute effectively.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

5. Relevant data, information and documents related to the river basin concerned are necessary for the stakeholders/ participants to access during the ...nt sessions so that they can contribute effectively.

56 responses

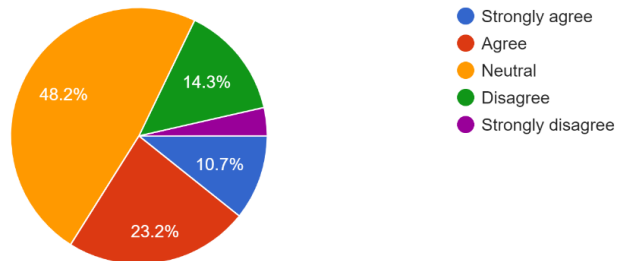


6. Stakeholders /participants should be given appropriate incentives or rewards for taking part in the stakeholder engagement.

Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree

6. Stakeholders/ participants should be given appropriate incentives or rewards for taking part in the stakeholder engagement.

56 responses

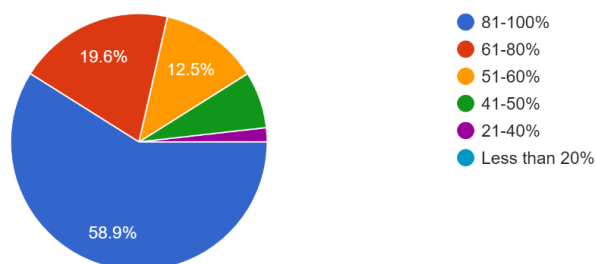


7. Based on the feedback from all the stakeholders/participants, what percentage is normally taken into consideration in the decision-making for the IRBM plan?
[Table] [Tick one answer]

- (i) 80 - 100%
- (ii) 60 - 80%
- (iii) 50 – 60%
- (iv) 40 -50%
- (v) 20 -40%
- (vi) 20% and less

7. Based on the feedback from all the stakeholders/ participants, what percentage is normally taken into consideration in the decision-making process for the IRBM plan?

56 responses



8. When conducting stakeholder engagement, what are the tools and approaches you have used to encourage full participation from each participant?

[Please list down – Tools and Approaches]

9. What means of communication are employed with the stakeholders/participants before, during, and after the engagement meetings/workshops?

[Please list down - Before]

[Please list down - During]

[Please list down - After]

10. In your opinion, what are the mechanisms for monitoring and evaluating the impact of stakeholder engagement?

[Please list down - Monitoring]

[Please list down – Evaluating]

Appendix 3 Interview Questions and Answers

Interviewee 1 - Ir. Najwa, Head of Water Regulatory Division, Pulau Pinang State (WRDPP) or BKSA PP in Bahasa Malaysia

1. Purpose of Stakeholder Engagement:

- i) What is the purpose of BKSA PP conducting Stakeholder Engagement (SE) when carrying out a study related to river basin or water resources management?

The main purposes BKSA carrying out a study related to river basin/water resource management are: -

- a) To identify the new potential of raw water resources.*
- b) To study the best practice management including planning, reducing, controlling, and monitoring water quality.*
- c) To establish the control points to monitor the water level and discharge.*
- d) To evaluate the water balance between available water resources and the water use quantity and the water allocation quantity.*
- e) To establish the rule for the reservoir operation and the diversion of water from the river.*
- f) To establish the water use right.*

SE is important to obtain feedback and contribution to any water-related studies.

- ii) How important is it that SE must be conducted?

To develop a deeper understanding of the stakeholder operations and solutions that fit their needs based on the study that has been carried out. Besides, by participating in SE, the agencies concerned will be more committed and cooperative.

- iii) There are perceptions from stakeholders that the SE is conducted as a matter of tokenism or

just for the sake of formality. Can you respond to that?

It can happen if the discussion of the engagement only involves a one-way direction and the scope is not related to the background of the participant.

2. Compliance with Water Policy and Mandatory Requirements:

- i) Can you describe how BKSA PP ensures compliance with relevant policies and mandatory requirements for stakeholder engagement in river basin /water resources management?

BKSA PP is one of the agencies providing technical reviews for development involving water resources. However, we still working on the new water enactment to empower our water governance.

- ii) What are the specific regulatory or legal frameworks that drive BKSA PP's stakeholders' engagement efforts?

The existing Enactment for Water Supply 1998; however, we are working to develop a revised water enactment for Penang.

3. Stakeholder Identification and Inclusiveness:

- i) How does BKSA PP identify and categorize stakeholders when conducting a river basin or water resources management study?

The identification is based on related planning, development, monitoring, enforcement, and waste management to the environment, especially for water.

- ii) For inclusiveness, is there any stakeholder mapping exercise carried out?

For the time being BKSA didn't have the mapping exercise and it could be carried out accordingly in the future.

- iii) Are there strategies in place to involve underrepresented or marginalized groups?

So far, no; but we will look into this based on the needs from time to time.

4. Collaboration and Partnerships:

- i) To what extent does collaboration with other organizations or government agencies contribute to successful stakeholder engagement in river basin/water resources management?

For now, there are good collaborations with water federal agencies and state agencies in the prevention of water pollution and currently reassembling to draft a new policy to strengthen the BKSA PP's existing scope of action.

- ii) How do you identify and establish partnerships with organizations/agencies that share similar objectives and values?

By referring to the objectives of the establishment of the organizations/agencies and learning about their responsibilities of establishment in terms of policy direction.

5. Contribution from Research Organizations and Academia:

- i) How do research organizations and academia contribute to the knowledge base and research on river basin/ water resources management and stakeholder engagement?

Based on their study and research output related to solving water issues in Penang.

6. Role of Civil Society Organizations (CSOs) and Non-Governmental Organizations (NGOs):

- i) What role do CSOs and NGOs play in advocating for stakeholder interests and influencing river basin/water resources management decisions?

To help in giving local information related to the issues on the river basin/water resources. Help to link with local communities.

- ii) Can you provide examples of successful CSO/NGO-led initiatives that have positively impacted river basin/ water resources management?

None so far.

7. Corporate Sector Involvement:

- i) In what ways does the corporate sector participate in river basin/water resources management initiatives, and how do their interests align with stakeholder engagement efforts?

Their research and current state-of-the-art technology can be used in certain government agencies, apart from providing funds and support in-kind for river care programmes.

- ii) Can you share instances where corporate sector involvement led to sustainable and mutually beneficial river basin/water resources management outcomes?

Cleaning of Tanjung Bungah and Batu Ferringhi beaches.

8. Local Communities Engagement:

- i) What strategies does BKSA PP employ to engage and involve local communities in river basin/water resources management decisions?

Engagement by participating in related activities/programs initiated by them.

- ii) Can you provide examples of projects/studies where community participation led to improved outcomes or the resolution of conflicts?

None, so far.

9. Political Involvement and Participation:

- i) How does political involvement, at both the local and regional levels, influence stakeholder engagement in river basin/water resources management?

It depends on their understanding of the issues; they can provide positive input.

- ii) Should politicians be included as the invited stakeholders? (please give reasons for Yes or No).

Yes, so that they support all water security and environmental protection initiatives. They can also provide support at the State Assembly or Parliament. In addition, they may help to seek corporate support.

10. Engagement Strategies:

- i) What strategies, methods, or approaches does BKSA PP employ to engage with diverse stakeholder groups effectively?

Group discussion and conduct programs or activities collectively.

- ii) Where the Consultant is employed to conduct the SE on BKSA PP's behalf, is there any SE guideline or checklist for the Consultant to follow?

So far, none. We still working to develop new water enactments, policy, and strategies to strengthen our water Governance and Operating Procedures, including guidelines for SE.

- iii) Does the Consultant come up with a comprehensive SE plan for BKSA PP's approval?

Yes, but a very general outline depends on the study that has been conducted.

- iv) In your opinion, is the 'Whole of Government and Whole of Society' approach a practical and effective strategy to be adopted for SE in river basin/water resources management?

Can, but it is time-consuming with so many agencies and non-state actors. Moreover, a lot of awareness through the media is needed.

11. Communication and Collaboration:

- i) How does BKSA PP facilitate communication and collaboration among diverse stakeholders?

Meetings, official letters & event notices.

12. Transparency:

- i) How do you ensure stakeholder engagement processes are transparent, accountable, and equitable?

Depends on the study and approach adopted.

- ii) Can you explain how BKSA PP promotes transparency and openness in its engagement processes?

We will explain our objectives, expectations, and limitations depending on the situation.

13. Willingness to Share Information and Data:

- i) To what extent does BKSA PP share data and information related to the water resources/river basin with stakeholders, including those outside the organization?

It depends on the purpose of data usage. Generally, okay for SE.

- ii) Is there any government policy/law that restricts the sharing of information and data, particularly from findings of Water Resources/IRBM studies?

Not sure.

14. Capacity Building and Training:

- i) How does BKSA PP assess and enhance the competency of staff or consultants/facilitators responsible for conducting stakeholder engagement activities?

Formal training, on-the-job training.

- ii) What efforts are in place to build the capacity of stakeholders, including local communities, to actively participate in river basin management?

Carry out engagement and programs related to them.

15. Conflict Resolution and Mediation:

- i) In cases where conflicts arise among stakeholders during engagement processes, how does BKSA PP handle conflict resolution and mediation?

By evaluating the situation and mediating based on related laws, regulations, and standing orders.

16. Integration with Decision-Making:

- i) To what extent is the feedback from stakeholders considered by BKSA PP in developing the Water Resources Management / IRBM Plan?

No implementation for IRBM has been started yet.

- ii) How does stakeholder input influence decision-making processes within BKSA PP in developing the Water Resources Management /IRBM Plan?

By considering their need for IRBM implementation.

17. Monitoring and Evaluating the Effectiveness of Stakeholder Engagement:

- i) How does BKSA PP monitor and evaluate the overall impact and effectiveness of stakeholder engagement in river basin/water resources management studies?

We depend on the agencies to provide the review and evaluation.

- ii) Do you use specific metrics or indicators to assess the success of engagement efforts?

No

- iii) How would you characterize the overall effectiveness of stakeholder engagement practices in water resources/river basin management within your organization?

So far good and acceptable.

