



A Framework for Dialogue Between Local Climate Adaptation Professionals and Policy Makers

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A Framework for Dialogue Between Local Climate Adaptation Professionals and Policy Makers

**Lessons from Case Studies in Sweden, Canada
and Indonesia**

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CONTENTS

List of figures, tables and boxes	iv
Summary	v
Acknowledgements	viii
1 Introduction: Growing interest in climate adaptation	1
Connecting local cases of climate adaptation with policy making	2
Case study research on and for social learning	3
2 Objectives and methodology	5
Theoretical framework: sense-making perspectives on case studies	6
3 Results and analysis: Cases and project genealogies	9
Case 1: The Stockholm region, Sweden	9
Case 2: The Niagara region, Ontario, Canada	12
Case 3: Mahakam Delta, Indonesia	16
Operationalising case studies within sense-making perspectives	19
4 Discussion	24
Planned versus self-organised adaptation	24
Significance of methodological choices	26
5 Conclusions	29
References	30

LIST OF FIGURES, TABLES AND BOXES

Figure 1:	Ladder of stakeholder participation	3
Figure 2:	Analytical model: Four different sense-making approaches to case study research	8
Figure 3:	The ACRM framework	14
Figure 4:	Analysis of the operationalisation of case study research in the three projects	20
Table 1:	Definitions of the organizing principles in the analytical framework	7
Table 2:	Participatory research approach of the Mistra-SWECIA project ‘Processes for Adaptation to Climate Change’	11
Box 1:	An application of the soft systems methodology analytical tool TWOCAGES	19

SUMMARY

Background

Unlike the issue of climate change mitigation, discussions about climate adaptation are still in their infancy in most national policy debates. The most popular approach has been to mainstream climate adaptation into sectoral policies, thus relying on an ‘upscaling’ model in which lessons learned from local change processes are used to inform decision-making at higher administrative levels. This political approach necessitates a dialogue between policy makers designing regulatory policy (principally concerned with drawing generalised conclusions based on local lessons) and professionals engaged in research projects examining examples of community-based climate adaptation in different contexts.

This situation prompts researchers and other professionals involved in discrete case studies of local climate adaptation to consider how best to use their data, experiences and insights to inform policy. How do local climate adaptation lessons become relevant for public policy? What are the opportunities and risks involved in exploiting local case studies for climate adaptation policy making? How do research projects navigate the many expectations and demands from the clients of policy in order to make their contributions relevant? The aim of the present report is to offer a methodological framework and a new vocabulary for researchers and their partners to consider more explicitly the different ways case studies can be used to inform policy processes.

Objective and methodology

In order to develop a firmer understanding of how local climate adaptation professionals can engage policy makers in a constructive dialogue, we examine three research projects, which all aim at studying or fostering climate adaptation as a process of social learning through the use of case studies. The three projects are:

1. Processes for Adaptation to Climate Change, under the Mistra-Swedish Research Programme on Climate, Impacts and Adaptation (Mistra-SWECIA) programme, focusing on the Stockholm region;
2. The joint Brock University / Environment-Canada Adaptive Collaborative Risk Management & Climate Change Adaptation project in the Niagara Region, Canada (ACRM&CCA); and,
3. Work Packages 5 and 8 of the EU’s Sixth Framework Programme MANGROVE project (Mangrove ecosystems, communities and conflict: Developing knowledge-based approaches to reconcile multiple demands) in the Mahakam Delta, Indonesia.

The work was conducted as a desktop review: concrete issues, case study contexts and methodologies were described through a review of documented evidence available as of March 2010. Insights were also elicited through interviews with project managers

and/or work package coordinators by the lead author, who had not been involved in any of the selected projects. The synthesis, including presentation of preliminary results and the analytical framework, was critiqued by researchers from the three projects at a workshop held in Stockholm on 26–27 May 2010.

In order to undertake the analysis of three quite distinct research approaches, we have developed a conceptual model distinguishing between four dominant sense-making perspectives, which determine how research findings are brought in dialogue with policy processes. In applying this framework, our purpose is both to elicit relevant lessons as to how research facilitate the dialogue between local climate adaptation and higher level policy and to ‘test-run’ the proposed framework, clarifying how it can be applied to guide research planning and evaluation. The purpose of this framework is to move beyond a discussion of ‘research technique’ and potential disciplinary tensions and instead to consider the underlying assumptions that shape how research seeks to link local adaptation efforts to the domain of public policy and politics.

Key findings

The key findings from this study can be expressed in the following set of questions, which we hereby pose to those who plan to undertake case study research on local climate adaptation in order to inform future policy processes. We contend that the researcher and partners ought to be readily able to provide an answer to each of these questions, if he/she wishes to ensure that the work is both scientifically rigorous and politically relevant. In the present report, we provide our view on how answers can be developed for each of these questions.

- How do you select and design your case study? Is it based on the assumption of a real ‘unit of analysis’ out there, which exists beyond your perception of it, or is your case a ‘learning platform’ created by people?
- What is the purpose of your case study? Are you examining certain phenomena of climate adaptation that have been identified prior to your engagement with the context, or do you aim to establish a dialogue among stakeholders in the case study so that shared understanding emerges as the basis for collective action?
- Are your research questions and hypothesis already determined before you engage stakeholders in your case study? If so, how do you adapt the assumptions of project owners and researchers in response to the insights shared by stakeholders?
- What kind of policy processes will your research support? Does it aim to contribute to planned policy (coercion and regulation) or non-coercive policy (self-organised adaptation)? Or perhaps both?
- Why are you interested in understanding the views of people in your case study? Is it because you wish to study their perceptions of climate adaptation or do

you want to actively assist them in removing institutional constraints to their adaptive efforts?

- Does your research depart from a view on ‘climate adaptation’, which is defined by international players and/or national government? If so, how will you enable people in the case study to highlight issues and responsibilities belonging to higher levels of decision-making and thus to embed community issues into national or even international climate related policies?
- Finally, throughout your work, how will you balance benefits from the case study work between different stakeholders (e.g. various community members), non-case recipients of the work (e.g. policy makers) and the researchers themselves? How will you navigate between generating ‘generalisable’ insights vis-à-vis guaranteeing that participants retain ownership over their insights? How do you reconcile your own interests as researcher (securing funding, publishing edge-cutting papers etc.), with those of stakeholders that you involve in the case study?

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We wish to express our gratitude to the people who are and have been involved in the three projects discussed in the report and who have the ownership of the evidence underlying this study. The three projects are: Processes of Adaptation to Climate Change under the Mistra-Swedish Research Programme on Climate, Impacts and Adaptation (hereafter Mistra-SWECIA), Sweden; the Environment-Canada led Adaptive Collaborative Risk Management & Climate Change Adaptation project in the Niagara Region, Canada (hereafter ACRM&CCA); Work Packages 5 and 8 in the EU's Sixth Framework Programme MANGROVE project (Mangrove ecosystems, communities and conflict: Developing knowledge-based approaches to reconcile multiple demands) in the Mahakam Delta, Indonesia. The presented work from Mistra-SWECIA was undertaken with Karin André of Linköping University and the work from the MANGROVE project in Indonesia was undertaken with Ahmad Syafei Sidik of the Faculty of Fisheries and Marine Science, Mulawarman University. We also acknowledge the financial support of the Swedish Foundation for Strategic Environmental Research (Mistra) and the European Commission for the generation of the empirical evidence discussed in this report and the SEI internal Research Capacity Fund for covering the hours needed to bring this work to its present form.

1 INTRODUCTION: GROWING INTEREST IN CLIMATE ADAPTATION

Unlike the issue of climate change mitigation, discussions about climate adaptation are still in their infancy in most national policy debates. Climate change manifests itself as one of the most intractable global problems to precipitate the employment of new governance approaches in nation states, but little attention has yet been paid to human adaptive responses and methods to assess the feasibility of adaptation measures are only in the initial stages of development (McCarthy *et al.*, 2001; Berkes and Jolly, 2001). However, there has been a recent burgeoning of government interest in fostering and learning from local climate change adaptation action. The prospect of benefiting from being ‘early adopters’ of new technologies and practices is one central motivation for countries to support adaptation efforts. Some parties to the international negotiations are also seeking to shift the discussion from climate system modeling and impact studies towards local adaptation efforts and strategies (e.g. van Aalst *et al.*, 2008; Fussler 2007).

This situation prompts researchers and other professionals involved in discrete case studies of local climate adaptation to consider both how best to use their data, experiences and insights to inform policy processes and to assess apparent incommensurabilities between case studies in different projects due to the diversity in problem contexts and research approaches. How do local climate adaptation lessons become relevant for public policy? What are the opportunities and risks involved in exploiting local case studies for climate adaptation policy making? How do research projects navigate the many expectations and demands from the clients of policy in order to make their contributions relevant? In addressing these questions, this research report builds on previous efforts of the Stockholm Environment Institute (SEI) and its partners to support researchers and other professionals working in the interface between science, policy and practice (e.g. Gerger Swartling *et al.*, 2011; Forrester *et al.*, 2009; Forrester *et al.*, 2008).

The aim of the present report is to offer a methodological framework and a new vocabulary for researchers and their partners to consider more explicitly the different ways case studies can be used to inform policy processes. We thus distinguish three groups in the target audience: 1) the researchers designing and leading research with local cases of climate adaptation, 2) the different groups of professionals engaging with researchers in such efforts, and 3) interested decision makers who find themselves the recipients of research recommendations and are curious how to interpret findings and implement lessons in policy making.

