



Method Development for Identifying and Analysing Stakeholders in Climate Change Adaptation Processes

Karin André , Louise Simonsson , Åsa Gerger Swartling & Björn-ola Linnér

To cite this article: Karin André , Louise Simonsson , Åsa Gerger Swartling & Björn-ola Linnér (2012) Method Development for Identifying and Analysing Stakeholders in Climate Change Adaptation Processes, Journal of Environmental Policy & Planning, 14:3, 243-261, DOI: [10.1080/1523908X.2012.702562](https://doi.org/10.1080/1523908X.2012.702562)

To link to this article: <https://doi.org/10.1080/1523908X.2012.702562>



Published online: 12 Jul 2012.



Submit your article to this journal [↗](#)



Article views: 2010



View related articles [↗](#)



Citing articles: 8 View citing articles [↗](#)

Method Development for Identifying and Analysing Stakeholders in Climate Change Adaptation Processes

KARIN ANDRÉ^{*,**}, LOUISE SIMONSSON[†], ÅSA GERGER SWARTLING^{‡,§} & BJÖRN-OLA LINNÉR^{*,**,*||}

^{*}Centre for Climate Science and Policy Research, Linköping University, SE-601 74, Norrköping, Sweden

^{**}Department of Thematic Studies—Water and Environmental Studies, Linköping University, SE-581 83, Linköping, Sweden

[†]Swedish Defence Research Agency (FOI), SE-901 82, Umeå, Sweden

[‡]Stockholm Environment Institute, Kräftriket 2b, Stockholm, Sweden

[§]Stockholm Resilience Centre, Kräftriket 2b, Stockholm, Sweden

^{||}Innovation and Society, Institute for Science, University of Oxford, Oxford, UK

ABSTRACT *It is now widely recognized that stakeholder interaction and dialogue is essential to improve decisions about and awareness of climate change. The term ‘stakeholder’ is broad and researchers and practitioners may have interrelated and contrasting views on who is a stakeholder or who is (or should be) responsible for adaptation to climate change. To engage stakeholders in research or other projects on adaptation thus requires a careful mapping of the stakeholder landscape and identification of relevant actors at different levels. Through a case study approach, based on studies of two Swedish urban regions, Stockholm and Gothenburg, this paper proposes a systematic method to analyse and identify roles and responsibilities in the stakeholder landscape. The initial mapping exercise was complemented by participatory studies of local and regional stakeholders’ perceptions of who is, or should be, involved in adaptation and their significance for climate change adaptation in the respective regions. The results indicate the value of careful stakeholder analysis for sustainable, effective, planned adaptation that is flexible, but also systematic enough to fulfil practical and scientific requirements for the study and advancement of ongoing adaptation processes and implementation.*

KEY WORDS: stakeholder, method, identification, adaptation, climate change, urban, region, Sweden

Correspondence Address: Karin André, Centre for Climate Science and Policy Research, Linköping University, SE-601 74 Norrköping, Sweden. Fax: +46 11 36 32 92; Tel.: +46 11 36 32 97; Email: karin.andre@liu.se

1. Introduction

Stakeholder interaction has become a key strategy in research and policy-making on climate change adaptation. There are many examples of stakeholder participation in climate change adaptation initiatives across countries and at different societal levels and sectors (Bruin *et al.*, 2009; Kloprogge & Van der Sluijs, 2006; SOU 2007:60; de la Vega-Leinert *et al.*, 2008; West & Gawith, 2005; Ziervogel & Downing, 2004). Accordingly, the Intergovernmental Panel on Climate Change's (IPCC, 2007) fourth assessment report established that stakeholder dialogue is essential to improve decisions about and awareness of climate change and that global knowledge of the climate system needs to be integrated with local knowledge on observed climate impacts. Stakeholder dialogues are considered to contribute to more effective adaptation to climate impacts by increasing the robustness of research results as well as the legitimacy of policies and measures (ACIA, 2005; Conde & Lonsdale, 2005; Few *et al.*, 2007; Hedger *et al.*, 2006; High & Pelling, 2003; Welp *et al.*, 2006; West & Gawith, 2005). There are, however, several issues related to representation, influence, democracy, capacity and legitimacy of stakeholders engaging in such processes (Davies *et al.*, 2005; Goetz & Gavanta, 2001; Kleinman *et al.*, 2007; Lövbrand, 2011; Mitchell *et al.*, 1997; Nasiritousi *et al.*, 2011; Powell & Colin, 2009; Vugteveen *et al.*, 2010). This study departs from the growing recognition of the need to advance participatory methodology by focusing on the first step of participatory processes: identifying and selecting relevant stakeholders. This paper aims to develop a systematic method for identifying the relevance and capacities of different stakeholder groups in deliberative processes for adaptation. It is intended to be used in participatory activities in the context of adaptation research, planning and policy-making. The method has been tested and developed in two Swedish regions: Stockholm and Gothenburg. The analysis is guided by the following research questions.

- What is a stakeholder in adaptation research and policy-making?
- What different functions and capacities do different stakeholders perform?
- What criteria can be used to identify and select stakeholders for participatory processes for adaptation?

1.1 *Theoretical Perspectives*

1.1.1 *Why engage stakeholders in participatory processes?* The call for stakeholder dialogues is part of the 'participatory turn' in global environmental governance (Bäckstrand, 2006). Knowledge co-produced through deliberative dialogues between researchers, policy-makers and other stakeholders is expected to provide new perspectives, contextualize findings and probe assumptions (e.g. Weingart, 2008; Wilsdon & Willis, 2004). Much literature highlights two rationales for increased stakeholder participation: (i) making science more 'socially robust' (Gibbons *et al.*, 1995; Nowotny *et al.*, 2001) through direct engagement with the societal context and (ii) making planning and decisions more legitimate in terms of both process and outcomes. The literature also distinguishes between instrumental, substantive and normative rationales for deliberative processes with an emphasis on learning outcomes and empowerment through stakeholder engagement (Fiorino, 1990 as cited in Powell *et al.*, 2011; Whitmarsh *et al.*, 2009).

Participatory research is particularly relevant in areas of high complexity and uncertainty or high stakes, such as climate change adaptation. The different

'knowledge abilities' of lay people and stakeholder groups are expected to augment the scope and quality of scientific risk assessment as well as the legitimacy of potential solutions (cf. Felt & Wynne, 2007; Funtowicz & Ravetz, 1993). Stakeholders can contribute by providing information and expertise and by articulating views that are not adequately represented in research and planning. By engaging in deliberation on uncertain and ambiguous aspects of problems facing society, participatory methods are argued to increase society's ability to deal with stochastic and unpredictable challenges (Nowotny *et al.*, 2001). If social actors directly affected by research results are invited to validate the assumptions made in the various steps of a research process, they also will gain trust in the findings (Jonsson *et al.*, 2009; Andersson *et al.*, 2010). While many analyses focus on categorizing stakeholders that have already been identified, the actual methodology to identify stakeholders is often overlooked (Achterkamp & Vos, 2007; Ballejos & Montagna, 2008; Mitchell *et al.*, 1997; Reed 2008).

