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Climate change scenarios and citizen participation: mitigation and adaptation perspectives in constructing sustainable futures

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ABSTRACT

This paper discusses adaptation and mitigation strategies as outlined in climate change scenarios. The adaptive perspective is closely connected to the concept of resilience understood as different views on nature's capacity to absorb shocks, renewal and re-organization. In constructing normative scenarios images of the future are generated illustrating potential ways of living, travelling and consuming products and services where certain goals such as a reduced climate impact are fulfilled. This paper argues that tension arising from climate strategies relying on either adaptation or mitigation strategies, or combining the two strategies, warrant further examination. In this paper the inter-relationships between adaptation and mitigation is discussed by examining processes of citizen-participation in constructing scenarios and applying the concepts of resilience, vulnerability and adaptive capacity. We discuss this using the concept of deliberative planning processes as a means to achieve legitimate, effective and sustainable futures. As a part of this approach, we argue that methods for citizen-participation applied in exploring different science and technology options also provide useful insight for this type of planning processes. The theoretical arguments are combined with examples from environmental scenario construction in practice. The paper brings attention to tensions between sustainability content values, such as reduced climate impact, and more process oriented values such as legitimacy and participatory scenario construction. Moreover, the concept of open innovation processes is introduced to the context of participatory scenario construction as a means to increase the robustness of action plans implemented to reduce climate change.

Keywords: Futures studies, scenarios, participation, stakeholders, urban development, climate change, open innovation process

INTRODUCTION

In 2008, for the first time in history, more than half of the world's population will live in urban areas (UNFPA, 2007:1). We do also know that climate change will have severe effects on the population in many cities (UNFPA, 2007:58 ff). Planning for adapting to possible climate changes is therefore becoming increasingly important. However, the purpose of planning is not only to prepare for the future, but also to create more desirable futures (Myers and Kitsuse, 2000:221). There is a great potential in planning for minimizing cities' climate effect. Today, urban activities generate almost 80% of all CO₂ and significant amounts of other greenhouse gases (UNEP and UN-HABITAT, 2005). Direct emissions come from activities such as energy generations, vehicles, industry and the burning of fossil fuels and biomass in households. Cities are also vulnerable to climate change that can give rise to inundation of large delta areas, saltwater moving upstream into freshwater rivers, uncontrolled air pollution, typhoons, floods and so forth (see e.g. Habitat Debate, 2006; IPCC 2007). There are several ideas around for future change concerning mitigation as well as adaptation strategies. Those include the introduction of renewable energy, cleaner production, energy efficient building, diminishing traffic, water management, assuring effective governance, changing settlement locations and form and so forth (see for example C-CIARN, 2006; ESPACE, 2007; IPCC 2007).

Nevertheless, Myers and Kitsuse (2000:223) claim that neither past grand planning visions, nor today's localized planning visions are strong on the future. Also, in the futures studies tradition, as shown in a study of anticipations of environmental gains in technology oriented scenarios (Larsen and Höjer 2007), it is not clear how the ideal desired sustainable future will come about in terms of how people will come to change their behaviour or the role of legitimization processes in adopting new technology or implementing regulation to achieve environmental objectives.

The field of futures studies contains of many approaches and studies are made with different intentions. Börjeson et al. (2006) present a classification of scenarios where it is suggested that all futures studies respond to one of the three questions "What will happen", "What can happen" and "How can a specific target be reached". The three categories are called *predictive*, *explorative* and *normative* scenarios (Börjeson et al., 2006:725). In the present paper the focus is on challenging images of the future presenting alternative solutions, thus what Börjeson et al. (2006) denote normative scenarios. These scenarios are in turn divided into *preserving* and *transforming scenarios*. Preserving scenarios respond to the question: "How can the target be reached, by adjustments to current situation" and transforming scenarios to "How can the target be reached, when the prevailing structures blocks necessary changes" (Börjeson et al., 2006:728). Preserving scenarios thus depict images of the future built on today's societal structures.

