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A framework for Nordic actor-oriented climate adaptation research

Richard J.T. Klein ^{a,b,*}, Sirkku Juhola ^{c,d}

^a Stockholm Environment Institute, Linnégatan 87D, Box 24218, 104 51 Stockholm, Sweden

^b Centre for Climate Science and Policy Research and Department of Thematic Studies, Linköping University, Sweden

^c Department of Environmental Sciences, University of Helsinki, Finland

^d Department of Real Estate, Planning and Geoinformatics, Aalto University, Finland

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ABSTRACT

The past ten years have seen a substantial increase in research on climate change adaptation, but a large gap remains between adaptation research and action. Adaptation researchers have either failed to demonstrate the relevance of their findings to practitioners and policymakers, or stakeholders have based their views and decisions on other kinds of information. In addition, in sectors such as agriculture, forestry, nature conservation, urban planning, water management and energy supply, adaptation has been studied separately from mitigation, which contradicts the reality of many practitioners. This paper identifies five bottlenecks to the use of adaptation research in adaptation practice and policy. These bottlenecks have gone unnoticed because the traditional framing of adaptation does not adequately consider the notion of agency, often rendering stakeholder interactions ineffective. Knowledge and use of actor-oriented theory when analysing and discussing adaptation needs and options could serve to find ways to overcome the bottlenecks and narrow the gap between research and action. The paper presents a novel framework for actor-oriented adaptation research that is being conducted within the Nordic Centre of Excellence for Strategic Adaptation Research (NORD-STAR). It frames climate adaptation as addressing both the impacts of climate change and the consequences of climate policy. Two methodological approaches – modelling and visualisation, and policy analysis – are applied to three thematic issues: land-use change, energy transitions, and insurance and finance.

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1. Introduction

Much recent research has focused on understanding if and how policymakers and other stakeholders consider, take up and use scientific information (e.g., Hertin et al., 2009; Juntti et al., 2009). It has become clear that the link between science and policy is usually not linear but involves a range of diverse

actors with often competing or incompatible interests and power relationships. To appreciate the complex nature of the science-policy interface is particularly important when it concerns an issue characterised by high reliance on science to inform necessary action, both now and in the future. Adaptation to climate change is such an issue.

Within the proliferating field of climate change adaptation, the focus of research has shifted from being dominated by

* Corresponding author at: Stockholm Environment Institute, Linnégatan 87D, Box 24218, 104 51 Stockholm, Sweden. Tel.: +46 73 7078525.

E-mail addresses: richard.klein@sei-international.org (Richard J.T. Klein), sirkku.juhola@aalto.fi (S. Juhola).

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model and scenario analysis to examining the characteristics of society and the parts played by individual or institutional actors (Biesbroek et al., 2010; PROVIA, 2013). The Nordic countries have been amongst the active contributors to this shift and generally have made great advances in climate adaptation research over the past ten years. The Nordic countries have also put adaptation high on their domestic political agendas. All five countries have initiated policies and measures at the national level to advance adaptation planning and implementation. In addition, action to adapt to the changing climate is increasingly being taken by municipalities and regional authorities across the Nordic region.

In spite of these developments, the impact of adaptation research on adaptation policy and practice has been relatively low, both in the Nordic region (e.g., Westerhoff and Juhola, 2010; Dannevig et al., 2012) and elsewhere (e.g., Vogel and O'Brien, 2006). There has been a disconnect between adaptation research and action, even though both came to the fore at around the same time. Based on a review of the literature on climate adaptation research and action in the Nordic countries, this paper identifies five bottlenecks to the use of adaptation research by stakeholders. The bottlenecks are related to the prevailing conceptualisation of adaptation, the type of scientific knowledge considered to support adaptation action, and stakeholders' realities of adaptation decision-making.

The paper then proposes an actor-oriented approach to adaptation research to overcome these bottlenecks. Central to this approach is to consider adaptation as addressing not only the impacts of climate change but also the consequences of climate policy. This new conceptualisation is now being applied in the Nordic context; it should produce research results that can more directly contribute to adaptation policy and practice by relating to stakeholders' roles and priorities, and the circumstances in which they make decisions.