1.1.2 *Who are stakeholders?* In the literature, stakeholders are often defined as individuals or groups that have a stake, or an interest, in a particular issue, either because they can affect a decision or policy, or because they will be affected (Freeman, 1984; Grimble, 1998; Mitchell *et al.*, 1997; Powell *et al.*, 2011). The concept of stakeholders has different uses and has been developed in parallel fields, and no uniform definition of 'stakeholder' exists (Reed *et al.*, 2009). Stakeholder analysis originates in business management theory (Brugha & Varvasovszky, 2000; Bryson, 2004), but today it is also commonly used within natural resource management. For example, Grimble & Wellard (1997, pp. 175–176) define stakeholders as 'any group of people, organised or unorganised, who share a common interest or stake in a particular issue or system; they can be at any level or position in society, from global, national and regional concerns down to level of household or intra-household, and be any groups of any size or aggregation'.

The notion of actors is also important to mention as it might be difficult to distinguish stakeholders from actors in relation to adaptation. Actors that are relevant for adaptation are not necessarily stakeholders, but could be. Whether they are stakeholders or not depends on what aspects of adaptation are being considered, and by whom.

In the context of climate change, stakeholders are generally divided into those who are affected by the indirect and direct consequences of climate change as well as decision-makers on adaptation (Conde & Lonsdale, 2005; IPCC, 2007; Willows & Conell, 2003). The IPCC (2007) identifies stakeholders as 'individuals and groups who have anything of value (both monetary and non-monetary) that may be affected by climate change or by the actions taken to manage anticipated climate risks' (Carter *et al.*, 2007, pp. 141–142). The UKCIP (2007, p. 9) elaborate adaptation stakeholders into four categories specifying who can affect change; who has the necessary knowledge or skills needed to make or implement decisions; who will be affected by climate risk and by responses to it; and who represents the interests of their community?

1.1.3 *How can stakeholders be identified?* One common technique for identifying and mapping stakeholders is the so-called snowball method (Conde & Lonsdale, 2005) where an initial group of stakeholders are asked to suggest additional stakeholders, for example, in interviews or focus groups. A more systematic categorization of the different roles of stakeholders often begins with

a basic division between primary and secondary stakeholders, that is, those who will be affected by the specific policies and measures and those who are responsible for its implementation (ODA, 1995). Further, stakeholders have been differentiated between those who will be directly affected or will be only indirectly affected by the specific policies and measures, that is, active and passive stakeholders (Grimble & Wellard, 1997). Mitchell *et al.* (1997) use 'the salience model' to make a distinction between stakeholders, which scores stakeholder types based on three attributes, 'legitimacy', 'urgency' and 'power'. Stakeholders that score high on all three attributes are labelled 'definite', meaning that is very important to involve them in a participatory process, whereas those who only score high on one attribute are not directly involved.

Achterkamp & Vos (2007) claim that something more than just a classification and categorization of stakeholders must be added in order to identify and decide who should be involved in a project and when. From a management perspective, it is more relevant to focus on *actualization* of stakeholders' influence. Inspired by critical systems thinking, Achterkamp & Vos (2007) thus suggest using 'boundary critique' as a method to identify stakeholders, focusing on assessing stakeholders' possible roles in and contributions to their organization. Stakeholders are then identified through brainstorming sessions and by asking questions of respondents in order to justify and specify their roles as stakeholders and their involvement in the project. However, it is complicated to assess a stakeholder's influence because it is the sum of many different factors and not necessarily limited to, for instance, legal hierarchy (ODA, 1995). Influence is also affected by social, economic and political status and is dependent upon the nature of the organization, its specific position or its relation to other stakeholders (ODA, 1995). It can also be related to informal power (ODA, 1995).

Ebi *et al.* (2005) present eight questions to guide the stakeholder mapping for adaptation projects, depending on which stakeholders are affected (by both climate change and climate variability, and adaptation policy and measures), which are potential leaders, which control the largest financial contributions and which are actively working, concerned and responsible for implementing and facilitating adaptation policies and measures, as well as disseminating knowledge. Similar to UKCIP's (2007) stakeholder categorization, these questions are valuable because they help to differentiate between stakeholder roles and their relevance.

The more clearly defined the case, the easier it is to identify stakeholders (Reed *et al.*, 2009; see also Achterkamp & Vos, 2007). The impacts of climate change are transboundary and cross both sectors and regions, requiring integrated management and adaptation approaches (European Environment Agency [EEA], 2008), which complicates the stakeholder mapping. Moreover, adaptation as defined by the IPCC (2007, WP II, p. 869) refers to an: 'Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities'. In practice, adaptation means both to build adaptive capacity and to deliver adaptation actions (Adger *et al.*, 2005; Füssel & Klein, 2006; UKCIP, 2007). That is to say, both develop research and collect information, raise awareness, change organizational and institutional structures, as well as concrete actions to manage climate risks and take advantage of possible opportunities. All of these activities take part of the adaptation processes and involve many different stakeholder types.

Drawing on analysis of interorganizational networks of different stakeholders in information systems, Ballejos & Montagna (2008) offer a systematic approach for identifying stakeholders that acknowledges different dimensions and criteria as well as analysis of stakeholder roles, interests and influence. Their method follows five steps which also are included in our method. As presented in Figure 1, the steps are (1) specify stakeholder types, (2) specify stakeholder roles, (3) select stakeholders, (4) associate stakeholders with roles and (5) analyze influence and interest. However, the fourth step is in fact integrated with the fifth step. The process of adaptation from a regional perspective is in many ways similar to interorganizational environments, in which stakeholders are not identified within a single organizational structure. However, in adaptation, roles are often not yet settled and developed and organizational and geographical boundaries not established.

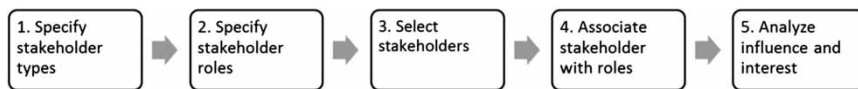


Figure 1. Stages of stakeholder identification. Modified after Ballejos & Montagna (2008).

2. Method and Data

In our development of a method for stakeholder identification, we draw on previous research as well as results from stakeholder involvement in two Swedish research programmes: Mistra-SWECIA (2008–2011) and Enhancing Cities' Capacity to Manage Vulnerability to Climate Change (2007–2012). These programmes focused on two different cases: climate vulnerability and adaptation in the Stockholm and Gothenburg regions.

In the case of Gothenburg, stakeholders, representing formal administration, have been informants on the research on methodology development, and to validate results on qualitative aspects of vulnerability assessments (Jonsson *et al.*, 2012). The Stockholm region case study (approximately equivalent to the County of Stockholm) involved local and regional stakeholders responsible for, or with an interest in, adaptation implementation mainly for the water sector. The intent was to explore perceptions of risk and adaptive capacity and to stimulate communication and dialogue on climate scenarios and impact modelling results (André *et al.*, 2009; Larsen *et al.*, 2011; Simonsson *et al.*, 2011).

Both the Stockholm and Gothenburg cases are examples of 'science-based stakeholder dialogues' (Welp *et al.*, 2006). These were initiated and run by the two research teams from the research programmes mentioned above. The cases applied participatory methods, notably focus groups and larger stakeholder workshops including various participatory techniques, to examine the different issues under study (André *et al.*, 2009; Jonsson *et al.*, 2012). In the Gothenburg case, in which specific attention was paid to the lower Göta Älv catchment (hereafter referred to as the Gothenburg region), these meetings took place from 2008 to 2010, and in the Stockholm case, during the autumn of 2008 until spring 2009.