Even if most planners do not see themselves as performing futures studies, plans do build on predictive and explorative scenarios. The final plans and strategies reminds of normative preserving scenarios since they are future oriented and tries to fulfil certain goals, but most often without changing societal structures. In transforming scenarios the goals are instead seen as difficult to reach within today's structures and major societal changes are therefore seen as necessary. The aim is often to create a foundation for a discussion on long-term development and goals. Scenarios are not

policies as such, but they are often used as foundations for making policy decisions. In this paper the inter-relationships between adaptation and mitigation is examined by analysing scenarios of climate change and discussing the concepts of resilience and vulnerability in the context of deliberative planning processes.

Today there is a widespread acceptance of stakeholder involvement in policy making (Connelly and Richardson, in press) and the processes where scenarios are generated are often participatory. There is thus clear policy relevance in examining participatory scenario constructing (Gunnarsson-Östling and Larsen, 2008). The outcomes of these processes depend heavily on the contributions by participants, how the participatory processes are facilitated, but also on the way in which climate change issues are identified in terms of mitigation-adaptation strategies. The aim of this paper is twofold. We examine the inter-relationships between adaptation and mitigation and we interpret participatory scenario constructing as deliberative processes.

This paper is organised in five parts. Following the introduction is a section on scenarios and participating citizens. Then a section outlining adaptation and mitigation pathways of climate change policy also link central concepts such as resilience and vulnerability to the context of deliberative planning processes. This is followed by an account of experiences from involving citizens in visionary activities relating to climate change and sustainable cities. Then, results and conclusions are discussed in the final section of the paper.

SCENARIOS AND PARTICIPATING CITIZENS

In constructing normative scenarios a set of images are generated illustrating future ways of living, travelling and consuming products and services where certain goal such as a reduced climate impact is fulfilled. These are not predictions of the future, but can be used as a way to act in accordance to achieving a desired future development. They can also be a contribution to the general debate or foundations for policy decisions. These scenarios also often include an account of changes in terms of consumption patterns and behavioural change. In this sense, these scenarios are extended beyond socio-economic predictions and relations to environmental load dealt with in other field, such as climate change predictions in the work of IPCC. The scenarios in focus here build on some predictive elements, but in addition the sustainability focus when including behavioural change also includes some normative elements as how to achieve a sustainable society in the future. In essence, this also means that images of behavioural change are included, but not necessary including explanations on how these changes came about (Larsen and Höjer, 2007). These descriptions of behavioural change are frequently formulated in describing level of acceptance (if new environmental tax) or new behaviour in daily travel patterns (new modes of transport). However, even though scenario generating is often creative processes with a range of participants demanding change, trust are built and ideas exchanged, these processes are seldom analyzed as deliberative processes. Deliberation takes places in communicative processes where participants with 1) diverse opinions, 2) but open to preference shifts, 3) are seen as equal (see Hendriks et al. 2007). Process values as learning and mutual understanding are created in addition to outputs such as policies.

Especially questions such as who takes part in the process and whom these participants are to represent become important since the scenarios often expect great behavioural changes. Is it legitimate to expect all people to change even if they did not feel as they were represented? It is important to keep in mind that scenario making processes are not set up only to share ideas and create mutual understanding, they aim at solving specific targets such as minimizing climate change. Some writers (e.g. Hendriks et al., 2007) underline the importance of deliberative processes being open and diverse and do not put as much attention to the outcome. Understanding the importance of legitimacy we see the process as crucial, but aiming for goals such as minimized climate change both the content and the impact of the output is also critical. Thus, we agree with Connelly and Richardson (in press) seeing effective deliberation as a process where stakeholders are engaged and the primary assessment should be regarding the process' "effectiveness in delivering an intended policy". They also underline that governance as a whole should be assessed regarding its possibilities to take action and achieve legitimacy, where legitimacy is understood as "the recognised right to make policy" (Connelly and Richardson, in press). There are thus three dimensions Connelly and Richardson (in press) find important: content sustainability, capacity to act and legitimacy.