18. Environmental Concerns and Mitigation:

- i) How does BKSA PP address environmental concerns and sustainability in stakeholder engagement processes for water resources/river basin management?

Referring to the DOE Act and regulation.

- ii) Should SE in water resources/river basin management be integrated into the ESG framework? If so, how can this be done?

Possible, since the goal is the same.

During the SE workshop, include the various dimensions of ESG.

19. Cultural and Heritage Preservation:

- i) How does BKSA PP respect and incorporate cultural and heritage preservation into river basin/water resources management projects?

Referring to the enactment, law, and regulation related to culture and heritage before getting the consideration from State Exco.

20. Religious and Spiritual Considerations:

- i) Do religious or spiritual aspects play a role in stakeholder engagement in river basin/ water resources management, especially in areas where rivers hold cultural or religious significance?

Referring to the enactment, law, and regulation related to religions before getting the consideration from Exco.

21. Financial Constraints:

- i) How do financial constraints impact BKSA PP's ability to conduct effective stakeholder engagement in river basin management?

We are still under the state secretariat office and financially restricted to that state approval. Yes, the limited budget may not be sufficient to reach to all relevant stakeholders.

22. Challenges and Obstacles:

- i) Besides finance, what are other challenges or obstacles BKSA PP faces when engaging with stakeholders in river basin management?

Old enactments and policies need to be revised to strengthen the BKSA PP.

23. Success Stories and Lessons Learned:

- i) Can you share success stories or examples of projects/studies where stakeholder engagement led to significant positive outcomes in water resources/river basin management?

Mekong River interstate river sharing raw water resources.

Kedah-Penang and Perak-Penang joint committees have been proposed and the framework for cooperation is still in progress.

- ii) On the other hand, what are some key lessons learned from situations where stakeholder engagement faced challenges or did not yield the desired results?

States with shared river basins have to cooperate and compromise. The Federal Government can play a strong facilitating role.

24. Emerging Trends and Future Outlook:

- i) In your view, what emerging trends or innovative approaches are likely to shape the future of stakeholder engagement in water resources/river basin management?

Revise the laws accordingly taking into consideration water security, environmental concerns, and impacts of climate change.

- ii) How can organizations adapt to changing stakeholder dynamics and evolving environmental challenges?

Training and exposure to new ideas.

25. Closing Thoughts:

- i) Is there anything else you would like to share or emphasize about BKSA PP's approach towards effective stakeholder engagement in water resources/integrated river basin management?

Water Enactment needs to be revised in Penang to strengthen our policies and water governance.

Interviewee 2 - Dato' Ir. Nor Hisham, Former Director General of DID

1. Purpose of Stakeholder Engagement:

- i) What is the purpose of DID conducting Stakeholder Engagement (SE) when carrying out an IRBM Study?

A SE is carried out to collect feedback from the stakeholders who will be beneficiaries of the IRBM. The SE facilitates the channeling of their concerns and ideas as to how their water and land resources should be managed and also commits to their role in ensuring sustainability.

- ii) How important is it that SE must be conducted?

SE is very important because IRBM impacts citizens. For stakeholders to buy-in into a plan and its implementation, stakeholders must have a say.

- iii) There are perceptions from stakeholders that the SE is conducted as a matter of tokenism or just for the sake of formality. Can you respond to that?

If properly conducted, an SE will reveal information that may not be obvious and will lead to a more practical and implementable IRBM Plan. The opinions of stakeholders should be addressed and deliberated in the IRBM report.

2. Compliance with Water Policy and Mandatory Requirements:

- i) Can you describe how DID ensures compliance with relevant water policies and mandatory requirements for stakeholder engagement in river basin management?

DID is always guided by the national water resources policy and the Water Services Industry Act which are federal laws. DID also acknowledges that the successful implementation of IRBM plans depends on the buy-in and commitment of the state authorities, particularly the state water authorities. The state water authorities are usually engaged very early in the IRBM Plan study and play a custodian role as entrenched in the state water enactments.

ii) Are there specific regulatory or legal frameworks that drive DID's engagement efforts?

These engagement efforts are purely public best practices and are not necessarily supported by any specific legislation.

3. Stakeholder Identification and Inclusiveness:

i) How does DID identify and categorise stakeholders when conducting a river basin management study?

Stakeholders can be broadly classified as government agencies, industry representatives, NGOs, and local communities.

ii) For inclusiveness, is there any stakeholder mapping exercise carried out?

Yes, before SEs are carried out, stakeholders are pre-identified and their expected contribution is assessed. The state DID and water authorities will be able to identify specific interest groups in the state or the study area whilst DID HQ will normally pre-identify other federal agencies or departments that are potential stakeholders.

iii) Are there strategies in place to involve underrepresented or marginalised groups in river basin management decisions?

Unsure. There is often a tendency to engage only the most active and well-known NGOs.

4. Collaboration and Partnerships:

- i) To what extent does collaboration with other organisations or government agencies contribute to successful stakeholder engagement in river basin management?

I would say that collaboration is crucial to ensure most if not all critical issues across sectors are addressed or considered.

- ii) How do you identify and establish partnerships with organizations/agencies that share similar objectives and values?

Organisations are identified based on how they use water, and they are usually committed once they understand what they can gain from the IRBM Plan.

5. Contribution from Research Organizations and Academia:

- i) How do research organisations and academia contribute to the knowledge base and research on river basin management and stakeholder engagement?

Research organisations and academia can contribute by depositing copies of any work or research they have conducted with DID.

6. Role of Civil Society Organizations (CSOs) and Non-Governmental Organisations (NGOs):

- i) What role do CSOs and NGOs play in advocating for stakeholder interests and influencing river basin management decisions?

CSOs and NGOs provide a non-state and presumably unbiased viewpoint toward the IRBM plans and decisions. They are usually protective of communities and their economic activities.

- ii) Can you provide examples of successful CSO/NGO-led initiatives that have positively impacted river basin management?

NGOs such as The Friends of Rivers have successfully promoted community river cleaning programs in the Klang Valley and are frequently called upon to advise on creating community awareness amongst river communities. GEC has the National River Care Fund to provide seed money to support local communities in caring for the rivers throughout the country.

7. Corporate Sector Involvement:

- i) In what ways does the corporate sector participate in river basin management initiatives, and how do their interests align with stakeholder engagement efforts?

Corporate sectors via their respective foundations have been supportive through their CSR funding initiatives related to river pollution control and beautification programmes. Some of these active corporate sectors are invited to take part in the stakeholder engagement exercise, and they contribute sound and pragmatic feedback.

- ii) Can you share instances where corporate sector involvement led to sustainable and mutually beneficial outcomes in river basin management?

The 'One State One River Programme' initiated by DID has been supported by many various corporate sectors such as local banks, and GLCs. The Sg Way River has been rehabilitated from Class V to Class III by a local private company located beside the river.

8. Local Communities Engagement:

- i) What strategies does DID employ to engage and involve local communities in river basin management decisions?

DID will always seek the help of established NGOs to identify existing JKKK of villages or residents' associations in the vicinity. Sometimes these communities are approached directly through the local govt and their elected representatives who know local issues better. The key personalities from the community are sometimes engaged separately for focused discussions or clarifications.

ii) Can you provide examples of projects/studies where community participation led to improved outcomes or the resolution of conflicts?

River of Life Project; Tioman Beach Improvement Project.

9. Political Involvement and Participation:

i) How does political involvement, at both the local and regional levels, influence stakeholder engagement in river basin management?

Politicians are crowd-pullers and can persuade their constituents to participate in numbers, especially for town-hall-type engagements at the local level. At the regional level or state level they can ensure that govt agencies under their portfolio commit and contribute towards the IRBM.

On the side of caution, the presence of politicians in small group discussions may not always be conducive to open and objective discourse either due to the political sensitivities of the time or the deference of government officials towards their political leaders.

ii) Should politicians be included as the invited stakeholders? (please give reasons for Yes or No).

No, because it might shift the focus of the IRBM SE to a complaint forum.

10. Engagement Strategies:

i) What strategies, methods, or approaches does DID employ to effectively engage with diverse stakeholder groups?

Town halls, focus-group discussions, technical workshops, and interviews.

ii) Where the Consultant is employed to conduct the SE on DID's behalf, is there any SE guideline or checklist for the Consultant to follow?

No, not that I know of.

iii) Does the Consultant come up with a comprehensive SE plan for DID's approval?

The SE sessions would be in the implementation program/schedule, but the actual content may not be detailed.

iv) In your opinion, is the 'Whole of Government and Whole of Society' approach a practical and effective strategy for SE in river basin management?

The Whole of Govt approach is needed to ensure policies & decisions across sectors are not counterproductive. A whole-of-society approach may not yet be practical across the country due to 1) the current state of IRBM understanding amongst the public, and 2) the limited time given for an IRBM study.

11. Communication and Collaboration:

i) How does DID facilitate communication and collaboration among diverse stakeholders?

That's why the SE is being done through the ways mentioned in 10(i). Engagement through various modes not to mention workshops, and via letters and emails. The IRBM plan report should also be an open document.

12. Transparency:

- i) How do you ensure that stakeholder engagement processes are transparent, accountable, and equitable?
- ii) Can you provide examples of how DID promotes transparency and openness in its engagement processes?

This is a non-issue unless all the SE is done through private interviews and the IRBM Plan is made a classified document.

13. Willingness to Share Information and Data:

- i) To what extent does DID share data and information related to the river basin with stakeholders, including those outside the organization?

DID's IRBM reports are made available to the state authorities where the basin lies. DID study reports are usually available to the public in hard copy at the department library and sometimes with the respective divisions. Digital versions are also available but usually only upon request.

- ii) Is there any government policy/law that restricts the sharing of information and data, particularly from findings of IRBM studies?

There is no written policy against the sharing of IRBM information. Some reports (not necessarily IRBM) are classified and would require official clearance. IRBM study reports are not classified as far as I know.

14. Capacity Building and Training:

- i) How does DID assess and enhance the competency of staff or consultants/facilitators responsible for conducting stakeholder engagement activities?

Assessment of the consultant's competency for stakeholder engagement has not been done on a proper or objective basis. The

focus has usually been on project delivery. Staff competency is also an area for improvement. In general, training is more on the job rather than through skills training.

ii) What efforts are in place to build the capacity of stakeholders, including local communities, to actively participate in river basin management?

