

# Building Institutional Capacity for Water Governance

## A Case Study on Integrated River Basin Management in Myanmar

### Abstract

Rivers are delicate and dynamic ecosystems that provide vital ecosystem services to society. Over the past decades, Integrated Water Resource Management (IWRM) has become a prominent approach to balance the competing interest of different water users. However, a sophisticated institutional framework needs to be in place for an IWRM approach to be effective. This thesis examines how such institutions are shaped in the ongoing transition towards IWRM in Myanmar. Departing from contemporary water governance and transition management literature, a nested case study is designed in which three initiatives for implementing IWRM in river management are holistically examined. Results emphasize the role of agency and local ownership as driving forces in this transition. Besides, a pragmatic approach towards IWRM is advocated in which its general principles are being tailored to the case specific context through small-scale pilots.

*Keywords: water governance, IWRM, transition management, institutions, Myanmar*

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*“I am not a leader but a follower, the leaders are the people living in the basin. They are facing a lot of problems and are trying to raise a soft voice. I am just a loud speaker, trying to address their concerns.”*

- Dr. Khin Maung Lwin (Advisor of the National Water Resources Committee)



## List of Abbreviations

<i>Abbreviation</i>	<i>Explanation</i>
<i>BMP</i>	Basin Master Plan
<i>CFF</i>	Communities For Future
<i>ECD</i>	Environmental Conservation Department
<i>EUWFD</i>	European Water Framework Directive
<i>DWIR</i>	Directorate of Water Resources and the Improvement of River Systems
<i>DSS</i>	Decision Support System
<i>HIC</i>	Hydroinformatics Centre
<i>IWRM</i>	Integrated Water Resource Management
<i>IWUMD</i>	Irrigation and Water Utilization Management Department
<i>MONREC</i>	Ministry of Natural Resources and Environmental Conservation
<i>MOTC</i>	Ministry of Transport and Communication
<i>NIVA</i>	Norwegian Institute for Water Research
<i>NLD</i>	National League of Democracy
<i>NWP</i>	National Water Policy
<i>NWFD</i>	National Water Framework Directive
<i>NWRC</i>	National Water Resource Committee
<i>RBO</i>	River Basin Organization
<i>RBC</i>	River Basin Committee
<i>WMD FD</i>	Watershed Management Division of the Forest Department

## **Foreword**

In front of you lies my thesis for the master programme Environment and Society studies at Radboud University, Nijmegen. A piece that required both an academic as a real-life adventure. I had the opportunity to travel to Yangon, Myanmar, the former capital of a country that finds itself in the midst of an extremely complex yet promising reform towards a modern democracy. After the independence in 1962, the country was under severe military oppression up until 2011. During my time in Myanmar I could still feel the tremendous fear and damage that this had on the population. Yet I have never met such genuine and loving people, thrilled to rebuild and reclaim their country and culture. The I hope the reading of this thesis offers you a glimpse of the amazing experience I've had in this beautiful country.

I would like to thank everyone that have made this experience possible for me. First of all, Lindsey Schwidder and Marian Kreijns for granting me an internship at VP delta. Second, Frodo van Oostveen, Kyaw Nyu Lin and Kaing Su Lwin for being an amazing welcome in Myanmar and supporting me throughout my stay. And last but not least, Sietske Veenman, for her patience in bearing with me in the bumpy ride of the research process.

## 1. Introduction

Rivers are extremely complex ecosystems that are essential for life on Earth. Especially in developing countries, the population is strongly dependent on the vital ecosystem services that rivers provide. Rural communities use the river as a source of drinking water, a washing tub or as a sewage system for their settlements. Fishermen catch their fish in the river and farmers irrigate their lands with its water. Miners dig somewhat deeper to find precious gems, fuels and other minerals that are hidden beneath the river's surface. For traders, the river is a highly efficient highway without any traffic jams. Even as an energy source, the river is increasingly deployed by the construction of hydropower dams. This high diversity of different stakeholders is what makes river management a very delicate task. All the conflicting interests of different river users need to be taken into account and carefully balanced in order to secure the sustainable development of this precious natural resource.

Integrated Water Resource Management (IWRM) has been globally acknowledged as a leading approach to water management among water professionals (Acheampong, Swilling, & Urama, 2016; Budryte, Heldt & Denecke, 2018). It was a central theme during the Rio+20 Conference for sustainable development and it has been adopted as Goal number 6 of the Sustainable Development Goals (Hering & Ingold, 2012). IWRM emphasizes the importance of adaptivity capacity in water governance and advocates decentralized management with inclusive stakeholder engagement. The high complexity that river systems are facing makes them especially demanding for this holistic management approach. Despite the prominence of IWRM as a best practice for good water governance (Pahl-Wostl, 2017), the success of its implementation has been limited since the emergence of the concept in the 1990s (Saravanan, McDonald, & Mollinga, 2009). Critics portray IWRM as a 'nirvana concept' that is focussing on general blueprints and panaceas, failing to take the local context in account when it comes to its practical implementation (Halbe, Pahl-Wostl, Sendzimir & Adamowski, 2013). The implementation of sustainable water governance structures such as IWRM is highly context-dependent and demands for a tailor-made approach (Silvestri et al., 2018).

This thesis examines the implementation of IWRM for river basin management in Myanmar. After decades of isolation under a military regime, the governance structure of Myanmar is still highly fragmented, and institutions are weak. Currently, the country is under political and economic reform and its institutional context is drastically changing on national, regional and local levels (Holliday, 2013). As of 2015, the government of Myanmar has received \$100 million credit from the World Bank with the objective to develop an institutional framework for implementing IWRM in Myanmar, with a focus on the largest and economically most significant river basin, the Ayeyarwady. In recent years, a number of other development initiatives have arisen from the international community with the aim to support the transition

towards IWRM. This reliance on international funding for the implementation of IWRM, brings about additional layers of complexity in terms of geo-political processes on the international level (Manzungu & Derman, 2016). Besides, the condition of data-scarcity in Myanmar further limits possibilities of informed decision-making that is necessary for IWRM (Karthé et al., 2015). These challenges make Myanmar a particularly interesting case to examine the ways in which IWRM principles are adopted from the international arena and adjusted to the local needs of a developing country.

This thesis takes on a nested case study approach in which the subject of IWRM implementation for river basins in Myanmar is studied holistically in relation to three key cases (Thomas, 2015). Besides the World Bank funded project in the Ayeyarwady basin, two other projects are selected that clearly illustrate the subject in separate river basins within Myanmar. In Chapter 2 the selection of these cases will be explained in more detail. Although these projects form the main unit of analysis within this thesis, they serve the purpose of understanding a broader transition towards IWRM that continues to evolve after the completion of these projects. Therefore, the focus in analyses of this transition is on the institutional dynamics of change. Rather than evaluating the progress that the government of Myanmar has made on implementing IWRM, the main interest in this thesis is how the efforts to implement IWRM have reshaped the institutional context of the country.

## 1.1 Research aim and questions

The aim of this thesis is two-folded. First, the practical aim is to create insight in the ways in which institutional capacity for IWRM in the selected river basins is built, in order to inform the further implementation of IWRM throughout the country. Second, the theoretical aim is to gain a better understanding of the institutional pathways of change that support the transition towards IWRM in developing countries. The following question and sub-questions are formulated to serve these research aims:

*How is the institutional context of the water sector in Myanmar reshaped by the transition towards IWRM in river basins?*

- 1. How can the institutional context of the water sector in Myanmar be characterized?*
- 2. What institutional arrangements for integrated management are in place on river basin level?*
- 3. How are these arrangements developing over time?*

## 1.2 Societal and scientific relevance

The highly complex task of integrating the economic, social and ecological values within the IWRM approach demands active stakeholder engagement (Budryte et al., 2018; Antunes, Kallis, Videira, Santos, 2009). Enabling stakeholders to engage freely and equally in the decision-making process increases the legitimacy of decisions and supports democratic processes (Reed, 2008). Besides, IWRM is claimed to enhance the equitable access to and efficient use of water resources (Saravanan, McDonald & Mollinga, 2009). These societal benefits of IWRM can only be realised if a tailor-made approach is set up that is in line with the context-dependent needs of Myanmar. This thesis contributes to defining such an approach, addressing a major critique of IWRM that its principles are uncarefully translated from the international arena into the local context (Pahl-Wostl, 2017).

Examining water governance from an institutional transition perspective addresses a key knowledge gap in the water governance literature (Bettini et al., 2015; Werbeloff, Brown & Cocklin, 2017). Approaches to water governance have focussed on formulating a desired situation, without paying much attention to the pathways of change towards adaptive and integrated water management (Pahl-Wostl, 2017). The international community that advocates IWRM emphasizes the need for an adequate institutional set-up that needs to be in place in order to coordinate integrative planning in a decentralized fashion (Hering & Ingold, 2012). Werbeloff et al. (2017) further highlight the lack of knowledge on the role that institutional change plays in IWRM transitions and plead for a broader examination of institutional mechanisms and their interaction over time. This paper builds on existing conceptualizations of institutions in transition management to address this knowledge gap. The case study in Myanmar is particularly relevant since developing countries have gained little attention in transition research (Loorbach, Frantzeskaki & Avelino, 2017).

The outline of this paper is as follows. The next chapter provides a literature review on the concept of IWRM and the institutional transition that it requires. Then, a conceptual model is derived from this theoretical framework, operationalizing the main concepts of the research question. In the third chapter, a detailed description is given of the methodological approach that is used in this thesis. The fourth chapter offers an account of the case context of Myanmar. In the fifth chapter, the obtained results from the key cases are reported and analysed. The final section is devoted to a conclusion in which the research question is answered, the practical and theoretical recommendations that follow from this and a brief reflection on the research process.



## 2. Theory

First, a brief overview is given of the water governance literature from which the IWRM concept has emerged in §2.1. The principles of IWRM (§2.1.1) and its critiques (§2.1.2) are discussed in more detail, as well as the lessons learned in the implementation of IWRM in river basins (§2.1.3). Second, the field of transition management is introduced along with its different perspectives on analysing (sustainable) transitions in §2.2. The particular perspective that focusses on institutional change is then highlighted (§2.2.1) in order to respond to the knowledge gap in water governance literature as described above. In §2.3, the conceptual model presented that follows from the literature review.

### 2.1 Water governance

Conventional modes of water management are characterized by the belief that water-related issues, such as floods and droughts, are predictable and can be controlled through technological solutions (Halbe et al., 2013). The urge of this ‘predictive and controlling’ water management paradigm was given rise to by the population growth in urban areas and the intensification of agriculture in the 19th and 20th centuries (Pahl-Wostl, Jeffrey, Isendahl & Brugnach, 2011). The general approach to water management was shaped by strong hierarchies and highly centralized decision-making processes with narrow stakeholder participation (Halbe et al., 2013). Partially induced by insights from socio-ecological literature, the importance of adaptivity and resilience of governance became recognized (Smith & Stirling, 2010). As a result, more collaborative modes of governance arose, which can be characterized as polycentric, balancing bottom-up with top-down, with active stakeholder engagement and frequent public deliberation (Emerson & Gerlak, 2014). In the field of water management, this paradigm shift can be referred to as integrated and adaptive water governance (Pahl-Wostl et al., 2011).

Along with this paradigm shift came the notion of water governance, which emerged as an academic field over the past two decades (Pahl-Wostl, 2017). Although it can be argued that there is no clear consensus on the scope and scientific definition of the term yet (Araral & Wang, 2013), Pahl-Wostl (2015, p. 26-27) proposes the following broad definition of water governance as *“the social function that regulates development and management of water resources and provisions of water services at different levels of society and guiding the resource towards a desirable state and away from an undesirable state.”* Similarly, Saravanan et al. (2009, p. 6) describe water governance as *“the mechanisms, processes, and institutions through which all involved stakeholders, including citizens and interest groups, articulate their priorities, exercise their legal rights, meet their obligations and mediate their differences.”* Furthermore, a water governance regime can be defined as *“the interdependent set of institutions (formal laws, societal*

*norms or professional practices) that is the main structural component feature of a water governance system*" (Pahl-Wostl, 2015, p.26-27). This concept of a water governance regime forms the principal unit of analysis in this thesis.

The current water governance paradigm can be characterized as integrated and adaptive. It embraces the complexity of water-related issues and recognizes the inability to completely predict and control them (Pahl-Wostl et al., 2011; Araral, Wang, 2013). Important to note here is the distinction between water governance and water management: the former setting the context in which the latter operates. Under the adaptive water governance paradigm, the way to manage water-related issues is to increase the adaptivity of the water system by building resilience through integrating different approaches and perspectives of water users (Halbe et al., 2013). This practical approach to solving water-related issues became known as Integrated Water Resources Management (IWRM). In the rest of this section the principles, critiques and implementation of IWRM is discussed in more detail.

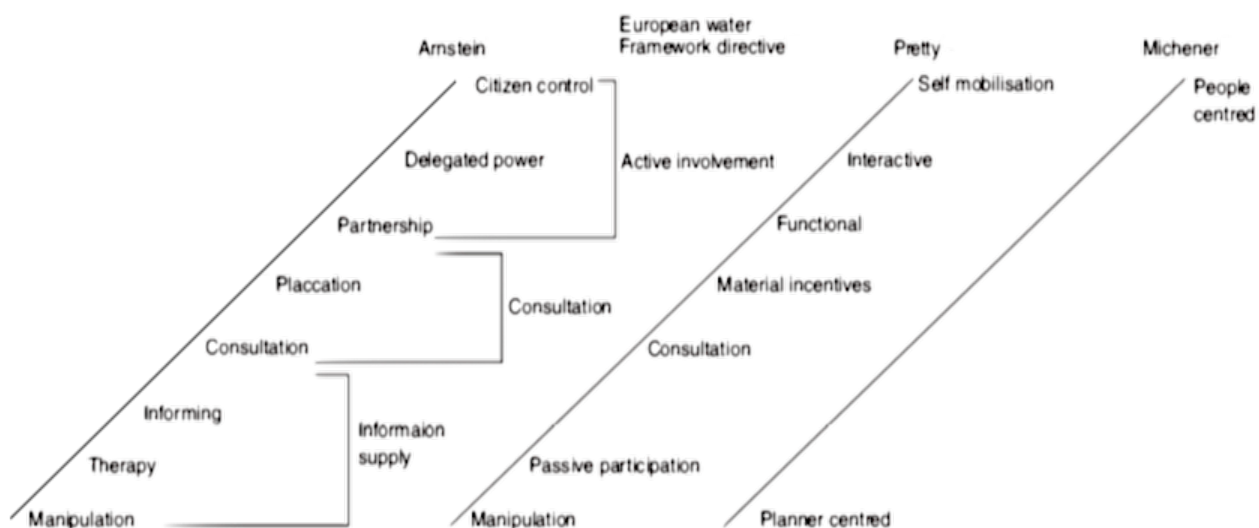
### *2.1.1 Principles of IWRM*

IWRM has emerged as one of the most advocated policy tools in the field of water resource management (Inguane, Gallego-Ayala & Juizo, 2014; Gain, Mondal & Rahman, 2017; Budryte, Heldt & Denecke, 2018). The Global Water Partnership (GWP, 2002, p.22) defines IWRM as a *"process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems."* By coordinating areas of development that previously operated in (relative) isolation, IWRM is ought to enhance the efficiency of water usage and improve equitable access to water resources (Saravanan et al, 2009). The concept of IWRM can be broadly conceptualized in two dimensions of integration: horizontal and vertical (Varis, Enckell & Keskinen, 2014). Horizontal integration refers to the collaboration and coordination across different sectors (e.g. irrigation, energy, fishery, transport). This principle of IWRM is also referred to as a multi-sectoral approach (Acheampong, Swilling & Urama 2016) or simply as the integration of different water-related functionalities such as irrigation, navigation, potable water supply, hydropower, etc. (Gain et al., 2017). Vertical integration refers to decentralization of decision-making power across different levels of government (national, regional and local) (Gain et al., 2017).