The identification process began with a comprehensive scan of official documents, with a focus on local and regional planning documents, assessments of risk and vulnerability, flood-risk maps and reports dealing with adaptation. In the

preliminary mapping, researchers involved in the case studies of Stockholm and Gothenburg regions had the opportunity to suggest and discuss potential relevant stakeholders for their respective research questions. Possible stakeholders were also approached by telephone or e-mail. The snowball sampling method (Conde & Lonsdale, 2005) was used, allowing a double check of important stakeholders. The stakeholder mapping was then extended through 10 pilot interviews with key actors and representatives in the two areas. Additional qualitative data were provided from the participants involved in the participatory processes.

3. Five-Step Method for Identifying Climate Change Adaptation Stakeholders

The challenge is not typically to define the stake itself, but rather to distinguish between stakeholders with a legitimate stake (Mitchell *et al.*, 1997; Reed *et al.*, 2009). This can be done by differentiating between the functions they perform and their various capacities. Hence, the issue and the system of interest need to be clearly specified (Achterkamp & Vos, 2007; WeAdapt, 2011). For example, the 'issue' could be a project, a policy, an organization or a problem, and the system could be a region or a sector. However, in interdisciplinary and cross-sectoral environments specifying the issue can be difficult and should not be done superficially, because often the process, the results and the outcomes will be determined to a large extent by the involvement and interaction with the selected stakeholders. The term 'stakeholder' is broad and researchers and practitioners might have both interrelated and contrasting views on who is the important stakeholder, and on the need for adaptation and climate risks.

In this section, we present a five-step method for identifying adaptation stakeholders that differentiates between different stakeholder types, roles and capacities in the adaptation process. The cases, from which the five-step method has been tested and developed, focused on adaptation related to climate change and water issues in urban and regional contexts.

3.1 Step 1: Specify Stakeholder Types

The first step of the method is to make a broad inventory of all potential stakeholder types. Building on Ballejos & Montagna (2008), we identify four criteria for identifying stakeholders in adaptation: (1) functional criterion (2) geographical location criterion, (3) knowledge and abilities criterion and (4) hierarchical level criterion. These criteria can be overlapping, but in the identification process it is useful to analytically distinguish between them. In addition, Ballejos & Montagna (2008) suggest that stakeholders should be divided into internal and external stakeholders. What is internal and external is case specific, and here internal stakeholders refer to those operating at the regional to local level in the Stockholm and Gothenburg regions, whereas external stakeholders refer to the national to global level. The adaptation process is clearly affected and influenced by both groups (Arnell & Delaney, 2006). Table 1 presents an overview of the stakeholders and their roles.

3.1.1 Functional criterion. For adaptation, the functional criterion relates to stakeholders that are formally *responsible* for adaptation, for example, those who have to make decisions on, prepare for and/or implement adaptation and those

Table 1. Stakeholder identification table, with general examples from the two Swedish cases

Selection criteria	Selection dimension		
Functional	<i>Local:</i> Municipalities, water, waste, energy and housing, building and construction, companies, insurance companies, citizens	<i>Regional:</i> CABs, regional government and cooperative bodies, local government, federations and municipal federations	<i>National/global:</i> Sectoral authorities (e.g. National Board of Housing, Building and Planning, MSB, National Food Administration, Board of Health and Welfare)
Geographical location	Municipalities, vulnerable groups, property owners, local business and private companies	SGI, CABs, local river groups	SGI, water authorities
Knowledge and abilities	Consultants, citizens	Trade and interest organizations, colleges and universities	SMHI, SGI, MSB, SEPA, Board of Housing, Energy Agency, & Mapping, Cadastral and Land Registration Authority, etc., trade and interest organizations, colleges and universities, IPCC
Hierarchical level	Municipalities, individuals	Decision-makers, CABs etc.	The parliament and the government, national authorities, the EU

Note: SEPA, Swedish Environmental Protection Agency; MSB, Swedish Civil Contingencies Agency.

affected by decisions on adaptation actions. In line with UKCIP's (2007, p. 9) stakeholder categorization, it means those who, due to their various functions, 'can affect change' or those affected 'by the response' and to some extent also those stakeholders who 'represent the interest of their community', even though this category also falls under the knowledge/abilities criterion. Stakeholder types in the two cases identified and categorized according to the functional criteria are national authorities, regional and local governments and the private sector.

At the national level in Sweden, various authorities have different functions depending on their working areas and specific responsibilities, while no single authority has the overall responsibility. However, the County Administrative Boards (CAB) are appointed to coordinate climate change adaptation at the regional level to local level (Government Bill 2008/09:162; Simonsson *et al.*, 2011; SOU 2007:60; Ulmanen *et al.*, 2012). In addition, as indicated in Government Bill 2008/09:162, other potential stakeholders at the regional level are regional government and bodies working with inter-municipal cooperation.

Implementation actions typically engage companies, municipalities and individuals at the local level. Swedish municipalities are likely to be key stakeholders since they are autonomous and have broad areas of responsibility, including for public utilities such as spatial planning and building, health, water and waste, as well as technological and infrastructural issues associated with those utilities (see e.g. Boverket, 2009). There are several sectoral activities such as water and waste services, energy and housing that cut across the municipal borders. Many

of the municipalities cooperate and use common water, waste, energy and housing companies. Private business and related stakeholders are also important for adaptation processes, such as the construction and insurance sectors.

3.1.2 Geographical location criterion. The geographical criterion complements the functional criterion in the sense that actors with no clear function for adaptation might be highly relevant because of geographical exposure to climate risks (see Willows & Conell, 2003). It also helps to separate similar stakeholder types. For example, in the Stockholm region there are 26 municipalities that are exposed differently to water-related risks in a changing climate. Moreover, because climate change impacts and adaptation options are interrelated with other regional changes, and because current and expected adaptive capacity also depend upon factors such as socio-economic and demographic status and trends, these types of geographical data also form part of this criterion.

Besides municipalities, it is relevant to identify those affected by, and vulnerable to, climate change (Ebi *et al.*, 2005). For example, property owners in risk areas are relevant because of the onus on them to protect their areas. Other such groups include local business and private companies that may be exposed to climate risks.

There are also organizations with an explicit geographical focus that could have an indirect or direct role for adaptation. For example, the Regional Water Authorities responsible for overall management of water-related issues in Sweden; the Swedish Geotechnical Institute (SGI) responsible for developing and improving landslide analysis and stabilization mapping along the Göta Älv catchment (Ministry of the Environment, 2009); and about 30 so-called local river groups in Sweden, which manage water-related risks and floods (SOU 2007:60).

3.1.3 Knowledge and abilities criterion. The knowledge/abilities criterion refers to stakeholders assumed to have certain knowledge and skills related to adaptation or expert knowledge on the climate system and climate risks. It could also refer to those stakeholders that have regional knowledge that is important to consider.

In the two case studies, institutions relevant to this criterion include agencies like the Swedish Meteorological and Hydrological Institute (SMHI), responsible for climate and hydrological modelling and information. Another group of stakeholders are trade and interest associations. According to the Commission on Climate and Vulnerability (SOU 2007:60), these organizations are likely to have important roles, especially in providing knowledge to their member organizations as well as changing industry norms and standards. Consultants are yet another stakeholder group that help municipalities assess and investigate local aspects and impacts of climate change. Also, NGOs have a role in disseminating knowledge, but many of them also conduct research. Individual citizens possess important knowledge and experience of local conditions where they live, which is important for the development of adaptation strategies. Universities and researchers can also be mentioned under this criterion, as well as the IPCC.