DID does not conduct specific training for stakeholders. This has been taken up by NGOs. The Malaysian Water Partnership, MyCDNet, and GEC are developing training modules for water managers and administrators.

15. Conflict Resolution and Mediation:

i) In cases where conflicts arise among stakeholders during engagement processes, how does DID handle conflict resolution and mediation?

Conflicts are addressed through workshop discussions. In matters that deal with policy, the affected parties are usually asked to formally record their stand or position on the matter for resolution at a higher level.

16. Integration with Decision-Making:

i) To what extent is the feedback from stakeholders considered by DID in developing the IRBM Plan?

All stakeholders' feedback is accepted as is as long their points do not contravene existing laws or encroach on the rights of others.

ii) How does stakeholder input influence decision-making processes within DID in developing the IRBM Plan?

Stakeholder input essentially informs DID if anyone's rights are being violated and if a particular aspect has been overlooked. The IRBM plan will then address these issues in the deliberations and propose the way forward with respect to designing the plan. The plan is shaped through consensus. The merits of each element are weighed against the best use of water resources and land use.

17. Monitoring and Evaluating the Effectiveness of Stakeholder Engagement:

i) How does DID monitor and evaluate the overall impact and effectiveness of stakeholder engagement in river basin management studies?

The overall impact and effectiveness of stakeholder engagement are seen in the quality and depth of stakeholders' responses. DID does not give ratings or scores to stakeholder engagement. It is more concerned about the presence and active participation of the stakeholders in the IRBM discussion.

ii) Are there specific metrics or indicators that you use to assess the success of engagement efforts?

Not that I'm aware of.

iii) How would you characterize the overall effectiveness of stakeholder engagement practices in river basin management within your organisation?

Good. SE has been a permanent feature in all DID IRBM studies.

18. Environmental Concerns and Mitigation:

i) How does DID address environmental concerns and sustainability in stakeholder engagement processes for river basin management?

These issues are part of the briefings before or during IRBM SE. Prevention,

mitigation, and enforcement issues are typical topics. The SE is expected to reveal the action plans of the relevant departments in tackling those issues and to see if their plans are aligned with the common goals.

ii) Should SE in river basin management be integrated into the ESG framework? If so, how can this be done?

IRBM SE can be considered an action plan under the DID ESG agenda. However, DID has yet to draft and formalise its sustainability plan. IRBM is both an environmental and governance initiative. The SE is the social aspect.

19. Cultural and Heritage Preservation:

i) How does your organisation respect and incorporate cultural and heritage preservation into river basin management projects?

In the Malaysian context of RBM projects, respect for the cultural and heritage values of all citizens has always been duly protected. However, in the course of implementing physical projects, there have been conflicts especially when it involves relocation. DID has always adhered to the rule of law and where grey areas exist, consultation with the relevant authorities and community is held.

20. Religious and Spiritual Considerations:

i) Do religious or spiritual aspects play a role in stakeholder engagement in river basin management, especially in areas where rivers hold cultural or religious significance?

Yes, religious and spiritual interest groups are often engaged/consulted to understand their practices. Many places of worship are located on river banks which is considered auspicious to their followers. Where possible such locations are preserved. However, any practice that

contravenes any law related to fish and wildlife preservation would not be preserved.

21. Financial Constraints:

- i) How do financial constraints impact DID's ability to conduct effective stakeholder engagement in river basin management?

DID never fails to allocate funds for physical works, however financial constraints limit the extent and duration of SE activities. Focus group discussions may require transport and lodging costs for participants hence participation would be limited to the budget available.

22. Challenges and Obstacles:

- i) Besides finance, what are other challenges or obstacles DID faces when engaging with stakeholders in river basin management?

Data sharing is a huge challenge. Business entities are typically hesitant to share data openly due to service agreements that demand confidentiality.

23. Success Stories and Lessons Learned:

- i) Can you share success stories or examples of projects/studies where stakeholder engagement led to significant positive outcomes in river basin management?

NA

- ii) On the flip side, what are some key lessons learned from situations where stakeholder engagement faced challenges or did not yield the desired results?

NA

I don't think there has actually been a study on the causal effect of SE decisions on the outcome.

24. Emerging Trends and Future Outlook:

i) In your view, what emerging trends or innovative approaches are likely to shape the future of stakeholder engagement in river basin management?

The availability of smartphone software applications that allow random surveys to be quickly designed and executed makes it convenient for SE and opinion-seeking polls.

ii) How can organisations adapt to changing stakeholder dynamics and evolving environmental challenges?

1. They need to invest in identifying the data critical to their purposes and establish a data-sharing policy.

2. Organise thematic seminars to share findings and publications.

3. The government should have a more agile administrative structure - one that can adjust to industry needs faster.

25. Closing Thoughts:

i) Is there anything else you would like to share or emphasize about DID's approach toward effective stakeholder engagement in integrated river basin management?

DID's approach may be too technical as the IRBM study presents loads of technical data. Perhaps an industry-centric approach might be explored to attract more non-governmental players into the IRBM discussions. The impact of decisions is not always felt immediately; the success or failure of a development decision is often realised 4-6 years in the future. A tracking system for basin development could be the means to tie eventual outcomes with the causal factors.

Interviewee 3 - Ir. Haslina, Head River Basin Management Division, SWMA or LUAS (answers translated from Bahasa Malaysia into English)

1. Purpose of Stakeholder Engagement:

i) What is the purpose of LUAS conducting Stakeholder Engagement (SE) when carrying out a study related to river basin or water resources management?

**To obtain data, feedback, and views from all relevant agencies and stakeholders on matters related to policy, strategies, and progress of action plans as proposed in the previous IRBM Master Plan.*

**SE shall be carried out in 3 stages: upon completion of the Inception Report, the Interim Report, and the Draft Final Report.*

**Obtain written comments from agencies for Inception and Interim Reports, and feedback during the workshop for Draft Final Report.*

**The Final IRBM Report will be gazetted under Section 46 (Implementation of Integrated Management Plan) and Section 127 of the LUAS Enactment 1999.*

ii) How important is it that the SE must be conducted?

**Very important so that all relevant agencies and stakeholders will understand and play their respective roles and responsibilities in carrying out the tasks as spelled out in the action plans of the IRBM Master Plan.*

iii) There are perceptions from stakeholders (through my online survey) that the SE is conducted as a matter of tokenism or just for the sake of formality. Can you respond to that?

**The SE is carried out not for formality but based on the need to obtain feedback so that the IRBM Master Plan that is developed will be comprehensive, taking into consideration all sectors and interests for the holistic management of the water resources and river basin.*

**Besides, SE will enable agencies and stakeholders to report on the progress of action taken based on the previous IRBM Master Plan.*

2. Compliance with Water Policy and Mandatory Requirements:

i) Can you describe how LUAS ensures compliance with relevant state policies and mandatory requirements for stakeholder engagement in river basin /water resources management?

**The approach of LUAS is based on the application of the principles of IWRM since the establishment of LUAS in 1999 under the 8th Malaysian Plan. Application of IWRM is also one of the strategies and components of the thrust on Sustainability which includes the implementation of IRBM as spelled out in the Selangor State Plan - 1 (RS1) 2021-2025.*

**Based on section 6(e) of LUAS Enactment 1999 one of the functions of LUAS is to coordinate the action of the various state agencies and encourage their cooperation and coordination on the various functions and usages of water resources.*

**Under section 46(d) of the LUAS Enactment 1999, the Board can establish local management committees and interest groups that will cooperate with the Board for the implementation of the IRBM Plan.*

**The development of the IRBM Plan is in line with Section 46 of the LUAS Enactment 1999 and its implementation by LUAS is prescribed in the Integrated River Basin Management Regulations.*

**The task of engagements and negotiations between agencies and stakeholders is one of the scopes in the Terms of Reference for Consultants employed for the development of the IRBM Plan.*

**The implementation of the functions of LUAS is based on the LUAS Enactment 1999 and the following subsidiary laws as gazetted by the State Authority:*

i) Integrated River Basin Management Plan Regulations for Langat River / Selangor River / Klang River 2019

ii) Water Resource Abstraction Regulations (Selangor) 2012

iii) Activities Affecting Changes to Resource Regulations (Selangor) 2013

iv) Water Diversion for Electricity Generation Regulations (Selangor) 2014

v) Entry or Release of Pollutants Regulations (State of Selangor) 2012

vi) Interior Water Navigation Regulations (State of Selangor) 2012

vii) Selangor Water Management Board (Licensing) Regulations 2012

viii) LUAS (Compound for Offence) Regulations 2006

ii) Are there any specific regulatory or legal frameworks that are driving LUAS's stakeholder engagement efforts?

- *Under Section 6(e) of LUAS Enactment 1999, one of the functions of LUAS is to coordinate the action of the various state agencies and encourage their cooperation and coordination on the various functions and usages of water resources.*
- *Under section 46(d) of the LUAS Enactment 1999, the Board can establish local management committees and interest groups that will cooperate with the Board for the implementation of the IRBM Plan.*
- *The Integrated River Basin Management Plan for Langat River / Selangor River / Klang River Regulations 2019 are the regulations for establishing an IRBM Plan as provided for under Section 127 of the LUAS Enactment 1999 where such an IRBM Plan has to be gazetted for its implementation. The Regulations provide details in terms of the function and membership of the Steering Committee which shall be appointed by the Board. This Steering Committee shall comprise the relevant technical agencies, the local authority, and the District and Land Office.*

3. Stakeholder Identification and Inclusiveness:

i) How does LUAS identify and categorize stakeholders when conducting a river basin or water resources management study?

- *Based on the role of the department and the functions as prescribed by the law related to the department concerned.*

ii) For inclusiveness, is there any stakeholder mapping exercise carried out?

- *Yes, for all the related State and Federal agencies (including DBKL), and they are as listed in the Action Plan for the Langat River/ Selangor River/Klang River IRBM Plans.*

iii) Are there strategies in place to involve underrepresented or marginalized groups?