Connecting local cases of climate adaptation with policy making

Experience has shown that governments tend to ‘mainstream’ the findings of local work on climate adaptation by integrating them in relevant policies. Ideally, such mainstreaming also identifies conditions and trade-offs for establishing both win-win situations and synergies among all sectors as well as mitigation and adaptation measures (Klein *et al.*, 2005). In this way, decision-making and practical action are informed at relevant levels and the ways adaptive actions can be aligned with other priorities are identified (see also Smit and Wandel, 2006). Such a mainstreaming approach, however, has pitfalls as reflected in experiences of disaster risk reduction where local responses promoted by national or sub-national policy are rarely adopted unless they are integrated into a larger framework of livelihood and development concerns (e.g. Thomalla *et al.*, 2009). Mainstreaming climate adaptation into sectoral policies tend to rely on an ‘upscaling’ model in which lessons learned from local change processes are expected to inform generic national or sub-national policies which can be implemented in all localities.

At first sight, this ambition of extraction and upscaling contradicts research traditions that approach community-based climate adaptation as ‘a community-led process, based on communities’ priorities, needs, knowledge, and capacities, which should empower people to plan for and cope with the impacts of climate change’ (Reid *et al.*, 2009, p. 13). How can, then, generic regulatory policy learn from highly contextual community-based adaptation, and what is the role of the climate adaptation professional in facilitating this learning process? In other words, what are the prospects for a dialogue between policy makers, who are primarily concerned with drawing generalisations based on local lessons, and local professionals, who examine community-based climate adaptation in context?

Whilst participatory approaches have gained increasing prominence in areas such as disaster risk reduction, natural resource management, agriculture, public planning etc., uncertainty persists as to the efficacy of feeding outcomes from these negotiated processes into the larger decision-making system (e.g. Twigg, 2003; Thrupp *et al.*, 1994; Thomalla and Larsen, 2010). As Khanlou and Peter (2004) have noted, participatory research is frequently characterised as an emancipating process of knowledge generation; but, it is less clear what guidelines exist once the lessons leave the case context. Indeed, Laukkonen *et al.*, (2009) suggest that ‘transfer’ of lessons is not possible without also affecting the ‘upscaling’ process into higher-level policy through an equally participatory approach as was initially employed locally. This partly reflects that, irrespective of the balance between so-called ‘top-down’ or ‘bottom-up’ approaches, case study lessons are frequently adopted into a policy framework that emphasises an optimal mix of policy instruments; and, in this case, departs from a knowledge prescriptive model in which the climate change ‘problem’ is already known and not open for negotiation (Urwin and Jordan, 2008). It thus raises the challenge of reconciling the unavailability of a ‘local’ level that represents a different context of complexity and uncertainty than that of national and international policy (Steyart *et al.*, 2007).

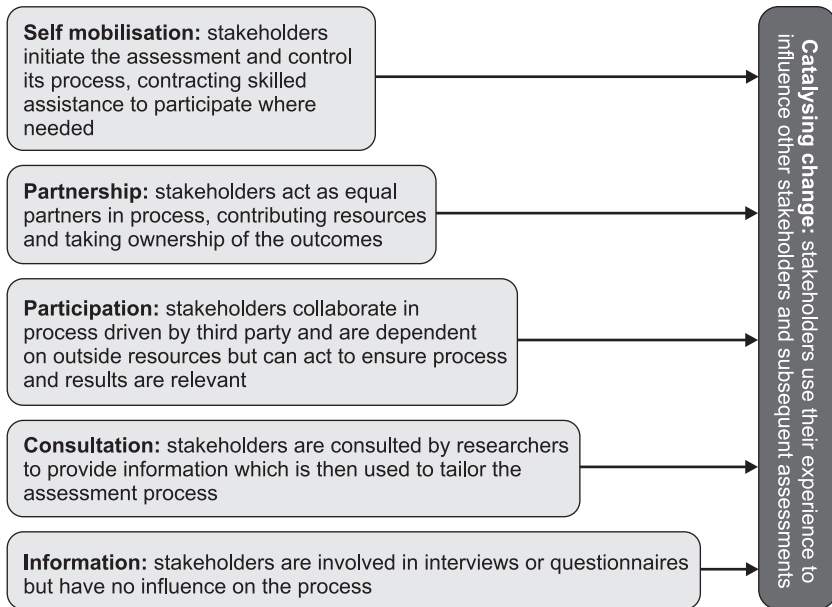


Figure 1: Ladder of stakeholder participation

(Reproduced from Carter *et al.* 2007 p. 142. Original framework from Arnstein, 1967)

There are numerous examples of participatory research being used simply as a means to justify findings convenient for centralised decision-makers or specific interest groups. This includes when evidence, removed/extracted from the ‘case’ context, is seized by researchers or decision-makers at higher administrative levels and then used for purposes which harm those who had original ownership of the knowledge and/or change process (e.g. Cooke and Kothari, 2001; van Aalst *et al.*, 2008). In response, distinguishing ‘levels’ of participation (Figure 1) has been proposed as one way to show differences in stakeholders’ engagement in the research, ranging from information provision to complete ownership of the process. Pitfalls of so-called ‘community-based’ management efforts have also contributed to flawed assumptions often made by researchers and decision-makers about local ‘communities’. Amongst other things, this includes the assumption that communities are relatively homogenous social entities that can live in balance with their biophysical environment, disregarding the range of institutions that link local stakeholders with other organisational levels as well as the diversity and non-equilibrium character of ecological and physical processes (Leach *et al.*, 1999).

Case study research on and for social learning

Qualitative case study methodologies were originally developed to examine complex questions requiring attention to detail and contingencies in scientific disciplines including sociology, political science, human geography, etc. In this study, we have

specifically considered case study research that expressly intends to foster and/or study social learning or otherwise draw on social learning theory. Methods which are inspired by social learning theories have been gaining popularity in the past decade as an effective response option for researchers studying and/or facilitating local climate adaptation efforts. These approaches to social learning relies on a wide range of differing theoretical traditions (see e.g. reviews in Blackmore, 2007; Armitage *et al.*, 2008; Nilsson and Gerger Swartling, 2009a; Reed *et al.*, 2010).

Among those traditions considering sustainable development, a social learning methodology acknowledges the complexity and uncertainty inherent in defining what constitutes the resource or management ‘problem’ and its possible solutions. Further, it appreciates that – in many cases – stakeholders at different levels of society have interrelated and contrasting views on climate risks and on the need for adaptation and thus must cooperate and establish networks. This means that climate change is perceived differently across the social spectrum; but, if societal change is to be realised, it is essential to gain insight into how people perceive and can effect that change (Smit and Skinner, 2002; ACIA, 2005). Research for social learning aims to support recognition of the interests, perspectives and perceptions of those associated with shaping adaptation actions, a dimension often overlooked in research on the subject (Parry *et al.*, 2007; Adger *et al.*, 2009). Research interventions must therefore both respond to the diverging perspectives of local stakeholders on climate change and identify the information and measures required to achieve adaptation through facilitating multi-stakeholder collaboration and co-production of knowledge.

Within social learning theory, case studies can generally be understood as akin to learning ‘platforms’ that provide space and time for new meaning to emerge. Steyart *et al.* (2007, p. 542) define these arenas as organised spaces ‘... resulting from disagreements between social groups, or at least from the appearance of difficulties in managing a problem common to them all.’ The role of the researchers thus consists of facilitating redefinitions of the problems, providing options for stakeholders to give feedback and supporting the management of social interactions. Learning may be facilitated when researchers enable the creation of or support ‘bridging institutions’ that are able to establish new networks and leverages for local stakeholders (e.g. Hahn *et al.*, 2006; van Aalst *et al.*, 2008). The creation and use of platforms can also often benefit from drawing on socio-technical objects, which are co-created by participants as intermediaries for dialogue (Billaud *et al.*, 2004). Many examples of such intermediaries (risk maps, vulnerability assessments, documented story lines, etc.) can be found in participatory methodologies in the fields of disaster risk reduction (van Aalst *et al.*, 2008), vulnerability research (Miller *et al.*, 2006; Smit and Wandel, 2006), public health research (Ebi and Semenza, 2008) and environmental policy planning (Cinderby *et al.*, 2008). For more extensive overview of tools relevant to climate adaptation, see also Reid *et al.* (2009).

2 OBJECTIVES AND METHODOLOGY

Accepting the political inevitability that local adaptation lessons will be upscaled from case study research, this study undertook a comparative analysis of three projects that all have drawn on a meta-methodology of case study research within an approach to social learning. The goal was to develop a methodological framework in order to 1) support dialogue between regulatory policy and local cases of climate change adaptation, and 2) facilitate comparison between different case study research projects, which draw on both shared and divergent research approaches in order to overcome apparent incommensurabilities.

The study draws on insights garnered from three projects, which have evolved independently of one another, but which all address questions of local climate adaptation and have been inspired by a desire to study and/or foster adaptation as a process of social learning:

- The Mistra-Swedish Research Programme on Climate, Impacts and Adaptation (Mistra-SWECIA) in the Stockholm Region, Sweden (Nilsson and Gerger Swartling, 2009a, Gerger Swartling and Nilsson, 2010);
- The joint Brock University / Environment-Canada Adaptive Collaborative Risk Management & Climate Change Adaptation project in the Niagara Region, Canada (ACRM&CCA) (May, 2009);
- Work Packages 5 and 8 of the EU's Sixth Framework Programme MANGROVE project (Mangrove ecosystems, communities and conflict: Developing knowledge-based approaches to reconcile multiple demands) in the Mahakam Delta, Indonesia (Powell and Osbeck, 2010).

