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'It Takes More to Get a Ship to Change Course': Barriers for Organizational Learning and Local Climate Adaptation in Sweden

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ABSTRACT *In working with local climate adaptation, questions are raised of how to increase the capacity for integrating climate considerations in planning and decision-making. As part of the institutional dimension of adaptive capacity, how to foster processes of learning and reflexivity among different administrative units and actors is particularly essential. The aim of this paper is to analyse how the call for systematic organizational learning is manifested in local climate adaptation in two Swedish municipalities, illustrating what forms of learning occur and what learning challenges are identified. Despite the distinct and often contrasting approaches to climate adaptation adopted in the two municipalities—reflecting a variety of learning approaches—there are striking similarities in terms of difficulties in moving beyond the specialized few and reaching general acceptability as well as in the inability to mediate tensions between local sector interests, values and priorities and thus bringing about reflexive learning through experience. The paper shows that the cross-cutting nature of climate change needs to be further acknowledged in practice, including to what extent learning takes place among a specialized few key actors or as part of a systematic and cross-sectoral organizational mainstreaming as well as to what extent learning 'on paper' is actually embraced as 'learning in use' in concrete working practices.*

KEY WORDS: Climate risks, climate adaptation, adaptive capacity, organizational learning, learning challenges

Introduction

At present, there is a degree of political consensus on the need to break away from current trends and development paths for all sectors and levels of society to come to terms with the implications of our changing climate. Irrespective of measures taken in the UN Framework Convention for Climate Change and how fast

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actual reductions in greenhouse gases come about, climate changes are still expected. Our current climate policy therefore includes a focus on both mitigation—emission reductions—and adaptation—responding to the consequences of a changing climate. In the paper, adaptation is defined as 'adjustments to reduce vulnerability or enhance resilience in response to observed or expected changes in climate and associated extreme weather events' (Adger *et al.*, 2007). Research has shown the need to increase knowledge of processes of adapting to both current and future climate risks, not the least since practical experiences of flooding, storms, erosion, etc. continuously reveal limits in preparedness and capacity to respond (Adger *et al.*, 2007; Burton, 2004; Pielke *et al.*, 2007; Wall & Marzall, 2006). The Intergovernmental Panel on Climate Change in their latest assessment conclude with very high confidence that there are substantial limits and barriers to our current level of adaptation and that an assumed high adaptive capacity does not automatically lead to reduced societal vulnerability (Adger *et al.*, 2007). In this paper, attention is turned to the local arena, which has been identified as having a key role in changing current policy-making, planning and decision-making in terms of climate change (Betsill & Bulkeley, 2007; Bulkeley & Betsill, 2003; Kousky & Schneider, 2003; Wilson, 2006).

In approaching climate adaptation at the local level, questions are raised of how to increase the capacity for integrating considerations of climate change in municipality agendas, routines and procedures for policy-making, planning and decision-making (Urwin & Jordan, 2008). Despite the identified need for revising and rethinking current working practices, several international studies report on signals of inertias and missed opportunities for interaction, knowledge exchange and learning that hamper current adaptation practice (Crabbé & Robin, 2006; Ivey *et al.*, 2004; Lidskog & Uggla, 2009; Næss *et al.*, 2005; Pelling *et al.*, 2008; Tompkins, 2005; Wilson, 2006; Winsvold *et al.*, 2009). This paper specifically targets the horizontal networking capacity at the local level, where the question of how to foster processes of learning regarding the consequence of climate change among different administrative units and actors working with, for example, risk management, environmental protection and planning becomes urgent. In practice, this horizontal networking capacity is one of the several elements contributing to institutional capacity-building for climate change (Storbjörk & Hedrén, submitted; Willems & Baumert, 2003). The aim of this paper is to analyse how the call for systematic organizational learning is manifested in the practice of local climate adaptation in two Swedish case studies—managing coastal erosion in a municipality with the assumed name of Coastby and flooding in a municipality with the assumed name of Riverby—illustrating particularly what forms of learning occur and what learning challenges are identified.

The Swedish Case Studies: Policy Context and Method

The Swedish climate change strategy has developed gradually since the late 1980s. In 2002, the Swedish Parliament decided upon a strategy of emission reductions, based on a combination of 'carrot, sticks and sermons' (Lundqvist & Biel, 2007, 17ff). Adaptation has entered the policy arena at a later date. In 2007, the Official Report on Climate and Vulnerability showed the need for strategic planning to deal with future climate change. Increased precipitation, temperatures and sea-level rise are expected to have a bearing on the intensity and occurrence of flooding, landslides and erosion, of which the south and south-western part of

Sweden are particularly exposed (SOU, 2007, p. 60). Even though the latest Governmental Bill on climate change mainly focus on emission reductions, it suggests that adaptation is given increased recognition in Swedish climate change politics (Government Bill, 2008/2009, p. 162). At the national level, an informal authority network on adaptation is currently at work (Uggla, 2009), and between 2009 and 2011 the County Administrative Boards—as regional state actors—have been given the task to coordinate adaptation within each region (Government Bill, 2008/2009, p. 162). The main work is however expected to take place at the local level where the 290 municipalities are to consider the consequences of climate change in spatial planning (Boverket, 2009). In a recent self-evaluation, 9 of 10 of the responding 200 municipalities claim to somehow approach adaptation (SKL, 2009b). How and to what extent adaptation is dealt with is however not elaborated upon. Previous studies have shown that local initiatives vary strongly across the country and stretch between, e.g. wait-and-see, reactive and proactive climate change adaptation (SKL, 2009a; Storbjörk, 2006; Uggla, 2009; Uggla & Lidskog, 2006). It has also been suggested that overall the radical