We believe those dimensions are also important for participatory processes generating scenarios aiming at mitigation as well as adaptation to climate change, otherwise they will not have any strong (and legitimate) impact on development. Hendriks et al. (2007) make an important distinction between partisan and non-partisan forums. We believe this distinction is important also when analysing scenario generating processes since it affects the legitimacy of the outcome. Partisans can be activists or belong to interest groups, organisations or associations, which strive for particular matters. Partisans are thus committed to certain agendas and are therefore often seen as poor deliberators (Hendriks et al., 2007:362). However, from a democratic perspective they are seen as important since they legitimate processes by making sure that particular stakes are represented. While partisan forums are made up to represent interest groups in society, non-partisan forums consist of randomly selected citizens, which ideally have rather open preferences. When exploring one partisan and one non-partisan process Hendriks et al. (2007) found that contrary to common expectations, partisan forums can have substantial legitimacy and impact problems. They also found that non-partisan forums might be favourable in deliberative capacity but they might fall short in external legitimacy and policy impact. The fact was that partisan participants accepted that deliberation means that you must be willing to adjust preferences, but they failed to do so (Hendriks et al., 2007:370). Both the partisan and nonpartisan forums included participants that stuck to their positions, but non-partisan participants had greater autonomy "so their deliberative capacity can be judged superior to that of partisan forums" (Hendriks et al., 2007:371).

In the study by Hendriks et al. (2007:372) legitimacy is defined and operationalized as: "the extent to which key actors, decision-makers and the media accept and support the procedure and its outcomes." In other words, the legitimacy (as defined in that study) is grounded on actors largely outside the forums active in the deliberation processes. This study also showed (by interviews of experts themselves) that the deliberation by citizens and capacity of lay people was questioned by some experts (Hendriks et al., 2007: 373-374).

In addition to this distinction of external legitimacy, the concept of legitimacy is in the literature largely divided in strategic and institutional legitimacy (Suchman, 1995:572). The strategic tradition stresses the managerial standpoint in how organizations making legitimate strategies resulting in manipulating to gain societal support. Hence, rather than emphasising participatory processes (and the inherent process values), these values and the participatory process can be by-passed by e.g. “astroturfing”² or other strategic options adopted. The branch of institutional studies of legitimacy, instead, emphasizes the “normative and cognitive forces that constrain, construct, and empower the organizational actors” as described in Suchman (1995:571) examining the two approaches. The conclusion of this examination of the two parallel domains of research on legitimacy concludes three categories: pragmatic (based on audience self-interest), moral (based on normative approval) and cognitive (based on comprehensibility and taken-for-grantedness). In practical cases one of these categories can be more protruding or legitimacy being a blend of these three. The external legitimacy category, discussed previously, share some common traits with the audience self-interest category (labelled pragmatic) in the sense that actors external to the deliberative process (the audience consisting of experts and media) has a strong saying in the legitimate value of the outcome.

The constellations of forums and involvement of stakeholders in governance processes is also featured in studies recognised as communicative planning theory (Healey, 1996) and the question also becomes relevant when implementing future-oriented development in European metropolitan regions (Healey 2000). Campbell (2006) underlines that conceptualization of justice in contemporary planning theory is much about procedural concerns. However, individual liberties may be in conflict or as Campbell (2006:95) puts it: “In relation to planning matters, the nature of interests is often complex and problematic; for example, individuals generally both desire clean air and to be able to drive their car(s) freely. Our preferences are therefore often inconsistent and overlapping.”

Also the previous work with Swedish futures studies construction in the 1960-70s having aims at democratic scenario construction by proposing a “particular responsibility to society’s weakest groups” (Andersson, 2006:288). At that time these groups were discussed in terms of the “weakest groups” (including the poor, elderly, unemployed and the disabled).

Other examples of relevance when discussing communication among actors can be found in game theory (Sally, 1995). Conditions where reciprocity and trust can help overcome self-interests are built by “cheap talk”. As we will see, content sustainability, capacity to act and legitimacy are intimately connected. Findings from studies of collective actions frequently find that “when the users of a common-pool resource organize themselves to devise and enforce some of their own basic rules, they tend to manage local resources more sustainably than when rules are externally imposed on them” (Ostrom, 2000:148). Common-pool resources are in this case understood as “natural or humanly created systems that generate a finite flow of benefits where it is costly to exclude beneficiaries and one person’s consumption subtracts from the amount of benefits available to others” (Ostrom, 2000:148).