Besides horizontal and vertical integration, an inclusive participatory approach is often mentioned as a key building block of IWRM (GWP, 2002). The principle of stakeholder participation is highlighted here for the reason that it is particularly important for the management of river basins (Antunes et al., 2009). As compared to more isolated water resources such as lakes or reservoirs, river basin management usually concerns a wider variety

of water users with competing interests that need to be reconciled. River basin management is an information intensive activity that requires an extensive account of the condition of the basin. This information is scattered across all different water users, operating on different levels of the basin. Participation processes allow these 'knowledge holders' to come together and synthesize their knowledge into integrative management strategies (Carr, 2015).

Approaches to stakeholder participation are usually conceptualized as a step-by-step process from passive involvement to active stakeholder engagement (OECD, 2015; Carr, 2015; Euler & Heldt, 2018). A number of these conceptualizations that have had a major influence in the participation literature are presented in Figure 1 (Carr, 2015 p.395). On Arnstein's ladder of participation (1969) each rung signifies a greater amount of decision-making power being devoted to citizens. Pretty (1995) introduces a similar typology for participation in sustainable development literature. Following the same rhetoric, Michener (1998) proposes a simplified classification by distinguishing fully centralized (planner-centered) to fully decentralized (people centred) decision-making processes. According to the European Water Framework Directive (EUWFD) there are three main participation processes: information supply, stakeholder consultation and active involvement (European Commission, 2003). Due to its focus on the development of integrated river basin management plans, the conceptualization of the EWFD is followed in this thesis.



**Figure 1.** Conceptualizations of stakeholder participation (Carr, 2015 p.395)

### 2.1.2 *Critics of IWRM*

Although many agree on the acclaimed beneficial outcomes of IWRM, experiences with its implementation has drawn many critiques. IWRM has been illustrated as a 'nirvana' concept, an idealistic approach seeking to harmonize interests that are inherently conflicting (Saravanan et al., 2009). Although the concept of IWRM has gained popularity for about two generations, there is still insignificant evidence of its successful application (Biwas 2008). Especially in developing countries, the progress of IWRM implementation is slow or in some cases stagnated (Archampong et al., 2016). According to some scholars, the critique of IWRM comes down to a lack conceptual clarity and scope of what exactly should be integrated (Biswas 2008; Herling & Ingold, 2012). The literature of IWRM has been characterized by general blueprints and panaceas for 'good water governance' without paying much attention to the pathways of change by which the transition towards IWRM can take its form (Pahl-Wostl, 2017). IWRM prescriptions are often criticized for being too vague. Its elements need to be further specified in management practices and institutional designs in order to facilitate practical implementation (Halbe, Pahl-Wostl, Sendzimir & Adamowski, 2013).

Another reason for this 'failure' of IWRM might be attributed to the fact that general principles are transferred too quickly from international arenas, ignoring the political, cultural and historical context in which they become implemented (Mukhtarov, 2007; Ashton, Turton, & Roux, 2006; Kramer & Pahl-Wostl, 2014). From a socio-political point of view, some scholars argue that the imperative of decentralization and inclusive participation of IWRM cannot be achieved because of the power dynamics that dominate social interactions (Saravanan et al., 2009). Besides, IWRM holds a strong normative implication for the integration of governance. This norm does not necessarily correspond to the values that are held in the country of implementation (Hering & Ingold, 2012).

### 2.1.3 *Implementation of IWRM in River Basins*

In response to the impediments to implementation of IWRM, the institutional design that facilitates its realisation has gained increased attention within the IWRM research field (Gallego-Ayala, 2013; Carr, 2015). In order to grasp the concept of IWRM into feasible measures for implementation, suitable bounds for integration need to be set. Hering and Ingold (2012) suggest a pragmatic approach in which the scope for integration is defined by case-specific conditions. IWRM holds the imperative to decentralize decision-making power and resources to the 'lowest-appropriate-level' (vertical integration) (Inguane, Gallego-Ayala & Juizo, 2014). Within the context of river basin management, the river basin unit is the preferred geographical scale to implement this principle (Dinar et al., 2007). However, the exact delineation of the river basin area is not always obvious. Sometimes it becomes complicated by overlapping administrative

boundaries or conflicting ethnic groups (Herling & Ingold, 2012). Besides, sufficient capacity of lower-level institutions is required to absorb the power of institutions at the centralized level (Mody, 2004).

Despite the challenges to determine the adequate institutional arrangements, two main institutional forms have been identified as best practices for integrated river basin management (Agyenim & Gupta, 2012; Inguane et al., 2014). First is the River Basin Organisation (RBO), an institution on basin-level to which decision-making power and resources from the central-level government are reallocated. The RBO is the main locus for the horizontal integration principle of IWRM (Acheampong et al., 2016), as all relevant water users are supposed to be represented within this organization. Second is the River Basin Committee (RBC). The RBC is a part of the RBO that functions as an arena for non-governmental stakeholder participation in the decision-making process. The main function of these institutional forms is to engage in an integrative planning process and coordinate activities for the sustainable development of the basin.

In order for these institutions to function properly, they need to provide a safe space for open discussion and consensus building. Several complexities need to be taken into account for enabling effective discussion arenas (Carr, 2015). First, the process of building consensus and conflict resolution needs to be carefully managed. This task is to be appropriated by local leaders that take up an active mediating role in the participatory process (Hering & Ingold, 2012). In addition, this process is further complicated by asymmetrical power relationships between stakeholders, which jeopardize open dialogue (Saravanan et al., 2009). Second, the imperative of IWRM to take into account the interests of all relevant stakeholders is a highly costly task, whilst funding is often limited (Hering & Ingold, 2012). Therefore, it is important that all participants agree on the conditions for a legitimate decision-making process and perceive the benefits of participation to exceed its costs. In general, an appropriate strategy to deal with these complexities is to engage in ongoing evaluation during the implementation phase, constantly reflecting and refining the participation process (Carr, 2015).

## 2.2 Transition Management

Over the past decades, the field of transition management has been applied as a new analytical lens to study the governance of sustainable transitions (Loorbach, 2010; Silvestri et al., 2018). In transition management, system change is initiated by experimentation with alternative practices in so-called 'transition arenas', where a number of key actors set up a safe space for experimentation and social learning (Bettini et al., 2015). These transition arenas interact dynamically with the dominant system that is currently in place (regime) and within a broader societal context (landscape) (Geels, 2004). Transition research emphasizes that transitions are disruptive, non-linear and multi-disciplinary change processes that emerge out of these

interacting dynamics (Loorbach, Frantzeskaki & Avelino, 2017). Within this thesis, the transition that is subject of study departs from a sectoral water regime - in which all different water sectors operate in isolation – towards an adaptive and integrated water regime. The projects in which IWRM is implemented can be regarded here as the transition arenas in which alternative practices are experimented with.

Traditionally, transition management designs provide a sense of direction and facilitate collective action towards a desired state. In its application on more complex societal changes such as sustainable transitions, transition management approaches have been criticized for being overly simplistic and even misleading in terms of the proclaimed ability to steer these processes (Shove & Walker, 2007). It is argued that instruments and methods for transition management should be diversified in accordance with different process phases and parallel-running processes (Silvestri et al., 2018). Silvestri et al. (2018, p. 14) plead for a more emancipatory approach, placing the focus of transition management on *“enlarging and strengthening democratic space by building capacity for participation in knowledge and society-shaping processes and by addressing hegemonic power imbalances”*. This also has implications for core assumptions of transition research, moving beyond universal principles towards culturally sensitive and trans-local collaboration processes.

Within transition research different disciplinary perspective have developed through which transitions have been studies (Loorbach et al., 2017). Early transition research analyses transitions from a socio-technical perspective, taking technological innovation as a starting point. Here, system innovation is perceived as a result of the production, use and diffusion of a new technology that fulfils a societal function (Geels, 2004). Later on, the field of transition management opened up to a broader understanding of societal systems and incorporated socio-ecological, socio-cultural and socio-political insights into the transition research discourse (Loorbach et al., 2017). Although these various influences have been partially adopted in socio-technical discourse (Smith, Stirling, & Berkhout, 2005; Geels, 2004; Smith & Stirling, 2010), the socio-institutional perspective can be distinguished as a separate school of thought within transition research. Bos & Brown (2012) argue that water management literature has predominantly focussed on technical experimentation following a socio-technical perspective, devoting little attention to governance experimentation and social learning. Therefore, the socio-institutional perspective is employed here to analyse the institutional change dynamics within the Myanmar water sector.



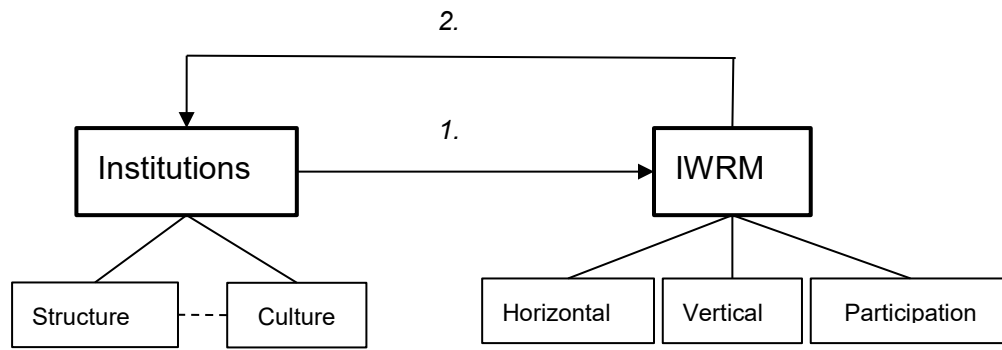
### 2.2.1 Socio-institutional perspective

The socio-institutional perspective to transitions emphasizes how ‘incumbent routines, powers, interests, discourses and regulations create path dependencies that are challenged by transformative social innovations’ (Loorbach et al., 2017, p. 610). Important to note is that the institutional domain does not solely belong to public authorities (Geels, 2004). It refers to a broader phenomenon of rules that structure and coordinate mutual dependencies between different social groups. Here, institutions are understood as “*organizing structures that enable collective action*” (Bettini et al., 2015, p.67). Institutions shape the context for action in which actors have a freedom to act, while at the same time the institutions provide actors with the agency to (re)produce these institutions (Geels, 2004; Bettini et al., 2015). This results in a dynamic interplay between agency and the institutional structure that effectuate change (structure-agency dilemma).

Werbeloff et al. (2017) examine water governance regime transitions by operationalizing institutions in two equally important dimensions following Scott (2014): structure-based and culture-based. Structural changes are not sufficient to constitute durable change, as they derive legitimacy from culture (Connor & Dovers, 2004). Institutional systems are not effective because of strict law enforcement. In fact, it is a general consensus that these laws represent the values that are held in society. The cultural dimension of institutions refers to these underlying norms and values that are shared within a society and determine how problems are defined and addressed. Changes that occur in the cultural domain occasionally become formalized in institutional structures. Institutions are therefore central element in regimes transformations, as they provide the means to embed emerging practices into a stable institutional framework (Werbeloff et al., 2017).

## 2.3 Conceptual model and operationalization

The water governance regime transition in Myanmar is analysed by the conceptual relationship between institutions and IWRM (Figure 3). Departing from a socio-institutional perspective, the institutional context is the locus through which the transition towards IWRM unfolds. Institutions are operationalized in a structural and cultural dimension following Werbeloff et al. (2017). The embeddedness of structural institutions into culture is represented by the dotted line in Figure 2. A regime transformation is a disruptive process and does not happen in a linear fashion. Sectoral water structures are still in place as new structures for IWRM emerge (arrow 1). Subsequently, social learning effects occur that further influence the institutional context (arrow 2).



**Figure 2.** *Conceptual model*

IWRM is conceptualized in the horizontal and vertical dimensions of IWRM. Although the principle of stakeholder participation is partially infused in these dimensions, it is operationalized here as a separate dimension for analytical purposes (Table 1). The concept of institutions is operationalized along a structure-based and culture-based dimension following Werbeloff et al. (2017). Structure-based institutions fall apart in ‘hard law’, including formally defined regulation and legislation, and ‘soft law’, referring to non-enforceable policy instruments that provide guidance. The cultural dimension of institutions falls apart in a normative and cultural-cognitive component (Scott, 2014). The difference between these two components is that normative rules imply social prescriptions and moral obligations, whereas cultural-cognitive rules are taken for granted and guide behaviour more implicitly. Normative rules imply an explicit socialisation process. On the other hand, cultural-cognitive institutions form internal mental models that provide sense and meaning to the world.

