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Towards extended shared socioeconomic pathways: A combined participatory bottom-up and top-down methodology with results from the Barents region

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1. Introduction

Adaptation to climate change is often a reaction to events that have already taken place (Ford et al., 2011), and a major challenge in adaptation planning is to shift attention from the past to potential future developments. One response comprises efforts to provide regionally and locally relevant information by downscaling global climate change scenarios (Koenigk et al., 2015; Pielke and Wilby, 2012) and to use the results as a basis for impacts assessment on biophysical and socioeconomic systems. While such information is useful to planners who focus on climate-related risks to society, a lack of attention to the complex local context within which climate change takes place often creates a gap in communication and issue framing between climate experts and practitioners (Pilli-Sihvola et al., 2015). There is thus a need to move beyond downscaling and develop approaches that allow local and scientific experts to share their respective perspectives, in order to generate practice-oriented and context-dependent interpretations of climate change scenarios (Swart et al., 2014).

The aim of this article is to present and discuss a method for generating locally relevant scenarios of future change nested in scenarios that focus on global change. The method combines participatory workshops with the use of narratives from the scenario framework developed by the climate change research community (Moss et al., 2010; O'Neill et al., 2017).

The article also presents results from using this method in four workshops in the Barents region (northern Fennoscandia and northwest Russia) and relates these results to elements of the global narratives. The overarching question we explore is: What future changes may influence the Barents region economically, environmentally and socially within the perspective of one to two generations? The question addresses a gap in knowledge about how the interaction among different drivers of change may affect adaptation action at the local level in general and in this region in particular. Based on this empirical material, the specific question for this paper is what further perspectives the engagement with local and regional actors can bring to narratives about global change.

2. Scenarios and narratives as tools for adaptation planning

Barriers to climate adaptation has become an important theme in the recent literature, with calls for attention to human perception, institutional change, equity (Hinkel et al., 2016), and to issues that local actors perceive as critically important for the development of their community (Hovelsrud and Smit, 2010; Barros et al., 2014). They may include shifts in global markets, changes in policy direction at the national and international level, demographic changes, and technology development, to name a few. While recent years have seen increasing efforts to provide user-friendly climate services (Hewitt et al., 2012; Lourenço et al., 2015 and references therein), including web portals that inform about projected future temperature and precipitation patterns down to the scale of individual watersheds (e.g. SMHI, n.d.) or municipalities (e.g. Climateguide.fi, n.d.), approaches that capture societal changes that affect adaptation processes and barriers to adaptation are less developed. At the same time, many important socio-economic drivers of change are linked to very high levels of uncertainty in a time perspective of a few decades or even shorter. Planning for adaptation and addressing potential adaptation barriers therefore becomes a matter of anticipating a range of possible futures with different

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sets of potential challenges. One tool suggested for such work is the use of scenarios (Swart et al., 2004).

2.1. Scenarios as a method to capture potential future change

In the global climate community, scenarios about socio-economic futures have played a major role in making projections for future emission of greenhouse gases (e.g. Nakicenovic et al., 2000). In addition, local scenarios have been used for assessing impacts of future climate change (Berkhout et al., 2002) and for adaptation planning (Kok et al., 2007; Baard et al., 2012; Carlsen et al., 2012; Berkhout et al., 2014).

As described in more detail in Section 3.1, a global scenario framework has been developed aimed to be relevant for projecting future emissions and for local adaptation planning. However, in order to capture the complexity of different local contexts, we argue that it is necessary to engage with local actors in order to create local storylines within the framework of global narratives, rather than attempting to compress narratives of change from the global framework to fit local contexts. To retain some of the advantages of working within a common framework, we propose a combined top-down and bottom-up approach that uses four of the global SSPs as common boundary conditions in the production of > extended SSPs" in a bottom-up process that involves co-production of knowledge in local workshops. One of those advantages is that it facilitates comparability between different case studies (Ebi et al., 2014).

There are several ways of developing geographically nested socio-economic scenarios, but the most important distinction is perhaps between top-down and bottom-up methodologies (Absar and Preston, 2015; Biggs et al., 2007; Kok et al., 2006). Top-down approaches take their starting point in a global perspective, where descriptions of global development, e.g. the global SSPs, are used as boundary conditions to set the scene for potential future developments in more specific contexts. They are often developed by experts within the scientific community. By contrast, bottom-up approaches take their starting point in a specific domain, e.g. local region or a societal sector. They often engage stakeholders as an important part of the methodology (Carlsen et al., 2012; Kok et al., 2006; Nilsson et al., 2015), and thus tend to include attention to local or sector-specific knowledge. In the literature, the term bottom-up is used also for scenario exercises that do not have any linkages to global scenarios. However, to be compatible with the definition of top-down approaches above, we prefer to reserve the term > bottom-up" to contexts where the ambition is to link locally developed scenarios to scenarios focusing on higher levels scales.