² Astroturfing is here used in the American way, as a way of describing formal public relations campaigns in politics that tries to look like grassroots movement. The term is referring to artificial grass – Astroturf.

The explanation from game theory is that individuals obtain results that are “better than rational” when they are allowed to communicate, or do “cheap talk” as some economists call it (see e.g. Ostrom, 1998). In other words, communicative approaches can make collaboration work better since people have the possibility to bond with each other. From this reasoning we conclude that in a process where participants are active, open to preference shifts and are allowed to actually influence the result, both the content sustainability and the capacity to act might increase. However, similar reasoning about legitimacy of these processes suggests that people that are not allowed (by some reason) to take part in the process might not experience the result as legitimate. Thus, the external legitimacy might be low.

The deliberative approach to scenario construction raises several questions about involvement of different types of groups and at what points in time (once or repetitive stakeholder participation) the process is opened up to citizens affected by measures adopted to mitigate of and adapt to climate change. Also the involvement of lay people besides scientific experts in increasingly complex questions (involving trade-offs synergies and inter-relationships between adaptation and mitigation strategies) give renewed urgency to find ways to incorporate views from diverse stakeholder groups or non-partisan forums to ensure the development of robust strategies and socio-economic models. It is also a question if the lay people participating in the process are invited to primarily learn during the process, or actually influence the outcome of the process. Here the planning tradition of stakeholder participation can also benefit from previous work in the area of participatory science and technology studies, discussed in the following section of this paper. Furthermore, the following section also brings attention to other central concepts based on previous literature when examining the adaptation and mitigation interface.

ADAPTATION AND MITIGATION PATHWAYS

This section of the paper accounts for policy options and strategies for adaptation and mitigation departing from strategies of the United Nations Framework Convention of Climate Change (UNFCCC). It discusses some of the changes towards climate policy integration of the adaptation and mitigation pathways and implications that can be foreseen for deliberative planning processes involving stakeholders in scenario construction. Further on, we also include a discussion of the central related concepts such as resilience, vulnerability and robustness from the growing literature on socio-ecological systems. Thereby, the section also contributes with a conceptual discussion on adaptation and mitigation in addition to accounting for the different types of inter-relationships described by the Intergovernmental Panel on Climate Change (IPCC).

The integrated mitigation-adaptation standpoint is outlined in chapter 18 in IPCC 4th report and focus on examining the inter-relationships between adaptation and mitigation and proposes four types of inter-relationships (Klein et al., 2007). These include adaptation actions with consequences for mitigation; mitigation actions that have consequences for adaptation; decisions that include trade-offs or synergies between adaptation and mitigation; and processes that have consequences for both adaptation and mitigation (Klein et al., 2007:748). The report also reflects on the balance of choosing strategies based on reducing the costs of mitigation or adaptation versus the costs associated with impact if no actions are taken (Ibid). Other

approaches to examine the mitigation-adaptation nexus are concerned with how “mitigation and adaptation synergies provide avenues for integrating sustainable development with climate policy, contextualized with respect to key relationships between the Millennium development goals and access to energy” (Venema and Rehman, 2007:875).

In discussing adaptation in the context of this paper, we mainly focus on scenario construction concerned with human settlements in urban areas, rather than focusing nature’s adaptive capacity when responding to impact of climate change. Having said that, naturally the cities we live in and natural resources we use are dependent on the surrounding landscape, water supply and other resources. These scenarios in focus of this paper thereby also include socio-economic and behavioural choices of citizens. These scenarios can provide ideas of adaptation measures and capture structural changes in society (Carlsen and Dreborg, 2008).

As outlined in the IPCC report on inter-relationships between adaptation and mitigation (Klein et al., 2007) the concept of adaptation is also applied to the level of sectors and communities’ adaptation processes. “Climate policy is being expanded to consider a wide range of options aimed at sequestering carbon in vegetation, oceans and geological formations, at reducing the vulnerability of sectors and communities to the impacts of climate change by means of adaptation”. (Klein et al. 2007:748).