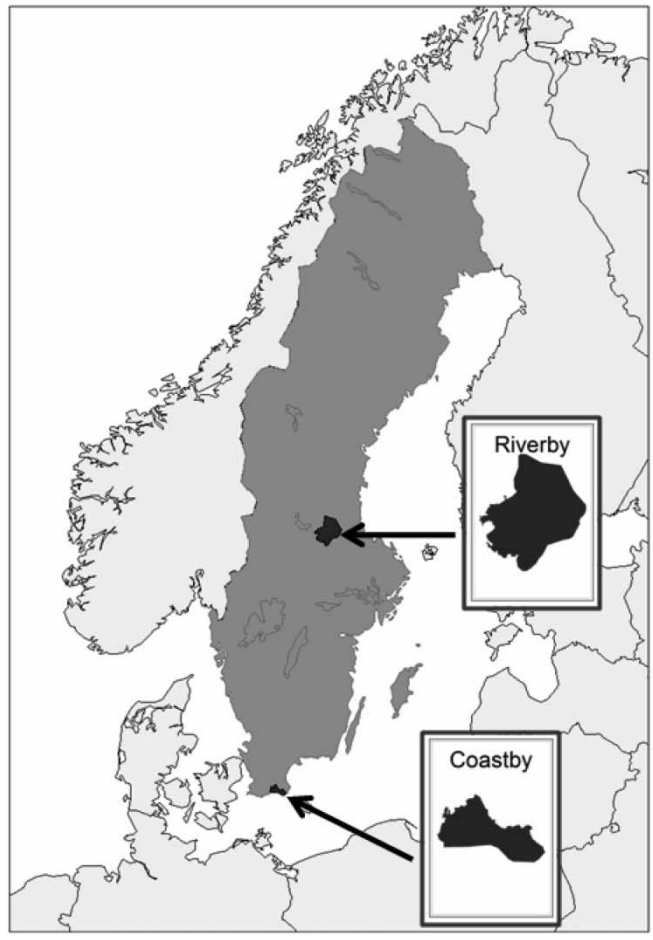

Figure 1. Case-study municipalities. Edited by Martin Karlsson and published with permission from the Swedish Lantmäteriet.

rhetoric in local climate change governance has led to rather modest results in practice (Granberg & Elander, 2007).

The two case-study municipalities targeted in this study both have a long history of exposure and necessity of learning to live with the risks of either erosion or flooding. Coastby is a small coastal municipality of 355 km^2 with 27,200 inhabitants, located in the south end of Sweden, whereas Riverby is middle-sized of 2289 km^2 with 55,000 inhabitants and located inland, north of Dalälven (Figure 1).

Methodologically, the two case studies have been based on document studies and interviews, with identified key actors from the local, regional and national levels. Eight interviews have been made regarding coastal erosion (2008) and eight regarding flooding (2008 and 2005). The interviewees represent different professional perspectives, knowledge and experience of the issues at hand and were selected using a snowball technique within each municipality (Table 1).

The interviews allow a focus on multiple realities, views and perceptions among key actors (Merriam, 1994; Stake, 1995). The interviews were semi-structured and questions open-ended with a flexible questionnaire to support the discussion. The interviews lasted between 1.5 and 2 h each and were recorded and transcribed. The analysis was done stepwise to allow for both concentration and categorization of meaning. The choice to use assumed names of the case-study locations was made by the author and motivated by a willingness to avoid identification of key actors as somewhat sensitive reflections are sometimes allowed in the analyses. Further, the case studies are done to highlight general lessons rather than directing focus on the positive or negative elements at the specific municipality level. None of the interviewees expressed doubts of standing by what they had said in the discussions we had after each interview. In this paper, some of the empirical categorizations bearing particular relevance for challenges of learning processes are highlighted, using a number of quotes that represent either general experiences among several interviewees or specific interpretations and perspectives. In addition, a number of policies, strategies, plans and investigations referred to in interviews have been included in the analysis.

Before turning to the empirical section, the theoretical departure in approaches and mechanisms for organizational learning is discussed.

Table 1. Interviews

Interviews in Coastby	Interviews in Riverby
Head of the technical unit/Director of strategic affairs	Head of building allowances
Official with strategic responsibility for environment and climate	Plan architect
Politician/former chair of local environmental board	Fire engineer at the regional rescue service
Politician/current chair of local environmental board	Security coordinator
Official formerly in charge of erosion at CAB	Official at CAB working with emergency planning
Official in charge of erosion at Swedish Geotechnical Institute	Official at CAB working with spatial planning
Professor involved in erosion management	Head of Water Regulation Company
Leader of local action group/landowners association	Dam Security Official (Water Regulation Company)

Mechanisms for Organizational Learning

Previous studies have shown that climate adaptation is largely dependent on communication and interaction between different actors and organizations in a way that encourages learning processes between established professional, disciplinary and sectoral discourses and perspectives at the local arena. Enhancing adaptive capacity is based on the need to identify patterns of interaction that allow an exchange and coordination of perspectives, interpretations and knowledge input as well as arenas for learning that create flexibility and balance power among different actors and types of knowledge (Berkhout *et al.*, 2006; Brooks *et al.*, 2005; Ivey *et al.*, 2004; Lidskog & Uggla, 2009; Næss *et al.*, 2005; Tompkins, 2005; Willems & Baumert, 2003; Wilson, 2006; Winsvold *et al.*, 2009).