<i>Concept</i>	<i>Dimension</i>	<i>Indicators</i>
Institutions	Structure	Hard law (e.g. legislation, rules, sanctions) Soft law (e.g. protocols, guidelines, mandates)
	Culture	Normative rules (e.g. norms, values, role expectations, codes of conduct) Cultural-cognitive rules (e.g. common beliefs, shared logics of action)
IWRM	Horizontal	Degree of multi-sector collaboration and coordination
	Vertical	Degree of decentralization of decision-making power across different actors and government levels (national, regional, local)
	Stakeholder participation	Degree to which relevant stakeholder are involved: Information supply Consultations Active involvement

**Table 1.** *Operationalization of conceptual model*

### 3. Methods

#### 3.1 Research design and strategy

In order to take notice of the specific local context in which IWRM is implemented, a *case study* is chosen as a suitable research design. The purpose of this inquiry is not to generalise findings, but rather to gain a rich analytical picture from which case-specific insights can be derived. Therefore, a case study is defined here as “the analyses of persons, events, decisions, periods, projects, policies, institutions or other systems which are studied holistically” (Thomas, 2015, p.23). Within the case of the water sector in Myanmar, three key cases are selected that illuminate the phenomenon of IWRM institutionalisation in river basins (subject). Together with the experiences of the researcher as participant observer throughout the entire research period, the key cases provide an analytical frame through which the study is conducted (object).

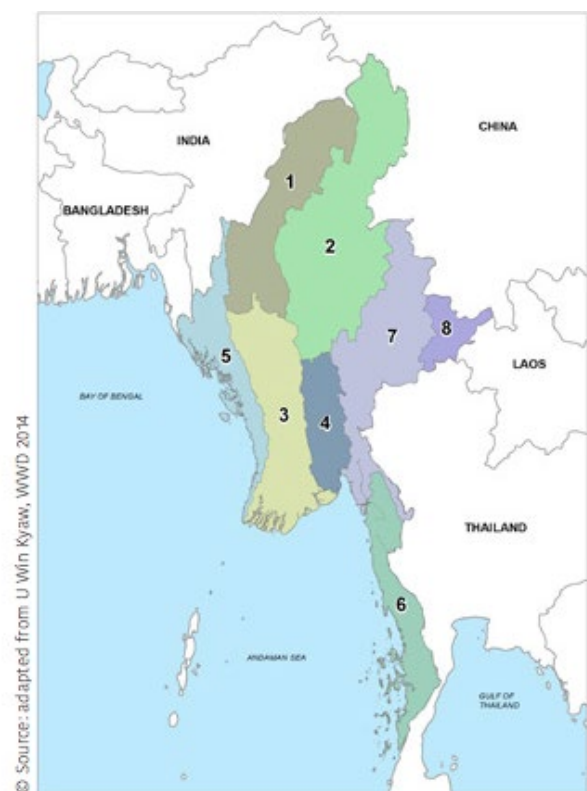
The meaning of reliability and validity is less clear-cut in case study research as compared to other kinds of research (Thomas, 2015). Instead, the quality of a case study is more dependent on the way in which cases are selected, described and analysed. Therefore, a more detailed account is given here on the choices that are made regarding the *purpose*, *approach* and *process* through which the case studies is conducted. On the one hand the purpose of this study is instrumental (Stake, 2005), with respect to the practical aim of supporting IWRM implementation in Myanmar. In this sense, the case plays a supportive role that facilitates the understanding of the pathways of change through which IWRM is institutionalised in the river basins of Myanmar. Due to the debates on the conceptual unclarity of IWRM, this study refrains from evaluating the progress on IWRM principles. Instead, the case study serves an explanatory purpose to respond to the theoretical aim. In the light of the theoretical framework presented in Chapter 2, this theoretical aim is rephrased as enriching the water governance literature by adopting a socio-institutional perspective to analyse change dynamics within IWRM transitions in developing countries.

This case study takes on an *approach* of an interpretative inquiry, assuming “an in-depth understanding and deep immersion in the environment of the subject” (Thomas, 2015, p. 124). It is an ethnographic approach aimed at a more profound understanding of people’s experiences with the subject and to expose the ‘soul of the case’. This is especially relevant given the emphasis that is placed on the contextuality of IWRM implementation in contemporary water governance research (Halbe et al., 2013). Therefore, the approach of this thesis is not to build on or test existing theory of universal IWRM principles, but rather to draw a ‘picture’ of the ongoing institutional transition in its local context and reflect on the meaning it conveys. This can be referred to as an illustrative-demonstrative approach, which allows for a better understanding of the theoretical concepts and enhances the development of its practice (Thomas, 2015).

The *process* is about the way in which the case study is structured, not to be confused with the multiple research methods that are applied within the case study (§3.3). This case study is structured a nested case study (Thomas, 2015). It is important to note that the selection of key cases is in no way an attempt to form a sample from which findings can be generalized. This is because the circumstances of the different key cases are too distinct to be compared in a systematic manner. Instead of offering comparisons between multiple cases, a nested study “gains its integrity, its wholeness, from a wider case” (Thomas, 2015, p. 153). In this study, the wider case is the water governance regime in Myanmar (principle unit of analysis) within which three key cases of IWRM institutionalisation in river basins (subunit of analysis) are nested. The main question of this thesis is answered in the analysis of how the subunits are connected with one another and fit into the wider case of a water governance regime under transition.

### 3.2 Selection of key cases

Within the wider case of water regime transition in Myanmar, three subunits are selected for deeper analysis on the basis of an initial exploratory research phase (which will be elaborated upon in the next paragraph). This selection is explained by the division of Myanmar in eight river basin areas (Figure 3, Nesheim, Wathne, Bo Ni, Zaw Lwin Tun, 2016), four of which are known as the main river basins of the country: the Ayeyarwady (2&3), the Chindwin (1), the Sittaung (4) and the Thanlwin river basin (7). Since the catchment area of the Thanlwin river crosses national boundaries, this river basin is taken out of consideration in this thesis. Involving multiple national governments in the river basin management process adds layers of complexity that make this case incompatible with the other three river basins which are fully based in Myanmar. In the remaining three river basins, initiatives have emerged around the implementation of IWRM in collaboration with national and international governments. Three of these cases are selected as subunits for further analysis:



**Figure 3.** Eight commonly depicted river basin areas in Myanmar:

- |                          |                          |
|--------------------------|--------------------------|
| (1) Chindwin River Basin | (5) Rakhine State        |
| (2) Upper Ayeyarwady     | (6) Taninthari Division  |
| (3) Lower Ayeyarwady     | (7) Thanlwin River Basin |
| (4) Sittaung River Basin | (8) Mekong River Basin   |

- (1) Ayeyarwady Integrated River Basin Management (AIRBM) project (Ayeyarwady river basin, number 2&3)
- (2) Integrated Water Resources Management - institutional building and training project (Sittaung river basin, number 4)
- (3) The Chindwin Futures project (Chindwin river basin, number 1)

As of 2009, more than 70 international development aid projects have been run in the water sector of Myanmar with an estimated value of about \$785 million (Mohinga, n.d.). Two main criteria were used to make a case selection from this list. Given the vagueness of the term IWRM, it is hard to determine which of these projects can be considered as 'implementing IWRM'. Therefore, the first and main criteria of case selection is the direct use of the term IWRM within the project objectives. Besides, the exploratory research phase showed that a lot of developments projects remain mere one-shot initiatives, due to a lack of repository within the institutional set-up (The Water Agency, personal communication, 7 August 2018). In order to examine the institutional change dynamics of the IWRM transition, the second criterium holds that the project should focus on creating institutional capacity for IWRM that is to remain after the completion of the project.

### 3.3 Data collection and research methods

The data were collected from July till November 2018 in Myanmar. The initial exploratory research phase included general desk research on the Myanmar water sector (e.g. policy documents, media reports, online articles, etc.) and a series of 4 open interviews with water professionals in the field. These include a Water Resources Officer at the Dutch Embassy in Yangon, the managing partner of a network organisation for the water sector (The Water Agency), and a water resources engineer from a local consultancy and engineering firm in Yangon (NEPS). Besides, a symposium was attended at which a high number of key stakeholders in the water sector was present. This symposium was organized by the Yangon Technical University, IHE Delft Institute for Water Education, Charles Sturt University, International Finance Corporation and WWF and was titled *"Exploring the Science and Policy for Developing an Environmental flows Framework for Myanmar"*.

Outputs from the initial exploratory phase include: (1) a stakeholder map of key actors and institutions in the Myanmar water sector, (2) a rough case context report of relevant developments in the Myanmar water sector (3) a shortlist of 7 key informants that were involved in the emergence and development of IWRM projects. These included the Myanmar country director of the International Centre for Environmental Management (ICEM), a river project coordinator from an international NGO (WWF), a researcher from the International Water Management Institute (IWMI), a country director from an international research organisation

(WorldFish), the chairman of the Myanmar Environment Institute (MEI), the secretary of the Advisory Group of the National Water Resource Committee (NWRC) and a research scientist at the Norwegian Institute for Water Research (NIVA).

After a desk research on the online available information of the IWRM projects, semi-structured interviews were held with the key informants. Interviewees were asked how the project came about, who was involved in the project and in what manner, how the project developed over time and what happened after the completion of the project. For the selected subcases a set of 3 additional interviewees were acquired using a snowballing approach. These included an environmental specialist of the AIRBM project, a project consultant at the Stockholm Environmental Institute (Chindwin Futures project) and a representative from the Irrigation and Water Utilization Management Department (IWUMD, Sittaung project). Regarding the AIRBM and Chindwin Futures project, these interviewees were asked about the communication, decision-making processes and their experiences with the project in more detail. The interviewee of the IWUMD had a slightly different focus. Here the intention was to zoom in into a particular water stakeholder (irrigation is one of the main water users in Myanmar) that is both active in the traditional sectoral water regime and participating in an integrated river basin management project. The interviewee was asked to reflect on the differences he experienced in these two settings. The interviews that were not selected for further analysis were used to check assumptions and elaborate on the case context report. All interviews were recorded, anonymized and transcribed for further analysis, under the permission of the interviewee.

To finalize the case context report and to incorporate the cultural aspects of institutions, 2 community consultations were held. The sessions took place in Kyauk Tan township (along the Yangon river), lasted approximately 1,5 hours and were supported by a translator. Villagers were approached and asked to participate in a group discussion, after a small introduction of the research was given. Participants were asked about the values they attach to the river, what problems they associate with the river, how they think these problems are caused, what the consequences of these problems are and what kind of solutions they prefer. The first session was held with a group of fishermen, the second with a couple of households. Besides, individual villagers were consulted with the same set of questions as well as a more open interview in which the relationship with governmental agencies and events regarding the river were discussed.

Next to the additional interviews, the data collection for the subunits is supplemented by document analysis and participant observation. For the Ayeyarwady case, data was retrieved online from [www.airbm.org](http://www.airbm.org) and from the AIRBM project site at [www.worldbank.org](http://www.worldbank.org). The participant observation was held at a seminar on the monitoring of Sustainable Development Goal 6: The Water Goal. The seminar was organised by AIRBM in collaboration with DHI (Danish Institute for Water and Environment) in Nay Pyi Taw on the 4th of October 2018. For the Sittaung



case, the data was retrieved from the Myanmar project website at [www.niva.no](http://www.niva.no) as well as the Facebook page of the project. Two participant observations were held within this subunit: first at an open seminar on the Bago Sub-basin Management Plan in Bago on the 20th of September 2018, second a meeting was attended at which the progression of the project was discussed among the members on the 21th of September 2018. Besides, a panel discussion was held with 5 members of the project in which the process of the project (communication, output, satisfaction, etc.) was evaluated. For the Chindwin case, the data was retrieved from the Myanmar archives at [www.sei.org](http://www.sei.org). Additional confidential documents were retrieved from SEI. Besides, media reports about the three subunits were retrieved from [www.myanmarwaterportal.com](http://www.myanmarwaterportal.com).

### 3.4 Data analysis

The approach of interpretative inquiry assumes that situations in the social world cannot be fractured into variables (Thomas, 2015). Within this case study, this implies that the analysis of IWRM transition in Myanmar should not be conducted in a strict deductive fashion using the indicators presented in Table 2. Instead, the meanings that people attach to their experiences of the 'IWRM transition' are interpreted in a holistic fashion, taking the indicators from the operationalization as sensitising concepts that provide guidance. Rather than pinning down these meanings to a set of structural and cultural institutions (as formulated in Table 2), the goal is here to arrive at a holistic picture of how IWRM institutionalisation in the river basins of Myanmar is taking place. Later on, this 'picture of reality' is compared to the conceptual relationship in Figure 2, in order to obtain a more profound understanding of the dynamic interplay of these concepts over time. Another reason for this approach is the lack of consensus on the conceptualization of IWRM principles, which problematizes the direct use of these principles in the analysis of the case study.

The data were analysed using a constant comparative method in which each element of the research data (interview transcripts, documents, observation notes) is compared to all other elements in an iterative process (Thomas, 2015). Although this did not happen through a well-defined set of iterations, the following broad steps are undertaken in the analysis. First, raw data was reviewed to arrive at a number of temporary constructs that give an impression of recurring topics and ideas. Second, the data is analysed again in order to refine the temporary constructs. This step is supported by a peer review of a water practitioner in the field (managing partner The Water Agency) to check the interpretations of the researcher. Third, a number of final themes is distilled from the temporary constructs that capture the essence of the IWRM institutionalization process. Finally, the conceptual relationship in Figure 2 is explained through these themes in order to answer the research question and formulate practical and theoretical recommendations.

## 4. Case context

In this chapter, a brief context description is given of the Myanmar water sector. First, the government structure for water governance is addressed, along with the administrative set-up of the country in §4.1. Then, the main institutions for IWRM that are in place are discussed in more detail in §4.2 and §4.3. This chapter ends up with an account of some observations regarding the culture of Myanmar in order to get a grasp on the normative and cultural-cognitive rules (Table 2) that are relevant for the transition towards IWRM.

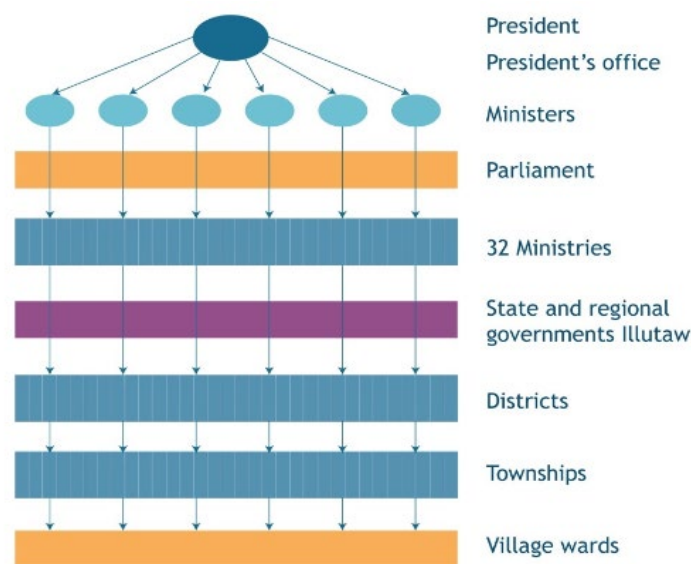
### 4.1 Government structure

Myanmar, previously known as Burma, is the biggest country of mainland Southeast Asia. The country has gained international attention for its abundance in natural resources such as gems, minerals, water, oil and gas. From 1962 to 2011, the country has been under control of a strict one-party military regime (Holliday, 2013). The first free democratic elections were held on November 2015 (Nesheim et al., 2016). The elections were won by the National League for Democracy (NLD). Party leader Aung San Suu Kyi took office as State Counsellor, which forms the top level of government together with the President (hereafter referred to as Union government).