The related concept of vulnerability has also been approached using vulnerability scores for countries, regions and communities (Smit and Wandel, 2006). In this approach, by calculating vulnerability scores, one may run the risk of using a rather mechanical approach to discussing strategies for reducing vulnerability, as in early approaches described in Wisner and Luce (1993). However, it can open up for identifying adaptation strategies that are feasible and practical in communities (Smit and Wandel, 2006:282). Also the discussion on “creeping vulnerabilities” can serve the purpose of identifying vulnerability aspects that are less obvious at a shorter time scale (Liotta and Shearer, 2005) when searching for strategies combining mitigation and adaptation pathways. Institutional adaptation is further examined in studies of resource management and concludes that “in there is recognition that flexibility and resilience are important characteristics of societies where environmental and societal risk permeate decision making” (Adger, 2003:201).

The concept of resilience, based on pioneering work by Holling (1973), incorporate several interpretations focusing on different types of capacity (in nature, a community or a system). Resilience is understood as different views on nature’s capacity to absorb shocks and still maintain function, but also the capacity for renewal and re-organization and development. (Folke, 2006:253). A special branch of resilience studies that focus on “social-ecological resilience” (and how it translates to search for novel climate solutions and learning) is further discussed later in this paper. Applied to the level of the community, this description with focus on renewal, re-organization and development share some common ground with contemporary science policy. Like in climate change policy there is a growing concern about generating participatory processes engaging both lay people and experts in discussing advances of science and development of new technical applications. We argue that these approaches to public engagement in science (see e.g. Wilsdon and Willis, 2004; Stirling, 2008; Lengwiler, 2008; Chilvers, 2008) also have direct relevance for advancing processes of

participatory planning, for example stakeholder participation in climate change scenario workshops. The reason for this is twofold.

Firstly, with increasing focus on adaptation measures (in combination with mitigation strategies) the roles of scientific experts can be further increased, also including assessment of the trade-offs and synergies between adopted climate measures. With increased complexity, this can naturally be followed by reduced possibility for lay people to influence. This can create contested outcomes that, in turn, guide policy that influence citizens directly. Here, experiences from studies of public engagement in science (where scientific expertise is at the core) and approaches such as deliberative mapping (DM) can contribute with useful insights to climate policy. This deliberative method is used for engaging both specialists and citizens in “the same appraisal process, providing for consistency of framing, mutual inter-linkage and interrogation, and substantial opportunities for face-to-face discussion” (Burgess et al. 2007:299).

Secondly, this branch of science and technology studies also emphasise the importance of citizen and user participation in both public and corporate science framed in the context of open innovation (Wilsdon and Willis, 2004:48). The arguments are not solely based on legitimization or ensuring democratic processes also in advances in and innovation strategies for science and technology. Rather, the arguments are that open innovation flows (that also builds on citizen and user participation) enable seeking out attractive diverse ideas; incorporate these ideas with existing corporate knowledge to create new products, services and technology; and also excelling at innovating in use, with active consumers improving innovations by having an active role in how services and products are used (Wilsdon and Willis, 2004:50). This is also described as a way to open-up processes to ensure robustness (Stirling, 2008).

Another type of studies is concerned with robustness of adaptation decisions, as in the example applied to water resource plans by Dessai and Hulme (2007). Here the perspective is addressing another type of robustness, than the previous perspective relating to participatory processes in science policy processes. Robustness in the study of adaptation decisions describes robustness of these models in relation to uncertainties in climate change models. In deliberative science processes, discussing future options of science and technology choices, the robustness of the decisions stemmed from involvement of stakeholder and citizen interests and view in order to achieve action plans and policies that were strengthened by both legitimacy and anchored in citizens’ views.