Even though some theorists have seen learning as a primarily subconscious process, the emphasis here is on learning as a deliberate process within the context of local climate adaptation. As such, it can be both rationally planned and the result of continuous experimentation and re-evaluation (Holden, 2008). Learning entails a process in which actors reflect upon, review and critically examine previous knowledge, perspectives and approaches in a way that leads to new ways of thinking and acting (Yeo, 2006). Learning is thus viewed in a socio-cultural respect, i.e. taking place in concrete working practices rather than in a rationalist respect, i.e. through a simplistic knowledge transfer (Lidskog & Uggla, 2009). Through dialogue, basic views on existential conditions and the relations between the organization and the world at large are questioned, reflected upon, discussed and revised (Armitage *et al.*, 2008). This also resembles the 'learning by interacting' concept used in the innovation literature (Grin & van de Graaf, 1996; Kamp *et al.*, 2004; Nooteboom, 2001). Translated to the context of adaptive capacity, learning-oriented reflexive processes are an important condition for climate change considerations to be made part of the structure, practices and behaviour of actors and organizations and administrative units from different sectors and levels. In theoretical discussions, learning processes are defined as a 'relatively enduring alteration in behaviour resulting from experience' (Holden, 2008, p. 6). Others have chosen to emphasize that learning is about 'transformation in the *potential for* behaviour' in response to experience seen from the viewpoint of an observer, where individual learning and learning in organizations are seen as distinct but complementary aspects of learning within organizations, acknowledging that 'collective learning is not the linear sum of individual learning' (Pelling *et al.*, 2008, p. 872). In the words of Argyris and Schön, 'organizational action cannot be reduced to the action of individuals /…/yet there is no organizational action without individual action' (Argyris & Schön, 1996, p. 8).

Further, it is acknowledged that learning can be either instrumental task-oriented and problem-solving or communicative—where individuals 'examine and reinterpret meanings, intentions and values' of particular activities and actions (Armitage *et al.*, 2008, p. 88). A theoretical distinction often referred to in theories of learning is that between *single-loop* learning as instrumentally 'fixing errors from routines' by identifying alternative strategies and actions and where working practices are corrected and modified and *double-loop* learning as 'modifying values, policies and norms' where fundamental changes in behaviour are expected, existing worldviews, core values and norms challenged (Argyris & Schön, 1996, 20ff). The latter has also been referred to as second-order learning (Grin & van de Graaf, 1996). Further, *triple-loop* learning has been defined as

're-designing governance norms and protocols', thus fostering changes in the underlying governance system (Armitage *et al.*, 2008, p. 89). Recently, Pelling *et al.* have made a distinction of six pathways to reflexive climate adaptation and learning in organizations (Table 2).

The analytical distinctions illustrate the occurrence of different processes of learning that tends either to instrumental compliance or to more proactive and reflexive learning, where—in the context of climate adaptation—critical issues are raised in terms of social, environmental and political implications from current trends and development paths in society where long-held beliefs may be questioned and stakes made clear. The pathways identified by Pelling *et al.* will be used in the forthcoming analysis and a revised version of pathways suggested in the concluding section, based on the specific case-study findings.

Further, different criteria have been distinguished as necessary in order to spread and diffuse knowledge so that organizational learning can occur. Drawing on research regarding innovations, Holden refers to the criteria, e.g. moving towards a general acceptability of the new approach, ability to mediate tensions, that the new approach is acknowledged to be better than the existing ones, reasonably compatible with values and experiences, and amenable to different levels of implementation (Holden, 2008, p. 19). Lidskog and Uggla have further asserted that to achieve shared learning in organizations, it is required that members of an organization develop a common frame of reference that influences their collective actions and problem-solving activities. Such learning is facilitated when the mandates and competence of organizational units and professionals are partly overlapping rather than separated (Grin & van de Graaf, 1996; Kamp *et al.*, 2004; Lidskog & Uggla, 2009). At the same time, it is important to keep in mind that antagonistic relations and struggles over meaning and interpretations among actors may also complicate environmental policy-making processes in terms of organizational learning (Feindt & Oels, 2005; Stevenson & Richardson, 2003). Keeping the above in mind, it is time to turn to the empirical context of beach erosion and flooding in the two Swedish municipalities. What happens with the call for organizational learning in the practice of local climate adaptation in the two Swedish case-study municipalities? What kind of learning processes is identified? What signs of enduring alteration in behaviour, interaction and exchange between different administrative perspectives can be found? What are the challenges and barriers for more integrated learning-oriented processes?

Table 2. Pelling *et al.*'s six adaptive pathways

1. Organizational internal action	Change in management structure/practice
2. Organizational external action	Change in relationship with external environment
3. Agent-centred command and control	Adjusting routines to comply with work guidelines
4. Agent-centred resource management	Adjusting work routines to reach performance targets without guidelines
5. Agent-centred reflexive adaptation	Lessons from experience cause change in goals and methods for adaptation
6. Agent-centred institutional modification	Attempts to modify institutional context and change policy priorities

Source: Modified from Pelling *et al.* (2008, p. 873).

Organizational Learning for Climate Adaptation in Coastby and Riverby

The empirical outline of the paper is presented in three thematic sections. The first deals with current learning approaches and outcomes in managing climate risk in the two municipalities. The second highlights learning challenges, e.g. moving beyond the specialized few and reaching general acceptability for climate adaptation in the municipality administration and of successfully mediating tensions between interests, values and priorities at the local arena.