Myanmar has 32 ministries of which 9 are independently involved in the water sector. Each ministry is responsible to implement their own mandates, which are separated and, in some cases, conflicting (The Water Agency, personal communication, 7 August 2018). The Department of Irrigation sets targets for the number of farmers that have to be supplied with irrigation water. These targets clash with targets from the Department of Environmental Conservation or the Department of Rural development that respectively want to conserve these resources or utilize them for drinking water (RVO, 2014). Moreover, environmental responsibility is shattered amongst different sectors and legislation around water resources remains fragmented. For example, the Directorate of Water Resources and Improvement of Rivers (DWIR) is responsible for monitoring and maintaining water depth of inland rivers, whereas the Irrigation department is responsible for flood protection of these rivers. When it comes to coastal rivers, the Myanmar Port Authority becomes accountable. For the required coordination of these overlapping activities, the local administrative level is often referred to. However, it remains questionable if these local institutions have sufficient capacity to do so (RVO, 2014). An overview of all water related governmental agencies and their functions can be found in Appendix II.

On the next lower administrative level, Myanmar is divided into seven States and seven Regions, and one Union territory which includes the capital of Nay Pyi Taw (Appendix I). Both States and Regions are constitutionally equivalent administrative units but differ in terms of ethnicity. In general, States cover areas with large ethnic minorities, whereas in Regions the

majority of the population is Burmese (NLD, personal communication, 10 October 2018). State/Region level governments (hereafter referred to as regional government) also consist of a partially elected parliament (Hluttaw), next to a cabinet of regional ministers and juridical institutions. Below the regional level is the district level, which consists of several townships (hereafter local government). The township level is the lowest level for government offices, although village tracts (urban areas) and village wards (rural areas) are the smallest formal administrative unit (Nesheim & Platjouw, 2016). Overall national policies are decided upon on Union level and operationalized on regional level. The national policies function here as a guideline and the regional government maintains relative autonomy to define their own regulation (WorldFish, personal communication, 27 September 2018). Each administrative unit gives instructions to the next lower level and reports to the next higher level. A graphical representation of the governance structure of Myanmar can be found in Figure 4.



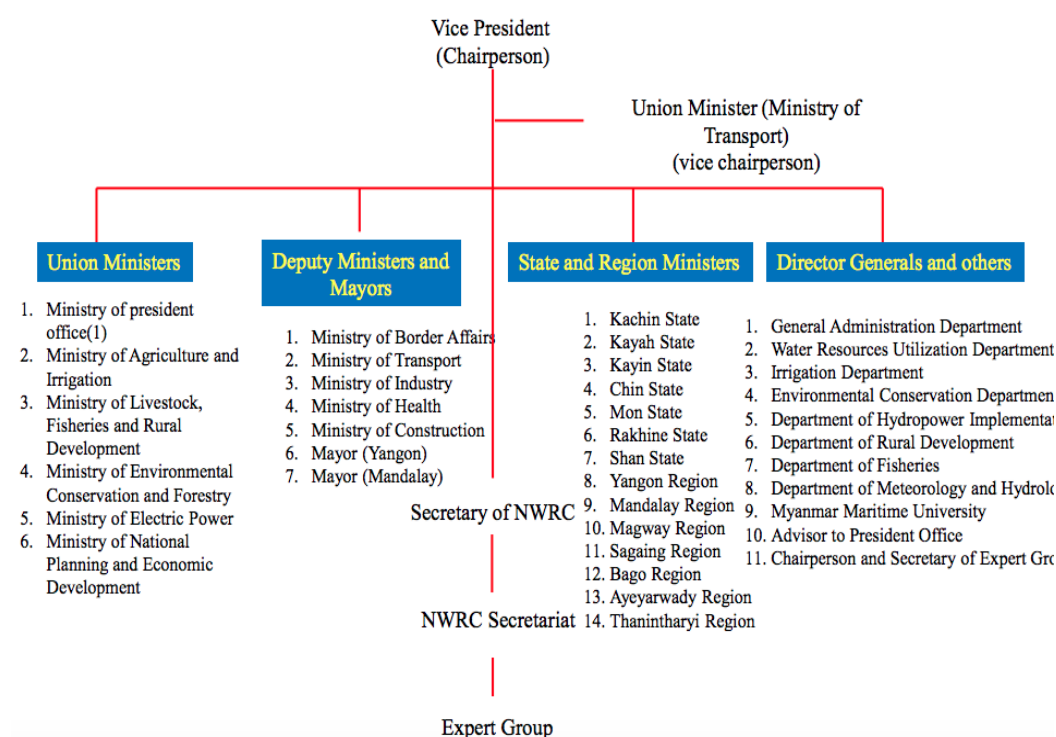
**Figure 4.** Government structure of Myanmar (RVO, 2014)

## 4.2 The National Water Resource Committee (NWRC)

The fragmentation of government is not exclusive to the water sector. The demand for integrative planning and including all relevant government agencies around a particular topic, has led to the establishment of several national committees in the past (NWRC, personal communication, 5 October 2018). The National Health Committee and the National Education Committee are two examples of this that have survived for a long time. However, in the case of water resources, committees often dysfunction quickly because of a too strong focus of government officials in their respective 'silo's' (NWRC, personal communication, 5 October 2018). After the country opened up to the international community (starting 2011), international partnerships were built for the sustainable development of

the Myanmar. With regards to the water sector, collaboration with the Dutch government created new momentum for the establishment of a nation-wide water committee (NWRC, personal communication, 19 September 2018). On 29 July 2013, the National Water Resource Committee (NWRC) was formed and a Memorandum of Understanding (MoU) with the Dutch government was signed. In 2015, the NWRC signed the MoU with the government of Australia. Together with the World Bank the four parties form a Water Resources Panel to discuss opportunities for future development of the Myanmar water sector since 2016.

The NWRC is chaired by the vice-president and consists of four pillars: The Secretariat (5 members), the Advisory Group (37 members), the Hydro Informatics Centre (HIC) and the Multi-Stakeholder Forum (MSF, 17 members). The HIC is a nation-wide database for hydrological information that is meant as a decision support organ for the NWRC. Figure 5 provides an overview of all government agencies under NWRC. The main mandate of the NWRC is to strengthen water institutions such as a national water policy, water law and water framework directive as well as building capacity of relevant stakeholders (NWRC, 2014). In 2015, the World Bank approved \$100 million credit for the AIRBM project, as the first project under the auspices of the NWRC. Besides the specific development of the Ayeyarwady river, part of the AIRBM budget is allocated to development of the NWRC its mandate. This will be discussed in more detail in the case analysis of the AIRBM project (§5.1).



**Figure 5.** The structure of the NWRC

### 4.3 National Water Policy and Water Law

The National Water Policy (NWP) was the first integrated policy tool for all water bodies in Myanmar (RVO, 2014). The NWP was drafted by the Advisory Group of the NWRC and got approval from the NWRC on March 2014. Eventually it was formally signed by the President Office later that year. The NWP is intended as an umbrella to provide guidance for all further development of water resource policy, legal frameworks, planning and projects related to water management. More specifically with regards to river management, the NWP states the following in section 13.4 (NWP, 2014):

*“Appropriate institutional arrangements for each river basin should be developed to collect and collate all data, inter alia to deal with and enable establishment of basin authorities with appropriate powers to plan, manage and regulate utilization of water resources in the basin”*

Part of the NWP is the National Water Framework Directive (NWFD) as a first imperative to review all existing water regulations and unite them into an inclusive Water Law, which is currently under development as one of the main deliverables of the AIRBM project (which will be discussed in more detail in §5.1). The NWFD has seven principles that were inspired on the European Water Framework Directive (EU WFD) (NWRC, 2014):

1. All ground and surface water must be clean and sufficiently stored.
2. Establishment of a National Water Budget
3. Assessment of ecological and chemical status of surface waters
4. Cooperation between national, regional and local governments
5. River basin development plans for all major rivers. To be updated every 10 years.
6. Addressing River Water Transfer to be in line with the principles for Sustainable Water Resources Management for River Basins.
7. Informing and involving public through media and direct communication of the President's Office.

The formulation of the NWFD shows how principles are translated from the global sustainable development agenda into policy tools that provide guidance to the national transition. The NWRC provides the institutional backbone that enables this translation. The Secretary of the NWRC has taken the responsibility to continuously monitor the progress that is made on the NWFD principles (NWRC, personal communication, 5 October 2018). However, the capacity of the NWRC as an institution remains limited to coordinate the implementation of these principles on the ground. Remarkable is that the establishment of the NWRC and its efforts to promote IWRM have been strongly shaped by individual agency. This is clearly illustrated by the narrative presented

in Box 1. It is a story of one of the founding fathers of the NWRC who exercises his agency beyond his formally defined role within the NWRC. It is an example of how agency can be a decisive element in the process of institutional change.

**Box 1 From invasion to integration**

"If the Chair and Secretary are not happy with my idea, I can't do anything", the man explained calmly. "So, I've selected some issues and took them up as a volunteer to get the job done," he continued with a strong sense of determination in his voice. As the retired director of the Ministry of Health and Sports, he is especially concerned with the issue of water-based diseases, with one disease in particular called Schistosomiasis. It is a disease transferred by parasites through an aggressive invasive species of snails that has entered the waters of Myanmar over 50 years ago. "Some of the seniors have seen it", he said with his eyes wide open, "not the worm itself but only the patients in which they got infiltrated." The man stressed the need for scientific evidence to expose the problem of this disease and take action. Part of this evidence came with the support of the World Health Organization in 2013. They found a history of Schistosomiasis infection in the samples of people living in the region of the Inle lake. "This is a true opportunity from IWRM," he argued "I try to advocate, that is the responsibility of the NWRC". Up to three times he took the evidence to the Secretary of the NWRC. Eventually he got the permission to organise a panel discussion. He brought together researchers, engineers and representatives from the departments of health, forestry, tourism and lake management. "Now the Ministry of Health is professionally proceeding with their own ideas of identifying diseases and looking for the treatment and prevention." Instead of claiming this as a result of his work, he concluded by saying "I am nobody, I'm just facilitating and using the advantage of being linked with the NWRC. I would like to see all NWRC members to think about how to help each other. We need to think for the other people and work together, while defining IWRM."

#### 4.4 Culture

During the observations in the field, a few instances took place that portray a set of cultural norms and values that are held within local communities. Some of these are relevant to discuss here. In Box 2 some observations are presented that illustrate the condition of the river along which the community consultations were held. Surprisingly, the locals that were consulted did not perceive the condition of the water bodies as problematic. "It's something the government takes care of" one woman answered when she was asked about her perception of the condition of the river. Any feelings of disgrace, dissatisfaction or complaints about the situation were left unnoticed. Residents of the township were very eager to explain about their experiences with the river, although in a very neutral fashion without any judgements or accusations to other parties.



### **Box 2 River situation in Kyauk Tan**

The deterioration of water resources in the area was pervading. The entire river bank was covered in waste that washed up with the river tide twice a day. Fisherman see the amounts of fish they catch diminishing every year. A few women explained how they used to receive cleaning tablets from the World Health Organization to clean the river water and use it as drinking water. Now they don't receive those tablets any longer and use the water from a couple of reservoirs next to the river. The water is stored in tubes next to their houses for a few days until the sedimentation has sunk to the bottom. "In the beginning we used to get sick from this water, but now we are used to it and is ok" one woman explained. "For most of the year this water is enough, but in the summer, it is dried up and we have to walk to the village to get our water," her neighbour added.



This sense of compliance with the situation as it is can be partly explained by religion. The vast majority of the population (88%) profess Buddhism (Myanmar Department of Population, 2016). Although the new constitution provides freedom of religion, all men are expected to spend at least 7 days in a monastery to practice the teachings of Buddha. Besides their robe, a razor to shave their head, a bowl and a water-filter, monks and nuns are not allowed to have any possessions. A Buddhist monk explained that the true nature of a Buddhist is to detach oneself from all discomfort that arises from his or her surroundings in order to arrive at an ultimate state of peace called nirvana (personal communication, 24 October 2018). Especially the rivers have a strong spiritual meaning in Buddhism, as they are perceived as the veins of nature that reflect the health of the environment.

Although religion has a strong influence in the Burmese society, the younger generation doesn't identify themselves as much with this tradition any longer. Instead of compliance it is a strong willpower that thrives amongst the younger generations to rebuild their country. This is illustrated by the 'Student Engagement Days'. A biannual event organised by The Water Agency as a means to involve students in the sustainable development challenges of the water sector.

After one of the sessions the students were offered a lunch break of a few hours. One of the students commented on this, saying: “A break? We have had 50 years of break, now it is time for action!” (The Water Agency, personal communication, 7 August 2018). This quote strongly depicts a spirit of activism that contrasts the notion of compliance during the community consultations. The clash of these seemingly conflicting attitudes is illustrated by a discussion that was held in a local tea shop (Box 3).

### Box 3 Tea shop discussion

I made a comment about a man sitting in his sidecar bicycle on the other side of the road. It was a typical Burmese image to me: the sidecar taxi men taking their time to relax in the shade (sunny season) or hide for the rain (rainy season). They can sit for hours, staring into the depth of the universe with a sense of complete satisfaction and peace of mind. “That is exactly the problem,” a local student commented, “people comply to their situation and no one takes real action to do something and improve their



livelihoods. It is better in Western societies; there the people can take their responsibility to take action. An individualistic society. Here all the people have to agree with each other. Everyone has to show respect for the community and especially the parents and elderly. In the end nothing changes.” His friends were nodding as they engaged in a fierce discussion among each other in Burmese language.