The work was conducted as a desktop review: concrete issues, case study contexts and methodologies were described through a review of documented evidence available as of March 2010. Insights were also elicited through interviews with project /work package leaders by the lead author, who had not been involved in any of the selected projects. The synthesis, including presentation of preliminary results and the analytical framework, was critiqued by researchers from the three projects at a workshop held in Stockholm on 26–27 May 2010.

It is a particular strength of this study that it was able to draw upon local case studies and project insights from three different continents. Indeed, because issues and policy environments differ widely, methodological and adaptation insights have been especially rich. However, the three projects are at various stages: ACRM&CCA is the youngest and at the time of this study was only initiating its first activities with an intensive planning process; Mistra-SWECIA kicked off in 2008 and had collected a significant amount of data already; and the MANGROVE project was completed after four years in 2009. Further, it is acknowledged that the results and methods from each project are examined through the eyes of the very projects that this study seeks

to critique. The study thus offers a meta-level analysis of empirical evidence, through the involvement of the project managers themselves (as co-authors or partners in the present study). As such, the study reflects an effort on behalf of the research teams involved to take the role of reflective practitioners (*sensu* Argyris and Schön, 1996) in order to facilitate both individual and institutional learning to improve future research praxes.

When focusing on how case studies are used in research projects, which are united in an acknowledgement of the relevance of viewing local climate adaptation as a process of social learning, differences between case study approaches will partly reflect differences in the approaches to and definitions of social learning. However, our purpose in this report is to elicit a more substantial understanding of the use of case study methodologies. While we expect that this study may inform further debates regarding the definition and approaches to social learning it is thus beyond the scope of the present study to take on this discussion in more detail.

Theoretical framework: sense-making perspectives on case studies

In order to organise the analysis, we introduce a conceptual model of sense-making perspectives that emerged out of a review of the documentation and findings from the three projects. In searching for a way to capture the diversity as well as similarities among the research approaches, they were inspired by the development of ‘epistemic maps’, an approach originally applied to capture different approaches to natural resource management (e.g. Bawden, 1999; Packham and Sriskandaraja, 2005). The derived model distinguishes four dominant sense-making perspectives, within which case study research is made meaningful (Figure 2, page 8). Two axes serve as a theoretical organising principle, with the guiding epistemology (the method of knowing, i.e. how the researchers know what they know) on the vertical axis and the intent of the research (inquiry) – particularly in terms of how it is made relevant to users – on the horizontal axis. The axes thus represent, respectively, a continuum between epistemologies of ‘realism’ and ‘constructionism’ as distinct mainstream philosophies of science, and assumptions of ‘contextual’ and ‘universal’ usage of the work. The latter distinction highlights whether research questions and hypotheses emerge either from and are intended to inform the context in response to interaction with the clients of the research, or through *a priori* and expert-defined perspectives (Table 1). Such a mapping of research approaches was relevant to the study because it allowed us to move beyond a discussion of ‘research method’ and potential disciplinary tensions and instead to consider the underlying assumptions that shape how research seeks to link local adaptation efforts to the domain of public policy. The specific value of this framework is that it provides a novel vocabulary to consider more explicitly the link between cases of local climate adaptation and higher level policy.

Table 1: Definitions of the organizing principles in the analytical framework

Epistemology	General approach to knowledge generation	Heuristic 'systems' model
Realism	Views the cases as 'real' settings, distinguishable from human perception, which can further be made objectively available through investigation and verification (Holliday, 2002). Draws on assumptions of the existence of natural 'objects' independent of the observer, which are used to delineate the case study (McLaughlin and Dietz, 2008).	Within the realist tradition, the view of the world is often contained within the paradigm of immutable or 'hard' systems. This means that the world is construed as a set of interacting systems that exist beyond the domain of perception and that can be modified to improve their functioning – for instance, they can be objectively defined according to naturally given ecological boundaries (i.e. 'eco-system') (e.g. Røling and Wagemaker, 1998).
Constructionism	Seeks to establish a dialogue among stakeholders in the case study so that shared understanding emerges as the basis for collective action. Researchers and participants are here all engaged in reality as unfinished and co-created. One dominant influence for constructionist epistemology is the sociology of knowledge in the empirical science tradition (e.g. Nielsen and Nielsen, 2006; Berger and Luckmann, 1966).	In the constructionist tradition, there is an emphasis on 'soft' systems, which acknowledges that all systems are in fact 'systems of interest' as defined through the eyes of stakeholders. Systemic qualities such as optimality or resilience reflect negotiated outcomes (e.g. Checkland, 2000; Powell and Jiggins, 2006).
Intent of inquiry	Value of cases for policy	Measure of quality
Universalism	Case study research is valuable in so far as it can be used to examine certain phenomena of interest that have been identified prior to engagement with the context. The purpose herein is to generate sufficient insights to draw the necessary type of generalisation that will predicate actions in other localities (Holliday, 2002).	Robustness of conclusions depends on meta-level analysis of a large number of case studies with similarly derived data. This tradition is frequently located in social science empirical research (Yin, 1989; Stake, 2000).
Contextualism	Instead of generalisations, this view values the unveiling of diverse manners in which a phenomenon is expressed in different contexts. Rather than using predefined research questions, the context informs the formulation of hypotheses. Contextualism implies that longer term adaptive strategies and shorter term coping mechanisms always must be considered against a background of general unpredictability and uncertainty of people's agency (e.g. Charmaz, 2006).	Specific case outcomes are considered irreproducible. Higher order patterns are not independent of the perspective of those who generate such analysis. Authorisation of findings depends on scientific and societal rules, based on expected beneficiaries and the acknowledgement made by both researchers and participants that the knowledge is considered 'robust' and useful (e.g. Svensson and Nielsen, 2006).

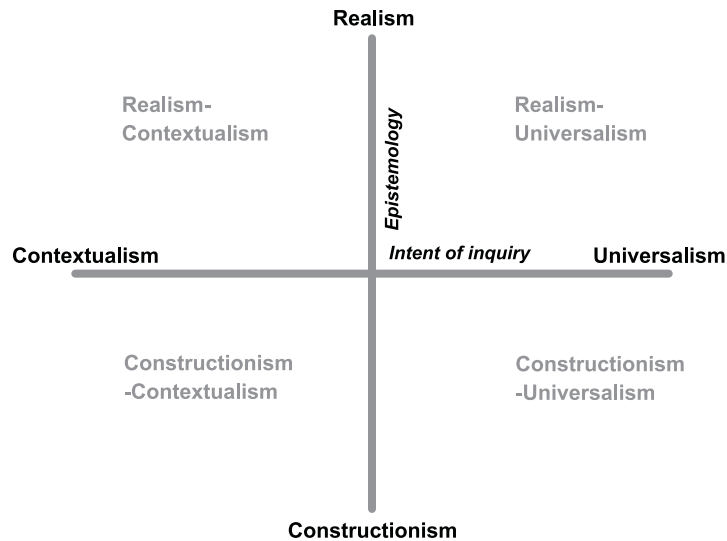


Figure 2: Analytical model: Four different sense-making approaches to case study research

See text for explanation of the figure

3 RESULTS AND ANALYSIS: CASES AND PROJECT GENEALOGIES

In order to develop a firmer understanding of how local climate adaptation professionals can engage higher level policy makers in a constructive dialogue, we examine three research projects, which all focus on studying or fostering climate adaptation as a process of social learning. First, we present a synthesis of each of the three projects in terms of their problem contexts and adopted research methodologies. We then move on to analyse the similarities and differences in how the three projects seek to make local climate adaptation lessons relevant for more generic policy processes, and vice versa. In so doing, we apply the analytical framework presented above, which provides a new vocabulary to undertake such an analysis – making more explicit the choices made by researchers which have implications for how to connect cases of local adaptation with policy processes. As alluded to in the introduction, such an attention is vital if research shall promote efficient progress towards more disaster prone societies without undermining the efforts and needs of localities, which often do not have a voice in determining how their experiences are used to motivate different political decisions.

Case 1: The Stockholm region, Sweden

Stockholm County consists of 26 municipalities with more than two million inhabitants, representing 21 per cent of Sweden's total population. The region is one of the mid-tier administrative layers in the country's political system of national, county and municipal governments. Municipalities have a 'planning monopoly' with regards to physical planning, health, water, sanitation and other infrastructural needs, but aspects of waste and sewage treatment, energy and housing are jointly administered by publicly owned companies and governmental authorities (André *et al.*, 2009). The Swedish Environmental Protection Agency (SEPA) annually surveys public awareness, knowledge and attitudes to climate change, and the results from 2009 (SEPA, 2009) show that a significant proportion of the Swedish public consider it to be very important that measures are implemented to combat climate change. However, the majority of policies developed for the Stockholm region to date focus on mitigation rather than adaptation measures (André, 2009). This parallels the situation for Sweden at large, where municipalities only over the last five years have started more focused work on climate change adaptation (Nilsson and Gerger Swartling, 2009b; Viehauser *et al.*, 2006).

A recent report produced by the governmental Commission on Climate and Vulnerability (2007) recommended regional government take a greater role in coordinating adaptation activities. In response, a government bill was presented in March 2009 (Government of Sweden, 2008) and included new roles for the Country Administrative Board (Länsstyrelsen), including the coordination and strengthening of regional climate adaptation efforts. The new Regional Development Plan for the Stockholm Region (Stockholm County Administrative Board, 2010) also calls for

regional climate adaptation initiatives. The plan highlights municipal responsibilities in ensuring that further risks are not ‘built in’ to society. The fact that the plan clarifies the role of regional authorities and calls for increased awareness establishes new social learning arenas for local actors in the Stockholm region.

