Adaptive Capacity of Coastal Resource Management Institutions in Cambodia, Viet Nam and Australia

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HIGHLIGHTS

- Institutional adaptive capacity varied within and across case studies.
- Such capacity was influenced by enabling and disabling conditions at play.
- Higher-level institutions need to support enabling conditions at lower levels.
- This may involve poverty alleviation and building human and social capital.

ABSTRACT Responding to environmental change requires a better understanding of how institutions—the rules and norms that structure human interactions—enable society to adapt to impacts of such change. By drawing on the Adaptive Capacity Wheel framework and empirical cases of coastal resource management decentralisation in the context of the Peam Krasaop Wildlife Sanctuary (Cambodia), Tam Giang Lagoon (Viet Nam) and the state of South Australia (Australia), this study examines how institutions support adaptive capacity. The characteristics of institutions analysed both facilitated and constrained adaptive capacity, depending on the enabling and disabling conditions at play. Despite the constraints, institutions have, to a certain extent, enabled actors to: organise themselves; learn and improve resource management; mobilise leadership, resources and authority; and, make progress towards improved governance. These illustrate the creation and mobilisation of adaptive capacity, which resulted in positive outcomes in responding to environmental change. In some of the cases studied, reinforcing enabling conditions of adaptive capacity will require creating livelihood alternatives, alleviating poverty, reducing inequality, and building human and social capital.

KEYWORDS *adaptive capacity; institutional analysis; decentralisation; coastal resource governance; environmental change; Southeast Asia*

1. Introduction

The Earth system is experiencing social-ecological changes at a pace that is unprecedented in human history. Some of the most pressing issues facing human societies include overexploitation of natural resources, biodiversity loss, and climate change. In this context, adaptation is a societal response, which can reduce the adverse impacts of such changes (Fidelman, Leitch, & Nelson, 2013). Adaptation refers to "…the decision-making process and the set of actions undertaken to maintain the capacity to deal with current or future predicted change" (Nelson, Adger, & Brown, 2007).

Successful adaptation relies on the capacity of individuals, communities, organisations and governments to adapt to different climatic and non-climatic stressors (i.e., adaptive capacity) (Engle, 2011; Hill & Engle, 2013). Adaptive capacity involves a better understanding of relevant physical and social

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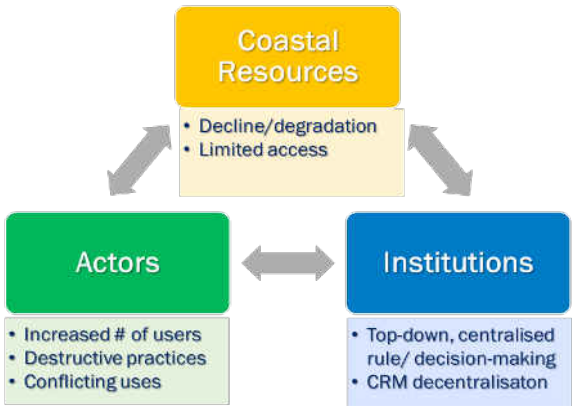

FIGURE 1. Environmental, social and political change in the Peam Krasaop Wildlife Sanctuary and Tam Giang Lagoon (CRM: coastal resource management).

Dimension	Evaluative criteria
Variety	Inclusive participation of relevant actors
Learning capacity	Joint activities that entail learning (e.g., meetings, decision-making, monitoring and enforcement etc.)
Autonomy	Autonomy to make and implement decisions
Leadership	Ability of actors to direct and motivate others to follow
Resources	Human, financial, and technical resources
Fair governance	Legitimacy, equity, responsiveness, accountability

TABLE 1. Dimensions and evaluative criteria of institutional adaptive capacity.

conditions that enable action to prevent, mitigate and adapt to impacts of a changing Earth system (Biermann et al., 2010). In sum, adaptive capacity is a critical property in fostering adaptation to environmental change (Engle, 2011).