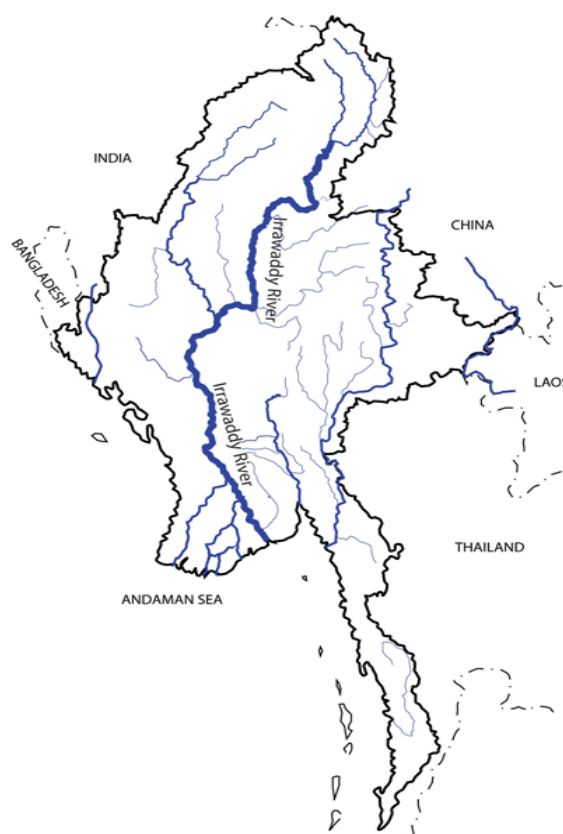
## 5. Analysis of key cases

In this chapter, the three selected projects that illustrate IWRM implementation in Myanmar are discussed. Each project is described in a similar fashion. First, the river basin to which the project applies is introduced in terms of socio-economic and ecological condition. Second, the outline of the project is chronologically presented. Thirdly, the conceptual model (Figure 2) is dressed by interpreting the project from a socio-institutional perspective. Finally, the IWRM transition that develops over time is depicted using the conceptualization of Table 2.

## 5.1 Ayeyarwady Integrated River Basin Management (AIRBM)

### 5.1.1 Introduction of the basin

The Ayeyarwady river basin (also known as the Irrawaddy) is the largest river basin in Myanmar with a stretch of 2,177 kilometres and a catchment area that covers 61% of the country's landmass (WWF, 2018). The river rises in the north of Kachin state (Appendix I) at the foothills of the Himalayas, where the Mali and N'Mai rivers meet. It continues to flow south through a vast Dry Zone in heartlands of the country, where precipitation rates drop from 4000 mm a year (in the north) to a mere 500-1000 mm (CGIAR & Greater MEKONG, n.d.). This is also where the Ayeyarwady meets its main tributary, the Chindwin river (§4.3) and crosses the country's second largest city of Mandalay. Further downstream the river ends up in a fertile but fragile nine-armed delta before it empties in the Andaman Sea (Figure 6). It is one of the most biologically diverse rivers in the world, containing over 1,750 species of mammals, birds, reptiles and fish, of which more than a 100 are globally threatened (WWF, 2018).



**Figure 6.** The Ayeyarwady River (Burma River Network (2008))

Next to these species the basin is home to about 35 million people, which is about 66% of Myanmar's population. The majority of these people is dependent on the river's ecosystem services to sustain their livelihoods. Besides the cultural services of offering a sense of place and spiritual experience that is highly valued among the local population, economical services include (eco)tourism, navigation, irrigation, aquaculture, potable water supply, fisheries and the provision of raw materials such as jade, gas, coal, gold and other minerals (WWF, 2018). The total of these services was recently estimated to be worth 2-7 billion USD to the Myanmar economy each year (HIC, 2017). The main economic activity takes place in the delta region, which is also referred to as the Myanmar's rice bowl, providing about 60% of the country's rice production. Besides, the Ayeyarwady has a big potential for hydropower. Currently, 17 hydropower dams are installed or under construction in the basin (including the Chindwin), 31 are planned and 1 is suspended due to high controversy among local communities and environmentalists (WWF, 2018).

Flooding, deforestation, bank erosion, water quality and the degradation of species have been identified as the main environmental pressures that the Ayeyarwady is facing (HIC, 2017). Especially the lower parts of the delta form a delicate ecosystem of mangrove swamps that is highly vulnerable to the risks of climate change and salt water intrusion. About 80% of the mangrove system of Myanmar has disappeared over the past century (RVO, 2014). Besides the risks within a particular sub-basin, some environmental pressures are interlinked throughout the entire basin (WWF, 2018). Mining activities in the upper catchment cause bank erosion and sedimentation downstream, and the chemicals that are used in these activities travel along. Hydropower dams often disrupt the natural tide of the river, threatening fish populations and impacting fisheries that are situated further down the river. This interdependency has raised the recognition for integrative management of the entire Ayeyarwady river system among government officials (Kristensen, 2019).

#### *5.1.2 Outline of the project*

The first conversations with the Union government of Myanmar and the World Bank date back to early 2010 (NWRC, personal communication, 19 September 2018). The aim of these discussions was to arrive at a development aid project for the water sector of Myanmar. After a couple years of fine-tuning a project proposal, the establishment of the NWRC in 2013 along with its international support from the Dutch and Australian government were the deciding factors for the World Bank to approve the six-year AIRBM project on 9 December 2014 (WB, 2019). The selection of the Dutch and the Australian governments to cooperate with did not happen at random. The following quote of a NWRC representative illustrates this selection process (NWRC, personal communication, 19 September 2018):

*“Governments that are really interested and capable to help are not more than 5. They need the capacity, the proper foreign policy and the national character. The Dutch are known as the world experts of water. Another nation with this character is Australia. They have Marydale, due to governance mistakes it dried out and species died. They recovered this by establishing a water law to protect the river. We need to learn a lot from this. If you go and talk with other countries, they may not be interested. Their first priorities may not be water. So, in AIRBM we are helped by only two governments: the Netherlands and Australia. There is no competition, two people can be friends very easily.”*

Interesting to note is the importance that is placed here on the ‘character’ of a country to do business with. It plays an important role in building a relationship of trust around the common interest of water resources. Another criterion that was mentioned is the capacity for development

aid. In the case of the Netherlands, an expert team on IWRM had been formed to assist the government of Myanmar in the translation of the NWP into a strategic plan for implementation (RVO, 2014). For Australia, the Department of Foreign Affairs and Trade established the Australian Water Partnership (AWP) in 2015, in order to respond to water management needs of developing countries. The third criterion is the availability of proper foreign policy of the donor country to do business in the hosting country. This allows foreign investment to take place without too much bureaucratic bother. An example of this is the Young Water Professional program, executed under the NWRC and funded by the Dutch and Australian governments. It was established in 2014 as an integration mechanism for young talent into the NWRC and water-related ministries.

After this international coalition had been forged, a Project Steering Committee (PSC) was appointed to provide strategic guidance to the project as well as approve work plans and budgets. The PSC is chaired by the Deputy Vice Minister of the Ministry of Transport and Communication (MoTC) and further includes NWRC officials. Besides, the Directorate of Water Resources and Improvement of River Systems (DWIR) under the MoTC was assigned as the focal department for implementing AIRBM. The mandate of the DWIR is “improving navigation channels and stabilizing the inland river ports, protecting against river bank erosion, and cooperating with other organizations in demarcation of dangerous water levels” (UNDP, 2014). This also includes prevention of river pollution and holding responsibility for other river water users such as households and agriculture. A Project Management Unit (PMU) was established under the DWIR to manage the implementation, procurement, finances, and safeguard measures for AIRBM.





**Figure 7.** Partners for the SOBA report (HIC, 2017)

The objective of the AIRBM project is to develop an institutional set-up that enables informed decision-making for national water resources management as well as the implementation of IWRM in the Ayeyarwady Basin. Therefore, one of the main deliverables is a Basin Master Plan (BMP) for the management of the Ayeyarwady river in 2020. ‘One plan for one river’ was the desire that government of Myanmar expressed to the World Bank during meetings that were held in 2012-2013 (AWP, 2018). The BMP would then be the foundation for a National Master Plan for all water resources in the country. For stakeholders that wanted to partake in this decision-making process, the Multi-Stakeholder Forum (MSF) of the NWRC was established on 18 October 2016. The MSF includes 17 volunteers representing 29 organizations and CSOs. Over the course of 2016-2018, 4 public consultation meetings have been held to feed into the decision-making process.

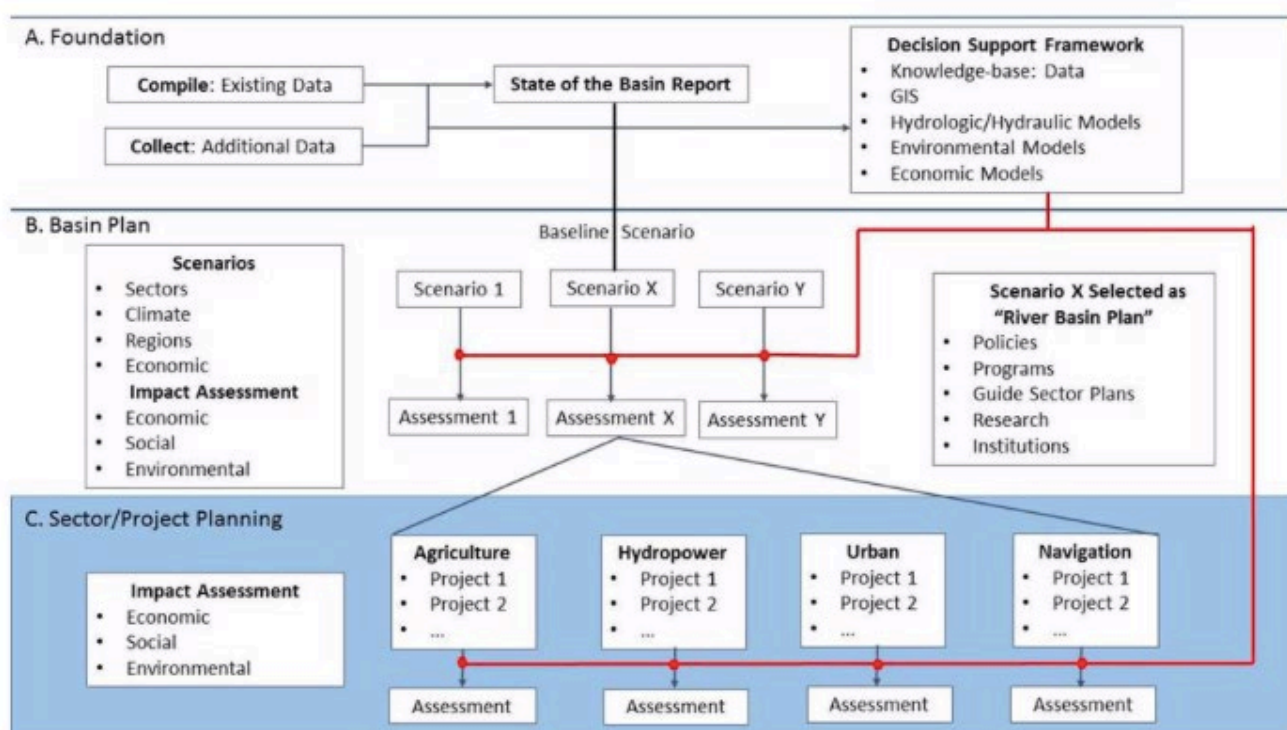
The available data on the socio-economic and ecological status of the basin was insufficient to engage in a master planning process. Therefore, an initial baseline study was required as a first step in the project. The State of the Basin Assessment (SOBA) is the first comprehensive assessment of the Ayeyarwady river basin and the first product of the Hydro-Informatics Centre of the NWRC, supported by a project coordinator from the AWP. The first step in this process was to

reach out to a network of NGOs that were already active in the Myanmar water sector in order to collect existing studies and determine what data was lacking (AWP, 2018). Afterwards, data was gathered by combining technical assessment with extensive community consultations. This was done by more than 100 experts from national and international companies, research institutes, NGOs and universities (Figure 7). Finally, all the acquired data was modelled and represented into an interactive Decision Support System (DSS).

In December 2017, the SOBA report was published at the third Asia-Pacific Water Summit in Yangon. The report forms the basis for the BMP along with the DSS (as part of the HIC). The DSS includes hydraulic, environmental and economic models for various development scenarios of the basin. One of these scenarios is then selected as the actual BMP which is to be pursued.



After a holistic assessment of this scenario is completed, it is separated again into projects for each sector. The DSS then serves again in assessing the progress of these projects. This entire process is presented in Figure 8 below. The BMP is the end result of this process and will be the main document through which future investments are approved. However, it has been made possible within the AIRBM project to prepare such future investments beforehand in case triple bottom line criteria are met. Such preparations include feasibility studies and activities concerning procurement safeguard measures and workshops for capacity building.



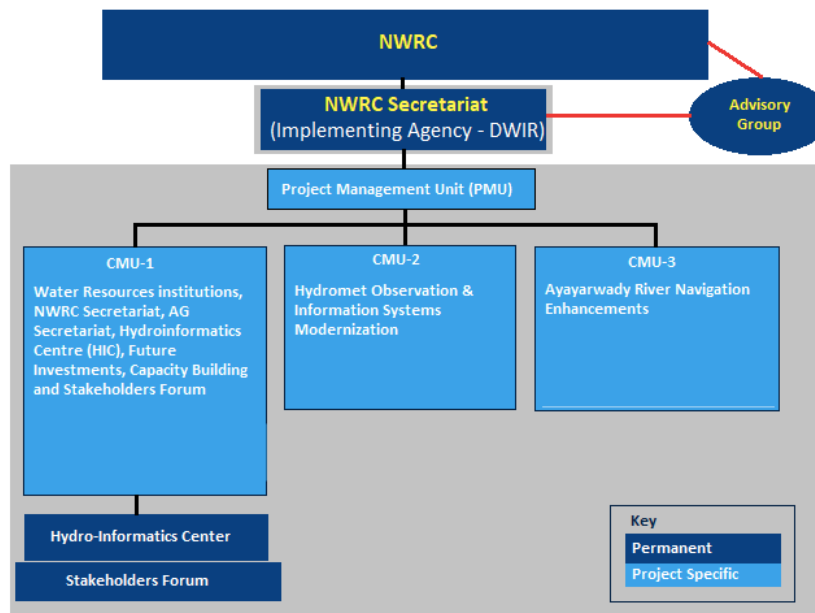
**Figure 8.** Overview of integrative planning approach in AIRBM (AIRBM, 2019)

### 5.1.3 The institutional set-up

Both the PSC as the PMU were shaped according to strict guidelines that were provided by the World Bank. These guidelines offer a detailed description on how units as the PSC and PMU should operate. In order to ensure collaboration between national and international actors, the World Bank prescribes a competitive bidding procedure. Broadly this procedure includes (1) the formulation of a procurement plan, (2) openly inviting national and international parties through procurement notices and (3) selecting the most suitable party by a list of criteria such as level of expertise or community involvement. Overall, these World Bank guidelines can be regarded as a form of soft law, since they provide a strong sense of guidance throughout the project without being legally enforceable.