- *Yes, in line with the requirement of LUAS Enactment 1999, the Strategies and Action Plans as contained in the IRBM Plan involved the commitment of all stakeholders such as relevant agencies, NGOs, and local communities.*

4. Collaboration and Partnerships:

i) To what extent does collaboration with other organizations or government agencies contribute to successful stakeholder engagement in river basin/water resources management? (eg collaboration with DID, DOE, etc)

- *Collaboration between LUAS and closely related agencies such as DID, DOE Local Authorities, District and Land Office, and other technical agencies as well as stakeholders such as Landasan Lumayan Sdn Bhd (LLSB) for the Selangor Maritime Gateway Klang River Project plays an important role in ensuring successful SE for the management of water resources and river basins.*

- *Among the platforms used is to hold engagement sessions, town halls, and also through meetings via the following Committees:*

i) *LUAS Technical Committee chaired by YB Dato State Secretary*

ii) *River and Coastal Basin Management Committee of Selangor chaired by EXCO Infrastructure and Agriculture*

iii) *Implementation Committee on the Conservation of Rivers in Selangor chaired by EXCO Infrastructure and Agriculture*

iv) *State Water Resources Pollution Emergency Committee of Selangor chaired by EXCO Environment and Public Health*

v) *Monitoring Committee for the Implementation of Integrated River Management Plan for*

Selangor River Basin, Langat River Basin, and Klang River Basin chaired by the Director of LUAS

vi) *Task Force for Selangor River Basin, Langat River Basin, and Klang River Basin chaired by the Director of LUAS*

vii) *Selangor State Jetty Management Committee chaired by the Director of LUAS*

viii) *Selangor State Water Resources Abstraction Management Committee chaired by the Director of LUAS*

ii) How do you identify and establish partnerships with organizations/agencies that share similar objectives and values?

- *Some of the approaches used are through the establishment of a Multi-Stakeholder Platform (MSP) or Committee consisting of the relevant agencies where meetings or engagement sessions are held at the sites.*
- *In addition, LUAS also promotes collaboration with agencies and stakeholders such as DID, DOE, MET MALAYSIA, AIR SELANGOR, and LLSB by signing an MOU for the sharing of hydrological data and river information.*

5. Contribution from Research Organizations and Academia:

i) How do research organizations and academia contribute to the knowledge base and research on river basin/ water resources management and stakeholder engagement?

- *Academics have been involved in water management studies under the responsibility of LUAS. For example, the Klang River IRBM Study 2022-2030 was by REDAC, USM Penang, while the previous Klang River IRBM Plan was developed by UKM Consulting Services.*
- *In addition, some studies involving beach management and aquaculture were carried out by UiTM.*
- *UM was also involved in the implementation of Citizen Science / People Science with the Friend of River (FoR) Community for the Selangor River.*

6. Role of Civil Society Organizations (CSOs) and Non-Governmental Organizations (NGOs):

i) What role do CSOs and NGOs play in advocating for stakeholder interests and influencing river basin/water resources management decisions?

- *CSOs and NGOs also play an important role in Water Resources Management. In the State of Selangor, many NGOs are actively involved in the Friends of River (FoR) programmes. The FoR is a*

Community-Based Programme involving river awareness and conservation practices by the local community within the river basin. The Community-Based Programme is also one of the components in the River Conservation Plan for the Selangor State which recognised the need for active involvement of NGOs/CSOs in organising local communities towards supporting and sustaining the conservation of rivers in the State of Selangor.

ii) Can you provide examples of successful CSO/NGO-led initiatives that have positively impacted river basin/ water resources management?

- *FoR for Langat River (UKM)*
- *FoR for Sungai Way (GEC)*
- *FoR for Klang River at Taman Melawati River Three*
- *Kawa Inspiration group for the Selangor River*

7. Corporate Sector Involvement:

i) In what ways does the corporate sector participate in river basin/water resources management initiatives, and how do their interests align with stakeholder engagement efforts?

The Corporate Sector can play an important role in Water Resources Management. Among the initiatives that can be implemented are CSR programs of the Company which generally involve the community and related agencies in providing awareness of the importance of water resources via activities such as tree planting, plogging, gotong royong, etc.

ii) Can you share instances where corporate sector involvement led to sustainable and mutually beneficial outcomes in river basin/water resources management?

- *Tan Chong: Construction of solar panels for the alternative water resource from the ponds in Serendah.*
- *Sime Darby: Management of Green Area in Elmina.*

8. Local Communities Engagement:

i) What strategies does LUAS employ to engage and involve local communities in river basin/water resources management decisions?

With the involvement of FoRs for the State of Selangor. Every FoR program will be reported to LUAS via the webpage which has been developed by LUAS. Every FoR also has a LUAS representative who acts as a caretaker or facilitator for program implementation.

ii) Can you provide examples of projects/studies where community participation led to improved outcomes or the resolution of conflicts?

Examples of community engagement that has a positive impact: a) FoR for Langat River where there is a close collaboration with UKM, b) FoR Taman Melawati for Klang River which is involved in the Selangor River People's Science Programme in collaboration with Inspiration Kawa and UM, the Biochar program with the Soil Science Association Malaysia, and the weekly Gotong Royong Programme or KUDAH.

9. Political Involvement and Participation:

i) How does political involvement, at both the local, state, and national levels, influence stakeholder engagement in river basin/water resources management?

The involvement of politicians in the implementation of the program will give added value to the success of the program involving the community and ensure political support and commitment towards the effective management of water resources.

ii) Should politicians be included as the invited stakeholders? (please give reasons for Yes or No)

Yes, because politicians can set a good example for awareness programs especially those organized by the Government and the community. It's also a commitment to ensure that the Government's policies are implemented smoothly.

10. Engagement Strategies:

i) What strategies, methods, or approaches does LUAS employ to engage with diverse stakeholder groups effectively?

Using the LUAS website, the Implementation Committee meeting platform of the Selangor River Conservation, and the FoR Selangor State program.

ii) Where the Consultant is employed to conduct the SE on LUAS's behalf, is there any SE guideline or checklist for the Consultant to follow?

There is no Guideline or Checklist but based on the scope and TOR of the consulting work.

iii) Does the Consultant come up with a comprehensive SE plan for LUAS's approval?

No, but is normally discussed in general during the Inception Report meeting.

iv) In your opinion, is the 'Whole of Government and Whole of Society' approach a practical and effective strategy for conducting SE in river basin/water resources management in Selangor?

Yes, the involvement and cooperation between the two parties either the Government or the Community is very important in ensuring the management of water resources and river basins in a holistic manner and that all strategies and action plans are successfully implemented. Extra time and budget may be needed to adopt such an approach.

11. Communication and Collaboration:

i) How does LUAS facilitate communication and collaboration among diverse stakeholders when conducting the SE?

Through workshops or group brainstorming sessions among stakeholders. Follow-up correspondence after the SE can be through emails.

12. Transparency:

i) How does LUAS ensure stakeholder engagement processes are transparent, accountable, and equitable?

The whole process during the implementation of the SE including every stakeholder's feedback will be recorded, and the summary will be presented to the Implementation Committee's Meeting.

ii) Can you explain how LUAS promotes transparency and openness in its engagement processes?

Each agency and stakeholder will be given the opportunity to voice their respective opinions and feedback, and where appropriate will be incorporated in the decision-making process for the development of the IRBM Plan.

13. Willingness to Share Information and Data:

i) To what extent does LUAS share data and information related to the water resources/river basin with stakeholders, including those outside the organization?

Stakeholders can apply to LUAS for the data and available information which will be reviewed and considered by the LUAS Information Officer on the intention of usage of such data and information. Data sharing can also have made available via MOUs signed with the relevant agencies or parties.

ii) Is there any government policy/law that restricts the sharing of information and data, particularly from findings of Water Resources/IRBM studies?

In general, the IRBM Plan developed will be shared with all the agencies involved in the development of the IRBM Plan. As for the public, data or information sharing will be subject to the conditions of the Selangor State Freedom of Information Enactment.

14. Capacity Building and Training:

i) How does LUAS assess and enhance the competency of staff or consultants/facilitators responsible for conducting stakeholder engagement activities?

LUAS staff are highly trained and skilled officers concerning the development of the IRBM Plan, including the facilitating process. Regular discussions between Consultants and LUAS staff during the development of IRBM studies to ensure that the study objectives are achieved. LUAS officers will also be appointed as facilitators together with the Consultants during the SE sessions.

ii) What efforts are in place to build the capacity of stakeholders, including local communities, to actively participate in river basin management?

LUAS also arranges technical visits with agencies and stakeholders involved with the SE to provide necessary training and awareness on matters or issues regarding water and river management. In addition, for participants from the FoR, incentives will be provided in various forms for their attendance in the training or exposure sessions.

15. Conflict Resolution and Mediation:

i) In cases where conflicts arise among stakeholders during engagement processes, how does LUAS handle conflict resolution and mediation?

Bilateral discussions with stakeholders to seek compromise solutions within the provision of existing legislation to ensure the benefits and objectives of IRBM are achieved.

16. Integration with Decision-Making:

i) To what extent is the feedback from stakeholders being considered by LUAS in developing the Water Resources Management / IRBM Plan?

Positive feedbacks are generally accepted as long as they are in line with the provisions of the existing legislation in force and do not violate the LUAS Enactment 1999.

ii) How does stakeholder input influence decision-making processes within LUAS in developing the Water Resources Management /IRBM Plan?

Stakeholders with strong and practical input will have a great influence and their input can be considered if it provides common benefits in the management of water resources.

17. Monitoring and Evaluating the Effectiveness of Stakeholder Engagement:

i) How does LUAS monitor and evaluate the overall impact and effectiveness of stakeholder engagement in river basin/water resources management studies?

Using 2 existing platforms i.e. a) Monitoring Committee for Selangor, Langat, and Klang River IRBM Plan; and b) Committee for Implementation of Selangor River Conservation. These committees will carry out the necessary periodic monitoring of the success of the action plans which indirectly evaluates the impact and effectiveness of stakeholder engagement carried out.

ii) Do you use specific metrics or indicators to assess the success of engagement efforts?

In the monitoring mechanism of the implementation of the IRBM Plan, there are established indicators for the evaluation of achievements of the strategies and action plans.

iii) How would you characterize the overall effectiveness of stakeholder engagement practices in water resources/river basin management within your organization?