Adaptive capacity particularly focuses on governance, institutions and management; therefore, it is translatable to decision- and policy-making applications (Engle, 2011). These may explain an increasing number of studies on institutional dimensions of adaptive capacity in recent years (Gupta et al., 2015; Hill & Engle, 2013)[1]. These studies suggest that responding to environmental change will necessarily demand responsive and flexible institutions that facilitate adaptive capacity. This involves, enabling social actors to design new institutions and reform existing ones to better respond and adapt to a changing environment (Gupta et al., 2010).

This study seeks to examine how institutions support (or reduce) adaptive capacity. It draws on empirical cases of decentralisation of coastal resource management in the context of the Peam Krasaop Wildlife Sanctuary (Cambodia), Tam Giang Lagoon (Viet Nam) and the state of South Australia (Australia).

2. Resource Management in a Changing Environment

The case studies examined in this study, i.e., Peam Krasaop Wildlife Sanctuary (Cambodia), Tam Giang Lagoon (Viet Nam) and South Australia Fisheries Management (Australia), are illustrative of environmental, socio-economic and political changes. They feature decline in resource conditions associated with resource use intensification. Such changes take place in the context of a centralised and hierarchical system of government, which, nevertheless, was promoting reforms towards decentralisation in response to social-ecological changes (Figure 1).

Decentralisation includes different types of policy reforms aiming to shift powers from centralised to more localised actors and institutions, such as sub-national units of administration, local government, the civil society, and/or local user groups (Meinzen-Dick & Knox, 2001). Accordingly, existing institutions were changed and new ones created to foster participatory, collaborative and decentralised coastal resource management. These were based on government intervention—and in the case of Cambodia and Viet Nam, involved international development initiatives in partnership with the community. Institutional reform included changes in the legislation, sharing responsibility over resource management, and establishment of community-based, resource-user and/or stakeholder entities (e.g., Village Management Committees in Cambodia, Fishing Associations in Viet Nam and Fisheries Council of South Australia). Information for each of the case studies is summarised in Appendix 1.

3. Methodology

3.1. Analytical Framework

This study draws on the Adaptive Capacity Wheel (ACW) of Gupta et al. (2010), an analytical approach developed to assess institutional adaptive capacity. The ACW is a useful heuristics to examine strengths and weakness of institutional capacity to adapt to environmental change (Grothmann, Grecksch, Winges, & Siebenhuner, 2013). It consists of six broad dimensions, i.e., (1) variety of actors, perspectives, and solutions, (2) learning capacity, (3) room for autonomous change (autonomy), (4) leadership, (5) resources and (6) fair governance. For each of these dimensions evaluative criteria were identified by drawing on Gupta et al. (2010) and related literature (e.g., Biggs et al., 2011; Dietz, Ostrom, & Stern, 2003; Ostrom, 2010) (Table 1).

[1] The notion of adaptive capacity used in this paper draws on the vulnerability framework. However, adaptive capacity has also developed in the domain of the resilience framework, where it is often referred to as 'adaptability' to describe the capacity of actors to manage and influence resilience (Engle, 2011; Nelson et al., 2007). Further, other theoretical perspectives, e.g., adaptive governance and adaptive co-management cover adaptation and institutions related themes (e.g., Armitage et al., 2009; Folke, Hahn, Olsson, & Norberg, 2005).

3.2. Selection of cases

Peam Krasaop Wildlife Sanctuary and Tam Giang Lagoon were selected to illustrate responses to environmental, socio-economic and political change in the context of coastal resource management, which provide a dynamic context to examine adaptive capacity. The availability of data and information from previous studies, and their history of engagement with coastal resource management were additional criteria used in their selection. The inclusion of the Australian case was a suggestion of one of the assessors of our initial proposal. The South Australia Fisheries Management was selected because it is the only state in Australia where fisheries co-management was formalised through specific government policy. It is important to note that unlike the Peam Krasaop Wildlife Sanctuary and Tam Giang Lagoon cases, which consist of community-based small-scale fisheries, South Australia Fisheries Management is mostly state-wide in scale and include commercial, recreational and traditional fishing.