2.2. Narratives as a method to capture local contexts

Narratives play a central role in our methodology and their role therefore warrants some reflection. In the context of scenarios, narratives are internally consistent qualitative descriptions of how the future might develop. Narratives can be articulated in many ways, both by experts providing narratives to communities, or by communities themselves constructing narratives based on discussions about challenges and possibilities for future developments (McIntosh et al., 2000; Daniels and Endfield, 2009).

The rationale for using narratives to improve communication and learning about climate change and adaptation is that people do not randomly add new information about climate to a loose conglomeration of earlier knowledge, but rather that they construct mental models which aid in making sense of observations (Kempton et al., 1996). These mental models are simplified representations of the world and exhibit story-like properties (Bruner, 1991). As we develop future narratives about changes in our social-ecological systems, our stories and past experiences determine our understanding and adaptation in practice: how uncertainties and risks are defined, who is authorized as an actor in the debate about change, and what range of policy options is considered (Paschen and Ison, 2014). The use of narratives can therefore help in translating complex scientific data into a form that is related to locally relevant concerns and perceptions. Narratives can also be used in combination with participatory research methods to bring information to the table that is not initially framed in scientific language, including the expertise and experience of local and regional actors, facilitating the translation of local knowledge into policy-relevant data (Bay-Larsen and Hovelsrud, 2017). Such data can for example serve as input to so-called story and simulation approaches that combine qualitative and quantitative data in integrated assessment models (Alcamo, 2008).

The use of narratives in research also warrants reflection about power and how it can influence research outcomes, regardless of whether the narratives are produced by scientific experts or in participatory processes. Narratives come into existence through social networks across different institutional, cultural, geographical scales, where specific perceptions of problems and solutions are the result of societal processes in which some worldviews (values and perceptions) appear as more legitimate and relevant than others. The constructed nature of narratives means that different plotlines of future developments can be drawn from the same facts and often include underlying assumptions that are not always transparent. One can think of these processes as random without a specific goal or ambition, but they may also be facilitated by particular interest groups or power networks, and emerge as a > group story" that gains hegemony, and thereby power, over narratives told by less dominant actors (Paschen and Ison, 2014). Such power dynamics occur at both the local scale and in international discussions. An example of built-in assumptions is when crisis narratives emphasize the power of global climate systems in ways that drown out narratives that highlight the role of human agency, including civic participation and local communities as actors in decision-making (Bravo, 2009).

Because narratives about the future are reflections of contemporary knowledge, discourses, ambitions, and power relations, there is a need to reflect on who takes part in constructing narratives and how language, social roles and relationships influence the communicative situations in ways that ultimately enable or inhibit agency. Moreover, it becomes relevant to explicitly address the role of power relations in the narratives as such. Narratives about Arctic futures have a long history that has often been linked to political ambitions for the region (Bravo and Sörlin, 2002) and tend to include > a rhetorical role in producing futures" (Avango et al., 2013). As climate change impacts are becoming increasingly visible in the Arctic, there has been a recent surge in the production of scenarios of Arctic futures (Arbo et al., 2012). We argue that this context makes it especially relevant to involve local and regional Arctic actors in the construction of narratives about the region < s future.

3. Method and empirical setting

3.1. Towards extended shared socioeconomic pathways

A new global scenario framework has recently been developed aimed at serving the modelling community working on integrated assessment, the global emission scenario community, as well as more locally focused studies of impacts, adaptation, and vulnerability (O'Neill et al., 2014 and references therein). Besides including a set of Representative Concentration Pathways (RCPs) used as input to climate models, the framework consists of the Shared Socioeconomic Pathways (SSPs) that outline different assumptions of global development pathways addressing the uncertainty space of adaptation and mitigation challenges (O'Neill et al., 2014, 2017). The purpose of the new framework is to provide a better tool for regional, local and sectoral analysis of impacts and response strategies.

The SSPs focus on qualitative descriptions of future changes in demographics, human development, economy and lifestyle, policies and