Learning Approaches to Climate Change

The two case-study municipalities show a long history of adapting to climate risks of either flooding or erosion. Undoubtedly, the risks have been made a part of the local agendas, administrative structures and concrete decision-making practices. In Riverby, local planning and urban development have for long been conditioned by the flood risks, as historical engravings at bridges and old foundations bear witness. Large areas of the city centre would be flooded, should water flows rise to critical levels and the protective measures fail. The main strategy is dependent on dam regulations, planned flooding and temporary embankments to protect existing settlements (Riverby, 2004a). Managing flood risks has in the last years been closely tied to the local security coordinator, appointed in 2002 after a critical incident by the municipal executive board. In 2004, a flood-management programme was processed, clarifying roles and responsibilities within the municipality. Risks related to a large nearby river were handed over to the regional rescue service—as it concerns several municipalities and County Administrative Boards—whereas risks related to the local watercourse fell upon the local security coordinator (Riverby, 2004b). Several residential areas built close to water in lowland sections of the municipality have, however, at the same time increased local flood risks and are today managed by temporary embankments. In collaboration with concerned stakeholders such as power companies, house-owners, fishermen and actors seeking to protect the environment and various recreational interests, a list of measures combating flooding was suggested in 2005. Involving local stakeholders means that compromises, common understandings and shared responsibility can be facilitated in the local arena and is one way of initiating learning processes between municipality officials and other stakeholders. When it comes to the interplay between different administrative units within the municipality, similar processes cannot be found. Instead, the local security coordinator answers to the question of who he collaborates with in the municipality administration:

> It's me, me and me.

Risk management is one thing, planning another. When planning future settlements in waterfront areas, local planners in Riverby rely heavily on existing building standards to facilitate sound choices, but they do not otherwise partake in managing climate risks or initiate reflections or questionings on the appropriateness of the prevailing standards in terms of extreme floods or future climate change. In theoretical terms, the approach is more of an agent-centred command and control or single-loop learning where compliance with centrally prescribed rules and guidelines is in focus. Other local examples, such as the policy approach taken to manage flood risks in the local watercourse—driven

by the local security coordinator—are based on local experience of water levels commonly known to be problematic, thus indicating organizational learning through previous experience and what is 'considered reasonable'. In applying the pathways to adaptation outlined by Pelling *et al.*, the approach can, to some extent, be considered as agent-centred reflexive adaptation as it involves reflection based on learning from experience, but at the same time it is not reflexive in the sense of involving critical examinations or reconsiderations of, for example, the appropriateness of the current way of approaching flood risks in a long-term perspective of climate change. When it comes to climate change, local officials, on the one hand, claim to be aware of what can be expected in the future. On the other hand, it is clear from interviews that it is a deliberate choice in municipality policy-making, planning and decision-making not to approach future changes and extremes. According to one of the local planners:

> We can't motivate measures guaranteeing worst case, either financially or environmentally. You have to make a risk-assessment based on what we know today and the future will tell what is right and wrong. Precipitation may increase and we may have natural disasters and climate change but we have to choose a reasonable and manageable figure to work with. If we look at worst case scenarios then we would not dare do anything.

Officials in Riverby have not seen it as their task to try to change the current approach of managing risks or engaging in further learning processes and capacity-building regarding climate change, such as changing building standards and routines. Instead, an experienced lack of capacity and competence of climate risks is expressed in the interviews, exemplified by the following quote from the local security coordinator:

> Municipalities cannot build their own competence around these issues. Knowledge regarding the effects of climate change and what needs to be done must come from the national level. Otherwise we are sitting here guessing and fumbling and that can lead us in the wrong direction.

Instead of taking a proactive role in adapting to climate change, the approach taken is that of awaiting further recommendations and guidelines and continuing with 'business as usual'. At the regional level, the Country Administrative Board, in their written statements to approve local detail plans, have sometimes raised the question 'are the levels applied enough in a long-term perspective of climate change?' as one indication of awareness regarding the potential limits of the prevailing standards in the light of climate change. So far, neither the CAB nor the municipality has tried to answer the question or engaged in any critical re-examinations, further discussions or learning endeavours on the matter.

In Coastby, the awareness of erosion dates back to the 1820s, and in the last decades, large areas of land have disappeared into the sea. The coastline holds beaches, natural reserves, summer cottages, pastures and harbours and is today protected by a number of solid technical constructions such as groins and breakwaters. Practically, the whole coastline is in danger of further erosion due to future sea-level rise (Coastby, 2004, 2007a, 2007b). After two awareness-raising conferences partly hosted by Coastby and a nearby university (one on coastal management and the other on greenhouse-gas-effects and planning) and an expert inventory on possible strategies in the late 1980s (Coastby, 1988), erosion management was handed over to the technical unit. Since then, local endeavours have

focused on building internal competence by, on the one hand, testing the effectiveness and relevance of various technical constructs and measures, monitoring change, etc. and, on the other hand, networking and exchanging experiences with other municipalities in networks such as Erosionsskadecentrum (EC), in which Coastby takes a leading role. A common experience from the local interviewees is that erosion management—in the lack of clear institutional frameworks at the national and regional levels—has also demanded a great deal of lobbying in relation to national and regional authorities since erosion has been seen as a problem for the south of Sweden, thus not qualifying for national support mechanisms. To increase local knowledge, Coastby partakes directly at the EU level in a number of coastal projects.