As mentioned before, the AIRBM project is meant to both develop institutions at national-level and basin-level (Figure 9). For the national-level, this mainly concerns the further development of the NWRC, including construction of office buildings, staffing and capacity building for NWRC members. For the basin-level, the AIRBM project is divided into three Component Management Units (CMU). Each CMU is headed by a Component Director and provided with an international advisor. Component 1 is concerned with the institutional framework for IWRM. It includes the development of the Ayeyarwady BMP as well as the development of the Water Law. Component 2 and 3 are concerned with the technical water infrastructure. Component 2 involves the modernization of hydro-meteorological information systems. Component 3 includes measures for safe and effective navigation along the Ayeyarwady river. Since Component 2 & 3 are less relevant for the institutional set-up for IWRM, they are not elaborated upon in here.

Besides, the HIC and MSF (as components of the NWRC) were also created under CMU 1 and are aimed to be nation-wide institutions that remain after the completion of the AIRBM project. After AIRBM, the HIC will become a not-for-profit consultancy firm for the government of Myanmar. Currently, departments separately own data-bases with water-related information and need to pay other departments if they want to get access to their information. This somewhat cumbersome system is ought to be replaced by the HIC. Regarding the MSF, its main function is to share information and experiences about the AIRBM process with stakeholders in the basin. Besides, the MSF has the objective to ensure active engagement of these stakeholders. However, the budget that has been allocated to MSF is too limited to achieve this goal (NWRC, personal communication, 19 September 2018). Within CMU-1, one position is assigned to coordinate the MSF. This role implies the instrumental use of the MSF and the lack of thorough integration in the decision-making process.



**Figure 9.** Institutional set-up AIRBM project

#### 5.1.4. IWRM transition

As in most cases of implementing IWRM, the main challenge in the case of the Ayeyarwady is to balance competing demands of different water uses (horizontal integration). Within the SOBA process these competing demands have been divided in four main categories of economic development, agriculture, environmental conservation and community (AWP, 2018). Agriculture stands out from this list as one of the main water consumers. It is the main economic sector in Myanmar, and it is at the heart of the Union government's strategy for poverty alleviation (Kristensen, 2019). However, distracting water from the river for irrigation purposes in the Dry Zone restricts the influx of water into the delta, causing problems in terms of saltwater intrusion and rice production. On the other hand, economic development remains the main criteria for investment within the international community. Within the AIRBM project, the main interest of the World Bank is to improve the navigability of Ayeyarwady river in order to secure return on investment. This has led the DWIR to become the focal department for implementing AIRBM. However, devoting decision-making power to a single governmental agency with a particular interest (navigation in this case) runs the risk of violating the principle of IWRM to horizontally integrate different water functionalities.

Regarding the vertical dimension of IWRM, some critical notes can be placed on the decentralisation of decision-making power across government levels. Throughout the project, the main decision-making power has been retained by the NWRC and the Union level government, in consultation with the World Bank (AIRBM, personal communication, 12 October 2018). Although

regional level ministers are incorporated within the NWRC, there is currently no institution in place at (sub)basin level to which decision-making power for AIRBM can be devoted. Especially when a long-term master plan is developed in a centralised manner, the adaptive capacity that is necessary for IWRM is at risk. Both the Dutch and Australian governments (as key partners in the AIRBM project) have advised the NWRC to adopt a learning-by-doing approach in order to reach a common agreement among stakeholders at first, before a master plan is to be distilled from these experiences (RVO, 2014; AWP, 2018). A representative from the World Bank responded on this critique by stating “don’t let the best be the enemy of the good” (AWP, 2018). It is important to recognize that master planning is a constantly evolving process, which is to be updated about every 5 years. In order to ensure adaptive capacity, adequate institutions need to be in place at local basin level to capture social learning process on the ground and feed them into the master planning process.

The approach to stakeholder participation within the project has mainly been through stakeholder consultation in the SOBA process and occasional consultation through the MSF. These consultations need to be repeated on a continuous basis in order to maintain a workable knowledge base for basin planning. This requires active involvement of communities and local governments to set up localized monitoring programmes that feed into the HIC. A representative of the NWRC explains how this step requires a cultural shift: *“A lot of distrust towards the government has been build up over generations. We have to break the norm that we can promise anything and then break it”* (AWP, 2018). After decades of oppression by the previous government, the local population is not used to receive support from the government, let alone to actively collaborate with them. On top of this, 26% of Union government officials from the former regime still holds office (NLD, personal communication, 18 October 2018). The traditional cultural-cognitive rules that are rooted in this group limit the acceptance of the IWRM principles that require active stakeholder engagement in decentralised structures. Over time, a culture of trust and genuine participation needs to grow in order to truly accomplish IWRM.

## 5.2 IWRM in Bago-Sittaung

### 5.2.1 Introduction of the basin

The Sittaung river basin is located in east-central Myanmar, stretching from the Mandalay region in the north, 420 km down south to the Andaman Sea (Figure 10). There are 23 main tributaries to the river basin, covering a total catchment area of 48100 km<sup>2</sup>. In 1878, a 61 km long canal was built to connect the Sittaung to the Bago river. The hydrological boundaries of the Sittaung river basin include most part of the Bago Region and smaller parts of six other regions and states: Magway Region, Kayah State, Yangon Region, Shan State, Mon State and the Nay Pyi Taw Union. The catchment area is home to 5.8 million people, about 10% of the population, mostly living in rural areas, but cities and major towns are expanding.

Agriculture is the main economic activity in the river basin area (Nesheim, Zaw WIn Myint, Toe Toe Aung, Zaw Lwin, Bo Ni & Friberg, 2018). The most common practice here is to cultivate a single crop in the rainy season without the use of irrigation. Dams have been constructed in the tributaries to pump irrigation water from the river or generate hydropower. Besides, the Sittaung river is an important navigation channel within the rural area, being navigable for 40 km during the year and up to 90 km during the rainy season. The northern part of the basin is rich in gold, minerals and timber. Mining activities in this region pollute the river and illegal logging degrades the forests in the area which has a negative impact on the run-off of the river basin (Nesheim, et al., 2018).



**Figure 10.** The Sittaung River Basin Area (Zaw Lwin Tun, Bo Ni, Sein Tun & Nesheim, 2016)

### 5.2.2 Outline of the project

In 2012, the Myanmar Ministry of Natural Resources and Environmental Conservation (MONREC) reached out to the Norwegian Ministry of Climate and Environment to request aid from the Norwegian government concerning environmental conservation programmes in Myanmar (NIVA, personal communication, 19 September 2018). Out of these discussions the Norwegian-Myanmar Bilateral Environment Programme was agreed upon for the period 2015-2017, funded by the Norwegian Embassy in Myanmar. One of the projects under this programme is called “Integrated Water Resource Management - institutional building and training” (hereafter referred

to as ‘the project’) as a collaboration between the Norwegian Institute for Water Research (NIVA) and MONREC (Nesheim & Platjouw, 2016).

The Norwegian Ministry of Climate and Environment assigned NIVA to the project in 2014, as an independent and not-for-profit environmental research foundation (NIVA, personal communication, 19 September 2018). During the project, NIVA reported the progress to the Embassy (funder) on a regular basis and had relative autonomy to spend the budget at their own discretion. A project management team was gathered by NIVA and the Watershed Management Division of the Forest Department (WMD FD) under MONREC in order to draft a work plan for the IWRM project. Besides NIVA and WMD FD, the project management team consists of the Irrigation and Water Utilization Management Department (IWUMD), the Environmental Conservation Department (ECD) and input from the DWIR. The work plan was drafted in Oslo, 2014 (NIVA, personal communication, 19 September 2018). The project consists of four components: (1) the river basin approach to water management, (2) lake and river monitoring programmes, (3) upgrade of the Water Quality Laboratory and (4) the development of a Water Quality Database. The general approach towards river basin management that was agreed upon is discussed in more detail in the next section.



**Figure 11.** Delineation of the Sittaung River Basin Area

One important requirement within the project was to pilot the river basin management approach before introducing it more widely throughout the country. The Sittaung river basin was selected by the project management team due to its relatively small size and absence of armed ethnic conflict (Nesheim, et al., 2017). In order to further delineate the administrative boundaries of the Sittaung river basin area, two one-day capacity building workshops were organised at the Irrigation Technology Centre in Bago in March and September 2015 (NIVA, personal communication, 19 September 2018). The workshops were attended by approximately 50-60 people, mainly representatives from the WMD FD, IWUMD and the DWIR of the Bago Region. Other parties such as the Health Department, ECD and the Department of Geography also attended the workshop. Out of the discussions during these workshops, the Bago river was identified as the sub-basin to run the initial pilot. The further delineation of the area into sub-basin units is shown in Figure 11 (Nesheim, et. al., 2017).





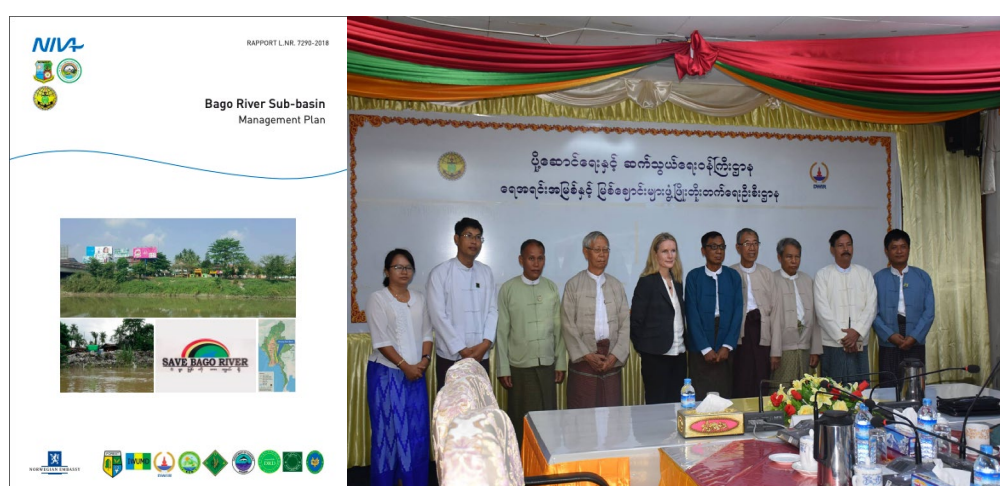
**Figure 12.** Garbage dump along the Bago river (left) and water quality testing (right) (Nesheim et. al., 2016)

Another output of the second capacity building workshop was the establishment of the Bago River Sub-basin Committee (hereafter referred to as ‘the Committee’) (Nesheim, Karlsen, Zaw Win Myint, Toe Aung, Zaw Lwin Tun, Hla Oo Nwe, 2018a). Core actors within the Committee are the director of the WMD FD, the director of IWUMD and the project coordinator of NIVA. Initially these actors formed a steering group that prioritized the topics for discussion and selected the other members of the Committee. A complete overview of the members of the Committee can be found in Appendix II. The main mandate of the Committee is to develop a holistic sub-basin management plan, deciding upon main environmental pressures, short term environmental goals and the implementation of abatement measures.

Next to the Committee a Non-Governmental Stakeholder Group (hereafter ‘the Group’) was established as a parallel discussion arena. The creation of the Group was the outcome of a workshop to discuss the participatory approach of river basin management in Bago on March 2016 (Nesheim, et al., 2018). The workshop was attended by 50-60 people, including NGOs, CSOs and township level politicians. On March 2017, the Group elected the leaders of two main political parties and one civil society organization as the secretaries. Initially the responsibility of the secretaries was to invite and involve relevant stakeholders (as were discussed in workshop on March 2016) for the Group meeting. Later on, the secretaries became the main channel of communication between the Committee and the Group. The challenge remains for both the Committee and the Group to keep reaching out to and involve relevant stakeholders, whilst maintaining effective dialogue. The Committee did not yet manage to include the Department of Hydropower, which represent an important group of water users.

The Bago River Sub-basin Management Plan (hereafter referred to as ‘the Management Plan’) was created over the course of 2016-2018. First a baseline study was done to get an

indication of the ecological status of the river (Figure 12). NIVA took the leading role in the execution of this study. The steering group organized biannual meetings for the Committee and the Group. During these meetings the Committee evaluated the progress of the project and discussed next steps. The Group held parallel meetings to inform the Committee prior to all important steps in the decision making around the management plan. The Group actively involved public stakeholder during their meetings, held community consultations and informed the public of the outcomes via social media. The secretaries of Group were informed about the agenda of the Committee and research outputs beforehand. Starting in 2017, the Committee organized bilateral meetings in order to further integrate both discussion arenas. These meetings were attended by the secretaries of the Group. In the beginning of each Committee meeting a presentation was given by the project team of FD, IWUMD and NIVA to provide an update on the research on the ecological status of the river basin. Every half year, the Advisory Group of the NWRC provided feedback to the project. The Management Plan was submitted to the NWRC in order get approval for its implementation (NIVA, personal communication, 19 September 2018).



**Figure 13.** Presentation of the Bago River Sub-basin Management Plan to the NWRC (NIVA-IWRM Facebook page).

Besides the activities of the Committee and the Group, a number of civil society initiatives have taken place to improve the condition of the Bago river. One of these was the construction of a fence along the riverside of the central marketplace in the city of Bago. Every night this fence is patrolled by local activist to prevent littering in the river (NIVA, personal communication, 19 September 2018). Besides, civil society groups have been created to raise environmental awareness and organize clean-up campaigns (Figure 14). Part of these CSOs are formally represented in the Group. However, a number of public consultations that were held by members of the Group and the Committee indicated that multiple community initiatives have emerged on a more informal basis in remote areas (head secretary of the Committee, personal



communication, 19 September 2018). This mostly concerns groups of neighbours that join forces to clean up the rivers next to their livelihoods. The head secretary of the Committee has expressed the desire to include these initiatives in the Group (personal communication, 19 September 2018).