Most participants involved in Mistra-SWECIA’s Stockholm case study have indicated that it is not a lack of scientific knowledge *per se*, but rather ‘... links and coordination between local practitioners and regional organisations’ that is the main barrier to implementing adaptation (Simonsson *et al.*, forthcoming; Nilsson and Gerger Swartling, 2009a). The risks and stresses identified as most difficult to address are both external (e.g. issues of economy and population that are beyond the control of the organisations) and internal in character. Similarly, these are distributed across institutional, economic and organisational dimensions (e.g. too little coordination within organisations and between actors, conflicting interests, and lack of will and opportunity to prioritise adaptation measures) (Simonsson *et al.*, forthcoming).

Whilst many of the immediate adaptation measures discussed at regional and municipal/local levels refer to infrastructure and water related risks (especially in terms of the risk of flooding), it is widely understood that such measures challenge the relationship between institutions and stakeholders. Rapid infrastructural adaptations are challenged given the high degree of integration among economic, social and technical systems in the region. Similarly, technical solutions at the local and regional levels are closely interlinked with national and international adaptation measures. Further, the adaptation process is coupled with construction regulations, including zoning and prohibitions for new constructions in the vicinity of Lake Mälaren and safety requirements for basement construction depths. Here, as elsewhere, not only are there divergent planning approaches for private, civil society and public sectors, but maps and safety standards are frequently contested (Rudberg, 2009).

The Mistra-SWECIA research project

The Mistra-SWECIA programme is an interdisciplinary research collaboration of five research organisations focused on climate change, impacts and adaptation in Sweden. Its tenure is 2008 to 2011, with a possible extension to 2015. Among involved organisations, SEI – in collaboration with Linköping University – is leading The Process of Adaptation to Climate Change project that seeks to investigate factors influencing stakeholders’ decisions: degrees of preparedness for future climate change risks, analysis of perceptions of risk, the extent to which information on climate change helps promote processes of social learning and the implications for adaptive capacity.

In this analysis, we focus on three of the programme’s work packages (WPs): 1) Stakeholder Mapping and Climate Risk Perception, 2) Social Learning on Adaptation, and 3) Policy Analysis and Integration. The WPs are intended to serve as platforms from which stakeholders can identify and consider adaptation options and which can provide alternatives to scientifically or politically defined pathways. Thus, not only is participatory research an essential component of data collection, but it is also a means to facilitate the creation of networks of both exchange of knowledge and experiences

Table 2: Participatory research approach of the Mistra-SWECIA project 'Processes for Adaptation to Climate Change' ¹

No.	Focus group meeting theme and overall theme/ questions	Stockholm region 2008	Forestry sector 2010
1:	'Orientation and exploration of climate related risks' What risks are perceived today and in the future? What are the general impressions of climate change?	September 11-12	Mars 9-10
2:	'Further exploration' Input from scientific results of climate science and impacts; and expert-stakeholder interactions to explore: What is involved in tackling climate change? What information is required and how should it be communicated? What adaptation options are perceived as relevant and feasible and why?	October 7-8	Mars 23, 25-26
3:	'Ways forward' What are the barriers to and opportunities for adaptation? Who is/are important for facilitation and implementation of climate adaptation and why? What changes are required and how should these come about?	October 21, 23-24	April 13-14, 19
4:	'Stakeholder workshop' Exchange of experience, perspectives and knowledge between groups, to explore further: What resources and organisational changes are required to get from today's situation to a desirable future?	November 18	May 11

¹ This methodology has been developed by Åsa Gerger Swartling (SEI, Mistra-SWECIA), Kate Lonsdale (former SEI, presently UKCIP) and Louise Simonsson (Mistra-SWECIA, formerly Linköping University, at present Swedish Defence Research Agency), and the specific content of each focus group meeting has been developed and modified by Åsa Gerger Swartling, Louise Simonsson and Karin André (Mistra-SWECIA / Linköping University).

and of collaboration and capacity building at the local and regional levels. Results of the Mistra-SWECIA programmes are expected to assist Swedish policymakers in designing more effective climate change adaptation strategies, in improving adaptive capacity strategies in response to future climate change and in integrating climate concerns into day-to-day decision-making. In addition to focusing on the Stockholm region, Mistra-SWECIA has also been conducting research on adaptation in the Swedish forestry sector since January 2010.

During the first years (2008 through early 2010), the initial investigation of adaptation processes in the Stockholm region centred on a stakeholder mapping exercise. Based on findings of the Climate and Vulnerability Assessment report (Commission on Climate and Vulnerability, 2007) as well as Mistra-SWECIA's other participating research projects, the key climate change risk identified for the Stockholm region was water-related. Focus groups were composed accordingly and members selected to represent local and regional stakeholders (public and private) responsible for the implementation of predicted adaptation measures. The groups also included practitioners and experts within municipal and regional administration and from the private sector who were working with planning and technical issues in the Stockholm region (André, 2009). The total of 22 participants in four groups represented: 1) technical and environmental administration from five municipalities, 2) planning and environmental administration from five municipalities, 3) regional organisations, and 4) companies and public utilities (water and sewage treatment, energy and insurance sectors).

The participatory research process involved a series of three focus group meetings, a final stakeholder workshop, and follow-up interviews with stakeholders. At the final workshop in Stockholm, the participants proposed recommendations for the future adaptation needs of the region. This methodology has also been applied in the final case study of Mistra-SWECIA on the Swedish forestry sector (Table 2, page 11).

Case 2: The Niagara region, Ontario, Canada

The Niagara region covers 1,863 km², corresponding to about 0.2 per cent of the entire province of Ontario, Canada, and is home to about 427,000 residents. The region has 12 municipalities, five cities, five towns, and two townships. Rather more than 30 per cent of the population (nearly 132,000 residents) live in the city of St. Catharines. The majority of this population is categorized as working class, and the number of senior citizens is rising. The Aboriginal population of close to 6,000 people (including members of North American Indian groups, Métis and Inuit) is increasing rapidly. There are also increasing numbers of Asian and Middle Eastern immigrants. Tourism, manufacturing and agriculture are the main economic activities for communities in the region (Khan, 2009a; Boettcher, 2009, 2010).

In Canada there is no national regulatory policy on adaptation *per se*. It is left to provincial and municipal agencies to structure a regulatory regime how they see fit. Half the governmental agencies and administrations in the region have initiated

climate change adaptation planning, either by integrating them into existing plans or by developing separate processes. Whilst many plans address mitigation and adaptation jointly, the dominant emphasis has been mitigation. Notwithstanding, St. Catharines has an interdepartmental task force on climate mitigation and adaptation. A number of sectoral planning processes are being implemented in the region, including the greenbelt legislation (protection of agriculture) and the Great Lakes Water Quality Agreement that includes climate change considerations by leading institutions (Gafarova, 2009). The regional government has undertaken adaptation planning for the smaller communities as well. The standard adaptation exercise comprises risk assessment and long term planning.

A recent electronic survey found that issues of greatest concern were storm water management, extreme weather events, flooding, and lake and river water levels (Boettcher, 2010). Notably, civil servants with formal responsibility for risk management and adaptation indicated that internet searches were the most common source of information, followed by other mass media and interactions with colleagues. Thus, whilst scientific data and large-scale projections are generally available, local agencies remain dependent on external support in order to develop forecasting models/scenarios. Scientists and federal agencies play an important role in supporting municipal administrations and agencies in project implementation. Research to date recommends that regional government play a stronger role in coordinating adaptation activities (Boettcher, 2010)

As the federal government is often the ‘insurer of last resort when climate-related disasters strike’ (Environment Canada, 2009a, p. 6), it is expected that adaptation measures will reduce the federal exposure to financial risk. However, the sub-federal interest in climate change adaptation is often dependent on two interlinked factors: 1) resource availability for planning and implementing programs on climate change adaptation, and 2) political buy-in in relevant councils. The challenge of communicating the importance of implementing adaptive measures at an early stage to municipal decision-makers is thus both political in nature and related to resource availability. It is appreciated that often politicians ‘refrain from implementing policies to build adaptive capacity because there is no baseline and no certain framework to follow’ (Khan, 2009b, p. 38). The significant investment required over the coming decade in municipal infrastructures also depends on the negotiation of new codes and standards that determine the distribution of financial gains amongst stakeholders (Environment Canada, 2009a). The Columbia Basin Trust (established in 1995) guides and informs the work in Niagara and seeks to act as a ‘bridging organisation’ convening people to address climate adaptation questions at the municipal level (Velaniskis, 2009). These adaptation projects are supported by a wider local development agenda, that develops and delivers initiatives and community programs in the basin.