Overall, the benefits and role of SE have been very useful and effective in assisting LUAS in developing the IRBM Plan.

18. Environmental Concerns and Mitigation:

i) How does LUAS address environmental concerns and sustainability in stakeholder engagement processes for water resources/river basin management?

Implementation of activities such as FoR where there are provided Activity Guidelines which should be in line with environmental protection and sustainability besides ensuring adequate water resources. Moreover, the environmental component is one of the aspects to be included and addressed in the development of the IRBM Plan.

ii) Should SE in water resources/river basin management be integrated into or incorporate the ESG framework? If so, how can this be done?

Implementation of SE activities involving management components of water resources and their protection are naturally integrated as one of the components in the ESG framework. It can be enhanced by incorporating various green incentives in water infrastructures.

19. Cultural and Heritage Preservation:

i) How does LUAS respect and incorporate cultural and heritage preservation into river basin/water resources management projects?

The relevant components of the protection of historic and cultural places such as fishing villages are accounted for in the preparation of the State of River Report as well as the development of the IRBM Plan for a basin. The aspect of ecotourism is also given due attention such as the firefly sites at Kg Kuantan along the Selangor River.

20. Religious and Spiritual Considerations:

i) Do religious or spiritual aspects play a role in stakeholder engagement in river basin/ water resources management, especially in areas where rivers hold cultural or religious significance?

Where any location or section of the river has been designated for religious ceremonies, it is appropriate that the relevant religious stakeholders be consulted together to ensure that the activities carried out do not affect the quality and quantity of water resources.

21. Financial Constraints:

i) How do financial constraints impact LUAS's ability to conduct effective stakeholder engagement in river basin management?

An adequate budget is certainly important to ensure that the necessary number of engagements can be carried out with proper planning to include all relevant stakeholders.

22. Challenges and Obstacles:

i) Besides finance, what are other challenges or obstacles LUAS faces when engaging with stakeholders in river basin management?

- *The understanding and knowledge of stakeholders about water and rivers may differ greatly, especially with water-related agencies. This*

will make it difficult to come to a consensus or agreement on the best options for river basin management.

As for government agencies, the low-level staff attending the SE may not be able to contribute effectively.

23. Success Stories and Lessons Learned:

i) Can you share success stories or examples of projects/studies where stakeholder engagement led to significant positive outcomes in water resources/river basin management?

- *The FoR Program for Langat River*
- *The FoR Program at Taman Melawati for the Klang River*
- *The Drainage Rehabilitation Project at Jalan Suasas, Banting.*

ii) On the other hand, what are some key lessons learned from situations where stakeholder engagement faced challenges or did not yield the desired results?

Early planning to ensure every SE process can be implemented successfully with harmonious discussion through appropriate platforms and with clear and easy-to-understand instructions.

24. Emerging Trends and Future Outlook:

i) In your view, what emerging trends or innovative approaches are likely to shape the future of stakeholder engagement in water resources/river basin management?

Community-based programs with the support of local community and agencies as well as with the involvement of politicians such as the constituency assemblyman.

ii) How can organizations adapt to changing stakeholder dynamics and evolving environmental challenges?

Regular discussions for input and views on the impact of climate change on water resources via platforms such as the various Committees that have been created under the Selangor State Rivers Conservation Implementation Programme.

25. Closing Thoughts:

i) Is there anything else you would like to share or emphasize about LUAS's approach towards effective stakeholder engagement in water resources/integrated river basin management?

LUAS always plays an important role in ensuring the sustainability of water resources. However, LUAS cannot afford to play alone without the cooperation of each agency and stakeholders. Every action needs to be performed in an integrated manner to ensure the sustainability of water resources for today, tomorrow, and future generations.

Interviewee 4 – Dato’ Ir. Zaki, Director General of NAHRIM

1. Purpose of Stakeholder Engagement

What is the purpose of NAHRIM conducting Stakeholder Engagement (SE) when carrying out a study related to river or water resources management?

- a. Making Informed Decisions through Scientific Findings: SE makes sure that the decision-making process is based on a full understanding of the views, needs, and concerns of all parties, such as environmental groups, businesses, local communities, and government agencies.*
- b. Risk Mitigation: Involving stakeholders early in the process helps find possible problems or conflicts so that effective steps can be taken to solve them.*
- c. Legitimacy and Acceptance: Involvement of relevant stakeholders makes the study and actions that follow more legitimate.*
- d. Holistic Understanding: Stakeholders bring different skills and points of view to the table. By involving them, NAHRIM can get a fuller picture of the complicated problems that come up when managing rivers and water, which leads to better and more complete answers.*

How important is it that SE must be conducted?

- a. Acceptance by Society: SE helps people accept the project and its results since they have already been consulted.*
- b. Resolving Conflicts: Potential conflicts can be found and dealt with before they get worse by involving stakeholders.*
- c. Better Decisions: Getting different people's opinions into the decision-making process makes it better and all-rounded.*
- d. Long-run Success and Sustain: SE helps river and water management projects sustain and be successful in the long run.*

There are perceptions from stakeholders that the SE is conducted as a matter of tokenism or just for the sake of formality. Can you respond to that?

Partially true if not properly planned and carried out. NAHRIM believes SE would encourage:

- a. Transparent Communication*
- b. Showing Impact*
- c. Continuous Involvement*
- d. Accountability and Responsibility*

These elements are important to ensure the effectiveness of the projects implemented, void redundant effort and optimise resources. It should be considered to ensure the projects can be executed at all levels although sometimes difficult to get a consensus.

2. Compliance with Water Policy and Mandatory Requirements:

Can you describe how NAHRIM ensures compliance with relevant water policies and mandatory requirements for stakeholder engagement in river basin management?

- a. Policy Alignment: NAHRIM makes sure that water policies are followed by making sure that the way it engages stakeholders is in line with the policies that govern managing river basins (national and regional policies) and integrating their principles into stakeholder engagement.*
- b. Making Use of Best Practices: NAHRIM adopts international and national best practices and standards related to stakeholder engagement in water management. Such as Climate Change Policy and SDG 2030.*

Are there specific regulatory or legal frameworks that drive NAHRIM's engagement efforts?

Yes, the following:

- a. Dasar Air Negara*
- b. Rancangan Malaysia 5 Tahun*

- c. *Integrated Water Resource Management*
- d. *Dasar Perubahan Iklim*
- e. *IPCC Assessment Report*
- f. *UNFCCC Paris Agreement including obligation to GHG emission reduction and adaption action*

3. Stakeholder Identification and Inclusiveness:

How does NAHRIM identify and categorize stakeholders when conducting a river basin or water resources management study?

- a. *Stakeholder Analysis: NAHRIM conducts stakeholder analysis to identify and categorize relevant stakeholders. This involves identifying individuals, groups, or organizations that may be affected by or have an impact on the river basin or water resources management study.*
- b. *Key Stakeholder Categories: Stakeholders can include local communities, government agencies, non-governmental organizations (NGOs), businesses, researchers, and others. NAHRIM categorizes stakeholders based on their interests, influence, and level of involvement in the water management context. For example, MRI for input on health and MARDI on agriculture.*
- c. *Based on current/future issues and type of R&D programme conducted.*

For inclusiveness, is there any stakeholder mapping exercise carried out?

No

Are there strategies in place to involve underrepresented or marginalized groups?

Yes, commonly included.

4. Collaboration and Partnerships

To what extent does collaboration with other organizations or government agencies contribute to successful stakeholder engagement in river basin/water resources management?

- a. Resource Pooling: Pooling of resources, expertise, and knowledge from various organizations and government agencies.*
- b. Diverse Perspectives: Different entities bring diverse perspectives to the table. Ensuring a more comprehensive understanding of issues and fostering creativity in developing solutions.*
- c. Increased Credibility: Partnerships with reputable organizations or government agencies enhance the credibility of the stakeholder engagement process.*
- d. Expanded Reach: Collaboration facilitates reaching a wider audience of stakeholders.*
- e. Shared Responsibilities: Working collaboratively allows for the sharing of responsibilities and workload.*
- f. Policy Alignment: Collaboration with government agencies ensures that stakeholder engagement efforts align with national policies and regulatory frameworks.*

How do you identify and establish partnerships with organizations/agencies that share similar objectives and values?

- a. Scoping and Networking: NAHRIM likely engages in scoping activities to identify organizations and government agencies with similar objectives and values.*
- b. Stakeholder Analysis: As part of stakeholder analysis, NAHRIM may identify potential partners based on their interests and expertise.*
- c. Type of R&D conducted*
- d. Issues and Problem*
- e. Formal Collaboration Agreements: NAHRIM may establish formal collaboration agreements or memoranda of understanding (MOUs) with identified partners.*
- f. Joint Initiatives and Projects: Collaborations can be initiated through joint projects or initiatives that align with the common goals of NAHRIM and partner organizations.*

5. Contribution from Research Organizations and Academia

How do research organizations and academia contribute to the knowledge base and research on river basin/ water resources management and stakeholder engagement?

a. Scientific Research

- *Conducting in-depth scientific studies to understand the hydrological, ecological, and environmental aspects of river basins (basic and applied research together with models and simulations development)*

b. Data Collection and Analysis

- *Collecting and analyzing large datasets related to water resources, climate, land use, and other relevant factors.*
- *Providing valuable insights into trends, patterns, and correlations, which inform evidence-based decision-making in water management.*

c. Innovative Technologies

- *Developing and implementing innovative technologies for monitoring and managing water resources. This may include remote sensing, GIS (Geographic Information System), and other advanced tools.*

d. Policy Development

- *Conducting policy-oriented research to inform the development of effective water policies and regulations.*

e. Public Awareness and Education

- *Raising public awareness about the importance of sustainable water management through outreach programs and educational initiatives. Eg: Sahabat Sungai Langat*
- *Communicating research findings to the public to foster informed decision-making and community engagement.*

6. Role of Civil Society Organizations (CSOs) and Non-Governmental Organizations (NGOs)

What role do CSOs and NGOs play in advocating for stakeholder interests and influencing river basin/water resources management decisions?

