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A state of the art of governance literature on adaptation to climate change: towards a research agenda

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Adaptation to climate change is, in practice, a social and institutional process. More specifically, we argue that adaptation to climate change is a matter of governance. The body of literature on governance has supplied useful tools and insights to deal with wicked problems. Adaptation to climate change can be considered as an example of a wicked problem. The issue involves many actors, sectors and scales, hence significant barriers to reaching consensus. Moreover, values involved portray fundamental conflicts. In addition, the knowledge and information needed and available is not sufficient and sometimes even considered controversial. And not in the least, the problem crosses all thinkable boundaries and routines, requiring both immediate action and long-term horizons. In other words, the issue of adaptation to climate change seems to be a sheer all-encompassing problem for today's society. Governance interpreted as the mode of horizontal interactions between public and private parties through both formal and informal structures in order to solve complex societal problems implies a promising approach to the adaptation to climate change. A systematic review of literature within the domains of (I) environmental studies, (II) planning

and development, and (III) public administration has lead to the demarcation of four general themes relevant to our notion of governance of adaptation: (1.) conceptual frameworks, (2.) assessment tools, (3.) adaptive policies and strategies, and (4.) science-policy relations. For each of the four themes, a research agenda has been formulated and argued, based on the literature study. The proposed research agenda for the theme on conceptual frameworks includes the topics (a.) critically scrutinizing the normative concept of adaptability, (b.) practical evidence of adaptive management/governance in the field of climate adaptation, (c.) other governance concepts for managing uncertainty and unpredictability, (d.) incrementalism and punctuated policy change (e.) theoretical multiplicity, (f.) the dark side of politics, (g.) designing innovative institutional arrangements, (h.) trajectory management and (i) changing governance. The research agenda for the theme of assessment tools includes (a.) mitigation- adaptation trade-offs and demarcations, (b.) knowledge dissemination and enhanced decision- support systems, (c.) non-linearity and shock events: damage control, (d.) risk perception and (e.) investigation of potentially useful assessment tools. The research agenda for theme of adaptive policies and strategies includes (a.) new concepts of climate proof urban development strategies, (b.) integration of adaptive policy measures into land development processes, (c.) land policy and restructuring the urban landscape, (d.) evaluation of finance principles and (e.) comparing delta regions. The research agenda for the theme of science- policy relations includes (a.) analysis and evaluation of science-policy interactions in climate policies so far - lessons to be drawn, (b.) designing boundary arrangements and/or transdisciplinary processes at the regional and national level and (c.) science system assessment. The paper is concluded with some general remarks and observations. We have come to the conclusion that the field of (governance of) adaptation to climate change is dominated by the natural sciences or scientists that have a background in that part of the scientific community. Much knowledge within the social sciences has been left unused and relatively little attention has been paid to organizational and institutional dynamics. Our paper aims to increase the relevance of the social sciences approach to the issue of adaptation to climate change.