CITIZENS IN VISIONARY ACTIVITIES

One of the crucial questions when involving stakeholders relates to using methods to generate options that will visualise how choices made today can affect citizens’ future lives in different ways. The idea is to stimulate processes open to different possible scenarios without experts steering the process too much. On the other hand, in scenario construction the learning aspect of citizens is also important. This aspect is discussed in this section providing experiences from Swedish participatory scenario construction generating images of future urban life. This study discusses both the

processes for recruiting stakeholders to the scenario making processes and also reflects on the learning (and other process values) of stakeholder participation. The process-oriented goal of learning in deliberative scenario construction is highlighted in the research project ToolSust (Carlsson-Kanyama et al., 2003a, 2003b, 2008). We bring up this particular example from a European project in order to discuss further the tension arising between scenario content goals and process-oriented goals, such as learning. The main objective of the ToolSust project was to “develop, test, improve and implement environmental tools for various groups of stakeholders concerned with a sustainable development in the city of tomorrow” (Carlsson-Kanyama et al., 2003a:2).

When recruiting stakeholders to the workshop intended for scenario construction, several approaches were used. These included (Carlsson-Kanyama et al., 2003b:7): inviting all local politicians and reminding the political parties that did not respond the first time, putting a notice on the noticeboard at the local information centre, using all possible personal contacts, giving invitations to local business at the spot, and sending invitations to all local organisations. In the letter sent out with the invitation it was also emphasised that the participants did not have to know anything in particular about environmental issues, but that it was important that they were committed to the local area (Södermalm located in south part of Stockholm) and also considered environmental and future issues to be important. The workshops were therefore not partisan forums where different stakeholders were represented. Neither were they really non-partisan forums since the participants did have special interests in environmental issues and they were not randomly selected. At the workshop, the focus was on the daily lives in the city from the viewpoint of the participants and the time horizon of year 2040. The four different scenarios were named: “Together in Green Söder”, “Efficient systems in the big city”, “Together in the big city”, and “Efficient systems in Green Söder”. These scenarios were identified by researchers carrying out the study and based on the numerous suggestions of future urban life in 2040 made by participants at the first workshop. The four scenarios were also outlined in the material provided to participants of the second workshop. The two dimensions used to formulate these scenarios were: 1) How land is used on Söder (for green areas or concentrating on the settlement/housing), and 2) How society is organized, vertically (top-down) or horizontally (bottom-up).

In the overall evaluation (following the involvement of citizens in the two scenario workshops arranged in Stockholm) the citizens participating in the workshops were asked to respond to statements to do with intended results, and also to unintended but plausible results. These results ranged from that the “meetings opened up new perspectives for how one could live in the future” to that the “meetings contributed to more knowledge on environmental issues” (Carlsson-Kanyama et al., 2003a:17). One of the least valued statements (on a scale from 1=don’t agree at all to 5=agree fully) related to the actual way the process generated a factual change in the way of living “The meetings contributed to me living in a more environmentally friendly way from now on” (mean score 2,5). On the contrary, the statement receiving the highest score on the opinion scale used was “The meetings opened up new perspectives for how one can think about the future” (mean score 3,8). Linked to the discussion on stakeholder groups, while also recognising the rough estimates derived from using this type of opinion scales, this can be interpreted in two ways. Either the process is to be seen as an eye-opener about future options rather than achieving more environmentally

adjusted behaviour. The alternative interpretation is that the citizens participating in these workshops were already considering themselves as concerned citizens taking environmental responsibility in their daily life, hence the relative low valuation on the impact of the meetings on living a more environmentally friendly life.

Within the project calculations were made to see whether the proposed images of the future would imply energy reductions. Carlsson-Kanyama et al. (2008:43) found that the scenarios constructed in the different cities showed a substantial potential energy reduction, which is a way of mitigating climate change, related to household consumption: 19-57% compared to now. The result in the Swedish scenarios was 43-57% (Carlsson-Kanyama et al., 2003b:33). However, they also write that “there is evidence that even if all popular ideas for sustainable city life were implemented and even if much more efficient technology than today were used, the energy reductions per capita would not be sufficient when long-term goals such as a 66% reduction are considered” (Carlsson-Kanyama et al., 2008:44). Thus, the extensive participatory processes aiming at constructing sustainable futures scenarios were less radical than the changes researchers have set out as necessary (Carlsson-Kanyama et al., 2008). Mitigation strategies were not strong enough and adaptation was not highlighted. This might depend on the fact that it is extremely difficult for people to think “outside the box” and Stevenson writes that he has “found that most visioning techniques currently used to identify and flesh out on alternative futures fail to break out of traditional mindset” (Stevenson, 2000:101). It is therefore important to develop new visioning techniques that help us to realise what discourses we are trapped in today and maybe, if possible, think outside today’s norms. Also, the workshops were not legitimate in the sense that they could form policies and they were not legitimate in the sense that key-actors (such as the experts calculating the expected energy reductions) could accept them. Hence, suggesting that external (audience) legitimacy was not considered achieved in the strict sense since the expert judgement was that the actions suggested were not enough to achieve the content goals that were formulated. However, the workshops showed that there are some popular ideas around for sustainable city life that are probably easy to get acceptance for. Those concern for example “more local and organic food, a greener environment, better public transport and opportunities for nonmotorised transport and a reorientation of values” (Carlsson-Kanyama et al., 2008:44). The existence of parks and green spaces is also formulated on the agenda for creating environmentally sustainable neighbourhoods (Choguill, 2008:44).