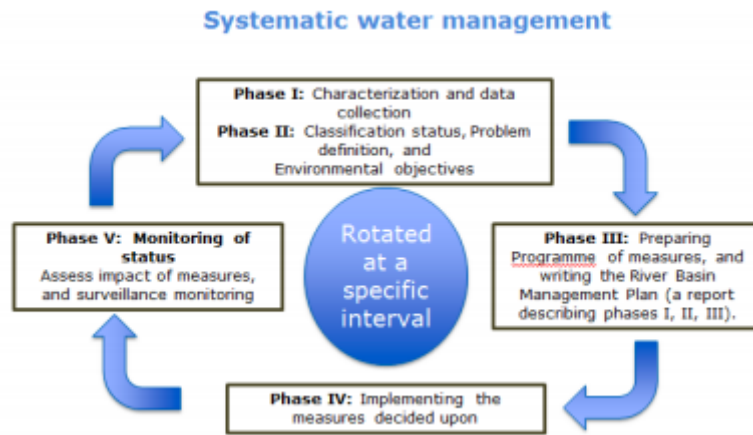
**Figure 14.** CSO Clean-up initiative (left), group discussion during open seminar in Bago on 19 September 2018 (middle), sticker campaign to raise environmental awareness (right).

### 5.2.3 The institutional setup

The Sittaung project succeeded to institutionalize IWRM in the Bago river in the form of both a RBO (the Committee) and a RBC (the Group). The Committee forms a central coordination and decision-making platform for all environmental and sector authorities (horizontal integration) and national, regional and local government authorities (vertical integration). The Group plays a supportive role to the Committee by engaging with non-governmental stakeholders in every step of the process.

The NWFD and the EU WFD were adopted as guiding policy frameworks (soft law), with the cycle for systematic water management (Figure 15) in particular. The NWFD was inspired on the EU WFD and mainly overlap on its guiding principles. A small difference is in the perceived adequate time interval for the water management cycle; 10 years according to the NWFD and 6 years in the EU WFD.

The first two phases of the cycle are intended to provide a common knowledge basis to support further decision-making. It includes the collection of data and the classification of the ecological condition of the water resource. In phase III, the main environmental pressures are identified and prioritized, environmental objectives are agreed upon and abatement measures are prepared. The output of phase III is a holistic River Basin Management Plan. Phase IV and V, respectively regarding the implementation of the measures and monitoring of environmental status, were beyond the scope of the three-year IWRM project (2015-2018).



**Figure 15.** *Systematic water management cycle of the EU WFD*

Monitoring programs are set up and repeated on a regular basis in order to attain a workable environmental knowledge basis. The building of the Water Quality Lab and Database are facilities to further support the decision-making process. The question remains on what administrative level it is most appropriate such facilities. Discussions were held with NIVA and the NWRC to adjust these initiatives with the construction of the Hydro Informatic Centre on national level.

Within the RBO the common belief was held that the IWRM project should be a pilot following a learning-by-doing approach (cultural-cognitive rule), in which reflections and reconsiderations were taken into account at every step of the process. The main rationale is to learn from experiences in order to improve future efforts of implementing IWRM (Nesheim, Wathne, Bo Ni & Zaw Lwin Tun, 2016). Therefore, the work plan evolved as a living document over time, refraining from setting detailed specifications beforehand. During the process, NIVA maintained a facilitating role; passively by mediating stakeholder meetings and actively by documenting.

#### *5.2.4 IWRM transition*

Integrative management in the form of the RBO and RBC is perceived as a radical innovation among the Committee members (Committee member, personal communication, 19 September 2018). Most members are still used to more traditional forms of management, which can be characterized by highly centralized and fragmentized governmental agencies that operated in isolation. The Head Secretary of the Committee mentioned that is important to think of the right enabling environment for members that are still used to the 'traditional' way of decision-making with respect for strong hierarchies and little room for open discussion. The Head Secretary further emphasized the need to actively involve public stakeholders, especially if they have a marginalized voice. He raised the question within the Committee how to include the community initiatives into the Group, despite that these people are both physically and emotionally detached

from the government. Given in by the norm of active stakeholder engagement (normative rule) this form of democratic leadership strengthens the institutional capacity for IWRM.

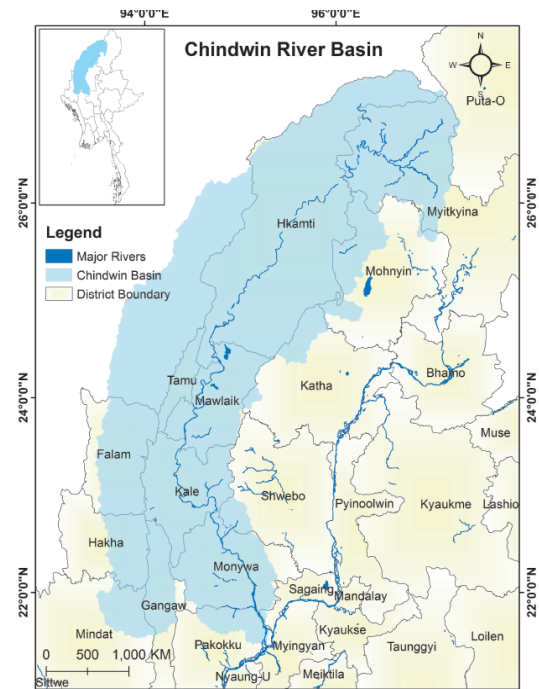
The adoption of a learning-by-doing approach allowed for a degree of flexibility to adapt the plan to any unexpected circumstances and adjust it to the case-specific context in Bago. Starting to engage in discussion on sub-basin level and separating government and non-government actors reduced the complexity of different interests and power dynamics in one group. Within the Committee power balances are carefully managed to ensure that different water user representatives are represented equally. An example of this is the assignment of the Director of the Environmental Conservation Department (ECD) and the Bago Township Development Committee (TDC) as co-secretaries within the Committee. This gradual process of allowing stakeholders to get used to open and multi-sector discussion accommodates the transition to an IWRM approach.

In order for stakeholders to articulate their interest in a meaningful way, they require the knowledge and capacity to do so. The water quality monitoring activities of NIVA contributed to a scientific knowledge base that catalysed the formation of a shared understanding among the RBO members. Without entering the epistemological discussion whether such a knowledge base should be considered a structure-based or culture-based institution, the provision of this knowledge strongly supported the realization of the Management Plan. Obtaining a common understanding of the different perceptions that were held within the RBO led to an increased sense of trust among the members. Over time, informal relationships were built between government officials that previously operated in strict isolation. Also, one of the Group secretaries explained how the relationship with government officials in the Committee improved during the project and that they are currently communicating via phone and email on an informal basis.

### 5.3 Chindwin Futures

#### 5.3.1 Introduction of the basin

The Chindwin river is the main tributary of the Ayeyarwady river. It originates in the Hukawng Valley close to the northern border with India, then heads west along the Saramati mountain until it meets with the Myittha river. The river then turns in south-eastern direction, passing the city of Monywa until it flows into the Ayeyarwady after 1.207 kilometres (Figure 16). Except for its origin in Kachin State, the Chindwin flows entirely within the Sagaing region. Therefore, the Sagaing regional government has jurisdiction over most of the basin, facing the challenge to balance the development of the people's livelihoods whilst preserving ecosystem services of the river. However, the catchment area of the Chindwin basin also covers parts of Chin State, Magway Region and India.



**Figure 16.** Chindwin River Basin (Khaingh Thanda Lwin, 2014)

The ecosystem services of the Chindwin river provide for needs of six million people, including drinking and irrigation water, fish and transport (Aung & Dharmalingam, 2019). The majority of the basin's communities live in rural areas with limited access to clean drinking water, sanitation and electricity. Besides, the Chindwin river area is rich in natural resources (Figure 17). Along the river, there are deposits of minerals such as jade and amber as well as hardwood forests within the drainage area of the river. Mining and logging activities, the instalment of hydropower dams and expansion of irrigated farmland have started to form a threat against the wealth and well-being of local communities and the biodiversity. The Chindwin river basin is home to 14 of the country's main biodiversity hotspots which are considered to be crucial for maintaining global biodiversity rates (Aung & Dharmalingam, 2019).



**Figure 17.** Typical open pit gold mine near Monywa (left) and view of mining pits in the upper parts of the Chindwin basin (right) (SEI, 2016)

### *5.3.2 Outline of the project*

The IWRM project in the Chindwin river basin was initiated by the Stockholm Environment Institute (SEI) in 2013. SEI is an international non-profit organization that focuses on environmental and development challenges through connecting scientific research with policy decision-making. In doing so, SEI adopts a participatory approach with emphasis on local capacity building, strengthening of institutions and engaging in long term relationships with key partners (SEI, 2019). This approach has led them to look out for a local counterpart to cooperate with. Late 2013, a cooperation with the Myanmar Environment Institute (MEI) was arranged. MEI is a non-governmental organization that was founded in 2012 as the first environmental institute in the country. The main activities of MEI include the provision of training courses in environmental science and management, as well as conducting environmental research and EIAs for the private sector (MEI, personal communication, 5 November 2018).

The initial plan of the SEI-MEI collaboration was to focus on the Ayeyarwady river basin in a project called Ayeyarwady Futures, funded by the Blue Moon Fund. A one-year scoping study (Nov 2013 - Dec 2014) was conducted and revealed the need to further institutionalize the emerging partnerships and pilot activities under the auspices of a Myanmar-based organization (SEI, 2019). Water quality, risk and disaster management, water allocation during the dry season and the management of sediments (for the sake of transportation) were identified as main environmental threats that are in need of scientific and governance capacity enhancements. Limitations in data collections and technical knowledge, as well as a lack of experience with multi-stakeholder processes and integrated planning were identified as main barriers.

Another outcome of the one-year scoping study was formal cooperation between SEI, MEI and the DWIR, initially for the period of Jan 2014 - May 2015 and later extended till December 2020. The aim of this collaboration is to close the gap between science, policy and research in managing environmental resources and water management challenges. The Director General of DWIR has welcomed SEI to provide capacity building for local staff to train them for climate adaptation measures, technology and tools for water management. The main role of MEI in this partnership is to engage local stakeholders, whilst DWIR fulfils the function of governance and critical leadership. The DWIR also acts a bridge to incorporate the work of the partnership in the policy-making process of the NWRC. Besides, Mekong regional experts from Chulalongkorn University, Bangkok (Thailand), Sustainable Mekong Research Network (SUMERNET), Mekong Program on Water, Environment and Resilience (M-POWER) were consulted and engaged within this partnership (SEI, personal communication, 1 October 2018).

In order to strengthen the link between science and governance in the water sector, a proposal for the second phase of the Ayeyarwady Futures project was submitted with the focus on building an Ayeyarwady Futures Partnership (AFP) with key existing organizations that are

active in the river basin. The AFP was meant as a communication and mediating platform to inform water policy and research agendas and to consider different water management strategies. However, due to the start of the AIRBM project in 2015 SEI decided to shift the focus on the Chindwin river as the main tributary of the Ayeyarwady in order to ensure the effectiveness of their efforts (SEI, personal communication, 1 October 2018). As of July 2014, the project continued under the name Chindwin Futures extended till the end of 2018. Active dialogue was maintained with the Ayeyarwady river basin and the DWIR. The main functions of this dialogue were to raise awareness on the values and shortcomings of integrated management on basin-level and strengthen capacity of state and civil society actors to discuss planning and strategies for water resource management.

The goal of the Chindwin Futures project was to establish and eventually implement a strategy for the integrated planning and development of the river basin (SEI, 2019). First, a number of monitoring activities, stakeholder consultations and an analysis of current policies were employed to identify a number of key issues for further strategic assessment. Second, a set of workshops was organized in which stakeholders explored alternative approaches for alternative scenarios of the Chindwin river basin (Figure 18). This output was then contrasted against existing views held by different stakeholders that were distilled from previous consultations and assumptions that are implied in existing policy. Finally, the implications for policy that came out of these sessions were assessed and fed into the policy-making processes of the Sagaing regional government (SEI, 2017).



**Figure 18.** Stakeholder consultations at local and national levels (SEI, 2016)

One of the main elements of the project was the water quality monitoring program. Water samples were taken on 17 sites in the upper, middle and lower parts of the river basin on a biannual basis in wet and dry season over the course of 2015-2017 (SEI, 2017). Next to building a knowledge basis on the ecological condition of the river, the program served to train local communities to test water quality and support local governments to establish a water quality management and monitoring scheme. Results show that water quality is deteriorating due to a lack of urban sewage systems (high levels of organic matter and low levels of dissolved oxygen), deforestation (increased soil erosion, sedimentation and turbidity) and upstream mining activities (heavy metal contamination). A major barrier for effective water quality monitoring was



found during the program. The responsibility for water quality monitoring is devoted separate government bodies without adequate coordination and knowledge sharing mechanisms. Water samples are collected in an inconsistent manner and analysed in testing facilities that are separately owned by different departments. Test results are not made public nor shared in a common repository.

Further investigation of this barrier by SEI and MEI revealed that competition of water resources between multiple water-related government agencies was formally laid down in the department's objectives. The most striking example of this is the competition between the IWUMD (irrigation) and the department of hydropower. The water that is used by the former directly impacts the hydropower potential for the latter. The need for a central discussion platform where these different stakeholders can come together became apparent. After a number of stakeholder consultations in the Chindwin river basin area, SEI - MEI submitted a proposal for the formation of an RBO to the Sagaing regional government in 2015. After some discussion and fine-tuning the proposal was approved. In 2016, the first Chindwin RBO meeting was held. In 2017, formal responsibilities and budget was assigned to the RBO by the SRG. As of 2018, the DWIR took responsibility to continue water quality monitoring and share it openly with the RBO. In the next paragraph the structure of the RBO is discussed in more detail.

### *5.3.3 Institutional setup*

Although it is not yet legally recognized by the Union Government, the Chindwin RBO is first RBO in Myanmar (SEI, personal communication, 1 October 2018). The mandate of the Chindwin RBO includes (1) improve the gathering and sharing of information among all stakeholders of the river basin, (2) coordinate collaboration across different sectors groups and areas, (3) encourage local initiatives for bottom-up input (4) raise public awareness about river conditions and IWRM and (5) coordinate capacity building activities for local communities to monitor water resource conditions.

Based on the requirements of the river basin that came out of the first SEI scoping study, the RBO is divided into five sub-committees: research & survey, finance & budget, external communication, legal & management and Communities For Future (CFF). Together, these five sub-committees form the Chindwin River Basin Committee (CRBC). Each sub-committee has its own members and secretary in order to maintain effective group sizes for constructive dialogue. The RBC contains 50-60 members, half of which are government officials, the other half being non-governmental stakeholders. Interdependencies among sub-committees are addressed by submitting proposals and approvals to the secretaries of the relevant sub-committee. Conflict resolution happens mainly through dialogue within the RBC but the SRG can be consulted in case of difficulties. The SRG keeps the main responsibility over the basin and there is no legal

foundation nor official recognition of the Chindwin RBO by the Union government (MEI, personal communication, 5 November 2018).