The ACRM&CCA research project

The Environment Canada led Adaptive Collaborative Risk Management & Climate Change Adaptation project in the Niagara Region, Canada (ACRM&CCA) project (2009–13) is composed of four work packages: 1) Social Learning and Participatory

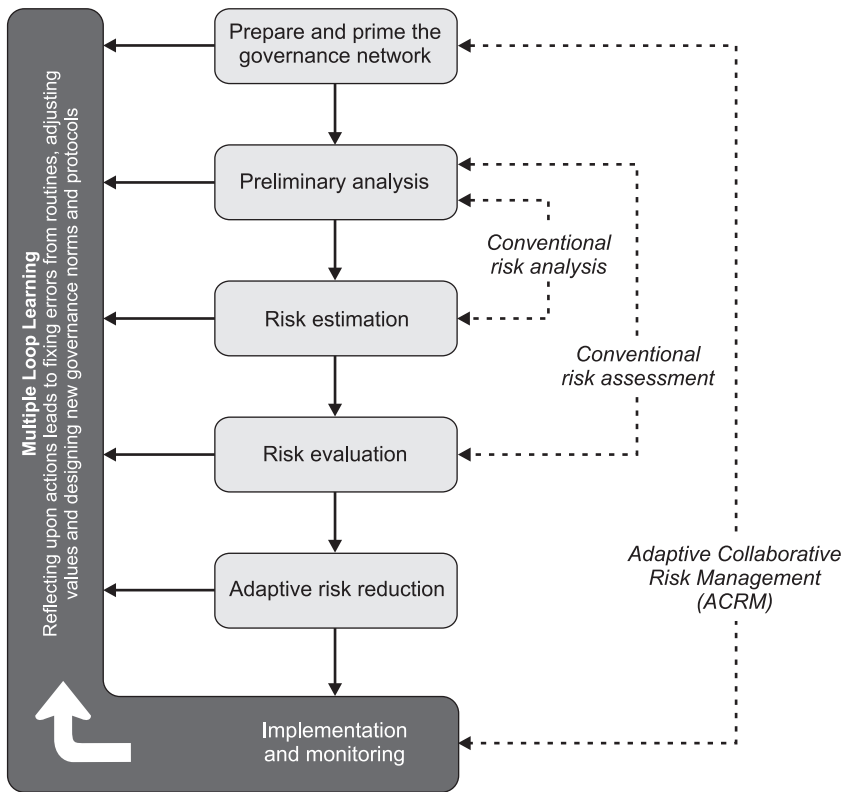


Figure 3: The ACRM framework

(Source: May and Plummer, 2009)

Approaches, 2) Adaptive Collaborative Risk Management (ACRM), 3) Community Sustainable Adaptation and Mitigation (SAM), and 4) Transformative Change Indicators. The project's structure was inspired by work undertaken by integrated landscape management practitioners and experts associated with the International Institute for Sustainable Development (IISD). Its goal is twofold: 1) to develop adaptation and mitigation portfolios in the region's 12 communities, and 2) to evaluate the efficacy of social learning in the context of climate change adaptation, mitigation and sustainable development (May, 2009). Environment Canada works with a number of universities as regional partners, including Brock University.

The project is nested within Environment Canada's Adaptation and Impacts Science Plan (AISP) as part of the federal government's larger Science Plan (Environment Canada 2009). AISP supports research that seeks to ensure Canadians understand and adapt to the impacts of atmospheric change. The plan also acknowledges that 'the private and public sectors, communities, highly impacted economic sectors and Canadians all make significant decisions and investments based on the future environment, and any actions chosen will require sound science based on shared

information and effective collaboration' (May, 2009, p. 1). Environment Canada is also implementing multi-disciplinary activities that involve a number of key user groups for climatic information. Among the science programmes operationalised therein is the ACRM&CCA project.

ACRM&CCA is being implemented in seven successively run stages to integrate steps from adaptive co-management, climate change adaptation to risk management (May, 2009) (see Figure 3). It thus rests on the assumption that a more coherent research process can best be facilitated through the integration of frameworks of adaptation, social learning and transformative capacity into community-based adaptation initiatives (Armitage and Plummer, 2009). Risk management is viewed as a climate change adaptation tool and adaptive co-management as a governance strategy, in which the integrated ACRM&CCA process addresses both technical and governance concerns. The more control-based discourse on risk management is enhanced by approaches to complexity, uncertainty and participation embodied in Social-Ecological Systems (SES) research. The ACRM&CCA framework also represents an adapted version of the six step iterative Canadian Standards Association Risk Management Standard, which aims to consider more fully 'the possibilities associated with deliberative interactions among pluralistic stakeholders across different levels' (May and Plummer, 2009, p. 7).

The initial phase of the project was implemented with reference to the social-ecological inventory, a method originally developed to identify people with ecosystem knowledge in conservation projects, complementing biological inventories and stakeholder analysis (Shultz *et al.*, 2007). The inventory identifies social-ecological system boundaries, local social and ecological processes, interactions between these processes, key actors, and relationships among these actors and their roles within the region (Velaniskis, 2009). Relying on social network theory and building on Elinor Ostrom's model for analysing a social-ecological system, it uses a 'hard' system approach to distinguish and study the interactions between resource and governance sub-systems (Ostrom, 2009). It also uses a number of specific tools, some of which have been developed in the Adaptation and Impacts Research Division including Geographical Information System, vulnerability/adaptive capacity mapping and socio-economic scenario development (May, 2009).

As part of developing a socio-economic profile of the Niagara region (Khan, 2009a), a list of social indicators has been compiled to develop an Adaptive Capacity Index. Indicators are quantifiable and measurable through, for instance, the number of NGOs in the municipalities or the degree to which the public participates in decision-making related to adaptation efforts (Environment Canada 2009b). The list of preliminary indices and indicators of adaptive capacity is currently approximately 130 (Khan, 2009b). A national survey (see above) was undertaken in 2009 to examine how Canadian communities access and use information about climate change in local adaptation planning i.e. the extent to which the science on climate change is 'useable' for communities (Boettcher, 2010). Useable science was defined as salient (context-sensitive), credible (perceived by users to be accurate, valid and high quality) and legitimate (perceived to be free of political influence or bias). Environment Canada

has also recently launched the Canadian Climate Change Scenarios Network website (www.cccsn.ca) as the interface for distribution of information on climate change scenarios and adaptation research to partners, particularly universities, across the country. The network mainly considers atmospheric modeling and climate change projections (i.e. scenarios), for instance via a periodic newsletter. The website also intends to provide global climate model scenarios, regional climate model scenarios and downscaling and risk assessment tools for a variety of other users.

Case 3: Mahakam Delta, Indonesia

One of the most significant examples of climate adaptation in Indonesia has been the recent and hitherto unprecedented attempt to rehabilitate mangrove ecosystems. These efforts have emerged at the juncture of a number of interconnected processes in South East Asia: 1) coastal pollution and disease leading to a collapse of much of aquaculture industry and, in particular, shrimp farms in areas that were previously mangrove forests, 2) several significant coastal disasters in the last decade caused by wave surges that have led to catastrophic destruction, widespread deaths and the salinisation of low lying paddy areas, and 3) acknowledgement that the frequency and intensity of storms will likely increase with climate change. The scale of the impacts has led to renewed interest in the role mangroves play in reducing the effects of natural hazards and in contributing to sustainable coastal resource management (Osbeck and Powell, 2009).

In response to this attention, numerous regional and national level programmes and initiatives have emerged targeting the restoration and rehabilitation of mangrove forests in South East Asia. Implementation of these programmes takes place in a policy environment that is following the paradigm towards decentralisation of natural resource management in the area. Since the end of the autocratic Suharto regime in 1998, the political system in Indonesia has undergone rapid transformation. When the Decentralization Act was passed in 1999, decision-making power and budgetary responsibility was transferred to the district level (Dermanwan *et al.*, 2006).

The Mahakam delta is situated in East Kalimantan, Indonesian Borneo. The rich and diverse natural resource base has turned it into one of the wealthiest regions of Indonesia; indeed, today it plays a significant role in the country's economy. 70 per cent of the province's annual income comes from the oil and gas industries. Fisheries are also important to the local economy, with the delta's production representing 20 per cent of East Kalimantan's total output.

However, rapid changes associated with the exploitation of marine and coastal resources, combined with upstream development, have had radical consequences for sediment and ecosystem dynamics in the area (Sidik, 2009). Like many of the coastal areas in Asia, East Kalimantan has experienced socio-economic and environmental change through urban encroachment, land use intensification, overfishing and pollution. In particular, the shift from agricultural to industrial based economies has

caused populations to move from inland rural areas to coastal areas. The subsequent development of the aquaculture economy alone has transformed much of the coastal landscape: indeed, the Mahakam delta has lost 70 per cent of its mangrove forests in 30 years as coastal lands have been converted into lucrative shrimp farms. Notably, more than 50 per cent of the world's mangrove forests have been cleared in the last five decades (Macintosh and Ashton, 2002), and it is estimated that 40 per cent of those remaining in tropical Asia are degraded (Blasco *et al.*, 2001).

It is because these often low-lying areas are especially vulnerable to increased storm frequency and rising sea levels associated with global environmental change that the issue of mangrove reforestation has acquired recent interest. Mangroves fulfill a unique ecological role in coastal systems by connecting the land with the sea and offering important habitats for a wide variety of fish species. The tree's unique root system not only captures sediment and prevents erosion, but a mangrove forest biome acts as one of the most efficient carbon sinks by comparison with other tree systems (Pidgeon, 2009; Bouillon, 2008). Moreover, it has been suggested that 75 per cent of all tropical commercial fish species pass part of their life cycle in the mangrove ecosystems, using them as nursery grounds, shelter or hunting grounds (Mangrove Action Project, 2009). Because the presence of mangroves forests in coastal areas demonstrably reduces wave heights (Hong, 2006), they may also play an important role in mitigating the impact of storm events. Thus, the ecological services maintained and promoted by mangrove forest biomes are intrinsically tied to a host of interconnected livelihood assets for coastal communities.