For 23 years, the former head of the technical unit has been at the wheel of local coastal management, providing continuity in risk management as well as a strong personal engagement, strategic thinking and acting, as several interviewees both inside and outside the local administration bear witness. To his disposal, there has been a team of three officials: one working with concrete operations and maintenance of protective measures, one with EU projects and one with strategic communication. Looking at actors outside the local administration, it is analytically reasonable to speak in terms of a strategic troika between the proactive and committed head official with erosion as a professional baby, an accredited professor positioned at a nearby university lending credibility to risk management by bringing and spreading relevant knowledge from the scientific frontline and, finally, a former real-estate agent with a long past in local land-owners associations playing the role of 'fighter on the barricades' by stubbornly contacting decision-makers to spread knowledge, engagement and kick-start activities. The three of them have throughout the years approached erosion management from complementary positions with different mandates, channels and resources (Storbjörk & Hedrén, submitted). In a recent administrative re-organization, aimed at strengthening the municipal executive board, a new position as Director of strategic affairs was established for the former head of the technical unit, meaning that erosion management is split between the technical unit and the new free-standing strategic position. This has made responsibilities unclear where those in charge have kept passing questions between them and the team of officials has been temporarily broken up. Despite this, the personalized learning processes taking place among a selection of key actors both inside the technical unit and outside the municipality administration have undoubtedly had a major impact on the rather ambitious approach to erosion management.

Since the late 1980s, the coastal management approach taken in Coastby relied on hard shoreline protection to keep the sea at bay rather than 'working with nature'. A new policy of integrated coastal zone management was produced in 2007 and politically accepted in September 2008, suggesting a change from a reactive to a proactive and integrated approach where goals, interests and perspectives are balanced and a long-term sustainable management of coastal areas aimed at (Coastby, 2008). The new policy was motivated by a willingness to learn from previous experience and also broaden the approach to coastal erosion and determine local priorities in a long-term perspective, including future climate change. In the eyes of risk-management officials, it clearly represents a necessary shift in approach (Storbjörk & Hedrén, in press). Taken together, the lack of central guidelines has not—as in Riverby—led to a

wait-and-see-approach. Instead, local key actors in Coastby have, to use the theoretical vocabulary introduced previously, attempted the pathways of a combined agent-centred institutional modification (which also is an attempt to achieve a triple-loop learning in fostering change in the overall governance system for erosion management), resource management and reflexive adaptation. The first through extensive lobbying in attempting to influence the regional and national levels, the second by proactive changes in routines without the presence of regional or national rules and guidelines and, finally, the third in the form of the new policy that clearly entails a critical review and examination of the appropriateness of the previous approach to erosion management in the light of future climate change while calling for more integrated management practices. At the same time, interviews have revealed that the new policy, however, praiseworthy on paper, is not necessarily embraced and accepted outside the inner circle of erosion managers. In fact, several learning challenges are identified.

Learning Challenges

Despite the differences in learning approaches identified above, there are striking similarities between the two municipalities when it comes to learning challenges. The problems of *reaching general acceptability and organizational mainstreaming* of climate concerns among the different administrative units appear as one such challenge. In Coastby, the strong role of the technical unit is described as a 'one man show' and as such problematic for cross-sectoral ownership and learning processes. There appears to be a history of inadequate internal contact and integration between officials working with erosion management and units dealing with, for example, planning and environmental protection. In the words of the official with strategic responsibility for environment and climate:

> Managing erosion should involve the units of planning and environment but it hasn't. /…/ I think that everyone has felt that our head has been so engaged and has run it so well without anyone else needing to be involved or concerned.

That responsibility for erosion has so strongly been placed in the hands of the technical unit clearly has involved a flip side in terms of lack of overall ownership, acceptance and common frames of reference. We witness examples of individual learning rather than organizational learning. Interviews also show that sometimes professional integrity and inter-departmental rivalry seem to come in the way of more integrated and learning-oriented approaches between different administrative units, as stated by a professor at a nearby university who has worked closely with the municipal administration since the 1980s:

> It's hard to implement an integrated approach in real life. Damned if the technical head tells the head of environment or planning what to do or other way around.

In this view, sticking to a traditional sector administration is comfortable and less demanding. Changing the attitudes and agendas of the different administrative units so that erosion is made part of their concerns is believed to take a lot of time and effort, not the least since all officials have their professional babies and interests to safeguard. The professor continues:

> Often you see your own tasks as the most important ones and if someone else comes along speaking about erosion or climate change then that might be interesting but the beetles are more important at the end of the day. It takes more to get a ship to change course.

It is thus assumed that the former division of responsibility also has to do with a convenience on behalf of local officials since cross-sectoral learning-oriented approaches are much more complicated to administer due to differences in professional interests and priorities, administrative cultures and goals. These differences also pose a challenge to the practical realization of the new policy, where it is required that the different administrative units jointly formulate and implement the goals of managing erosion so that a more integrated approach is made possible. Keeping administrative units and different professionals so separated from each other rather than intertwined makes it difficult to achieve common frames of reference, priorities and actions in daily working practice, which is essential for organizational learning to occur beyond the stage of policy formulations (Lidskog & Uggla, 2009, p. 77). The new policy is not necessarily generally accepted or acknowledged to be better than the previous ones. Instead, it is currently embraced and highly valued among the officials working with erosion management. Similar tendencies of separated sectoral spheres in the municipality administration are found in Riverby where flood management is clearly seen as the responsibility of the local security coordinator or the regional rescue services rather than planners, for example, meaning that climate adaptation—in the municipality administration—clearly runs the risk of being seen as someone else's task rather than as a common endeavour.

Another apparent challenge for achieving a long-term systematic approach to erosion management is the *lack of continuity*. In Riverby, there have been reoccurring re-organizations of local risk management during the years, and several local officials state the problem of disrupted learning processes in managing climate risk at the local level. Learning by experience appears to have led only to temporary organizational change (Argyris & Schön, 1996). The event-driven nature of legitimacy, political support and acceptance for managing climate risks tend to restrict the needed continuity in local learning processes. The interviewed fire engineer at the regional rescue services gets to illustrate this point:

> Sometimes ten years pass between events of high water levels and floods and risks are forgotten and tax-payers' money devoted to other urgent matters. We have been taken by surprise many times during the years.