3.1.4 Hierarchical level criterion. Whereas the functional criterion to a large extent focuses on organizations with an explicit responsibility for adaptation, the hierarchical level criterion enables identification of decision-makers and other types of influential stakeholders who indirectly could facilitate or hinder

adaptation. It also refers to hierarchical structures within organizations and the positions that adaptation managers, if there are any, hold. The hierarchical level criterion also plays an important role with respect to group dynamics among those stakeholders that are involved in the participatory processes (Jonsson *et al.*, 2011).

3.2 Step 2: Specify Stakeholder Roles

This step highlights the different stakeholder roles in relation to adaptation that should be involved in the participatory process, which can be done simultaneously with the stakeholder classification. The roles specified here are generic and derived from the literature (Ballejos & Montagna, 2008; Ebi *et al.*, 2005). As shown in Table 2, the different roles relate to the criteria and, depending on for what purposes stakeholders are identified, the roles are more or less relevant. In any case, the list can be used as a discussion tool and a checklist (see Jonsson *et al.*, 2011) that complements the first step.

This procedure was used for discussions among researchers in both cases to decide on stakeholder groups that should be actively involved in the participatory processes.

3.3 Step 3: Selecting and Classifying Stakeholders

This third step focuses on the selection and categorization of stakeholders for the participatory process. It builds on the two previous steps and considers the roles, dimensions and criteria that were specified in Tables 1 and 2. Stakeholders could

Table 2. Stakeholder roles for climate adaptation

Stakeholder role	Example/definition	Criteria
Supporters	Stakeholders who prepare and support adaptation through advice and guidance, evaluation of adaptation, etc.	F
Providers	Stakeholders who provide research, knowledge and information on climate change causes, impacts, vulnerabilities and adaptation, etc.	K
Disseminators	Those who disseminate climate knowledge and information	K
Funders/sponsors	Funders of adaptation measures and/or climate-related research	F
Experts	Local experts on specific local conditions, climate experts on the climate system and impacts of climate change and/or practical and technical solutions	F/K/G/ H
Implementers	Stakeholders responsible for implementing adaptation measures	F
Coordinators	Stakeholders that coordinate other actors, research or adaptation strategies in general	F/K
Responsible and/or decision-makers	Stakeholders that have an explicit responsibility for climate policies, climate adaptation or activities that are affected by climate change, such as long-term planning or sensitive sectors	F/H
Regulators	Initiators or implementers of new legislation, as well as changes in norms and standards	F/H
Affected	Stakeholders exposed and/or vulnerable to climate impacts or the responses	G/K

be selected based on more than one criterion. Following the selection, stakeholders are categorized based on their roles in the concerned initiative. Stakeholders might have several roles and the same role can be represented by more than one stakeholder (Ballejos & Montagna, 2008).

In the Stockholm case study, exposure to water-related risks and expected adaptive capacity were key issues for all the overall research issues. It was also important to involve stakeholders that directly or indirectly had some responsibility for planning or implementing adaptation. These parameters determined the composition of the focus groups that formed part of the participatory research on adaptation processes. Accordingly, the geographical criterion is important in order to identify municipalities that match the issues mentioned above. However, the functional and hierarchical level criteria are also central as they have helped us in defining stakeholder responsibilities. This procedure guided us in identifying, categorizing and composing focus groups with 20 stakeholders in total representing five different municipalities in the Stockholm region and their respective environment, planning and technical departments; public and private water and waste companies; insurance and energy sectors; and regional organizations (André *et al.*, 2009).

In the Gothenburg case, focus groups were used to test and develop tools for adaptation processes and to study different aspects of vulnerability. While the functional criterion was the key to the selection in Stockholm, the variety of geographical locations was the key criterion in the Gothenburg case. In addition, this case study had a more explicit focus at the local level. Therefore, it engaged about eight stakeholders representing municipal departments with different areas of responsibility, such as environment, planning and technical issues, traffic, parks and nature, and real estate. In addition, energy, water and sanitation companies and a regional organization responsible for railways were also represented (see Jonsson *et al.*, 2012).

All in all, the participants in both case studies related to one or several of the following stakeholder roles: responsible and/or decision-makers, affected, experts and supporters (Table 2).

3.4 Steps 4 and 5: Associate Stakeholders with Roles and Analyse Their Influence and Interests

In the context of adaptation, it is important to analyse stakeholder influence and interest because it determines to what extent and how adaptation can be realized. In the cases in this study, the fourth and fifth steps are integrated, because stakeholder roles, interest and influence are to a large extent related.

To complete the stakeholder identification and allow for comparisons between perspectives, a participatory actor analysis exercise was performed with all participants in the case studies. Through the participatory exercise, we also examined the participants' notion of who are (or should be) the involved and active stakeholders in regional adaptation. The exercise also allowed association of stakeholders with roles and to analyse their capacities and relevance for adaptation.

The exercise was organized as follows: during a brainstorm session, the participants were encouraged to identify stakeholder groups who they considered relevant for the adaptation work. In the Stockholm case, they were instructed to consider those actors that were perceived as important for the entire Stockholm

region, while the Gothenburg case focused on specific development areas. However, the participants in both cases were asked to not limit themselves to local–regional actors, but to consider all types of actors from individuals to groups of actors and organizations at all scales. Then, all actors were written down on stickers and placed on a whiteboard to illustrate the perceived landscape of adaptation stakeholders. The closer to the centre of the board they were placed, the more important the actor was perceived to be in relation to adaptation efforts. The level of connections and cooperation between actors was also indicated with lines (see also Nilsson & Gerger Swartling, 2009). Figure 2 shows an example from one of the groups in the Stockholm region.

An actor with many links to other actors could be seen as influential, even though the actor is not ‘important’ as such for adaptation. For example, the European Union (Figure 2) was not perceived to be of direct importance for adaptation in the Stockholm region, but it was perceived to be influential in terms of indirectly creating an enabling environment for policies and support. The issue of relevance thus became a subjective evaluation of many factors such as responsibility, ability to influence other actors, decision-making power, resources, interest and active involvement in adaptation initiatives. In this way, stakeholder roles were also explored, because the perceived roles of the actors were linked to their importance and influence. For example, several focus group participants in the Stockholm region discussed the importance of Swedish municipalities, which have a special position to decide and plan for future development.