In order to coordinate the RBC, two secretaries were appointed from the DWIR to form the Chindwin River Basin Secretariat (RBS). The responsibility of the RBS is to arrange the annual stakeholder meetings and mediate communication, as well as day-to-day management and administration of the RBC. The RBC functions as a decision-making arena and discussion platform and provides guidance to the RBS. A voting system is applied in case of dissension. In a later stage, the formation of a set of River Sub-Basin Organizations may be considered given the size of the Chindwin river. The RBC is chaired by the Sagaing Regional Chief Minister who is responsible for the selection of the members of the RBC as well as the members of the Sagaing Regional Cabinet. However, the whole selection process and all structural innovations of the RBO are openly discussed and approved by the whole RBO.

The CFF sub-committee holds a slightly different function within the RBO structure. It comprises a group of active community members within river basin area that were involved in the capacity building activities of the project. Community representatives take place in the CFF sub-committee which is chaired by a parliamentary member of the NLD. They have the role to bring water-related community initiatives under the attention of the RBO and advocate for community concerns.

The main activities of the RBO is an annual meeting, starting in 2016. This meeting takes the form of a 1-2-day workshop attended by the SRG, parliamentary people, universities, government departments, private sectors, community representatives and CSOs. Public stakeholders are also openly invited to the RBO meeting. The secretaries of each sub-committee review the results of their work and the participants discuss future activities of the RBO. During the first meeting, a draft structure of the RBO was presented by SEI-MEI. Negotiations of the RBO structure were made during the meeting and participants agreed that the RBO structure should remain to be provisional.

#### *5.3.4 IWRM transition*

The role of agency in the creation of an institutional framework for IWRM again becomes apparent from this case. MEI was the first environmental institute of the country at the time of the project. The founder of MEI was professor at the University of Yangon. Driven by a sense of urgency to raise environmental awareness in Myanmar, MEI was established in 2012 (MEI, personal communication, 5 November 2018). This provided the essential institutional backbone from which the Chindwin RBO emerged later. SEI was intentionally looking for a local organization as a counterpart to do business with apart from governmental agencies. The main reason for this was to secure the integrity of sustainable development efforts (SEI, personal



communication, 1 October 2018). Socio-political processes may complicate inclusivity of stakeholder participation, putting the IWRM principle of stakeholder engagement under pressure. Both SEI and MEI place a strong normative value on the local embeddedness and ownership of the decisions that are made, including the RBO. The founder of MEI even argued that without local ownership to people from the Sagaing region, the RBO is most likely to fail (MEI, personal communication, 5 November 2018).

During the scoping study of the project, it was mentioned that the partnerships that emerged were of significant value for the governance capacity. This was the reason for institutionalizing these partnerships under the AFP. The circumstances of the AIRBM project that was about to start cancelled this idea and turned into a similar institution in the Chindwin basin. As in the Bago-Sittaung case, this illustrates how a learning-by-doing approach that allows for some flexibility is necessary to adapt to the changes on the ground. Most important for such an approach to flourish in terms of IWRM is the emphasis on inclusive participatory modelling in every step of the process. The Chindwin Futures project truly showcases this idea. Not only were stakeholders inclusively engaged through the RBO, the outcomes of these consultations were leading for all the decisions that were made by RBO. The decision-processes went off jointly, aiming for consensus with the entire RBO, without any mediating party or higher authority that had to come in between.

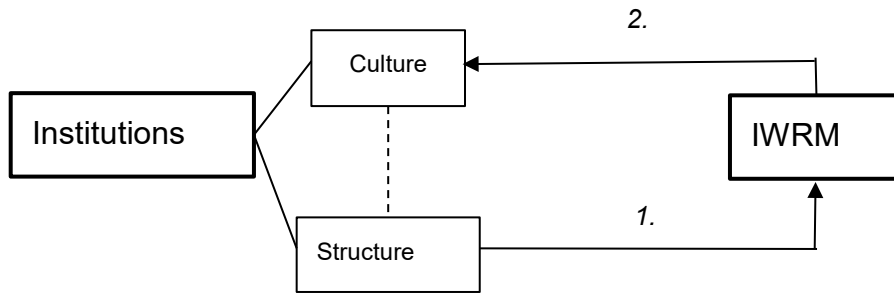
The Chindwin case shows how the delineation of administrative boundaries plays an important role in the vertical integration of IWRM. This is the case because of the large overlap between Chindwin catchment area and the administrative boundaries of the Sagaing Region. An additional benefit to this is that the majority of the population in Sagaing Region is of Burmese ethnicity. Therefore, the degree of ethnic tensions within the Region remains low, fostering the collective ownership of the RBO among the public. The SRG has sufficient authority to approve the formation of and plans that are made within in the RBO, without any need for formal approval from the Union level government. However, the Chindwin RBO still relies on international funding and volunteers because official recognition by the Union government is still lacking. The SEI-MEI collaboration has been agreed new funding for an extension of the Chindwin Futures project. Whether the Chindwin RBO develops to its full potential after this international support fades away remains to be seen.

## 6. Conclusion

### 6.1 Answering the research question

The institutional transition of the water sector in Myanmar towards an IWRM regime is examined in this thesis. The status quo of this transition has been described as a sectoral regime with high levels of centralization (low vertical integration) and fragmentation of governance (low horizontal integration). Different functionalities of water resources have been institutionalized under separate governmental agencies with often competing mandates. The history of sectoral government structures has led to a believe that responsibilities should be formally assigned to qualified officers in order to drive change. This governance culture can be characterized by a 'silo-mentality', impeding the imperative of IWRM to integrate different sectors. The formation of the NWRC as a national water institution and the creation of RBOs on local (Bago) and regional (Chindwin) levels are the first efforts that break out from this traditional way of decision-making and reconfigure towards IWRM.

The dynamic of this ongoing transition towards IWRM is further explained by a modification of the conceptual model in Figure 19. The cases that are examined here indicate that the driving force of this change is initiated by individual agency of local actors (arrow 1). Examples of this are the establishment of the MEI and the case of IWRM advocacy by an agent from the NWRC regarding water-based diseases. In a similar way, the Head Secretary of the Bago Committee actively incorporated marginalized stakeholders and pursued opportunities to further engage with bottom-up initiatives. This has been labelled as a form democratic leadership which truly drives the IWRM transition (arrow 1). With the support of the international community, these agents succeed in pulling together discussion arenas, enabling an open dialogue between water-related officials that previously operated in isolation. In doing so, they adopt a learning-by-doing approach which allows them to adapt to the specific needs of the locality in which the IWRM structures are implemented. Examples of this are the change of geographical focus in the Chindwin Futures project and the experimentation with bilateral meetings and group sizes in the Bago-Sittaung project. In socio-institutional terms, this force of agency and democratic leadership is underpinned by normative and cognitive rules in the cultural domain of institutions.



**Figure 19.** *Revised conceptual model*

As a result, social learning processes occur in which negotiations take place and informal relationships are built up over time (arrow 2). This process of gaining a mutual understanding is further facilitated by the creation of knowledge bases through a combination of technical assessments and community consultations. The HIC is an institutionalized example of this, but also the Chindwin and Bago projects engage in monitoring activities to inform decision-makers. In the end, it is this gathering around a collectively agreed upon piece of information that enables integrative planning and eventually an integrative Water Law (second iteration arrow 1). Overall, these findings suggest an opportunistic piloting approach towards IWRM, avoiding the tendency to implement a predefined set of integration principles but rather emphasize local ownership and agency.

## 6.2 Recommendations

### 6.2.1 For praxis

Currently, the main challenge for IWRM implementation in Myanmar is the exploration of synergies between stakeholder groups whilst avoiding duplication of their activities. As the Bago case shows, it can be beneficial to organize dialogue in small-scale pilots at sub-basin level, since it allows for closer relationships between stakeholders and trust building, which in turn fosters active group discussion. Rather than acting too quickly towards an ‘IWRM ideology’ driven by a sense of urgency, the focus should be on carefully managing the process of social learning that takes place in a complex web of actors. The transition towards IWRM requires a culture of trust and genuine participation that needs to be nourished and grow over time. Storytelling of successful initiatives and envisioning the progress towards a future of healthy rivers may support this process.

The NWRC and basin-level organizations (Chindwin RBO and Bago Committee & Group) provide the adequate institutional space to capture social learning processes. The main role of NWRC should be to nurture and support the creation of new basin-level institutions, prioritizing

the establishment of an Ayeyarwady RBO to which decision-making power can be devoted. In doing so, the NWRC should seek for delineations where hydrological and administrative boundaries closely overlap. The more this is the case, the less diversity in stakeholders from different administrative units is involved, reducing complexity for multi-stakeholder decision-making. Besides, it can be favourable for the NWRC to invest in platforms that facilitate communication and collaboration between water actors. The Water Agency in Yangon can be suitable organization to carry out this function and unlock capacity for the NWRC in doing so. For the World Bank, the procedures they uphold stand at odds with the vertical integration principle of IWRM, as they imply centralized decision-making. This paradox could be resolved by securing the development of regional and local water management institutions into the World Bank guidelines.

### *6.2.2 For theory development*

The distinction between structure- and culture- based institutions can be used to explain the intricate structure-agency dilemma within transition management discourse. This is to say that an agent departs from the normative and cultural-cognitive 'rules' that are held by the individual, which lead him or her to take action beyond formally defined roles. However, the initiating role of agency over structure does not imply a strict 'solution' to the structure-agency paradox. Local agents derive inspiration from an international community that is actively advocating democratic and IWRM principles which have been formally institutionalized before. Examples of this are the UN Sustainable Development Goals and the European Water Framework Directive that formed direct input for the formulation of the NWP as a primary policy tool and IWRM projects that were subject to this thesis.

Since the findings stress the role of agency and democratic leadership in transition management, the true question becomes: what makes these people tick? Taking a closer look on the normative and cultural-cognitive dimension of culture as proposed by Scott (2014) may reveal a deeper understanding of the dynamics that underpin this behaviour. Besides, they underlie the choice for the approach in the IWRM process, be it a more centralised master planning approach (AIRBM) or a more organically evolving learning-by-doing approach. Currently, the distinction between normative and cultural-cognitive is a mere categorization, adding little value to understanding the water governance transition in practice. Insights from social sciences (sociology, anthropology) may strengthen the explanatory value of these constructs. In addition, this picks up on contemporary IWRM literature that emphasizes context-dependency. Linking the classification of normative and cultural-cognitive rules to sociological/anthropological literature and methodology may support the translation of general IWRM principles into a tailor-made approach that respond to the needs of the locality in question.

### 6.3 Reflection

Given the theoretical vagueness of the term IWRM, it proved hard to examine the phenomenon through a deductive approach. Although the distinction between horizontal and vertical could hold stand in the analysis, it still added little value to explaining the evolution of the institutional context over time. All three cases showed parallel processes of horizontal and vertical integration as soon as 'arena's for open dialogue' had been formed. Here, the dimension of stakeholder participation became apparent as well, making it almost irrelevant to analyse this dimension separately. In hindsight it makes sense that the essence of concept of IWRM, i.e. integration, is overlooked when it is studied in isolated dimensions.

This also goes for the operationalisation of the socio-institutional perspective by Scott (2014). The general distinction between the structural and cultural dimension of institutions was useful in answering the research question. However, the further operationalisation into hard, soft, normative and cognitive added little explanatory value to the thesis for two reasons. First, the distinction of hard and soft law was too shallow for the cases that were analyzed here. Almost no hard law had been formed yet, leaving all other structural aspects labelled as "soft law". Second, the distinction between normative and cognitive did not match the methodology used in this thesis. Cognitive institutions are implicit and cannot be properly observed through documents and interviews. Beliefs and assumptions become explicit and mostly turn into normative statements. The observations that were held during my time in Myanmar did allow for a cultural description (chapter 4) that reveals some of the implicit beliefs that underpin behaviour. However, the methodological tools were lacking to systemically analyze these observations in an unbiased manner and synthesize them into the transition management discourse.

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## Appendices

### Appendix I. Myanmar States and Regions (CartoGIS Services, 2012).



## Appendix II. Water related government agencies in Myanmar

Source: Nesheim & Platjouw, 2018

Ministry	Agency	Functions
Ministry of Transport	Department of Meteorology and Hydrology	Water assessment of major rivers Data collection and analysis
	Directorate of Water Resources and Improvement of River Systems	Ensuring safe navigation on rivers and creeks; protecting the river systems for the beneficial utilization of the public, monitoring of water quality river training, river dredging, navigation, river bank protection and river water quality monitoring
Ministry of Agriculture and Irrigation	Irrigation and Water Utilization Management Department	Provision of irrigation water to farmland, and monitoring of water quality irrigation water supply, construction, operation and maintenance of irrigation dams and flood protection embankments, agriculture water quality monitoring.
		Pump irrigation and rural water supply
Ministry of Environmental Conservation and Forestry	Forest Department	Reforestation and Conservation of forests
	Environmental Conservation Department	Environmental conservation and management
Ministry of Electric Power	Department of Hydroelectric Power	Hydropower generation
Ministry of Industry	Factories	Industrial use, water treatment
Ministry of Livestocks Breeding, Fisheries and Rural Development	Myanmar Fishery Enterprise	Fishery works, monitoring and controlling water body
	Department of Rural Development	Domestic and rural water supply and sanitation
Ministry of Health	Department of Health	Environmental Health, Water quality assessment and control, monitoring water quality
Ministry of Construction	Department of Human Settlement and Housing Development	Domestic water supply
	City Development Committee	City water supply and sanitation, water conservation and protection works
	Myanmar Engineering Society	Water resources management related activities, especially consultation
Ministry of Science and Technology	Technology University	Training and Research
	Township level	Organizing water needs, conservancy needs

### **Appendix III. Members of the Bago River Sub-basin Area Committee.**

<b>Ministry/ Department</b>	<b>Title</b>	<b>Position within Committee</b>
1. Ministry of Natural Resources and Environmental Conservation	Minister	Chair
2. Watershed Management Division Forest Department	Director	Head secretary
3. Directorate of Water Resources and Improvement of River Systems	Director	Co-secretary
4. Irrigation and Water Utilization Management Department	Director	Co-secretary
5. Environmental Conservation Department	Director	Co-secretary
6. Forest Department	Range Officer	Member
7. Directorate of Water Resources and Improvement of River Systems	Deputy Director	Member
8. Bago Township Development Committee	Assistant Engineer	Member
9. Bago Township Development Committee	Member	Co-secretary
10. Department of Rural Development	Assistant Director	Member
11. Department of Agriculture	Staff Officer	Member
12. Department of Fisheries	Staff Officer	Member