These experiences from engaging citizens and other stakeholders in visionary activities show that tensions can arise between values and norms that are built into the methods used in constructing the scenarios. Here, we point at that the process gives rise to tensions between sustainability content values, such as reduced climate impact, and more process-oriented values such as building trust, learning and mutual understanding. Learning and search for novel solutions using climate change scenario approaches also entails the concept of adaptive capacity. In the field of work described as *Social-ecological resilience* the concepts of adaptive capacity, transformability, learning and innovation is in focus and furthermore adding that resilience “is also about the opportunities that disturbance opens up in terms of recombination of evolved structures and processes, renewal of the system and emergence of new trajectories.” (Folke, 2006:259). Participatory vulnerability

assessment approaches also look into the future by examining future “exposures and sensitivities (what conditions or risks the community may be facing) and future adaptive capacity (in what ways the community may potentially plan for or respond to these conditions) to determine future vulnerability.” (Smit and Wandel, 2006:289). Although the two areas focus on different concepts (resilience and vulnerability) they both target increasing the robustness of action plans implemented to reduce climate change.

DISCUSSION

The challenge of handling both content and process values in participatory processes where scenarios for future sustainable urban development are created is discussed in this paper. If the focus is only on process values, the content is not necessarily sustainable. On the other hand, if the focus is only on content values, the resulting scenario may lack institutional legitimacy and will not be able to take necessary actions in implementing policies towards a sustainable development with reduced climate impact. In discussing the inter-relationships between mitigation and adaptation, the concepts of resilience and vulnerability are of direct relevance in participatory approaches in constructing scenarios. Depending on participants’ view on and understanding of vulnerability and resilience, the question of *what* and *when* climate measures should be taken, becomes contested. Thus, influencing what environmental issues have priority and when measures to address this are implemented. This is the case for both scientific experts and lay people participating in processes aiming at creating robust climate strategies.

This paper emphasizes the importance of both content and process values in constructing climate scenarios. If the content values are not safeguarded, the scenario constructed does not reach important target as reduced climate impact. On the other hand, if process values are not safeguarded, the outcome is not legitimate. However, as stated earlier in this paper, these values cannot be built if the process is by-passed by e.g. astroturfing. Instead, participative processes must be honest and clearly defined processes as a way to involve people in creating sustainable outcomes and implement robust action plans. However, there is also a risk that deliberative planning process could be used as legitimizing unsustainable outcomes. This balance also includes considering benefits of open innovation knowledge flows in climate policy where users’ (or citizens’) knowledge is utilised in developing robust and efficient national- and corporate strategies for adaptation and mitigation. The timing of participation therefore becomes crucial. Partisan as well as non-partisan forums can help identify popular measures for mitigation and/or adaptation that could form the basis for legitimate and robust policies – that is policies that will be accepted by the general public and therefore possible to carry through. However, when creating sustainable future scenarios it is also important that experts are engaged in formulating content targets as well as calculating the expected results on climate change of the lay peoples’ suggestions. After this, the results can be brought back to the lay people to provide a chance to adjust their suggestions. This use of this iterative process is also suggested in the light of open innovation processes where involvement of users is key in search of novel solutions

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