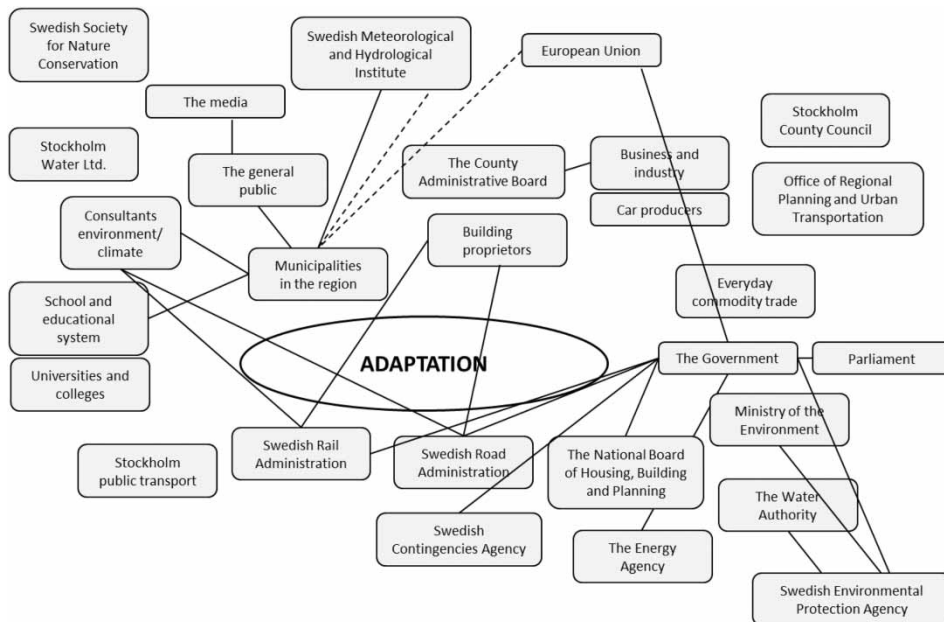


Figure 2. Map of stakeholder groups identified as relevant for adaptation work in the Stockholm region. The proximity to the ‘adaptation circle’ corresponds to the perceived level of importance of actors for future adaptation efforts. The actors are also clustered on the basis of their level of cooperation with each other. The lines represent established collaboration considered relevant to local adaptation action, whereas broken lines reflect group’s concerns about ‘too weak collaborative links’ (Nilsson & Gerger Swartling, 2009, p. 11).

By charting the landscape and focusing on relationships between actors, this step complements the previous steps in the identification process, because stakeholders that may be missed by the researchers in Step 1 may be identified in this step. In this respect, the exercise provides more detailed information about stakeholders; information that includes local and regional knowledge and experience of which external researchers may otherwise be unaware.

4. Discussion and Evaluation of Method

This section discusses the findings of the study, with a particular focus on evaluating the method, including the criteria for identifying and selecting stakeholders for participatory processes in adaptation.

Our methodological approach differs from other approaches to stakeholder analysis, such as that of natural resource management and business management. While many analyses focus on stakeholders relevant for *one* organization (Freeman, 1984) or those that are relevant for the implementation of *one* policy or project (Grimble & Wellard, 1997), ours started from a broader perspective, considering adaptation as a process in order to capture the complexity and cross-scale nature of adaptation in regions. That requires a flexible method where the 'dynamics of the context' (Ballejos & Montagna, 2008, p. 296) is somehow managed. The method of Ballejos & Montagna (2008) concerns the initial stages of a project's lifecycle and consequent complementary mechanism to revise and add/remove stakeholders is required. In studies of adaptation, this might be even more important, because it is a long-term process. Changes may arise, which are likely to affect the stakeholder landscape as well stakeholder roles and responsibilities. Adaptation is a relatively new issue, and in the cases outlined in this paper, roles and responsibilities were not completely settled when the studies were carried out (see Simonsson *et al.*, 2011; Ugglå, 2010). Moreover, in comparison to mitigation, which aims for the fixed goal of stabilizing greenhouse gases at a certain level in the atmosphere, the objectives of adaptation are less clear, as it involves local or regional processes to acquire and maintain a capacity to adapt amongst various stakeholders (see e.g. Government Bill 2008/09:162). The term 'adaptation' can also mean many different things, such as building adaptive capacity, autonomous adaptation or concrete planned adaptation actions (Füssel & Klein, 2006; UKCIP, 2007). Participant discussions in the Stockholm case illustrated this range of meanings. However, the Gothenburg discussions were, due to study design, focused chiefly on infrastructural measures and the adaptive capacity of municipal administrations.

A further complicating factor is scientific uncertainty over climate change impacts. Because of this, actors may perceive adaptation to be an issue for the future, since the impacts of climate change are not yet directly experienced (West & Gawith, 2005). Experience from the UKCIP (West & Gawith, 2005) shows that small- and medium-sized companies may be difficult to involve in adaptation as they tend to be influenced by factors other than climate change, such as the current market situation, and this short-term perspective means that it is difficult to motivate them to consider adaptation and to integrate it into their activities. As noted above, the stakeholder landscape is subject to change, and exogenous factors such as extreme weather events might increase the perceived need for action. Hence, actors that so far have not been involved in adap-

tation and planning might join certain networks and thus become more active stakeholders (see Schmidt-Thomé & Peltonen, 2006).

Mitchell *et al.* (1997) point out that those not present in policy processes also need to be considered in the stakeholder analysis. Our method may need further improvement to capture those who should be represented and have influence but are not 'visible' due to timing of the analysis or ignorance of the analysts. This methodological problem is naturally also a concern for reasons of representation, democracy and legitimacy, and for various types of policy implementation processes which has been observed also in relation to other complex environmental issues (see e.g. National Research Council, 2008; Fischer, 2000; Holmes & Scoones, 2000; van den Hove, 2007). Therefore, the question of who participates should be emphasized continuously; selections and identifications of stakeholders should be revisited throughout the processes and critically discussed in the analyses.

In the literature (e.g. Achterkamp & Vos, 2007; WeAdapt, 2011), it is clear that successful stakeholder identification requires well-defined cases in terms of both issues and system boundaries. As with adaptation, the term 'region' can be defined in several ways depending on physical, cultural, social and economic characteristics, and there is thus no unambiguous definition of a region. The two urban regions studied here could be described and classified on the basis of natural phenomena (e.g. a watershed), administrative characteristics (e.g. regional counties) or according to their function, which often implies heterogeneous interdependent units, such as a network of communities with a detectable spatial pattern of flows of goods, services and people. Stakeholder perceptions of what constitutes their region in relation to adaptation need to be taken into consideration, and the step-by-step method described above ought to include feedback loops to help integrate these perceptions.

The UKCIP (2007) categorization of stakeholders applied in the two urban settings of Stockholm and Gothenburg has proven useful as it illuminates different stakeholder characteristics and contributions in the adaptation process. In addition, analysis of the four criteria—functional, geographical location, hierarchical level and knowledge and abilities—during the first step of this method could be an important tool for identifying stakeholders in a structured manner and to simultaneously build a broader understanding of the current situation and possible changes, in policy, planning projects, networks, etc.

The functional criterion enabled the identification of the largest number of stakeholders in the cases. The other three criteria revealed only a few additional stakeholders. However, these criteria still appear important to consider because they add new aspects and attributes of stakeholders that could play a significant role in the subsequent steps. For example, municipalities (or local governments) were identified within the framework of the functional criterion, yet in selecting a sample group of municipalities to involve in the participatory process, the geographical location criterion helped to distinguish municipalities exposed to climate risks, as well as their current and expected adaptive capacity.

The four scale dimensions of the criteria (local, regional, national and global) are of particular importance during the first step of stakeholder identification in which potential stakeholder types are identified. The impacts of climate change are experienced across sectors and regions. Focusing only on one level could hinder a comprehensive understanding of how these levels interact for effective implementation of adaptation strategies, something which was evident in the sta-

holder analysis on influence and interests during the fifth step. At the same time, it was rather difficult to cover all four levels, because in practice this would mean identifying hundreds or even thousands of stakeholders. However, we consider this first step as a basis for further analysis, and it must be complemented and refined during the subsequent steps of the method. In addition, as the first step concerns identification of stakeholder *types*, it is not necessary at this stage to identify specific individual stakeholders.