- a. Advocacy and Representation: CSOs and NGOs serve as advocates for various stakeholder groups, including local communities, environmental organizations, and marginalized populations.*
- b. Community Empowerment: CSOs and NGOs often work directly with communities to empower them with knowledge, skills, and resources. This empowerment enables communities to actively participate in decision-making, ensuring that their voices are heard and considered in water management initiatives.*
- c. Monitoring and Accountability: CSOs and NGOs play a crucial role in monitoring the implementation of water management policies and projects. To ensure transparency and adherence to environmental and social standards.*
- d. Capacity Building: These organizations engage in capacity-building activities, providing training and education to local communities and other stakeholders.*
- e. Public Awareness and Education: CSOs and NGOs work to raise public awareness through campaigns, workshops, and educational programs.*
- f. Collaboration with Research Institutions: This collaboration strengthens the evidence base for advocacy efforts, allowing these organizations to make informed arguments in favor of sustainable water management practices.*
- g. Legal Advocacy: CSOs and NGOs may engage in legal advocacy to ensure that water management decisions align with existing laws and regulations.*

Can you provide examples of successful CSO/NGO-led initiatives that have positively impacted river basin/ water resources management?

- a. Global Environment Centre (GEC) – National River Care Activity*
- b. World Wildlife Fund – Wetland (utilised mangrove for coastal protection from the impact of sea level rise)*
- c. Reef Check Malaysia– coral reef*

7. Corporate Sector Involvement

In what ways does the corporate sector participate in river basin/water resources management initiatives, and how do their interests align with stakeholder engagement efforts?

- a. Collaboration with Stakeholders: Engaging with stakeholders helps align corporate interests with broader societal and environmental goals.*
- b. Investment in Water Infrastructure: This may involve supporting community water supply systems, watershed restoration, or water treatment facilities.*
- c. Corporate Social Responsibility (CSR) Initiatives: These initiatives often include community engagement, education, and projects aimed at improving water access, sanitation, and hygiene in surrounding areas.*
- d. Adherence to Water Policies and Regulations: This ensures compliance with legal frameworks and contributes to sustainable water governance.*
- e. Involve and participate directly in the programme – financing the programme*

Can you share instances where corporate sector involvement led to sustainable and mutually beneficial outcomes in river basin/water resources management?

Collaboration TNB/TNBR-NAHRIM-Perbadanan Kemajuan Cameron Highland (PKCH) & Majlis Daerah Cameron Highland (MDCH) through Bertam River Basin engagement programme (river sedimentation management program) and Intelligent River Guard (INTRiGUARD) innovation product.

8. Local Communities Engagement

What strategies does NAHRIM employ to engage and involve local communities in river basin/water resources management decisions?

- a. Community-Based Participatory Research (CBPR):*

- *Implement community-based participatory research approaches that involve local residents in the research process. Collaborate with communities to collect data, analyze findings, and jointly develop solutions to water-related challenges.*

b. Education and Capacity Building:

- *Conduct educational programs and capacity-building initiatives to enhance the understanding of local communities about water management practices. Empower community members with the knowledge and skills needed to actively participate in decision-making processes.*

Can you provide examples of projects/studies where community participation led to improved outcomes or the resolution of conflicts?

a. SPAH Johor (Masjid Jamek Tan Sri Ainuddin Wahid, Skudai, Johor) (2023)

b. SPAH PusatKebajikanAnakYatimIslam Ledang, Tangkak, Johor (2018)

c. SPAH KlinikKesihatanTanjungEmbang, Santubong, Sarawak (2018)

d. PESSVA – Participatory Ecosystem Service Shared Value Assessment for Chenderoh and Bukit Merah Lake

e. Integrated Lake Basin Management Plan (ILBMP) for Semberong and Durian Tunggal Lake

9. Political Involvement and Participation

How does political involvement, at both the local and regional levels, influence stakeholder engagement in river basin/water resources management?

a. Policy Formulation and Implementation: Political involvement is crucial in the formulation and implementation of policies. Shaping the legal and regulatory frameworks that guide water management practices.

b. Resource Allocation and Budgeting: Political decisions influence the allocation of resources and budgeting. Securing funding for infrastructure development, conservation efforts, and others.

- c. *Decision-Making Processes: Political leaders often participate in decision-making processes. Shape the direction of these decisions and impact the overall governance.*
- d. *Representation of Constituent Interests: Politicians represent the interests of their constituents, including local communities, in water-related matters.*
- e. *Conflict Resolution: Political leaders may play a role in resolving conflicts related to water resources. Whether it's disputes over water allocation, land use, or environmental impacts, political involvement can facilitate negotiations and conflict resolution.*

Should politicians be included as the invited stakeholders? (please give reasons for Yes or No).

Yes, Politicians Should Be Included because:

- a. *Representation of Public Interests: Politicians represent the public, and including them as stakeholders ensures that the interests and concerns of the broader community are considered in decision-making processes.*
- b. *Policy Influence: Politicians have the authority to influence policies and regulations. Including them in stakeholder engagement provides an opportunity to align water management strategies with political priorities and legislative frameworks.*
- c. *Communication Channels: Politicians serve as key communication channels between government institutions and the public. Involving them ensures effective communication and coordination in water-related initiatives.*
- d. *Conflict Resolution: Politicians can play a role in resolving conflicts and mediating disputes. Their inclusion as stakeholders can contribute to smoother conflict resolution processes.*
- e. *"Political Will" especially at the state level where we have many IRBM developed by JPS but have not been implemented*

10. Engagement Strategies

What strategies, methods, or approaches does NAHRIM employ to effectively engage with diverse stakeholder groups?

a. Stakeholder Identification and Analysis: Identify and understand the diverse stakeholder groups relevant to river basin and water resources management. This involves categorizing stakeholders based on their interests, influence, and potential impact on the study.

b. Participatory Workshops and Forums: NAHRIM may organize participatory workshops and forums to engage with stakeholders. These sessions provide a platform for stakeholders to express their opinions, share local knowledge, and actively participate in the decision-making process. Eg: Siri Roadshow & Outreach R&D Institut Penyelidikan Air Kebangsaan Malaysia (NAHRIM) and Hari RDCI NAHRIM 2023.

Where the Consultant is employed to conduct the SE on NAHRIM's behalf, is there any SE guideline or checklist for the Consultant to follow?

a. Basically, the consultant doesn't get involved

b. No guidelines or checklist

Does the Consultant come up with a comprehensive SE plan for NAHRIM's approval?

Not Applicable

In your opinion, is the 'Whole of Government and Whole of Society' approach a practical and effective strategy for SE in river basin/water resources management?

a. In the context of river basin and water resources management, the 'Whole of Government and Whole of Society' approach is practical and maybe partially effective.

b. For example, an incinerator project is good for protecting the river basin ecosystem but objected to by the community.

c. Thus, this strategy might be unable to satisfy everyone both from Government and Society.

11. Communication and Collaboration

How does NAHRIM facilitate communication and collaboration among diverse stakeholders?

- a. Regular Meetings: to provide updates on the progress of studies, share relevant information, and gather feedback.*
- b. Public Forums and Workshops: to engage with a broader audience, including local communities, businesses, and NGOs.*
- c. Information Dissemination: NAHRIM likely employs various channels to disseminate information to stakeholders. This may include conferences, technical talks, seminars, technical reports, and annual report*

12. Transparency

How do you ensure stakeholder engagement processes are transparent, accountable, and equitable?

- a. Clear Communication: Ensuring transparent stakeholder engagement begins with clear and accessible communication.*
- b. Inclusive Participation: NAHRIM strives for inclusive participation, making efforts to involve a diverse range of stakeholders.*
- c. Public Access to Information: Transparency is enhanced when information is easily accessible to the public.*
- d. Feedback Mechanisms: Establishing clear feedback mechanisms allows stakeholders to provide input, express concerns, and seek clarification.*

Can you explain how NAHRIM promotes transparency and openness in its engagement processes?

- a. Public Disclosure of Information: This can be achieved through online platforms, public libraries, or community engagement events.*

- b. Engagement Through Multiple Channels: Utilizing a variety of communication channels, such as meetings, seminars, and workshops, ensures that information reaches a diverse audience.*
- c. Online Platforms for Engagement: Utilizing online platforms, such as dedicated project websites or social media, facilitates continuous engagement and provides a space for stakeholders to access information, ask questions, and participate in discussions. MyCoast, N-HyDAA, and MAIN.*

13. Willingness to Share Information and Data

To what extent does NAHRIM share data and information related to the water resources/river basin with stakeholders, including those outside the organization?

Willingness to Share Information and Data by NAHRIM. Common practices that demonstrate a willingness to share information include:

- a. Publicly Accessible Reports: NAHRIM likely publishes reports, studies, and findings on its website or through other public platforms. These documents provide stakeholders, including the public, with access to valuable information.*
- b. Stakeholder Engagement Platforms: NAHRIM uses stakeholder engagement platforms, such as public meetings, workshops, and forums, to share information directly with stakeholders. These events provide opportunities for two-way communication and ensure that information reaches diverse audiences.*
- c. Collaborative Projects: In collaborative projects with government agencies, NGOs, or academic institutions, NAHRIM shares data and findings to facilitate joint decision-making and address shared challenges in water resources management.*
- d. Technical Reports and Publications: Technical reports, research papers, and publications may be shared with the scientific and academic community. This contributes to the broader knowledge base in water resources management and encourages peer review.*

e. Open Data Initiatives: NAHRIM participates in open data initiatives, making non-sensitive datasets publicly available. Open data promotes transparency, allows for independent analysis, and supports innovation in addressing water management challenges.

f. Customized Information for Stakeholders: NAHRIM tailors information and data for specific stakeholder groups, ensuring that the content is accessible and relevant to diverse audiences, including policymakers, local communities, and businesses.

Is there any government policy/law that restricts the sharing of information and data, particularly from findings of Water Resources/IRBM studies?

- Need to consider the information/data available in flood risk/hazard map – to think the setback of this information given direct access to the public that may harm property development/business.*
- At this moment no policy/law that restricts the use of the information/data if the data/information is publicly available.*
- Comply with the National Data Sharing Policy (NDSP)*

14. Capacity Building and Training

How does NAHRIM assess and enhance the competency of staff or consultants/facilitators responsible for conducting stakeholder engagement activities?

