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Identifying and overcoming barriers in urban climate adaptation: Case study findings from the San Francisco Bay Area, California, USA



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ABSTRACT

The persistent gap, termed the “adaptation deficit,” between the assumed ability of communities to adapt to climate change and the on-the-ground evidence of their progress to adapt is well-documented. To at least partially explain this adaptation deficit, a growing number of researchers have focused on the existence and nature of barriers to adaptation and about society’s ability to overcome them. This paper presents an empirical study that systematically identifies barriers to adaptation processes in the San Francisco Bay Area, California, USA. To do so, a theory-driven framework, previously developed by the authors, was used here to identify, organize, and diagnose barriers in four cities and one largely urbanized region. The study identified as the most frequent type of barrier encountered in these cases is related to institutional and governance issues, followed by the attitudes, values and motivations of the actors involved. Resource and funding constraints also matter, but scientific and technical issues are far less prominent than often presumed. The theoretical framework was found to usefully support the empirical identification and organization of barriers and to provide a “road map” for designing strategies to circumvent, remove, or lower the barriers and thus come closer to closing the adaptation deficit.

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1. Introduction

Adaptation to climate change has risen sharply on the scientific and policy agendas in recent years (Adger et al., 2007; Moser, 2009; Preston et al., 2009). A growing number of researchers has attempted to explain a widely observed “adaptation deficit” (Burton, 2009), i.e., a gap between what might be considered a well-adapted society to the existing climate and the actual and inadequate adaptation achievements of that society. This deficit is not only common in poorer nations and communities of the developing world, but also evident in developed nations like the US as inadequate preparedness for disasters, continued development in high-hazard areas, and growing losses from weather-related extreme events indicate (National Research Council, 2010). To at least partially explain this adaptation deficit, some researchers have focused on the existence and nature of barriers to adaptation and about society’s ability to overcome them (e.g., (Burton, 2009; Adger et al., 2009a,b; Easterling et al., 2004; Grothmann and Patt, 2005; Jamieson and VanderWerf, 1994; Mitchell et al., 2006; Moser, 2008; Moser and Luers, 2008; Nielsen and Reenberg, 2010; Patt and Schröter, 2008; Pielke et al., 2007).

Much of the existing literature on adaptation barriers is based on studies of individual projects or locations, focused on particular types of constraints (legal, information, and others), yet unsystematic in its approach. This has fostered both greater understanding of the impacts and importance of barriers, and greater awareness of the fact that much adaptation is hampered by barriers, even in well-resourced entities with well-functioning institutions. A meta-analysis of the existing body of research has led to a theory-driven framework for systematically diagnosing adaptation barriers (Ekstrom et al., 2011; Moser and Ekstrom, 2010). Subsequently and independently, a Dutch research group reviewed some of the same and additional literature and produced almost identical results (Biesbroek et al., 2013). This suggests that the diagnostic framework is well supported by existing theory and scientific literature, but it does not yet illustrate its usefulness for empirical research or practical applications. The present study thus empirically tests whether the framework is robust and practically useful in the context of a particular region: San Francisco Bay (USA). In addition, this study investigates whether the framework is sufficiently inclusive of the actual barriers found in a real world context. Our framework thus serves to structure this empirical study, to reveal the full range of barriers encountered across the adaptation process and to identify ways in which the involved actors are overcoming them.

Below, we briefly summarize this diagnostic framework previously developed (Section 2) and the research methods and geographic setting of the case study (Section 3). Section 4 provides an overview of adaptation progress made to date in each of the cases, while Section 5 focuses on the main study findings regarding adaptation barriers (the nature of the barriers, aids and advantages that help avoid barriers, and strategies to overcome the barriers). Section 6 discusses implications of the findings and Section 7 concludes with thoughts on how our insights can be used and recommendations on future work.

2. Underlying theory: the diagnostic framework

To improve our understanding of barriers to adaptation in a real-world context, our study conducted and compared multiple case studies in the San Francisco Bay Area of California, USA. To guide the study, we used a framework to identify and organize barriers to adaptation, previously developed on the basis of an extensive literature review on barriers to adaptation (Ekstrom et al., 2011; Moser and Ekstrom, 2010). This diagnostic framework first organizes barriers by relevant stages in the adaptation process (Fig. 1). This simple heuristic constitutes the dynamic dimension of the framework. In a second step, the framework helps identify the causes of each barrier in a given social-ecological system (Fig. 2), its structural component. The three fundamental sources of the barriers are (1) the actors involved in the adaptation process (which typically changes over time), (2) the larger context in which they act (for example, the governance system and socio-economic conditions), and (3) the object upon which they act (here called the system of concern, which is the system that is exposed to climate change impacts and needs to be managed).

The first two components (process and structure) of the framework help answer two fundamental questions, namely: (1) What could or does thwart the adaptation process from moving forward? And (2) how do the actor(s), context, and the system of concern contribute to the barrier?

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