Besides laying the foundation for further analysis and identifying stakeholders, specifying stakeholder types and roles also serves as the basis for selecting stakeholders. Altogether, these three steps inform each other in an iterative process. In our cases, selection of stakeholders also involved invitations to actively participate in the study. Hence, there is always a risk that selected stakeholders do not want to participate, which might result in a biased selection where those already interested, motivated or feel that they have a responsibility (i.e. those who identify themselves as stakeholders) participate, while those who are not convinced they are a stakeholder choose not to participate (see e.g. van Asselt Marjolein & Rijkens-Klomp, 2002; Few *et al.*, 2007). This is a common problem for many projects involving external actors. However, solid knowledge on and clear motivation for why someone should be involved, as produced during the first and second step of this method, could help to overcome these difficulties. At the least, it could increase transparency in the process of selecting stakeholders.

Our approach enables broad representation of stakeholder types, which complements the perspectives of the researchers and project participants. The stakeholders identified during the first step are considerably more in number than the stakeholders that were eventually selected for participatory process. However, they might be relevant and important to involve some of those that were not selected at later stages of the process, for instance, as recipients and communicators of research results. An additional aim of the identification process is to learn more about conditions that affect adaptation—from that perspective it is essential to identify all possible stakeholders.

Although the focus was on identifying stakeholders, the method allowed us to detect a number of actors in the two regions with a more indirect role for adaptation. Thus, the method appears valuable for identifying stakeholders and for identifying actors, yet in each case it is important to consider for what purposes the method is used. As the stakeholder landscape is changing, an actor can become a stakeholder and vice versa. In addition, different groups of stakeholders have diverse perceptions of stakeholder roles and their importance for preparing for and implementing adaptation.

5. Conclusions

This paper proposes a method to systematically map stakeholder landscapes in climate change adaptation processes. The method has been tested and developed in two Swedish urban regions: Stockholm and Gothenburg. Compared to Figure 1 an additional step has been included to illustrate the participatory actor analysis—the brainstorm exercise—that was made together with the focus group participants and from which additional knowledge and deeper understanding of the stakeholder landscape was revealed. The thinner arrows have also been added to show how each step informs the others in an iterative process. We summarize the method in Figure 3.

We contend that the method is relevant for multiple purpose studies of adaptation processes in which it is difficult to discern a linear course of action (cf. Smit & Wandel, 2006), because it reveals both the context and stakeholder roles and responsibilities. However, the method can also be used, as in the Gothenburg case, to gain an overall understanding of the stakeholder landscape and to identify specific stakeholders for a development project. In the Stockholm case, the method was applied to learn about the adaptation process itself and the complexity of regional adaptation where many different stakeholders are involved. In both cases, we used the method to select stakeholders for active participation in the project, and as a tool for learning more about the stakeholder landscape for adaptation. Achterkamp & Vos (2007) argue that their method could be used as a learning and diagnostic tool. We believe that the method presented here could have similar functions as it illuminates both researchers' and stakeholders' perceptions of stakeholder roles and responsibilities (see Jonsson *et al.*, 2011).

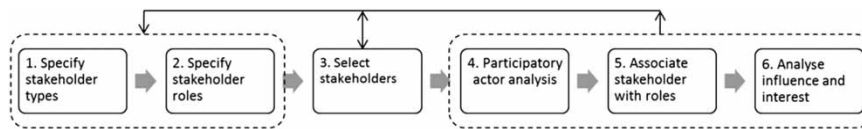


Figure 3. Revised method for stakeholder identification. The arrows show how the methodology progresses from the first to last step, where each step informs others in an iterative process.

In sum, analysing stakeholder relevance and capacities is important because it lays the foundation for further analysis and understanding of adaptation processes. It is relevant to combine top-down knowledge (e.g. that presented in official documents) with experience and knowledge based on bottom-up processes and it should be carried out systematically and with care. Combining both types of knowledge helps build an understanding of the stakeholder landscape and of who should be involved in regional adaptation. It also helps to overcome possible problems of unclear responsibility for, and diverse expectations of, regional adaptation.

Acknowledgements

The authors express their gratitude to all stakeholders and research colleagues who participated in the study. The research is generously supported by the Foundation for Strategic Environmental Research (Mistra) through the Mistra-SWECIA programme (www.mistra-swecia.se), Formas the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (2006-4871-7662-55) and NordForsk's top-level research initiative through NORD-STAR: Nordic Strategic Adaptation Research (www.nord-star.info). We also acknowledge three anonymous reviewers for valuable and constructive comments on earlier versions of this article and Tom Gill, SEI for editorial support that helped us to sharpen our arguments.

References

- Achterkamp, M. C. & Vos, J. F. J. (2007) Critically identifying stakeholders evaluating—boundary critique as a vehicle for stakeholder identification, *Systems Research and Behavioral Science*, 24(1), pp. 3–14. doi:10.1002/sres.760.

- ACIA (2005) *Arctic Climate Impact Assessment* (Cambridge: Cambridge University Press).
- Adger, W. N., Arnell, N. W. & Tompkins, E. L. (2005) Successful adaptation to climate change across scales, *Global Environmental Change*, 15(2), pp. 77–86. doi:10.1016/j.gloenvcha.2004.12.005.
- Andersson, L., Jonsson, A., Wilk, J. & Alkan Olsson, J. (2010) Use of participatory scenario modelling as platforms in stakeholder dialogues, in: S. Khan, H. Savenije, S. Demuth & S. Hubert (Eds) *Hydrocomplexity: New tools for solving wicked water problems*, pp. 187–192. IAHS Publ. 338, Proceedings of the Xth Kovacs Colloquium, Paris 2–3 July 2010.
- André, K., Gerger Swartling, Å. & Simonsson, L. (2009) *Stockholmsregionens anpassning till ett förändrat klimat. Sammanställning av delresultat från studier inom forskningsprogrammet Mistra-SWECIA* [Stockholm Region's Adaptation to a Changing Climate. Summary of Results from Studies Within the Research Program Mistra SWECIA], Mistra-SWECIA Programme Report No. 2/CSPR Briefing No. 4 2009, Norrköping: Centre for Climate Science and Policy Research.
- Arnell, N. & Delaney, E. K. (2006) Adapting to climate change: Public water supply in England and Wales, *Climatic Change*, 78(2–4), pp. 227–255. doi:10.1007/s10584-006-9067-9.
- van Asselt Marjolein, B. A. & Rijkens-Klomp, N. (2002) A look in the mirror: Reflection on participation in integrated assessment from a methodological perspective, *Global Environmental Change*, 12(3), pp. 167–184.
- Bäckstrand, K. (2006) Multi-stakeholder partnerships for sustainable development. Rethinking legitimacy, accountability and effectiveness, *European Environment*, 16(5), pp. 290–306. doi:10.1002/eet.425.
- Ballejos, L. C. & Montagna, J. M. (2008) Method for stakeholder identification in interorganizational environments, *Requirements Engineering*, 13(4), pp. 281–297. doi:10.1007/s00766-008-0069-1.
- Boverket [Swedish National Board of Housing, Building and Planning] (2009) *Bygg för morgondagens klimat. Anpassning av planering och byggande* [Building for tomorrow's climate. Adaptation of Planning and Building], Karlskrona: Boverket.
- Brugha, R. & Varvasovszky, Z. (2000) Stakeholder analysis: A review, *Health Policy and Planning*, 15(3), pp. 239–246. doi:10.1093/heapol/15.3.239.
- Bryson, J. M. (2004) What to do when stakeholders matter. Stakeholder identification and analysis techniques, *Public Management Review*, 6(1), pp. 21–53. doi:10.1080/14719030410001675722.
- Carter, T. R., Jones, R. N., Lu, X., Bhadwal S., Conde C., Mearns, L. O., O'Neill, B. C., Rounsevell M. D. A. & Zurek, M. B. (2007) New Assessment Methods and the Characterisation of Future Conditions, in: M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden & C. E. Hanson (Eds) *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, pp. 133–171 (Cambridge: Cambridge University Press).
- Conde, C. & Lonsdale, K. (2005) Engaging stakeholders in the adaptation process, in: I. Burton, B. Lim, E. Spanger-Siegfried, E. L. Malone & S. Huq (Eds) *Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures*, pp. 47–66 (Cambridge: Cambridge University Press).
- Davies, B. B., Blackstock, K. & Rauschmayer, F. (2005) 'Recruitment', 'composition' and 'mandate' issues in deliberative processes: Should we focus on arguments rather than individuals? *Environment and Planning C—Government and Policy*, 23(4), pp. 599–615. doi:10.1068/c04112s.
- De Bruin, K., Dellink, R. B., Ruijs, A., Bolwidt, L., Van Buuren, A., Graveland, J., De Groot, R. S., Kuikman, P. J., Reinhard, S., Roetter, R. P., Tassone, V. C., Verhagen, A. & Van Ierland, E. C. (2009) Adapting to climate change in the Netherlands: An inventory of climate adaptation options and ranking of alternatives, *Climatic Change*, 95(1–2), pp. 23–45. doi:10.1007/s10584-009-9576-4.
- Ebi, K. L., Lim, B. & Aguilar, Y. (2005) Scoping and designing an adaptation project, in: I. Burton, B. Lim, E. Spanger-Siegfried, E. L. Malone & S. Huq (Eds) *Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures*, pp. 33–46 (Cambridge: Cambridge University Press).
- European Environmental Agency (2008) *Impacts of Europe's Changing Climate: 2008 Indicator-Based Assessment* (Copenhagen: European Environment Agency, Office for Official Publications of the European Communities).
- Felt, U. & Wynne, B. (2007) *Taking European Knowledge Society Seriously. Report of the Expert Group on Science and Governance to the Science, Economy and Society Directorate. Directorate General for Research, European Commission* (EUR 22700), Luxembourg: Office for Official Publications of the European Communities.
- Few, R., Brown, K. & Tompkins, E. L. (2007) Public participation and climate change adaptation: Avoiding the illusion of inclusion, *Climate Policy*, 7(1), pp. 46–59.
- Fischer, F. (2000) *Citizens, Experts and the Environment: The Politics of Local Knowledge* (Durham: Duke University Press).
- Freeman, R. E. (1984) *Strategic Management: A Stakeholder Approach* (Boston, MA, London: Pitman).

