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Review

Climate change adaptation under a social capital approach – An analytical framework for small islands

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ABSTRACT

Small islands are more vulnerable to the impacts of climate change than most continental regions. However, islands also feature a high degree of resilience through resources from dense social networks, such as collective action, norms of reciprocity, and relations of trust. Therefore, we argue that these resources – generally defined as social capital – are particularly relevant for climate change adaptation on small islands.

Current research on the role of social capital for communities covers many different aspects, such as local knowledge, economic development, and political capacity. But effective adaptation relies on understanding the role of social capital for these aspects in connection to the specific impacts of climate change – a holistic approach is needed.

Based on empirical case studies we developed an analytical framework that provides a step-by-step approach to help analyse the potential of social capital for the adaptation to climate change in island-specific case studies. These steps, among others, include an assessment of social capital, hazard mapping, and the analysis of political and economic capacity. Moreover, the framework suggests methods on how to analyse these steps.

1. Introduction

The current debate on the hazardous consequences of global climate change puts small islands in the focus of scientific (cp. Kelman and Khan, 2013; Nurse et al., 2014) and public attention – most recently after the impact of cyclone Pam on Vanuatu (Climate Policy Observer, 2015). A significant rise in sea level has already been noted and in future a further increase is expected – whether global CO_2 emissions will be reduced or not (Church et al., 2011; Mimura et al., 2007; Nurse et al., 2014). Among the most affected regions from sea-level rise are low-latitude coastal areas and islands – and small islands in particular (Kelman and West, 2009). Apart from these future threats, small islands are and often have been regarded as particularly vulnerable places. Due to problems such as very limited natural resources, social fragmentation and economic disadvantages on the global market, small islands are vulnerable not only to environmental stresses.

Some scholars, however, suggest that island societies feature a particular socio-cultural resilience, which distinguishes them from continental societies (Campbell, 2009; Turner et al., 1996). The anticipated vulnerability may even lead not only to particular economic and political conditions but also to particular social structures. We argue that adaptation to climate change impacts such as rising sea levels and increased storm surges requires collective action, as adaptation is not only a technical obligation, but a social and political challenge as well. Only by understanding how social features are integrated into local actions and decision-making, and which role collective memory and civil society plays for the effectiveness and acceptance of adaptation measures, community resilience towards sea-level rise can be effectively promoted.

This paper analyses the role of so-called social capital in the context of adaptive capacity on small islands. Despite the concept's lack of a universal definition and its disputed interpretation, it offers a perspective on the effects of collective action and civil society on various scales in the context of adaptation to climate change. Chapter 2 of the paper deals with different perspectives on island vulnerability and resilience followed by a focus on the concept of

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social capital (chapter 3). The fourth chapter applies insights from empirical case studies to integrate island resilience and social capital into the discourse about collective action for adaptation to climate change and highlights its explanatory power for the discussed research question. This is the basis for the resulting analytical framework (chapter 5) for analysing the role of social capital for adaptation to sea-level rise on small islands. Finally, the conclusion highlights the value of such a framework for empirical case studies.

2. Small island vulnerability vs. resilience

When trying to define issues particularly related to small islands several questions arise: Do things matter differently on small than on large islands? When is an island small and when is it large? Is it essential to distinguish small from large islands (cp. Logossah, 2007)? For the purpose of this paper it is tedious to define "small", however, it is important to point out that there are relevant island-related issues, such as the so called "isola effect" (Moro et al., 2005) – islands' shared characteristics of vulnerability, on the one hand, and socio-economic resilience, on the other hand.

Islands are commonly considered as places with high vulnerability in several respects. According to Blaikie (1994, p. 11), vulnerability refers to "[…] the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard". What then makes islands so vulnerable? Generally, islands' vulnerability is caused by issues of scale and issues of location (Kerr, 2005). Issues of location include expensive and unreliable transport, and vulnerability to natural disasters. Royle (2001, p. 43) calls the dependence on sea and air connections for the transport of goods as well as people the "[…] most obvious and basic constraint of insularity" (cp. Brookfield, 1990, p. 25). The often peripheral setting of islands complicates the transfer of innovations from core regions (Royle, 2001, p. 45). Through isolation islands feature a genetically uniqueness of species, making them vulnerable to disturbance, while isolation can also protect against impacts from threats that are present on the mainland (Moro et al., 2005, p. 667). King (1993, p. 33) claims this also on the social level, e.g. disturbance by mass tourism. Issues of scale, on the other hand, include the lack of a market, which forces islands to high openness (McElroy, 2002, p. 49). Limited economics of scale and narrow range of exports leads to high specialization and dependency on one export product. Thus, changes in global market patterns and prices are threatening (Briguglio, 2002, p. 73; Hess, 1990, p. 5; Royle, 2001, p. 61). The lack of natural resources, leads to a dependency on strategic imports, such as food and fuel, as self-reliance is hardly possible (Ratter and Petzold, 2012; Walker and Bellingham, 2011, p. 306; Hess, 1990, p. 4). Limited human resources and "[…] limited capacity to spatially segregate activities produces tight feedback loops between any environmental stressor and its impact" (Kerr, 2005, p. 508).