3.3. Data collection and analysis

This study adopted a qualitative case study approach (Yin, 2003). It used multiple sources of data, i.e., documents (e.g., grey [technical reports] and academic literatures, organisation's websites, policies and legislation), participant observation, interviews and focus groups.

Observation, interviews and focus groups were undertaken between April and December 2014. Interview respondents and focus group participants were selected based on their history of involvement with and/or knowledge of the case studies. These respondents included community/villagers, resource users, members of decentralised entities (e.g., fishing associations and village management committees), and government officials (for details see Appendix 2). Interviews and focus groups explored perceptions of respondents and participants of the extent to which the case studies met the evaluative criteria outlined in Table 1.

Documents, interview and focus group data were analysed using systematic qualitative techniques (Miles & Huberman, 1994; Paton, Curtis, McDonald, & Woods, 2004). These included content analysis of documents, and interviews and focus groups data. Coding was based on the six dimensions and criteria described in the analytical approach. Data analysis was undertaken using the software NVivo.

4. Results

This section presents the characterisation of adaptive capacity in the context of the Peam Krasaop Wildlife Sanctuary (PKWS), Tam Giang Lagoon (TGL) and South Australia Fishery Management (SAFM). General strengths and weaknesses in terms of enabling and disabling conditions are also identified, as summarised in Table 2.

4.1 Variety

The three cases examined included, to different extents, a variety of state and non-state actors representing different sectors and levels of governance. For example, in the PKWS and TGL, these actors included international donor agencies, researchers, government officials, resource users and villagers.

Dimension	Adaptive Capacity	
	Enabling	Disabling
Variety	Engagement of state and non-state actors from various sectors and multiple levels of governance Involvement of diverse knowledge and expertise	Diversity of perspectives, interests and authority may lead, in some cases, to conflicts and tensions between actors
Learning capacity	Decision-making and management activities with potential to entail learning, e.g., training workshops, discussion forums, joint implementation, regular meetings	Limited resources for learning activities, conflict and tensions between actors, power imbalance, change in committees' membership, weak leadership
Autonomy	Policies and legislation support decentralised resource management	Limited decision-making and implementation authority Partial support from higher-level authorities
Leadership	Engagement and commitment of local and external leaders	Leadership qualities eroded by limited resources, self-interest, power imbalance, conflicts and tensions between actors
Resources	Ability of actors to mobilise external and internal financial, technical and human resources	Limited and inconsistent resources, over dependence on external sources
	Decentralisation of resource management, devolution of authority, allocation of property rights	Inconsistent policy implementation, tensions and conflicts, power imbalance, partial support from high-level authorities

TABLE 2. General enabling and disabling conditions of institutional adaptive capacity in the PKWS, TGL and SAFM.

In addition, some of these actors aggregate a variety of other actors in their composition. For example, the Fisheries Council of South Australia consists of members with collective knowledge and expertise in relevant areas related to fisheries management (e.g., fisheries science, research and development; conservation; social science; law; business; Indigenous, commercial and recreational fishing). In contrast, involving a variety of actors, sectors and levels in policy- and decision-making may pose significant challenges. For instance, in the PKWS, the diversity of perspectives, interests and authority has, in some cases, underscored existing conflicts and tensions between actors. This was evident in Koh Sralao and Koh Kapic communities where the head of the commune council and village chief considered Village Management Committees as adversaries.

4.2 Learning Capacity

The involvement of multiple actors, sectors and levels (*variety*) in coastal resource management, has significant implications for learning. Such *variety* has the potential to enhance learning capacity through, for example, combining information and knowledge (e.g., local and technical), sharing of experiences through networks, and learning from other actors through joint activities. For example, in the PKWS, the Participatory Management of Mangrove Resources (PMMR) project adopted a "learning by doing" approach. Such approach proposes that decentralised resource management may be an experimental, reflective and adaptive process. Thus, the PMMR team spent its first few years developing activities to facilitate learning, i.e., activities by which actors could exchange ideas and perspectives, and build capacity. These included a number of awareness raising and training workshops, and study tours covering a range of topics (e.g., environmental management, governance, project management, livelihood improvement, coastal conservation, and mangrove inventory and restoration).