The MANGROVE project, suggests that underlying problems associated with defining the mangrove trees' benefits have impacted their management. If, for example, they are linked to climate change and storm surges, then the approach tends to be technocratic, expert driven with a protectionist conservationist paradigm. If, however, livelihoods and environmental pollution feature strongly in the problem definition, then the initiatives tend to promote a participatory based conservation approach. In short, while the multiple functions and values of the mangrove are increasingly recognised, rehabilitation initiatives have not been implemented with a clear understanding of how to guarantee long-term sustainable benefits. Indeed, even though the shift towards decentralisation was intended to promote local participation in policy processes, civilian concerns have been undermined by those of powerful interest groups.

The MANGROVE research project

Mangrove ecosystems, communities and conflict: Developing knowledge-based approaches to reconcile multiple demands was a Sixth EU Framework Research Programme seeking to facilitate an action planning process in the Mahakam Delta and elsewhere (This report only considers WPs 5 and 8, commonly known as 'Reconciling Multiple Demands: Institutions and Stakeholders'). The project departed from a predefined expert view that mangrove forests could be delineated and understood solely through the use of ecological science without consideration for stakeholder perspectives and how mangrove forests was meaningful to them. As the project evolved and researchers became immersed in the local realities of land users in the

delta, they deconstructed this initial realist sense-making perspective. Thereafter, perspectives came to characterise the situation more as ‘resource dilemmas’ characterised by ‘subtractability’; that is, that the management utilise and draw upon a number of finite financial, social and ecological resources; multiple stakeholders with potentially competing claims to the resources; high levels of controversy; uncertainty and complexity with unexpected events being frequent; and ‘interdependency’ of stakeholders’ perspectives, behaviours and actions (Ison *et al.*, 2007).

The work uncovered multiple interests characterizing the different roles mangroves would play in the future management of coastal resources. One dominant view emphasized their role as a means of reducing the impact of natural hazards in the context of local livelihoods and national economic development. It was understood as imperative that appropriate protocols for mangrove reforestation and plantation projects also acknowledge the diverse set of interests associated with these efforts. As such, integrated approaches in management of coastal resources were examined in a multi-stakeholder review of the regulatory framework and policies relevant for the future sustainability of mangrove ecosystems (Powell and Osbeck, 2010). The policy analysis and adaptation of the project thus situated the challenge within a historical context of conflicting interests in terms of the management, governance and use of coastal resources.

The project developed an action planning process whereby the restoration and rehabilitation of mangrove would help reconcile conflicts of interest in these coastal contexts. Further, researchers adopted a soft systems methodology to analyse coastal land use and management in areas targeted for mangrove rehabilitation and restoration. Soft systems methodology is an approach to solving complex, unstructured and manmade problems using holistic analysis and systems thinking (Checkland, 2000). As a participatory methodology, it helps different stakeholders understand each other’s perspectives. It focuses on identifying the systems and relationships necessary for an organisation or group to achieve a common goal. Thereafter, unstructured or messy problems are clarified through the design of ideal or conceptual scenarios or models in order to identify changes deemed socially and politically desirable and feasible. Soft systems methodology therefore inspired the development of a learning framework for use by the MANGROVE project to understand the nature of the problem and system failure by critiquing the activity of actors, rules, power structures and norms involved (Powell and Osbeck, 2010). The qualitative data came from secondary data (literature reviews) and primary data (from interviews and personal communication with stakeholders and experts). A rich picture of the institutional setting in the Indonesian case was developed using an analytical soft systems tool known as TWOCAGES (see Box 1).

TWOCAGES is a tool, which was been developed by Richard Bawden and colleagues within a tradition of systems thinking and action research at the Centre for Systemic Development at the University of Western Sydney in 1995. It is based on Peter Checkland’s (2000) analytical framework CATWOE, which was presented within his soft systems methodology. The acronym TWOCAGES is an abbreviation of eight

Box 1: An application of the soft systems methodology analytical tool TWOCAGES

(Source: Powell and Osbeck 2010; original framework developed by Richard Bawden at the Centre for Systemic Development at the University of Western Sydney).

T - Transformation – details of the proposed change (restoration and rehabilitation of mangroves)

W - Worldview – the particular view that makes change meaningful to the “owner” of the process. (mangrove plantations to protect coastal areas and mitigate impact of natural hazards).

O - Owner – those who have the authority to authorize the change (in the Indonesia case it is the national government and more specifically the Ministry of Forestry).

C - Communities of interest – these are beneficiaries or victims of the change.

A – Actors – those implementing the change (in this case, the government, oil and gas industry).

G - Guardians - those who watch or monitor for unintended outcomes of the change (in this case the MANGROVE project plays this role).

E – Environment – The operating environment in which a change is being undertaken (in this case the relationship with the private sector, decentralization, concept of conservation and production).

S - The System of interest bounded by change related issues identified by the clients.

questions, which are posed to the situation in which the research is carried out, which helps the researcher to distinguish between different types of stakeholders in relation to an envisioned transformation in the system of interest. It thus enables the stakeholder identification and research interventions to depart from the ongoing dynamics *in* the local situation, in which the research is undertaken, rather than *a priori* defined categories.

Operationalising case studies within sense-making perspectives

The above description of the three projects and the research contexts shows that the three projects overlap in terms of assumptions and methodologies through their ambition to study and/or foster local adaptation to climate change as a process of social learning. Yet, they also differ in various respects. In this section, we undertake a comparative analysis of the design of each research approach vis-à-vis its local context, project objectives and linkages to policy and change processes. The analytical model described below (Figure 4) is used to organise and support this analysis. Here, key elements of each project have been selected and mapped against the two axes of differentiation discussed earlier: epistemology and intent of inquiry. In this way, our purpose is both to elicit relevant lessons as to how research facilitate the dialogue

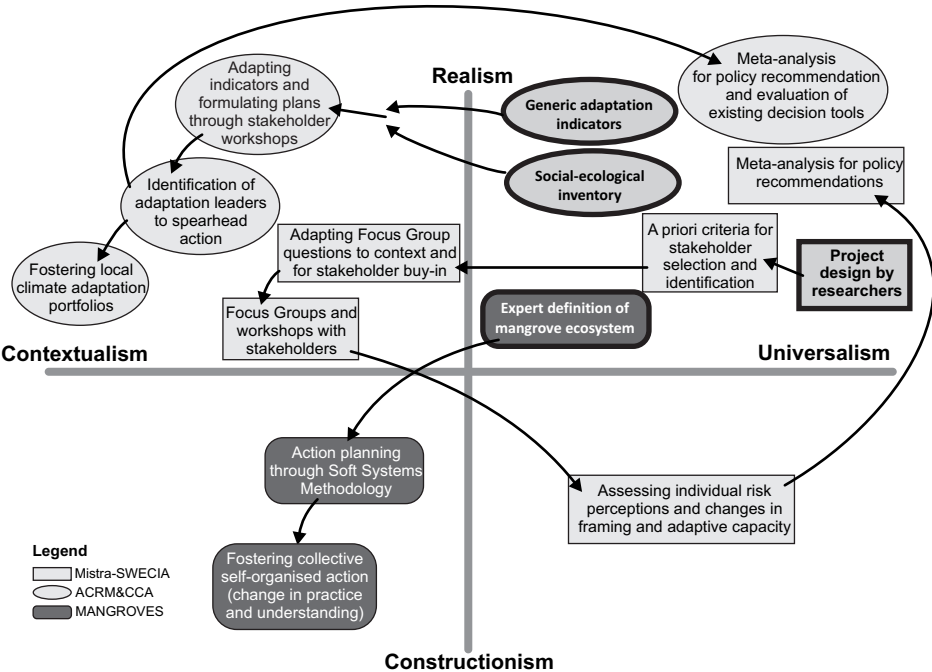


Figure 4: Analysis of the operationalisation of case study research in the three projects

Key methodological steps in the projects are located in the most appropriate sense-making perspective in order to trace the ‘project journeys’. The location of a methodological step within a certain perspective does not convey information of ‘degree’.

between local climate adaptation and higher level policy and to test-run the proposed framework, clarifying how it can be applied to guide research planning and evaluation.

All three projects depart from *a priori* defined research questions and demands and through the research process enter a dialogue with their local contexts and stakeholder perspectives. That is, they move from an initial realist-universalist problem definition and come to embrace two or three other perspectives. This illustrates effectively the extent to which methodological applications in case study research can draw upon several research traditions. Indeed, the axes of differentiation effectively become continua on which projects may shift over time. This dynamicity of the projects also affirms that case study research for local climate adaptation can be operationalised in many different ways.

Below, we discuss the implications these findings have on the prospects for enabling synergies between different case study research projects and in considering how the research relates to the ambitions of regulatory policy. It is important to bear in mind that the differences in research methods and design also show the extent to which the

projects operate in different contexts and scales, and with distinct objectives, histories and management structures.

Project start: realist-universalist perspective

Mistra-SWECIA and ACRM&CCA have convened their respective stakeholder processes through an explicit focus on the process of adaptation to climate change. In so doing, they identified relevant problem definitions in dialogue with stakeholders. By contrast, the MANGROVE project departed from the issue of mangrove rehabilitation, a concrete outcome of the international climate change discourse. The relocation of the MANGROVE project to the constructionist-contextualist perspective occurred when the research team and partners realised that mangroves could be used as a platform on which to reconcile discordance amongst stakeholders owning diverging problem definitions and that the notion of rehabilitation was coming from a fixed knowledge domain. Thus, the emphasis shifted to broader concerns of coastal management, letting the research hypothesis emerge from stakeholder interests and perspectives.