- Funtowicz, S. O. & Ravetz, J. R. (1993) Science for the post-normal age, *Futures*, 25(7), pp. 739–755.
- Füssel, H. & Klein, R. J. T. (2006) Climate change vulnerability assessments: An evolution of conceptual thinking, *Climatic Change*, 75(3), pp. 301–329. doi:10.1007/s10584-006-0329-3.
- Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P. & Trow, M. (1995) *The New Production of Knowledge. The Dynamics of Science and Research in Contemporary Societies* (London, Thousand Oaks and New Delhi: Sage Publications).
- Goetz, A. & Gavanta, J. (2001) *Bringing Citizen Voice and Client Focus into Service Delivery*, IDS Working Paper No 138, Brighton: Institute of Development Studies, University of Sussex.
- Government Bill 2008/09:162 *En sammanhållen klimat- och energipolitik—Klimat* [A Coherent Climate and Energy Policy—Climate] (Stockholm: Ministry of the Environment).
- Grimble, R. (1998) *Stakeholder Methodologies in Natural Resource Management. Socioeconomic Methodologies. Best Practice Guidelines* (Chatham: Natural Resources Institute).
- Grimble, R. & Wellard, K. (1997) Stakeholder methodologies in natural resource management: A review of principles, contexts, experiences and opportunities, *Agricultural Systems*, 55(2), pp. 173–193.
- Hedger, M. M., Connell, R. & Bramwell, P. (2006) Bridging the gap: Empowering decision-making for adaptation through the UK Climate Impacts Programme, *Climate Policy*, 6(2), pp. 201–215.
- High, C. & Pelling, M. (2003) *Understanding Adaptive Capacity to Rapid Climate Change: Theories of Social and Organisational Learning*, Rapid Climate Change Project. Working Paper 1. Available at <http://www.rcc.rures.net/documents/WP1.pdf> (accessed 26 June 2012).
- Holmes, T. & Scoones, I. (2000) *Participatory Environmental Policy Processes: Experiences from North and South*, IDS Working Paper No 113, Brighton: Institute of Development Studies, University of Sussex.
- van den Hove, S. (2007) A rationale for science-policy interfaces, *Futures*, 39(7), pp. 807–826. doi:10.1016/j.futures.2006.12.004.
- IPCC (2007) *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press).
- Jonsson, A., Lövbrand, E. & Andersson, L. (2009) Participatory research in theory and practice: Why, how and when? in: E. Lövbrand, B.-O. Linnér & M. Ostwald (Eds) *Climate Science and Policy Research—Conceptual and Methodological Challenges*, pp. 50–60 (CSPR Report 09:03) (Norrköping: Centre for Climate Science and Policy Research).
- Jonsson, A. C., Glaas, E., André, K. & Simonsson, L. (2011) *Verktyslåda för klimatanpassningsprocesser. Från sårbarhetsbedömning till hantering* [Toolbox for Climate Adaptation Processes. From Vulnerability Assessment to Management], CSPR Report 11:01, Norrköping: Centre for Climate Science and Policy Research.
- Jonsson, A. C., Hjerpe, M., Andersson-Sköld, Y., Glaas, E., André, K. & Simonsson, L. (2012) Cities' capacity to manage climate vulnerability: Experiences from participatory vulnerability assessments in the lower Göta Älv Catchment, Sweden, *Local Environment*, iFirst. doi:10.1080/13549839.2012.685880.
- Kleinman, D. L., Powell, M., Grice, J., Adrian, J. & Lobes, C. (2007) A toolkit for democratizing science and technology policy: The practical mechanics of organizing a consensus conference, *Bulletin of Science, Technology & Society*, 27(2), pp. 154–169. doi:10.1177/0270467606298331.
- Klopprogge, P. & Van Der Sluijs, J. P. (2006) The inclusion of stakeholder knowledge and perspectives in integrated assessment of climate change, *Climatic Change*, 75(3), pp. 359–389. doi: 10.1007/s10584-006-0362-2.
- Larsen, R. K., Gerger Swartling, Å., Powell, N., Simonsson, L. & Osbeck, M. (2011) *A Framework for Dialogue Between Local Climate Adaptation Professionals and Policy Makers. Lessons from Case Studies in Sweden, Canada and Indonesia*, Stockholm Environment Research Report 2011, Stockholm: Stockholm Environment Institute.
- Lövbrand, E. (2011) Co-producing European climate science and policy. A cautionary note on the funding and making of useful knowledge, *Science and Public Policy*, 38(3), pp. 225–236. doi:10.3152/030234211X12924093660516.
- Ministry of the Environment (2009) *Letter of Appropriation Financial Year 2010—Appropriation 1:10 M2009/4750/A. 2009-12-21* [In Swedish] (Stockholm: Ministry of the Environment).
- Mitchell, R. K., Agle, B. R. & Wood, D. J. (1997) Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts, *Academy of Management Review*, 22(7), pp. 853–886. doi: 10.5465/AMR.1997.9711022105.
- Nasiritousi, N., Hjerpe, N. & Linnér, B.-O. (2011) The politics of non-state actor involvement in the international climate change negotiations. Paper presented at the 6th ECPR General Conference, Reykjavik, August 25–27, 2011.