The lack of continuity in learning became particularly clear in a high-risk situation in 2002 where it was devastatingly clear that the responsibility for flood management had fallen between different administrative stools. In the words of one of the local planners:

> No one knew who was in charge of what. It was a mess.

Knowledge appears to have been held only in the minds of individual members as carriers but over time lost (Argyris & Schön, 1996). After the 2002 incident, the current local security coordinator entered the stage. Such shifts in responsibilities and internal organization for managing flood risks have occurred during the years, indicating a lack of continuity in risk management and disruptive learning processes in the local administration in Riverby. In Coastby, the problem so far has

not been lack of continuity, but instead cemented roles and responsibilities hampering more systematic and cross-sectoral internal learning processes.

The lack of organizational mainstreaming also seems to have clear implications for practical planning and decision-making, where *tensions between interests, values and priorities* come in the way of systematic and reflexive climate adaptation. From the two case studies, it becomes clear that tensions and trade-offs between either prioritizing flood-safety or giving consent to attractive waterfront housing put a strain on the potential for cross-sectoral and reflexive learning from experience. In Riverby, the interviewed planners, on the one hand, state that:

> We would never agree to build settlements that jeopardize these levels (of flood-safety). They represent an obvious limit. No politician would dare allow settlements that are located too low because we have been exposed so many times.

On the other hand, there are several examples of settlements in lowland areas that today need to be protected against rising water levels by means of temporary measures, such as quick water walls. There is also a strong political pressure for attracting new citizens and changing former trends in population decline by, for example, providing attractive waterfront housing. Several of the current local plans target lowland waterfront areas in an attempt to revitalize Riverby by rebuilding aesthetic values and facilitate boat-traffic and attractive shorelines for recreation and other activities, thus branding it as being a waterfront city (Riverby, 2005a, 2005b, 2009). The targeted areas are, however, sensitive to flooding and of bad geophysical conditions for building, which calls for extensive landfills and restrictions in the bases of buildings to guarantee safety in terms of 100-year flows (where climate change is not included). According to planners, the approach is not problematic as protective measures are taken and the existing guidelines and levels of flood safety are not compromised. According to the local security coordinator, the plans are troublesome examples of conflicting perspectives between respecting flood risks and the desire to allow waterfront planning. The local security coordinator gives his reflection:

> Humans have always been driven to the water. We want to live close by but that means difficulties in handling high water levels. We have to make decision-makers aware that we should not build in areas where mappings show reoccurring flood-risks. That is very unwise. When the high levels come we need to be prepared rather than having built a societal structure increasingly dependent on risk-management protecting badly located areas.

In his view, the current plans are a clear sign that society walks out of step and does not engage in reflexive learning by experiences where knowledge of flood risks is taken into account. Instead, an approach of knowing but overlooking is at hand (White *et al.*, 2001). Even though waterfront areas are believed to increase the competitiveness and attractiveness of thinly populated areas located in more peripheral regions, the need to have a more sound balance of the safety *vs.* scenery divide in planning (Storbjörk, 2007) cannot be ignored in his view. Several local officials state that the ability to more successfully mediate current tensions and to take proper long-term considerations is dependent on changes in political priorities. In the words of one of the local planners:

> For current guidelines to be changed politicians need to take a clear stand. Their actions are sometimes more valuable than research findings and all other available knowledge.

Apparently, reflecting on local vulnerabilities and whether the current building standards are enough is not a priority for planners in Riverby.

In Coastby, there are clearly tensions between administrative interests and priorities when it comes to defining what a future sustainable coast is and how best it is safeguarded. In the perspective of the local erosion managers, it is reasonable that we also reconsider where to live and that development and exploitation 'are to be avoided' in coastal areas that at present or in the future can be exposed to erosion or flooding (Coastby, 2007a, p. 11). That planners and decision-makers need to adopt a more long-term perspective on climate risks is emphasized in several interviews, for example, by the following quote from the local official with strategic responsibility for climate and environment:

> Thanks to the climate change debate our politicians are beginning to understand. They are aware of the problem but it is a challenge to persuade them to dare being the ones taking these enormous steps outlined in the new policy. When we build houses we need to think 'can they stay here in a 100-years?' and if the answer is no then we shouldn't build them. It will be tough for politicians.

Moving from awareness and promising policy formulations to a substantial change in concrete decision-making priorities is not expected to be smooth, according to several interviewees. There is a subsequent risk that the policy, after being officially accepted, is simply put on the shelf without clarification of how to implement it in practice as a guiding principle. The local preparedness for taking a clearer stand for climate adaptation in line with the new policy is further seen as complicated by the current trends in planning, where it is popular to rebuild harbour areas for attractive waterfront housing, as was noted also in Riverby. Here, the risk of short-term considerations is apparent according to several interviewees. The following quote from the strategic official working with environment and planning serves as an example of such concerns:

> We make plans for strange areas. In a meeting the County Administrative Board pointed out coastal areas under investigation and at risk due to sea-level rise and increased groundwater levels. For one of the areas he said incidentally that 'this is probably intended for outdoor life'. I sat next to one of the planners who whispered 'no, we plan to build houses there'. It is strange. We have worked with erosion for 25 years and still plan in risky areas.