For Mistra-SWECIA, the realist-universalist approach was expressed, for instance, in the criteria for stakeholder identification, which were defined by the researchers prior to the work and with the aim of how best to provide more meta-level insights for policy makers. The goal was to assemble homogenous focus groups composed of participants sharing important characteristics regarding the climate adaptation process. The project used this approach to derive lessons from specific groups of practitioners and to ensure that valid claims could be made that are representative for the larger group regarding risk perceptions and individual learning.

For a government authority such as Environment Canada, the facilitation of stakeholder involvement has to be adequately designed within its official mandate and its science and technology role in understanding the impacts of climate change and the processes that lead to more effective community adaptation. Hence, in ACRM&CCA, a thorough social-ecological inventory and stakeholder mapping exercise was pioneered before initiating the participatory process in order to obtain an accurate and justifiable scientific outline of stakeholders, social networks and resources. As mentioned above, the social-ecological systems approach originates in ‘hard’ (realist) systems science and seeks to comprehend the complexity and non-equilibrium character of the governance system. It assumes that the researcher, with an expert perspective, can position her/himself outside the system of interest and define the logical boundaries of the system as well act as a relatively objective participant in the discussions on what constitutes desirable improvements. This guarantees that ‘science’ and the negotiation amongst stakeholders remain separated in the governance system. For instance, in the social-ecological inventory, a distinction was drawn between a ‘democratic process perspective’ and a ‘successful ecosystem management approach’, which were seen as mutually exclusive (Velaniskis, 2009). The work underlying the ACRM&CCA project thus draws on realist reductionist inspired methodologies as inputs for the participatory risk management process. For instance, Khan (2009a) outlines the preliminary (universal) indicators of adaptive capacity, several of which assume that – whereas this capacity is not directly measurable – it can be measured in an aggregate manner

through the reduced sub-categories of indicators. By contrast, Mistra-SWECIA has considered using ‘learning indicators’ that will be negotiated through the research with stakeholders.

Stakeholder interactions: contextualist perspective

In all three projects, the facilitation of stakeholder interactions occurred within a contextualist perspective (i.e. the projects initially journeyed from the right to the left half in Figure 4). This decision reflects the necessity, which project staff encountered, to ground the initial universalist expectations by donors and researchers in the local context. The contextualist perspective proposes to focus on ensuring that the research can adapt the assumptions of project owners and researchers in response to stakeholder insights.

Whilst the MANGROVE project operated in the constructionist epistemology, Mistra-SWECIA and ACRM&CCA draw on realist contextualism. The focus groups, interviews, identification of adaptation leaders and development of adaptation portfolios are guided by context-independent categories created before entering the work with the municipalities and local actors (i.e. in the universalist-realist perspective). This is also true for the survey methods applied by ACRM&CCA to assess adaptation efforts (Boetcher, 2009) or the survey used in the Mistra-SWECIA project to assess perceptual changes in the focus groups. By contrast, the soft systems action planning process in the MANGROVE project operated within the constructionist perspective and delineates the foci of interest based on the ‘system of interest’ of stakeholders. The soft systems analytical tool TWOCAGES applied by the MANGROVE project was used to identify the interests involved and to provide a framework with which to analyse the different kinds of stakeholders involved in the learning process. The analysis supporting the facilitation of self-organised action acknowledged that the ‘case’ was an originally situated learning process that changes character with the intervention of the researchers or those who expect to derive higher order lessons for the purpose of comparison. The MANGROVE project thus followed a participatory action research approach where validity of the findings was a meta-level negotiated construct dependent on the learning process and whether people felt the research contributed with improvements.

Consensus building or social structures

Whilst both the Mistra-SWECIA and the MANGROVE projects moved into the constructionist perspective in the analysis (Figure 4), they did so with a universalist and contextualist intent, respectively. That is, Mistra-SWECIA aimed at assessing individual risk perceptions and how adaptive capacity was framed by the participants in order to subsequently revert back to higher-level policy making with more generic recommendations. In contrast, MANGROVE undertook an action planning process aiming to foster self-organized action amongst the participants (who also included different policy makers). This illustrates how the universalist approach emphasises learning through facilitation of dialogue between groups and actors, aiming at a sharing of perceptions and the building of increased consensus, while the contextualist view attends more explicitly to social structures, conflict and contestation which hold back concerted action. The approach in Mistra-SWECIA refers to social learning as a

process by which agents and organisations continuously frame and reframe the issues at stake and develop enhanced capabilities to deal with common problems which individuals often cannot resolve on their own (Nilsson and Gerger Swartling, 2009b, p. 2, sensu J. D. Tabara.

This is linked to an emphasis on perceptions and psychological factors, such as risk perception and perceived adaptive capacity in determining adaptation (Grothmann and Patt, 2005). It also includes an emphasis on joint development of individuals' knowledge ('elaboration of knowledge') as well as common generated knowledge ('co-construction of knowledge') in group settings (Wibeck *et al.*, 2007). This shows how the constructionist-universalist perspective is naturally oriented towards informing meta-level analysis in the realist-universalist perspective. That is, the work on risk assessments anticipates the later journey back towards more generic policy recommendations. In fact, the objective of informing regulatory policy means that it is relevant for the project team to attach higher value to some kinds of learning than others. For instance, it was more relevant to understand how increased awareness amongst participants about the need for climate adaptation emerged, or how focus groups could lead to a more sophisticated and pragmatic awareness of adaptation needs amongst the participants (Nilsson and Gerger Swartling, 2009b).

By contrast, the MANGROVE project's contextualist (action research) methodology sought to identify and respond to problematic social structures in order to enable the negotiation of concerted action during the research interventions. The research process intended to facilitate the reframing of issues situated in a need to reconstruct existing institutional structures, which currently hindered local adaptation. This implies that a rigorous learning process was inextricably bound to whether the research negotiated its ethics of the knowledge generation and change process.

One further illustration of the difference between the universalist and contextualist perspective is the different types of stakeholder analyses applied by the Mistra-SWECIA and MANGROVE projects. MANGROVE worked through a framework distinguishing between different types of stakeholders through use of the soft systems tool TWOCAGES (Box 1 above), where stakeholder roles are defined according to their engagement in and degree of benefitting from the change process, in this case mangrove forest rehabilitation. For action planning in the Mahakam Delta, the stakeholders were often not identical with the formal institutional units. By contrast, Mistra-SWECIA's analysis both draws on an inter-organisational stakeholder approach reliant on an codification of stakeholder types and roles focusing on the formal/informal roles and administrative and organisational boundaries (Ballejos and Montagna, 2008; André and Simonsson, 2010). Both approaches to stakeholder analysis offer valuable methodological insights in lieu of the rather crude definitions of stakeholding as phenomenon in most climate and environmental policy documents (see e.g. André and Simonsson, 2009), but differ significantly in their assumptions regarding the nature of the policy process and how research ought to contribute.

4 DISCUSSION

Planned versus self-organised adaptation

The analysis of the three research projects above has shown how case study research can foster dialogues between local climate adaptation professionals and higher level policy makers in a wide array of ways. Clearly, the choices regarding how to operationalise of case study research within different sense-making perspectives significantly shapes the manner in which a research project informs policy and change processes. In particular, it determines the degree to which the research project contributes to planned policy (coercion, regulation) and/or self-organised adaptation of stakeholders in the context of the research (non-coercive policy).

Both Mistra-SWECIA and ACRM&CCA intend to inform planned policy interventions through providing policy recommendations through meta-analysis of the research findings. There is here an emphasis on planned adaptation as steered through regulatory policy instruments. This explains why the selected case (Stockholm region) and stakeholder mapping and analyses are bounded by administrative and organisational units (e.g. municipalities, offices). As explained above, to elicit the context-specific nature of the Stockholm region, the empirical approach in Mistra-SWECIA combines the predefined, realist point of departure with a bottom up approach to stakeholder articulation of preferences of a future, desirable institutional landscape and governance structures for adaptation action. Still, the focus groups do not intend to foster immediate collective action but instead to identify risk perceptions and adaptation needs, and the potential for social learning on climate adaptation, which can yield recommendations to regulatory policy.

ACRM&CCA has a similar realist-universalist goal (generic policy recommendations) in keeping with the formal science mandate of Environment Canada. It also has an end point in the realist-contextualist perspective, seeking to foster concrete local climate adaptation through the support of adaptation leadership in the region's communities. In contrast to Mistra-SWECIA, it forms part of a governmental mandate and its activities thus have joint policy implementation significance as well as research/facilitation relevance. As a governmental agency, Environment Canada is responsible for ensuring that Canadians understand the impacts of a changing atmosphere in order to reduce the adaptation deficit and take advantage of new opportunities that may arise (Environment Canada, 2009). Moreover, the programme must refer to the government protocols and agency objectives. As a public authority in which not all claims are negotiable when interacting with local communities, a degree of prescriptive knowledge in the realist-universalist tradition is required.

Finally, the MANGROVE project ended its journey in the contextualist-constructionist perspective by means of the soft systems methodology that aimed at direct self-organised action as the outcome of the social learning process. This project thus sought

to enable contextualised and self-organised action in its research activities rather than informing regulatory policy directly.

Addressing disabling governance structures

For these three projects, ‘adaptation’ initially constituted a change process defined by international players and/or national governments that has since been integrated into the regulative, coercive and normative governance framework and has implications for resource allocation. For stakeholders involved in each case study, the research serves as an opportunity to highlight issues and responsibilities belonging to higher levels of decision-making and thus to embed community issues into national or even international climate related policies (see also van Aalst *et al.*, 2008).