On the other hand, factors that hindered learning capacity included: inadequate resources to support learning activities, conflict and tensions among actors, and power imbalance. In the case of SAFM, the change in membership of committees and the Fisheries Council may have led to loss of institutional knowledge. Another critical factor constraining learning capacity is weak leadership (see e.g., Marschke and Sinclair [2009] for discussion on learning in the context of the PKWS).

4.3 Autonomy

In all case studies, legislation and policies have been enacted providing for decentralisation of resource management. This involved transferring some level of authority over the design and reform of management arrangements to actors at sub-national and/or local levels. Examples of such legislation include the Sub-decree on Community Fisheries Management 2005, 2007 (PKWS), Decision 3677/2004/QD-UB (TGL) and the Co-management of Fisheries Policy in South Australia. Despite the formal support to decentralisation, entities responsible for management at the local level, such as Village Management Committees in the PKWS, and Fishing Associations in the TGL, still have limited power in terms of decision-making and implementation. In the three case studies examined, the ultimate responsibility for decisions over coastal resource management remains with high level policy- and decision-makers.

4.4 Leadership

Leadership qualities of actors varied across and within the case studies. However, strong leadership was regarded as an important attribute enabling decentralised resource management. For example, the Peam Krasaop Village Management Committee's strong leadership has helped mobilise support from its members and villagers. In the TGL, members of the Fishing Association executive boards may include experienced, responsible and prestigious fishers. In these instances, leadership has proven to be an enabling factor contributing to success of these entities (Marschke & Sinclair, 2009). In SAFM, focus group participants considered leadership critical to decentralised management, and building and mobilising adaptive capacity. Conversely, weak leadership in Koh Sralao and Koh Kapic communities was regarded as a main contributor to ineffective and/or dysfunctional Village Management Committees. Likewise, in the TGL, the Co-management Board, which was established to facilitate coordination between Fishing Associations and local authorities, had a poor record of accomplishments given, in part, the weak leadership. In general, leadership qualities were eroded (e.g., the PKWS case) by limited resources, self-interest, power-imbalance, and conflicts and tensions among local actors.

4.5 Resources

Decentralisation of resource management in the PKWS and TGL were supported, particularly during its inception, by external human, financial, technical resources. They were provided by international donor agencies, researchers and government authorities. In addition, to external support, some communities were able to use funds from other activities to support resource management. That was the case of Peam Krasaop, which used financial resources generated from ecotourism to fund conservation, development and poverty alleviation activities. In the TGL, annual membership and exploitation fees helped support their operations. Local actors were also able to mobilise human and technical support through their networks. Nevertheless, resources have overall been limited, inconsistent, and, very often, over reliant on external sources; which has constrained management activities. In the PKWS, for example, the absence of a speed boat and limited technical support impacted on the capacity of Village Management Committees to engage in patrolling. Similarly, limited financial resources hindered further development of co-management in SAFM, for instance, through trialling of co-management in different fisheries.

4.6 Fair Governance

Overall, the resource management initiatives examined have helped improve principles of fair governance, such as legitimacy, equity, responsiveness and accountability. It is important to note that in Cambodia and Viet Nam decentralisation takes place in a complex and evolving political context, characterised by centralised government systems. In this context, the transfer of authority (yet somewhat limited) over resource management to local non-state actors is a positive outcome. Further, local entities to which such authority has been transferred (such as Village Management Committees)

comprise elected villagers and resource users. In the case of SAFM, Fishery Management Committees provided, in the past, opportunity for stakeholders to provide input into South Australia's fisheries management. Nevertheless, fair governance remains challenging in the cases examined. Tensions and conflicts, power imbalance, partial support from high-level authorities, limited resources, and inconsistent policy implementation are some of the constraining factors. Importantly, as seen previously, the ultimate authority to make decisions in all cases examined remains with high-level government authorities.