The most evident problem and probably "greatest potential threat" (Byrne and Inniss, 2002, p. 10) to small islands, though, is global climate change with its various consequences. An observed global mean sea-level rise of 20 cm during the last century already caused coastal land loss on many coastlands and islands (cp. Forbes et al., 2013); a further rise of several meters would cause major problems not only for infrastructure and settlements on flat islands such as the Maldives or Tuvalu with highest elevations less than 2 m (Walker and Bellingham, 2011, p. 298). Sea-level rise causes increased salt water intrusion, flooding of freshwater wetlands and valuable agricultural zones (Walker and Bellingham, 2011, p. 298; Byrne and Inniss, 2002, p. 9). Further consequences of climate change include increased storm activity, to which small islands are particularly vulnerable (Byrne and Inniss, 2002, p. 9), and changes in precipitation patterns making dry islands drier and influencing composition of flora and fauna (cp. United Nations, 2014; Lane et al., 2013). The problem increases that small islands already suffer from very limited catchment areas for precipitation, causing widespread water scarcity (Royle, 2001, p. 63). Coral bleaching due to ocean acidification and an increase in water temperature cause major problems not only for the marine fauna and flora but also for the coastal erosion processes and coralline up-building of island fringes (Walker and Bellingham, 2011, p. 297; Tompkins et al., 2005, p. 24).

Societal resilience is considered to express the potentials of social systems to deal with these upcoming challenges. Resilience can be defined as "the ability of human or ecological systems to cope and adapt to changes in the environment" (Marshall et al., 2009, p. 5). But what shapes islands' resilience, their ability to deal with climate change? Campbell (2009) focuses on resilience rather than vulnerability on small islands and declares "[…] vulnerability was not a particularly marked characteristic of island societies and communities and, accordingly, islands are not inherently vulnerable places. On the contrary they were resilient" (Campbell, 2009, p. 94). Islanders lived on islands for centuries; even if they are vulnerable, islands also offer great opportunities. Island communities dealt with the finiteness of their resources for centuries and with constrained contact or trade to other world regions (Kerr, 2005, p. 504). With the background and experience of life with so many limitations and life in a constantly changing environment, islanders developed efficient traditional adaptation strategies. Similarly, Turner et al. (1996, p. 170) suggests that "[s]ome traditional societies have developed networks for support and reciprocity that are more effective than the natural disaster programs of even the wealthiest countries". These experiences can contribute to the development of technologies and concepts, not only for islands but for the world (Cambers, 2007). Others (e.g. Barnett and Adger, 2003; Baldacchino, 2005; Campbell, 2009) point out the strong feeling of a common identity, which can often be found on islands. More dense social networks and cooperation are an important factor for resilience. Campbell (2009, p. 91), for example, observed increased inter- and intra-island cooperation to increase food security in traditional Pacific island communities. Thus, Baldacchino (2005, p. 32) suggests that "small island territories may be the best sites for seeing the effects, or absence, of a strong social fabric", while Hay (2013, p. 314) stresses the importance of social development to enhance island resilience.

3. The concept of social capital

The concept of social capital suits an analysis of the role of social networks and civil society on small islands – not only in the context of co-management and decision-making, but also for the acceptance of adaptation measures and flows of information. The concept of social capital goes back to the question of what holds societies together, and is used to explain why some societies develop better than others (Narayan and Pritchett, 1999; Serageldin and Grootaert, 2000). In this way the concept has found application in development studies (Narayan and Pritchett, 1999) and human geography (Radcliffe, 2004; Bohle, 2005), being relevant in the public discourse and for institutional policy, most prominently adopted by the World Bank (Holt, 2008; Krishna and Shrader, 1999; Dasgupta and Serageldin, 2000). Most recently, especially in the context of resource management and environmental (climate) change, social capital is considered to have explanatory power for how social networks and collective action can increase community