Case study research has the ability to address disabling governance structures as well as to resolve conflicts of interest and goals between sectoral policies. The problem lies rooted in differential access and connections to decision-makers for local stakeholders. For instance, the introduction of climate concerns at the national level in Sweden suggests that both mitigation and adaptation emerged from the national political discourse rather than responding to local needs. The Mistra-SWECIA research indicates that participants in the Stockholm region are interested in climate adaptation but need to be convinced that climate change adaptation needs to take priority over their own immediate socio-economic concerns. The evidence emerging from the research partially provides a constructive critique of the attitudes of the various agencies’ mandates. It requires further negotiation between national objectives and local experiences of and reactive adaptations to climate related crises such as flooding and storms (see also Uggla and Lidskog, 2006; Storbjörk, 2006). In the same way for ACRM&CCA, national policies can be shaped by international experiences (Gafarova, 2009). For instance, a discrepancy exists between the identification of the most pertinent hazards in governmental databases and in the self-generated community risk profiles, which emphasise epidemics and socially determined risks. In so doing, case studies can foster insights to challenge management assumptions that perpetuate overly crude conceptions of reality and the linkage between adaptation and the public good. They may also serve to surface the heterogeneity of local stakeholders who are unable to agree on the most desirable adaptation process without more inclusive processes of consultation and deliberation.

In real terms, the infusion of local definitions into higher level discourses, i.e. project-enabled processes of stakeholder analysis and mapping, policy analysis, and social-ecological inventory, all have the potential to support the negotiation of mandates between the formal and informal domains. Further, they can draw on the identification and critique of existing structural constraints to governance and conflicting perceptions of roles and responsibilities. For instance, in highlighting the many indirect stakeholders (who are not visible at the outset), the Mistra-SWECIA project pointed to a discrepancy between a person’s own conception of being an actor and the formal conception of him/her by the state (André and Simonsson, 2009). The MANGROVE project identified an incredible self-organising capacity within the informal system and an operating environment for people characterised by ambiguity

and diverging interests. However, significant power imbalances between human actors and between the discourses of conservation and production, including institutional and geopolitical conflicts, obstructed the long-term, sustainable governance of mangrove forests (Powell and Osbeck, 2010). Work in the Niagara region has highlighted that, as a rule, municipalities do not involve stakeholders in risk identification (Chynoweth, 2009). This encourages the expectation that ACRM&CCA can enhance processes of social learning in community climate change adaptation initiatives (May and Plummer, 2009).

In supporting the implementation of adaptation initiatives at the interface of planned and self-organised policy, case study research may provide additional leverage for researchers and stakeholders to promote and create platforms for local/national learning. The three projects may, through their programmatic structures and connections to policy makers along with deliberative and decision making fora, offer participating stakeholders an attractive way to leverage influence. Also, reference groups and project boards can serve as vehicles for stakeholders to access higher levels of decision-making. Further, collaboration between case study research projects may respond to their practical limitations associated with long-term interactions and learning. In particular, collaboration can answer to the fragility of short-lived participatory initiatives and the need to mainstream stakeholder and social learning inspired activities into everyday practices. This might support a longer and more continuous stakeholder involvement upon project completion, by for instance supporting requests for follow up meetings and activities.

Significance of methodological choices

The above analysis has yielded recognition of the methodological decisions which, implicitly or explicitly, reflects how research project view of the role of public policy. The journeys undertaken by each project were partly expressions of explicit research designs, but they also equally reflect a process of adaptive project management, where methodological shifts arise out of pragmatic responses to the project realities. They reflect a balancing between espoused participatory methodology and the actual histories of projects, responding to donor needs and the legitimization of their owners and clients as well as the personal perspectives, education and professional competencies of project leaders. Above and beyond general decisions, it is rare that project staff would or do share the same intentional and methodological opinions and perspectives. Undoubtedly this is symptomatic of most research consortia, where people of diverse disciplines and institutions are brought together.

The fact that research projects are both purposefully methodologically planned and organically adapted to needs and expectations throughout their implementation highlights the need for an explicit attention to how methodological choices affect how case study research mediates between the local efforts and experiences of professionals and stakeholders and the higher order policy goals of society. Whilst realist-universalist methodologies are powerful tools in promoting specific change processes, they also

place limitations on the researchers, impacting their ability to negotiate research frameworks with stakeholder definitions of what constitutes desirable ‘adaptation’, an ‘ecosystem service’ or the boundaries around a ‘social-ecological system’. This is particularly pertinent for some frameworks, as for instance in realist inspired vulnerability systems that are weakened by ‘us/them’ distinctions and generalising stakeholders’ vulnerability (e.g. Bankoff, 2003). The problem can be circumvented when using such frameworks as dialogical tools within a contextualist perspective, where the categories of resilience, stressors, etc. are co-defined in the learning process with people. Whilst contextualist approaches invest much effort in negotiating ethics into the process and determining what comprises ‘desirable’ outcomes, the universalist set of methods short-circuits this process and defines desired forms of adaptation based on predetermined problem definitions anchored in political goals.

Transparent balancing of interests

Over and beyond the mediation between the local context and the more generic realm of policy, in the undertaking of local case study research, research projects are in fact also dependent on reconciling the interests of researchers themselves with those of the involved stakeholders. There is typically a need for identifying ways in which researchers can draw more general lessons for improving their own work, whilst designing value-adding opportunities for stakeholders. It is here useful to be explicit up front about the risks of pursuing such synergies in case study research. As a case in point, Eikeland suggests that researchers’

modern theories and other ‘head stuff’ are like superficial opinions, words, easy to remove ... But prejudices ... are subconscious and tacit, merged with or submerged in our practices and routines (Eikeland, 2006, p. 205)

It is particularly important to be aware of such underlying prejudices when bringing stakeholders into the knowledge generation process because it breaks the traditional division of labour between researchers and researched and increases various risks and exposures. Indeed, even within participatory research, the emphasis on ‘cases’ often reify a certain research tradition, namely what by Nielsen and Nielsen (2006) have termed the ‘socio-technical tradition’. Here, the learning process is considered limited to ‘field’ experience, and researchers can legitimately fall back into a traditional ‘extractive’ and selfish mode once they return to their offices.

Some research interests may concur better with the interests of stakeholders than others. Collaboration on research design, knowledge transfer between cases (including through stakeholders’ participation in joint events) and a general improvement of research practice can also improve the change process for stakeholders. Research facilitated processes can serve as sources of inspiration and empowerment, creating new learning opportunities and strengthening relationships between actors in climate change adaptation. However, researchers’ natural desire to eliminate research overlap in order to generate cutting-edge publications often conflicts with the need to engage labouriously in variously located processes and contexts, where the outcomes are never given. Establishment of case studies may be motivated by the increased access

to empirical results, opportunities for publishing and advancing scholarship. These objectives do not have any direct value for stakeholders; on the contrary, they can inspire ‘generalisable’ insights without a clear relationship to the local relevant and actual change processes and/or cause case study participants to lose ownership over their insights.

5 CONCLUSIONS

This study began by acknowledging the political ambitions underlying the interest in upscaling of local adaptation lessons from case study research and undertook a comparative analysis of three major projects concerning climate change adaptation. As such, we have developed an analytical model to demonstrate the multiple ways case study research can bridge between local climate adaptation and policy making. The findings permit the claim that the choices made regarding different sense-making perspectives and research methods have more than academic interest; indeed, they significantly shape the extent to which a research project informs policy and local change processes and mediates between local efforts and higher order political goals. Most centrally, these methodological choices shape the research approach to working at the interface between planned policy (coercion and regulation) and non-coercive policy (facilitated, self-organised adaptation). An explicit attention to sense-making perspectives is also necessary in overcoming what in academic debates often are seen to be philosophical and normative incompatibilities, preventing synergies in research collaboration to develop. Through connecting the planned and self-organised modes of adaptation, synergies between different research projects and sense-making perspectives can facilitate a deconstruction and then reconstitution of existing realities that move beyond any predefined ‘case’.

When case studies acquire political momentum and become conduits for local actors to access decision makers, it is because the collaboration between researchers and local communities has facilitated the creation of such a platform. They effectively invite practitioners and their experiences to serve as ‘cases’ in policy making, thus surfacing the practical experiences and capacities of stakeholders. The participatory processes in all three cases studied in this report made their stakes explicit, thus enabling a meta-communication regarding how issues and mandates are defined and acted on. Case study learning has thus achieved new significance if viewed as a platform to leverage stakeholder competencies and capacities not only to informing existing political structures, but in driving the very change and reinvention of these institutions. Throughout, it has been critical for researchers to balance case study benefits in reference to stakeholders (e.g. community members), non-case recipients of the work (e.g. policy makers) and the researchers themselves. Crucially, this has necessitated transparency in generating ‘generalisable’ insights vis-à-vis the case study’s situated change process and guaranteeing that participants retain ownership over their insights.

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Unlike the issue of climate change mitigation, discussions about climate adaptation are still in their infancy in most national policy debates. How do local climate adaptation lessons become relevant for public policy? What are the opportunities and risks involved in exploiting local case studies for climate adaptation policy making? How do research projects navigate the many expectations and demands from the policy clients in order to make their contributions relevant? The aim of the present report is to offer a methodological framework and a new vocabulary for researchers and their partners to consider more explicitly the different ways case studies can be used to inform policy processes for climate adaptation.



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