5. Discussion

This study examined institutional adaptive capacity in the context of decentralisation of coastal resource management in the Peam Krasaop Wildlife Sanctuary (PKWS, Cambodia), Tam Giang Lagoon (TGL, Viet Nam) and South Australia Fisheries Management (SAFM, Australia). The six dimensions of institutional adaptive capacity (i.e., *variety, learning capacity, autonomy, leadership, resources and fair governance*) varied within and across the case studies examined. These dimensions may both facilitate and constrain adaptive capacity, depending on enabling and constraining conditions at play.

The fact the institutional dimensions examined may both serve as enabler and/or deterrent to adaptive capacity may be explained by the very nature of institutions. That is, institutions can inherently both expand and/or limit human decision-making and action (Ostrom, 2005). It may also be explained by the interdependent nature of these dimensions; that is, these six dimensions of adaptive capacity can reinforce and/or undermine each other (Gupta et al., 2010). For example, in the PKWS and TGL, external financial and technical resources were critical to support learning activities (*resources* have supported *learning capacity*). Such activities aimed, among others, to enhance the ability of villagers, fishermen, government authorities and technical staff to participate in decentralised resource management (*learning* has reinforced *variety*). *Resources* also helped mobilise *leadership* by reducing the transaction costs of participation. *Leadership*, in turn, proved critical to mobilise external technical *resources* and authority (*autonomy*). Later, policies and legislation formalised and provided legitimacy and legal authority for local actors to take part in resource management (*autonomy* has supported *governance* and *variety*). Conversely, limited *resources* and *autonomy* have constrained *leadership* qualities of local actors; and, inconsistent policy implementation and law enforcement have undermined local authority in some instances (*governance* has constrained *autonomy*).

The constraints to resource management, highlighted in the assessment of the six institutional dimensions of adaptive capacity, are common to decentralised initiatives elsewhere (see e.g., Larson & Ribot, 2004; Larson & Soto, 2008). They indicate that democratic decentralisation of natural resources, similar to the case studies investigated here, is rather challenging to implement, and results are therefore variable (Larson & Soto, 2008). The literature on decentralisation of natural resources emphasises that these constraints arise fundamentally from governments transferring inadequate powers to local actors (Larson & Ribot, 2004). Further, as highlighted previously, decentralisation takes place, particularly in the PKWS and TGL, in complex and evolving socio-economic and political contexts, characterised by centralised government regimes. These are compounded by different reasons underpinning governments' motivation towards decentralisation (Marschke, 2012).

6. Concluding Remarks

Despite the constraints to adaptive capacity discussed above, coastal resource management has, to a certain extent, enabled actors to: organise themselves; learn and improve resource management; mobilise leadership, resources and authority; and, make progress towards improved governance. These illustrate the creation and mobilisation of adaptive capacity, which in some cases resulted in positive outcomes in responding to environmental change.

Nevertheless, responding to issues involving complex external factors seems to be beyond the means of the institutions examined. These issues usually comprise some of the most pressing environmental change issues, such as climate change. Responding to such issues requires action at multiple governance levels. At the local level, a priority strategy is reinforcing existing enabling conditions and minimising those constraining adaptive capacity of local institutions. At sub-national and national levels, in addition to building and mobilising adaptive capacity at those levels, institutions need to provide and reinforce enabling conditions at lower levels. These include providing adequate financial and technical resources and authority so that adaptive capacity may be strengthened, and adaptation may emerge locally. In some cases, such as the PKWS and TGL, reinforcing enabling conditions may also include creating livelihood alternatives to the exploitation of coastal resources, alleviating poverty, reducing inequality, and building human and social capital.

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APPENDIX 1

Characterisation of the case studies

Peam Krasaop Wildlife Sanctuary, Cambodia

Peam Krasaop Wildlife Sanctuary (PKWS) is located in the Koh Kong province, southwest Cambodia. The PKWS contains extensive areas of mangroves (24,000 hectares, approximately) (Marschke & Nong, 2003).