- National Research Council. (2008) Public Participation in Environmental Assessment and Decision Making. Panel on Public Participation in Environmental Assessment and Decision Making, in: T. Dietz & P. C. Stern (Eds) Committee on the Human Dimensions of Global Change. Division of Behavioral and Social Sciences and Education, pp. 33–74 (Washington, DC: The National Academies Press).
- Nilsson, A. & Gerger Swartling, Å. (2009) *Social Learning about Climate Adaptation: Global and Local Perspectives*, Stockholm Environment Institute/Mistra-SWECIA Working paper No. 1, Stockholm: Stockholm Environment Institute.
- Nowotny, H., Scott, P. & Gibbons, M. (2001) *Re-thinking Science. Knowledge and the Public in an Age of Uncertainty* (Cambridge: Polity Press).
- ODA (Overseas Development Administration) (1995) *Guidance Note on How to Do a Stakeholder Analysis of Aid Projects and Programmes*, Overseas Development Report, July. Social Development Department. Available at http://www.sswm.info/sites/default/files/reference_attachments/ODA%201995%20Guidance%20Note%20on%20how%20to%20do%20a%20Stakeholder%20Analysis.pdf (accessed 29 July 2012).
- Powell, M. C. & Colin, M. (2009) Participatory paradoxes: Facilitating citizen engagement in science and technology from the top-down? *Bulletin of Science, Technology & Society*, 29(4), pp. 325–342. doi: 10.1177/0270467609336308.
- Powell, N., Gerger Swartling, Å. & Hoang, M. H. (2011) Rural development in Vietnam, in: N. Powell, Å. Gerger Swartling & M. H. Hoang (Eds) *Stakeholder Agency in Rural Development Policy Articulating Co-governance in Vietnam, Hanoi-Vietnam*, pp. 1–13 (World Agroforestry Centre ICRAF).
- Reed, M. S. (2008) Stakeholder participation for environmental management: A literature review, *Biological Conservation*, 141(10), pp. 2417–2431. doi:10.1016/j.biocon.2008.07.014.
- Reed, M. S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., Prell, C., Quinn, C. H. & Stringer, L. C. (2009) Who's in and why? A typology of stakeholder analysis methods for natural resource management, *Journal of environmental management*, 90(5), pp. 1933–1949. doi:10.1016/j.jenvman.2009.01.001.
- Schmidt-Thomé, K. & Peltonen, L. (2006) Actors, networks and actor-networks in coping with sea level rise, in: P. Schmidt-Thomé (Ed) *Sea Level Change Affecting the Spatial Development of the Baltic Sea Region*, pp. 51–59, Special Paper 41, (Espoo: Geological Survey of Finland).
- Simonsson, L., Gerger Swartling, Å., André, K., Wallgren, O. & Klein, R. J. T. (2011) Perception of risk and limits for climate change adaptation: Case studies of two Swedish urban regions, in: J. Ford & L. Berrang-Ford (Eds) *Climate Change Adaptation in Developed Nations*, pp. 321–334 (Dordrecht, Heidelberg, London, New York: Springer).
- Smit, B. & Wandel, J. (2006) Adaptation, adaptive capacity and vulnerability, *Global Environmental Change: Human and Policy Dimensions*, 16(3), pp. 282–292. doi:10.1016/j.gloenvcha.2006.03.008.
- SOU 2007:60 (Swedish Government Commission Report) (2007) *Sweden Facing Climate Change: Threats and Opportunities. The Commission on Climate and Vulnerability*, Swedish Government Official Reports, Stockholm: Edita.
- Uggla, Y. (2010) Climate change adaptation: Regulation under formation, in: R. Lidskog, L. Soneryd & Y. Uggla (Eds) *Transboundary Risk Governance*, pp. 73–90 (London: Earthscan).
- UKCIP (2007) *Identifying Adaptation Options* (Oxford: UKCIP). Available at <http://www.ukcip.org.uk/> (accessed 26 June 2012).
- Ulmanen, J., Gerger Swartling, Å. & Wallgren, O. (2012) *Climate Change Adaptation Concerns in Swedish Forestry Policy: An Historical Overview*, Stockholm Environment Institute/Mistra-SWECIA Working paper, Stockholm: Stockholm Environment Institute.
- de la Vega-Leinert, A. C., Schroeter, D., Leemans, R., Fritsch, U. & Pluimers, J. (2008) A stakeholder dialogue on European vulnerability, *Regional Environmental Change*, 8(3), pp. 109–124. doi:10.1007/s10113-008-0047-7.
- Vugteveen, P., Lenders, H. J. R., Devilee, J. L. A., Leuven, R. S. E., van der Veeren, R. J. H. M., Wiering, M. A. & Hendriks, A. J. (2010) Stakeholder value orientations in water management, *Society and Natural Resources: An International Journal*, 23(9), pp. 805–821. doi:10.1080/08941920903496952.
- WeAdapt (2011) *Stakeholder Analysis and Engagement. Introduction to Stakeholder Analysis and Engagement*. Available at <http://weadapt.org/knowledge-base/social-learning/stakeholder-analysis-and-engagement> (accessed 19 January 2012).
- Weingart, P. (2008) How robust is 'socially robust knowledge'? in: M. Carrier, D. Howard & J. Kourany (Eds) *The Challenge of the Social and the Pressure of Practice: Science and Values Revisited*, pp. 131–145. (Pittsburgh, PA: University of Pittsburgh Press).

- Welp, M., de la Vega-Leinert, A., Stoll-Kleemann, S. & Jaeger, C. C. (2006) Science-based stakeholder dialogues: Theories and tools, *Global Environmental Change: Human and Policy Dimensions*, 16(2), pp. 170–181. doi:10.1016/j.gloenvcha.2005.12.002.
- West, C. C. & Gawith, M. J. (Eds) (2005) *Measuring Progress: Preparing for Climate Change Through the UK Climate Impacts Programme* (Oxford: UKCIP). Available at <http://www.ukcip.org.uk/> (accessed 26 June 2012).
- Whitmarsh, L., Gerger Swartling, Å. & Jäger, J. (2009) Participation of experts and non-experts in a sustainability assessment of mobility, *Environmental Policy and Governance*, 19(4), pp. 232–250. doi: 10.1002/eet.513.
- Willows, R. & Conell, R. (Eds) (2003) *Climate Adaptation: Risk, Uncertainty and Decision-Making*, UKCIP Technical Report, Oxford: UKCIP. Available at <http://www.ukcip.org.uk/> (accessed 26 June 2012).
- Wilsdon, J. & Willis, R. (2004) *See-Through Science: Why Public Engagement Needs to Move Upstream. Demos Report*. Available at <http://www.demos.co.uk/publications/paddlingupstream> (accessed 3 January 2009)
- Ziervogel, G. & Downing, T. E. (2004) Stakeholder networks: Improving seasonal climate forecasts, *Climatic Change*, 65(1–2), pp. 73–101. doi:10.1023/B:CLIM.0000037492.18679.9e.