Assessment and Enhancement of Competency for Stakeholder Engagement:

- a. Training Programs*
- b. Skill Assessments (LNPT)*
- c. Participation in Workshops and Seminars*
- d. Frequently invited to give a talk/to be a panel.*

- e. *Continuous Professional Development*
- f. *Peer Learning*

What efforts are in place to build the capacity of stakeholders, including local communities, to actively participate in river basin management?

Capacity Building for Stakeholders, Including Local Communities:

- a. *Workshops and Training*
- b. *Educational and Awareness Programs*
- c. *Information Dissemination – reports, manuals, etc.*
- d. *Access to Resources – website, reports, etc.*
- e. *Demonstration Projects*
- f. *Roadmap Program and Rakan Community – to expose stakeholders to the current issues and participation by the community.*

15. Conflict Resolution and Mediation

In cases where conflicts arise among stakeholders during engagement processes, how does NAHRIM handle conflict resolution and mediation?

- a. *Open Communication Channels: Encouraging stakeholders to express concerns and providing a platform for dialogue helps in the early identification of conflicts and prevents escalation.*
- b. *Collaborative Problem-Solving: Encouraging collaborative problem-solving. Facilitate discussions where stakeholders work together to identify common goals and develop solutions that address the concerns of all parties involved.*
- c. *Documentation and Learning*
- d. *Continuous Improvement: Regular evaluations, feedback loops, and post-conflict assessments contribute to refining strategies and preventing similar conflicts in the future.*

16. Integration with Decision-Making

To what extent is the feedback from stakeholders considered by NAHRIM in developing the Water Resources / IRBM Plan?

Normally focus on the methodology developed and the final findings.

a. Early Involvement:

- *Stakeholders are likely involved from the early stages of plan development. This ensures that their perspectives, concerns, and local knowledge are considered throughout the planning process.*

b. Consultation Meetings and Workshops:

- *Regular consultation meetings are likely organized to gather input from stakeholders. These sessions provide a platform for stakeholders to express their views, provide suggestions, and contribute to the decision-making process.*

How does stakeholder input influence decision-making processes within NAHRIM in developing the Water Resources/IRBM Plan?

a. Informed Decision-Making:

- *Stakeholder input is likely a critical factor in informed decision-making.*

b. Alignment with National and International Aspirations:

- *Stakeholder input helps align with the aspirations and priorities.*

c. Identification of Priorities:

- *Stakeholder input assists in identifying priorities*

d. Conflict Resolution and Mitigation:

- *Stakeholder input may contribute to the identification and mitigation of potential conflicts.*

e. Enhanced Plan Acceptance:

- *Plans that incorporate stakeholder input are more likely to be accepted and supported by the communities affected.*

f. Compliance with Regulations:

- *Stakeholder input may guide decisions to ensure compliance with relevant regulations and legal frameworks.*

g. Public Trust and Credibility:

- *Considering stakeholder input enhances public trust and credibility.*

17. Monitoring and Evaluating the Effectiveness of Stakeholder Engagement

How does NAHRIM monitor and evaluate the overall impact and effectiveness of stakeholder engagement in river basin/water resources management studies?

a. Feedback Mechanisms: Implementing structured feedback mechanisms allows NAHRIM to collect input from stakeholders on their experience with the engagement process.

b. Monitoring Participation Levels: Tracking the levels of participation in engagement activities over time helps NAHRIM understand the evolving dynamics of stakeholder involvement. An increase in participation may indicate growing trust and interest in the engagement process.

Are there specific metrics or indicators that you use to assess the success of engagement efforts?

Not Applicable

How would you characterize the overall effectiveness of stakeholder engagement practices in water resources/river basin management within your organization?

- a. By incorporating feedback from other authorities and stakeholders. Likewise, if Nahrim is a stakeholder, the dataset and information provided by NAHRIM should be included by the authorities concerned.*

b. Proactive Inclusivity: active involvement and representation of diverse individuals, groups, or communities in decision-making processes, programs, or initiatives

c. Meaningful Participation: Effective engagement involves meaningful participation, where stakeholders feel their input is valued, and there is evidence that their contributions influence decision-making processes.

d. Adaptability and Learning: The ability of NAHRIM to adapt its engagement strategies based on feedback, lessons learned, and changing circumstances is indicative of effective practices. Continuous improvement and learning from past engagements contribute to overall effectiveness.

e. Demonstrated Impact: The extent to which stakeholder engagement has a demonstrable impact on policies, plans, or projects reflects the effectiveness of the process. Tangible changes based on stakeholder input indicate that engagement is a driving force in decision-making.

18. Environmental Concerns and Mitigation:

How does NAHRIM address environmental concerns and sustainability in stakeholder engagement processes for water resources/river basin management?

- a. New findings from R&D programmes such as climate change and sea-level rise conducted*
- b. Incorporating Sustainable Practices*
- c. Climate Change Adaptation and Mitigation*
- d. Water Quality Improvement*
- e. Stakeholder Education and Awareness*

Should SE in water resources/river basin management be integrated into the ESG framework? If so, how can this be done?

Yes. It should be included in the related water resources roadmap plan, where engagement directly with stakeholders and NGOs related to ESG, particularly on climate change projection data dissemination through:

- a. Developing Inclusive Policies*
- b. ESG Impact Assessments*
- c. ESG Reporting and Disclosure*
- d. Stakeholder Representation in Governance Structures*
- e. Metrics and Key Performance Indicators (KPIs)*
- f. Collaboration with ESG Professionals*
- g. Continuous Improvement and Learning*

19. Cultural and Heritage Preservation

How does NAHRIM respect and incorporate cultural and heritage preservation into river basin/water resources management projects?

Not Applicable to NAHRIM's project

20. Religious and Spiritual Considerations

Do religious or spiritual aspects play a role in stakeholder engagement in river basin/ water resources management, especially in areas where rivers hold cultural or religious significance?

Role of Religious or Spiritual Aspects in Stakeholder Engagement in River Basin/Water Resources Management:

In areas where rivers hold cultural or religious significance, religious and spiritual considerations can indeed play a crucial role in stakeholder engagement for river basin and water resources management. The inclusion of religious and spiritual aspects is important for fostering

understanding, respect, and collaboration among diverse stakeholders. Some ways in which religious and spiritual considerations may influence stakeholder engagement:

- a. Sacred Sites and Rituals*
- b. Ceremonial Practices and Water Use*
- c. Understanding Cultural and Religious Calendar*
- d. Religious Values in Decision-Making*

21. Financial Constraints

How do financial constraints impact NAHRIM's ability to conduct effective stakeholder engagement in river basin management?

It will affect and impact the accuracy and certainty of the study carried out due to the elements below:

- a. Lack of Resource Allocation for Engagement Activities*
- b. The number of Frequency and Scale of Engagement Events*
- c. Limit Technological Infrastructure for Engagement*
- d. Limit Travel and Logistics for Field Engagement*
- e. Less/No Cost to conduct Capacity Building and Training Programs*
- f. Less/No Cost for Consultation and Expertise*
- g. Less/No Cost to improve Data Collection and Analysis*
- h. Less/No Cost for Communication and Outreach Strategies*
- i. Less/No Cost for Continues Monitoring and Evaluation*

22. Challenges and Obstacles

Besides finance, what are other challenges or obstacles NAHRIM faces when engaging with stakeholders in river basin management?

- a. Diverse Stakeholder Interests*
- b. Limited Stakeholder Awareness*
- c. Communication Barriers*
- d. Power Imbalances*
- e. Resistance to Change*
- f. Political Interference*
- g. Limited Technical Capacity*
- h. Time Constraints*
- i. Environmental Uncertainties*
- j. Legal and Regulatory Complexities*
- k. Data Availability and Quality*

23. Success Stories and Lessons Learned

Can you share success stories or examples of projects/studies where stakeholder engagement led to significant positive outcomes in water resources/river basin management?

- 1. Sistem Pengumpulan Air Hujan (SPAH) dan Pili Cepak Air di Masjid Jamek Tan Sri Ainuddin Wahid, Skudai, Johor.*

Objective

- a. Determine the potential suitability of using the Rainwater Harvesting System (SPAH) at Jamek Tan Sri Ainuddin Wahid Mosque, Skudai*
- b. Transforming the mosque building into an energy and water efficient building.*

Target Groups

- a. Mosque congregation*
- b. Locals*
- c. State Religious Department*

Advantage

- a. Reduce dependence on the use of treated water that can be used for other purposes (potable use).*
- b. Save the cost of utility bills borne by the mosque*
- c. Educating the community towards green practices through the concept of energy and water efficient buildings (green building concept).*
- d. Transforming mosque systems, management and facilities towards green practices.*

Expected Outcome

- a. Reduce dependency on the use of treated water in mosque buildings by 25% per year.*
- b. Make the mosque building an example of energy and water efficient buildings that can be implemented in other buildings in the state of Johor and throughout Malaysia.*

2. PENYELIDIKAN KE ARAH SEKURITI DAN KUALITI AIR SUMBER AIR DAN KELESTARIANNYA TADAHAN SUNGAI BERTAM - ACTION PLAN FOR BERTAM CATCHMENT AREA

- i. Penganjuran Program Kelestarian Tadahan Sungai Bertam siri 1: Bengkel Penambahbaikan Syarat-Syarat Teknikal Untuk Kelulusan Lesen Pendudukan Sementara (LPS) Pertanian Dan Kaedah Pelaksanaan (2016)*
- ii. Penganjuran Program Kelestarian Tadahan Sungai Bertam siri 2: Pemimpin bersama rakyat ke arah Kelestarian Tadahan Sungai Bertam (2017)*
- iii. Penganjuran Program Kelestarian Tadahan Sungai Bertam siri 3: Projek Perintis : Pemasangan INTRiGUARD di rizab sungai Cameron Highland (2018)*

Objective

- a. Implementation of Buffer Zone Action Plan for Bertam Catchment and Erosion and Sediment Control Action Plan at Cameron Highlands.*
- b. The primary objectives were to protect and conserve river catchment areas, reduce land encroachment, and address erosion and sedimentation issues affecting the Sultan Abu Bakar Dam*

Target Group

- a. Local Communities*
- b. Agricultural Stakeholders*
- c. Government Agencies*
- d. Environmental Organizations Advantage*
- a. Land Encroachment Reduction*
- b. Erosion and Sediment Control Outcome*
- a. Preservation of River Catchments*
- b. Enhanced Water Quality*
- c. Government Recognition and Appointment*

On the flip side, what are some key lessons learned from situations where stakeholder engagement faced challenges or did not yield the desired results?