Ten thousand people live in PKWS across three administrative districts, containing 6 communes and 15 villages. For most of these people, mangroves and associated resources provide opportunities for income generation and livelihood. However, since the early 1990s, coastal resources have significantly declined as a result of population growth, clearing of mangroves for aquaculture and charcoal production, destructive fishing practices (e.g., cyanide fishing), and illegal fishing (Marschke, 2012; Marschke & Nong, 2003).

In response to resource decline, in the late 1990s, an initiative known as Participatory Management of Mangrove Resources, led by the Ministry of Environment, facilitated the establishment of Village Management Committees comprising members of the community and resource users (The Participatory Management of Coastal Resources Project, 2008)

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Tam Giang lagoon, Viet Nam

The Tam Giang Lagoon (TGL) is located in Thua Thien Hue Province, Central Viet Nam. It covers an area of approximately 22,000ha and stretches approximately 70km along the coast (Tuyen, Armitage, & Marschke, 2010). It is estimated that the lagoon's aquatic resources are directly or indirectly important for 300,000 people living in 33 communes and towns, and 326 villages across the lagoon area (Tuyen, 2002; Tuyen, Armitage, & Marschke, 2010).

The decline in fish catch and restricted access to the lagoon resulted from a rapid resource use intensification over the past 15 years or so (Tuyen, 2002). In addition, these problems were exacerbated by agricultural development and urbanisation (Tuyen, Armitage, & Marschke, 2010).

Decentralised resource management was initially adopted at the district level to complement the existing centralised, top-down management approach. Fundamental elements of resource management decentralisation in the TGL include the Fishing Associations. These are a type of social-professional organisations with responsibility for resource management at the village or user group level (Tuyen, Armitage, & Marschke, 2010).

South Australia Fisheries Management

Over the years, the management of South Australia's fishery resources has been undertaken in partnership and consultation with the fishing industry and other key stakeholders. This consultative co-management arrangement was largely implemented through Fisheries Management Committee processes. Nevertheless, conflicts between the government, industry and other key stakeholders still persisted. This led the South Australian government to recognise the need for its fishery managers and scientists to engage regularly with commercial, recreational and traditional fishers, and other key stakeholders and the general community that use or have a stake in fishery resources in the state (PIRSA, 2013).

In 2007, the Fishery Management Council of South Australia was established; and, replaced the Fishery Management Committees. The Council's functions include the preparation of fisheries management plans; advising the Minster on allocation issues; promoting the co-management of fisheries; and promoting research, education and training in relation to fisheries and their management (Fisheries Council, 2013).

APPENDIX 2

Data collection methods used in the case studies

Case Study	Methods
Peam Krasaop Wildlife Sanctuary (PKWS) Case sites (communities): • Koh Kapic • Koh Sralao • Koh Kang • Peam Krasoap	***Desktop review*** of co-management in PKWS Informal scoping discussions and participant observation in each site ***Focus groups***, three in each site, involving 25-30 participants e.g., Village Management Committee members, fishers and villagers ***Interviews*** with 50 key informants, including: former Staff of the Participatory Management of Coastal Resources project, high level officers and managers from the Provincial Department of Environment, Department of Agriculture, Fisheries and Forestry, Provincial Department of Women's Affairs, and PKWS; former UNDP-GEF small grant's manager; past representatives of Village Management Committees; and, respected village elders ***Validation and dissemination workshop*** involving 26 participants
Tam Giang Lagoon (TGL) Case sites (communes): • Loc Binh • Vinh Giang • Vinh Phu	***Desktop review*** of co-management in TGL ***Interviews*** with 20 key informants, including researchers and officers from government, fisheries and environment/resource agencies, and Fishing Associations ***Focus groups*** in each of the case sites involving 12-15 Fishing Association officers and members
South Australia Fisheries Management	***Desktop review*** of co-management in South Australia's fisheries Focus group with 6 fishery managers