The quote clearly illustrates the lack of reflexive learning from experience and communication between administrative units. The divergence in perspectives, agendas and priorities between planners and decision-makers—wanting a coastal zone open for interpretations—and risk managers—wanting stricter levels of allowances and standards for buildings—is strong today. Taken together, these diverging agendas and perspectives among environmental advocates, planners, decision-makers and risk managers currently pose a big challenge for mainstreaming organizational learning processes and for achieving reflexive climate adaptation at the local level in the two Swedish case-study municipalities.

Despite an identified need for cross-sectoral integration, it seems more reasonable to speak in terms of a strong 'politics of sectoring', where the logic, identity and interests of the traditional policy sectors in practice remain intact or are even strengthened in the current local processes (Derkzen *et al.*, 2009).

Summarizing the Case Studies

The two case-study municipalities reveal both similarities and differences in their approach to climate variations, extremes and change, involving different types of learning processes. The comparison is summarized in Table 3.

Riverby is a middle-sized municipality with long tradition of flood-risk exposure. Somewhat disrupted learning processes and lack of continuity are identified at times where responsibilities have fallen between stools, due to the event-driven nature of risk management. Today, responsibilities have been specified and risk management is clearly seen as the concern of the local security coordinator with little room for internal dialogue and communication across administrative borders. Recent experience-based learning processes have built on a deliberate dialogue and communication between the security coordinator and local stakeholders adapting to risks that are considered reasonable in the local watercourse. When it comes to climate change, the officials in Riverby have not yet engaged in any learning activities, and the building standards in use and locally accepted have not included considerations of climate change. Local officials clearly await national and regional guidance in this respect and have not seen it as their role to be more proactive, due to perceived restrictions in mandate, competence and ability. Using the analytical vocabulary introduced previously in the paper, the pathway to adaptation is not that of reflexive or institutional modification when it comes to climate change. Instead, it is reasonable to speak of an approach of agent-centred command and control by complying with existing guidelines where officials put faith in them being enough. If and when guidelines change so will local practice.

In contrast, the small municipality of Coastby has a long history of proactive approaches to managing beach-erosion. Climate change first featured on the local agenda for risk management in the late 1980s, which is early in national comparison. The strong focus of the technical unit has been based on, *inter alia*, personal commitment of key actors, extensive contacts with the scientific frontier through professional contacts with the nearby university, deliberate research and development experiments of technical measures as well as intense knowledge exchange and learning with other exposed municipalities. The ambitions of local officials in charge of erosion management rest upon at least three of the pathways outlined by Pelling *et al.* First, in line with the agent-centred resource management approach, officials adjust their practices to reach locally identified goals of erosion management where future sea-level rise is estimated, despite the lack of external guidelines or support. Secondly, officials clearly hope to influence and change the wider institutional context for managing beach-erosion through lobbying upwards in the administrative hierarchy (as suggested by the pathway of agent-centred institutional modification and triple-loop learning). Thirdly, the recently accepted policy of integrated coastal zone management on paper builds on a long-term holistic perspective aimed at changing current local goals and priorities, which can be seen as an attempt at agent-centred reflexive adaptation. Challenges are, however, expected in moving from such agent-centred

Table 3. Case-study comparison

	Coastby	Riverby
Municipality size	27,200 inhabitants, 355 km^2	55,000 inhabitants, 2289 km^2
Geographical location	South end of Sweden, coastal	North of Sweden, inland
Exposure to climate risks	Long history of erosion	Long history of flooding
Responsibility	Stable since 1980s in the hands of technical unit (committed key actors)	Disruptive/event-driven, since 2002 in the hands of the local security coordinator
Internal coordination/ knowledge exchange	Lack of cross-sectoral coordination	Lack of cross-sectoral coordination
Horizontal coordination/ knowledge exchange	Proactive engagement with other municipalities (EC)	Proactive engagement with local stakeholders
Vertical coordination/ knowledge exchange	Proactive lobbying upwards in an attempt to influence CAB, national authorities and politicians. Partake at the EU level	Await national/regional guidelines, the CAB sometimes comments on the appropriateness of local plans. No dialogue/exchange otherwise
Approaching climate change	Involved in research conference in 1989, ICZM-policy 2008 proactive on paper	Await national/regional guidelines. Assessment of 'what is considered reasonable' in local watercourse
Adaptation strategy adopted so far	Technical measures and solid constructions	Dam regulations, temporary embankments and planned flooding
Adaptive pathways taken, following Pelling *et al.* (2008)	Agent-centred institutional modification, resource management, reflexive adaptation (climate variations, extremes and change)	Agent-centred command and control, reflexive adaptation (climate variations)
Barriers for working with climate adaptation	Cemented roles, lack of political priority, learning from experience, cross-sectoral coordination, general acceptability, ability to mediate tensions	Event-driven risk management, lack of guidelines, political priority, learning from experience, cross-sectoral coordination, general acceptability, ability to mediate tensions

reflexiveness to achieving overall systematic organizational learning. Even if it is reasonable to say that changes have been made in the internal management structure through the acceptance of the new policy—which is seen as one valid approach to learning—it is today an open question how and to what extent that policy change translates to any reformations in planning and decision-making practice across administrative units or whether the traditional sector logics, interests and identities remains intact. The future will reveal whether we are witnessing agent-centred learning processes (among a specialized few erosion-management officials) or whether it is reasonable to speak in terms of collective organizational learning and change across sectors.

Conclusions

The main concerns of this paper have been how the call for systematic organizational learning is manifested in the practice of local climate adaptation in the two Swedish case-study municipalities, what forms of learning occur and what

learning challenges are identified. One striking observation is that within each municipality, there is not one pathway of learning that dominates, but instead a variety of approaches can be found in the analysis. In an attempt to summarize different pathways of organizational learning in managing local consequences of climate variations, extremes and change by combining insights from the Swedish case studies with some of the theoretical distinctions made in Section 2—particularly influenced by the six adaptive pathways outlined by Pelling *et al.* (2008)—Table 4 is tentatively proposed.