2. Nordic adaptation challenges

The Nordic region comprises Denmark, Finland, Iceland, Norway and Sweden, as well as the Danish associated territories of the Faroe Islands and Greenland, and the Finnish associated territory of Åland. The Nordic region has a combined population of 25 million, and all five countries are ranked within the top 25 of the Human Development Index (UNDP, 2013). The Nordic countries have long cooperated in economic, political and environmental issues, with much cooperation taking place through the Nordic Council, established in 1952. The countries' political systems are similar, characterised by representative democracy with highly devolved decision-making authority at the local level.

As the reliability of regional climate change projections continues to increase, so does confidence in expected changes in the Nordic countries. Although regional variations exist and uncertainties remain, Nordic countries will experience an increase in mean temperature, with the greatest warming in the winter, as well as an increase in annual precipitation (IPCC, 2007). This level of warming is considerably higher than the expected global average. In addition, precipitation (both rain and snow) is likely to increase in winter, and one-day

precipitation extremes are expected to become more severe throughout the year (IPCC, 2007). Sea-level rise will pose challenges for low-lying areas along both the Baltic and the North Sea coasts (BACC Author Team, 2008).

Future changes in climate and sea level will have a range of impacts on the Nordic region, affecting ecosystems, the built environment and other physical infrastructure, and economic sectors such as forestry, agriculture, fisheries and tourism. The Nordic region is not considered particularly vulnerable to climate change (Greiving et al., 2011), yet economic costs could be significant (Hallegatte et al., 2011) and changing climate extremes could lead to additional fatalities from weather-related hazards (Wichmann et al., 2011; Rocklöv and Forsberg, 2010). In addition, ecosystems could undergo irreversible change, especially in the Arctic and Subarctic regions (IPCC, 2007; Kirilenko and Sedjo, 2007). Not all impacts of climate change will be negative: climate change can also create opportunities, for example for agriculture and tourism (Tervo, 2008).

Adaptation would serve both to reduce vulnerability to the adverse effects of climate change and to prepare for new opportunities. Compared with other parts of the world, the Nordic countries have high adaptive capacity (Greiving et al., 2011), although this may not necessarily be the case for individual communities, households and firms (O'Brien et al., 2004; Keskitalo et al., 2011; Juhola et al., 2012a,b). Moreover, complacency due to the low perceived risk of climate change could mean that despite high adaptive capacity, action is not taken to prepare for potential impacts (O'Brien et al., 2006; Johannessen and Hahn, 2013). On the whole this suggests there are several adaptation challenges in the Nordic countries, both for research and policy.

The analysis presented in this section and in Section 3 is based on a literature review. Using the Thomson Reuters Web of Science (WoS) database, the authors searched for all papers published during the period 1945–2013 containing the keywords “climate change adaptation”, “climate change and energy policy” and “climate change and land use policy”, combined with any one of the following: “Nordic”, “Denmark”, “Finland”, “Iceland”, “Norway” and “Sweden”. This search yielded 1427 articles, 34 of which address issues related to the gap between adaptation research and action, or contain other findings relevant to the analysis presented here. In addition, 24 publications cited in this paper are not included in WoS but also informed the analysis. The latter set of publications consists of articles in journals not indexed by WoS, government reports and other kinds of grey literature with which the authors are familiar.

2.1. Adaptation research in the Nordic countries

Climate change had become a priority for the Nordic countries when the Intergovernmental Panel on Climate Change (IPCC) was established in 1988 and the United Nations Framework Convention on Climate Change (UNFCCC) was agreed in 1992 (Nordic Council of Ministers, 1995). The Nordic approach to climate change would mirror the way in which other environmental issues had been analysed and tackled, with policy informed by scientific research and driven by the political resolve to protect the environment (Sairinen, 2001; Engström et al., 2008). In the 1980s, for example, acid rain and

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