- a. To conduct early and inclusive engagement - to build trust and garner support,*
- b. To have effective communication strategies, and*
- c. To conduct capacity building for effective participation - providing capacity-building initiatives, training programs, and accessible information to empower stakeholders to actively contribute to decision-making processes.*

24. Emerging Trends and Future Outlook

In your view, what emerging trends or innovative approaches are likely to shape the future of stakeholder engagement in water resources/river basin management?

- a. *Index or matrix to assess SE participation and its effectiveness*
- b. *Toolkits to facilitate SE participation*
- c. *SE Empowerment through Technology:*
 - *Leveraging technology to empower SE, providing them with tools and information to actively contribute to decision-making processes.*
 - *Data Analytics and AI for Decision Support - Increased use of data analytics and artificial intelligence (AI) to process large datasets.*
 - *Introduce gamification elements in engagement strategies to make the process more interactive and engaging.*

How can organizations adapt to changing stakeholder dynamics and evolving environmental challenges?

- a. *Continuous Stakeholder Engagement:*
 - *Foster a culture of continuous stakeholder engagement rather than episodic involvement. Establish mechanisms for ongoing dialogue, feedback, and collaboration to adapt to changing stakeholder dynamics and evolving priorities.*
- b. *Flexible and Adaptive Strategies:*
 - *Develop flexible and adaptive engagement strategies that can evolve in response to changing environmental conditions, emerging challenges, and stakeholder feedback. This includes regularly reassessing goals and adjusting approaches accordingly.*
- c. *Investment in Capacity Building:*
 - *Invest in capacity building for both internal staff and external stakeholders to enhance their understanding of emerging environmental challenges and the tools available for effective engagement.*

d. *Proactive Risk Management:*

- *Implement proactive risk management strategies to identify and address potential challenges before they escalate. This includes scenario planning, anticipating stakeholder concerns, and developing contingency plans.*

e. *Technology Adoption:*

- *Embrace and leverage emerging technologies that can enhance stakeholder engagement, data collection, and decision-making processes. Regularly assess and adopt innovations that align with the organization's goals and stakeholder needs.*

f. *Collaborative Research and Innovation:*

- *Foster collaborative research initiatives and innovation hubs that bring together researchers, practitioners, and stakeholders. This collaborative approach can lead to the development of innovative solutions and practices for evolving environmental challenges.*

g. *Transparent Communication:*

- *Maintain transparent communication channels to keep stakeholders informed about organizational strategies, challenges, and successes. Transparency builds trust and helps manage stakeholder expectations effectively.*

25. Closing Thoughts

Is there anything else you would like to share or emphasize about NAHRIM's approach towards effective stakeholder engagement in water resources/integrated river basin management?

Scientific findings/results approach should be stressed in any engagement with stakeholders so that it can be embedded/consolidated formally in any policies/direction/planning development. It can be implemented through:

a. *Holistic Approach*

- *Emphasize a holistic approach that considers the interconnectedness of environmental, social, and economic factors.*

b. *Inclusivity and Diversity*

- *Prioritize inclusivity and diversity in stakeholder engagement efforts. Ensure that a broad range of perspectives are actively sought and considered.*

c. Participatory Decision-Making

- *Foster participatory decision-making processes that empower stakeholders to contribute meaningfully. This involves providing accessible information, facilitating open dialogue, and incorporating stakeholder input into decision-making.*

d. Transparency and Communication

- *Maintain transparent communication channels to keep stakeholders informed about plans, progress, and outcomes. Clear and timely communication builds trust and fosters a sense of collaboration among stakeholders.*

e. Adaptive Management

- *Embrace adaptive management principles, recognizing that conditions may change over time. Flexibility in strategies and a willingness to adjust based on evolving circumstances contribute to the resilience of water management initiatives.*

f. Capacity Building

- *Invest in capacity building for both internal teams and external stakeholders.*

g. Collaboration with Partners

- *Collaborate with various partners, including government agencies, non-governmental organizations, academia, and the private sector. Partnerships enhance the collective capacity to address complex water management challenges.*

h. Continuous Innovation

- *Embrace a culture of continuous innovation. Explore new technologies, methodologies, and approaches to enhance stakeholder engagement, keeping pace with advancements in the field.*

Appendix 4 List of Integrated River Basin Management (IRBM) Studies by DID Malaysia

Study on River Basins that are Completed, in Progress, or Planned under the 12th Malaysia Plan

	River Basin	Catchment Area (sq km)	State
	<i>Completed</i>		
1	Sungai Selangor	1,937	Selangor
2	Sungai Klang	1,297	Selangor/WPKL
3	Sungai Langat	2,348	Selangor/WPKL/N.Sembilan
4	Sungai Buloh	452	Selangor/WPKL
5	Sungai Miri	680.9	Sarawak
6	Sungai Padas	8,822	Sabah
7	Sungai Kelantan	12,981.85	Kelantan
8	Sungai Kemaman	2,190.87	Terengganu
9	Sungai Dungun	1,828.13	Terengganu
10	Sungai Besut	953.22	Terengganu
11	Sungai Setiu	876.89	Terengganu
12	Sungai Marang	411.89	Terengganu
13	Sungai Kuantan	1,684.53	Pahang
14	Sungai Kedah	2,972	Kedah
15	Sungai Merbok	439	Kedah
16	Sungai Muda	4,150	Kedah/Pulau Pinang
17	Sungai Perai	448	Pulau Pinang/Kedah
18	Sungai Juru	80.8	Pulau Pinang
19	Sungai Kesang	658	Melaka/Johor/N.Sembilan
20	Sungai Johor	2,286	Johor

	River Basin	Catchment Area (sq km)	State
21	Sungai Batu Pahat	2,049	Johor
22	Sungai Sedeli Besar	1,425	Johor
23	Sungai Pontian Besar	362	Johor
24	Sungai Pulai	346	Johor
25	Sungai Skudai	293	Johor
26	Sungai Mersing	273.58	Johor
27	Sungai Tebrau	256.72	Johor
<i>In Progress</i>			
28	Sungai Terengganu	4,596	Terengganu
29	Sungai Paka	832.23	Terengganu
30	Sungai Kertih	248.90	Terengganu
31	Sungai Kemasin	347.66	Kelantan
32	Sungai Semarak	500.50	Kelantan
33	Sungai Bernam	2,836	Perak/Selangor
34	Sungai Perlis	724	Perlis/Kedah
35	Sungai Melaka (Langkawi)	67.93	Kedah
36	Sungai Kerian(Review)	1,420	Pulau Pinang/Kedah/Perak
37	Sungai Linggi	1,298	N.Sembilan/Melaka
38	Sungai Melaka	615	N.Sembilan/Melaka
39	Sungai Muar	6,138	Johor/Pahang/Melaka/ N.Sembilan

	River Basin	Catchment Area (sq km)	State
40	Sungai Perak	14,908	Perak
41	Sungai Manjung	595.11	Perak
42	Sungai Beruas	310.91	Perak
43	Sungai Kurau	740.13	Perak
44	Sungai Endau	4,739.06	Johor/Pahang
45	Sungai Bebar	1,117.40	Johor/Pahang
46	Sungai Tenggi	527.72	Selangor
47	Sungai Sepang	101.93	Selangor
48	Sungai Sepang Kechil	76.04	Selangor
49	Sungai Tuaran	988.42	Sabah
50	Sungai Papar	788.033	Sabah
51	Sungai Kinabatangan	16,072.95	Sabah
52	Sungai Sibuti	892.66	Sarawak
53	Batang Saribas	1,905.66	Sarawak
54	Batang Samarahan	903.09	Sarawak
55	Batang Rajang	50,531.60	Sarawak
56	Sungai Mercung	628.26	Pahang
57	Sungai Rompin	3,939.23	Pahang
58	Sungai Pontian	319.72	Pahang
<i>Under Planning</i>			
59	Sungai Kedamaian	861.88	Sabah
60	Sungai Segama	4,402.69	Sabah
61	Sungai Bandau	253.21	Sabah

River Basin	Catchment Area (sq km)	State
62 Batang Kemena	5,765.56	Sarawak
63 Batang Lupar	5,942.87	Sarawak
64 Batang Kayan	1,063.38	Sarawak
65 Sungai Sarawak	1,726.84	Sarawak
66 Sungai Pahang	28,682	Pahang/N.Sembilan
67 Sungai Jawi	231.03	Pulau Pinang
68 Sungai Sedeli Kechil	1,424.61	Johor
69 Sungai Lebam	365.46	Johor
70 Sungai Santi	117.36	Johor

Appendix 5 Documents Screening for Requirements on the Need to Conduct Stakeholder Engagement

Policy

1. National Water Resources Policy of Malaysia (2012)
2. National Policy on the Environment (2002)
3. National Policy on Climate Change (2010)
4. National Policy on Biological Diversity (2022-2030)
5. Malaysia Policy on Forestry (2021)
6. National Policy on Solid Waste Management (2016)

Legislation

1. Waters Act 1920 (Revised-2018)
2. Selangor Water Management Authority Enactment 1999 (Amended 2022)
3. Sabah Water Resources Enactment (1998)
4. Water Ordinance of Sarawak 1994 (Revised 2008)
5. Kedah Water Resources Enactment (2008)
6. Water Services Industry Act (2006)
7. State of Kelantan Water Resources Enactment 2019

Standard / Guideline / Manual

1. Guideline on Public Consultation Procedures, MPC, MITI (2014)
2. Chapter 5 of the Malaysian Stormwater Management Manual (2012)
3. The AA1000 Stakeholder Engagement Standard (SES), *Accountability* (2015)
4. Stakeholder Engagement for Inclusive Water Governance (2015), OECD
5. Engaging Stakeholders in Your Watershed (2013), U.S. Environmental Protection Agency (EPA)
6. Article 14 of the Water Framework Directive, EU (2000)
7. The Alliance for Water Stewardship (AWS) (2018)
8. The International Association for Public Participation (IAP2) Spectrum of Public Participation
9. UNDP-SIWI Water Governance Facility