When analysing different pathways taken and the effect they have on local adaptive capacity, I thus argue on the basis of the two case studies that we need to acknowledge to what extent learning takes place among a specialized few key actors (agent-centred organizational learning) or as part of a systematic and cross-sectoral organizational mainstreaming (collective organizational learning). Further, we need to acknowledge to what extent 'learning on paper', e.g. as observed in strategies, goals and policy formulations, is actually embraced as 'learning in use' in concrete working practice at the stage of implementation and decision-making. In implementation and decision-making, there may also be either singular examples of learning practices or tendencies of mainstreaming a particular way of approaching adaptation.

An interesting analytical observation is that despite the distinct and often contrasting pathways and approaches to managing risks of climate change identified so far—one proactive and the other awaiting—there are, when analysing challenges for organizational learning, striking similarities between the two municipalities. In both case-study municipalities, the interviews reveal a lack of cross-sectoral communication, interaction, ownership and learning between, on the one hand, the necessary administrative units and, on the other, between local officials and politicians. There is a correspondence with conclusions from

Table 4. Pathways of organizational learning in managing local consequences of climate variations, extremes and change

1. *Instrumental compliance*. Instrumental 'learning as complying' with rules or guidelines, e.g. guidelines for climate adaptation, building standards, flood-zone mapping, etc. set by, for example, regional or national authorities. In the lack of rules or guidelines, a wait-and-see-approach is chosen (considering climate change in Riverby).
2. *Proactive internal learning*. In the lack of formal rules or guidelines, local agent-centred initiatives are taken to manage local consequences of climate variations, extremes and change as 'learning within' the formal municipality administration, e.g. change in organizational structure and working practice, policy-framing, rules, standards and guidelines of adaptation, etc. (Coastby technical unit).
3. *Proactive external learning*. In the lack of formal rules or guidelines, local agent-centred initiatives of knowledge exchange and learning are taken to manage local consequences of climate variations, extremes and change in interaction with actors outside the formal municipality administration, e.g. in horizontal networks with fellow municipalities (EC in Coastby), in dialogue with scientists/actors brokering scientific knowledge (conferences and collaboration with the professor in Coastby), in dialogue with local stakeholders (the local watercourse in Riverby) and in vertical networks with regional, national and international actors (EU projects in Coastby).
4. *Systematic and cross-sectoral learning*. Systematic and cross-sectoral learning based on, for example, critical self-reflection, challenging of existing worldviews and underlying values, tensions between interests, values and priorities are reflected upon and mediated in the open (only partly in the framing of the integrated coastal zone management policy in Coastby).
5. *Institutional modification.* Attempts are made to change overall institutional frameworks or governance conditions by, for example, redesigning or modifying overall institutional or governance norms, frameworks, conditions, policy priorities, etc. (lobbying in Coastby).

previous studies on learning in the field of environmental policy-making, planning and decision-making processes that learning tends to feature predominantly at the individual level rather than spreading in the organizations at large (Berkhout *et al.*, 2006; Næss *et al.*, 2005; Shepherd *et al.*, 2006; Wall & Marzall, 2006).

The possibility of taking a more systematic and reflexive pathway in climate adaptation is clearly problematized by risk management being in the hands of a specialized few officials. The process of building local knowledge and achieving permanent change in procedures and outcomes becomes sensitive to changes in responsibility and staff, which—combined with the event-driven nature of risk management—threatens the continuity of the approach. The Swedish case studies have also shown that organizational learning is further complicated by existing professional perspectives, traditions, organizational cultures and concrete priorities that influence climate adaptation in a way that risk closing rather than opening up the doors for coordination, knowledge exchange and learning across administrative borders while furthering business-as-usual. Differences in perspectives are particularly prominent in Riverby and Coastby between administrative and political priorities related to some of the current trends in planning, where a lack of reflexive learning from experience is found. Instead the risk of 'knowing but overlooking' (White *et al.*, 2001), needs to be acknowledged. For example, tensions between safety and scenery, i.e. where the need to increase safety by locating settlements further away from areas sensitive to flooding and coastal erosion clash with the willingness to allow attractive waterfront housing in risky areas (Storbjörk, 2007), need to be mediated openly. The empirical findings in Sweden coincide with several other Swedish and international studies that have shown how differing perspectives, cultures and traditions within the local administration come in the way of new approaches to climate change (Glaas *et al.*, 2010; Lorenzoni *et al.*, 2000; Næss *et al.*, 2005; Tompkins, 2005; Wilson, 2006; Winsvold *et al.*, 2009).

At the end of the day, it is a problem for processes of climate adaptation that the cross-cutting nature of climate change is not taken as a starting point in administrative structures and day-to-day activities and that tensions are not systematically dealt with in the open. Instead, 'politics of sectoring', where the logic, identity and interests of traditional sector units remain unchanged, is identified (Derkzen *et al.*, 2009). The new policy in Coastby appears to have the potential on paper to generate a changed approach in this respect, but to what extent it becomes something more than a promising ambition depends on whether it gets embraced and accepted beyond the compounds of the technical unit. To follow Holden (2008), it needs to be generally accepted among officials and decision-makers, thus acknowledged as better than the previous approach. To follow Lidskog and Uggla (2009), for it to correspond with priorities and actions in daily working practice, it needs to be based on common frames of reference. To summarize the analytical points of this paper, while also speaking with one of the interviewees in this study, it clearly takes more to get a ship to change course.

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