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Adaptive environmental governance of changing social-ecological systems: Empirical insights from the Okavango Delta, Botswana

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ABSTRACT

Adaptive management and related fields have theorized new governance strategies that embrace complexity and are able to respond effectively to changing and unpredictable biophysical dynamics. However, this body of work pays inadequate attention to important on-the-ground realities, including feasibility of implementation and the power dynamics embedded in multi-scalar systems of environmental governance. This paper presents findings from a research project on challenges to adaptive management in the variable wetland ecosystem of the Okavango Delta, Botswana. Many residents of this rural region rely on transitional agricultural practices, shifting between dryland and floodplain farming in response to dynamic precipitation and flooding patterns. Higher than average floods in 2009–2011 inundated many floodplain fields past the point of production, causing farmers to shift to the dryland for multiplem seasons. At the same time, the highly centralized Government of Botswana began to implement stricter regulations over floodplain resources, which stemmed in part from a new adaptive management plan developed for the region. As a result, many farmers felt pressured by the government to abandon transitional livelihood practices and to shift permanently to dryland agriculture even though many preferred to continue floodplain farming. This loss of a responsive livelihood strategy will likely result in decreased long-term adaptive capacity for many residents. Drawing on these findings, this paper advances the argument that if adaptive management is to become a viable option for communities in changing environments, more attention must be given to the role of unequal power relations in multi-scalar systems of environmental governance.

1. Introduction

Increased environmental variability as a result of climate change will continue to intensify in coming decades, with particularly acute consequences for those living in already marginal conditions (Ensor et al., 2015; IPCC, 2014; Kuruppu and Liverman, 2011; Pelling, 2010). The impacts of these biophysical changes require new approaches to environmental governance to facilitate successful forms of climate change adaptation for individuals and communities in changing social-ecological systems (SES). Governance systems must account for not only what is known and predicted about the future, but also for the "deep uncertainty" about what the future will hold (Haasnoot et al., 2013). Existing work from adaptive management and related fields has effectively theorized new governance strategies that embrace complexity and are able to effectively respond to changing and uncertain biophysical dynamics (Bakker and Morinville, 2013; Bogardi et al., 2012; Huitema et al., 2009; Pahl-Wostl, 2007; Ostrom, 2007). However, these theorizations often lack attention to important on-the-ground realities, including the feasibility of implementation and issues of power within multi-scalar environmental governance systems (Eriksen et al., 2015; Bakker and Morinville, 2013).

Environmental governance is the "set of regulatory processes, mechanisms, and organizations through which political actors influence environmental actions and outcomes" (Lemos and Agrawal, 2006, 298). Environmental governance systems are comprised of both formal and informal social institutions, which are defined of as the "socially accepted rules that determine access to natural resources" (Ellis, 1999, 131). Rules may be formal or customary in origin (Ellis, 1999). These institutions determine how access to natural resources is governed (Leach et al., 1999) and how governance systems will respond to increased environmental variability as the result of climate change (Eriksen et al., 2015; Agrawal, 2010; Boko et al., 2007). Under conditions of environmental change, environmental governance systems and their related social institutions have the potential to build adaptive

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capacity or to limit the present and future adaptive capacity of certain actors.

Adaptive management is based on the idea that environmental governance systems should have the ability to change practices based on new insights and experiences, especially considering that future events are difficult to accurately predict and plan for (Pahl-Wostl, 2007). Adaptive management practices allow for experimentation within an SES to gain feedback and make necessary changes before negative outcomes occur (Ostrom, 2007). The related polycentric governance approach involves several independent actors within adaptive management systems that are able to effectively respond to change and uncertainty (Bakker and Morinville, 2013; Ostrom, 2010; Pahl-Wostl, 2009; Huitema et al., 2009; Folke et al., 2005; Ostrom et al., 1961). Ideally these actors are an integration of formal and informal institutions, which leads to higher adaptive capacity for resource management and governance systems (Pahl-Wostl, 2009). Proponents of this approach embrace complexity and use it as a way to make decisions, rather than as an excuse for inaction (Bakker and Morinville, 2013). This is believed to foster "learning by doing" (Bakker and Morinville, 2013) or "learning to manage by managing to learn" (Pahl-Wostl, 2009). Advocates of polycentric governance argue that these systems are more resilient to climate change than mono-centric systems because they are better equipped to respond effectively to uncertainty (Pahl-Wostl and Knieper, 2014; Bakker and Morinville, 2013; Bogardi et al., 2012; Huitema et al., 2009).

However, there remains a need for more systematic research on how polycentric and adaptive governance systems operate in specific settings, including on the roles of governmental and non-governmental actors (Pahl-Wostl and Knieper, 2014). Indeed, a number of scholars have suggested that adaptive governance approaches should not be considered a panacea (Ostrom, 2010; Armitage et al., 2008a,b), but rather should be treated as "one potential tool in a suite of governance options" (Armitage et al., 2008b). Of particular importance to the arguments being advanced in this paper, Bakker and Morinville (2013, 7) highlight three potential problems with adaptive governance systems. First, the feasibility of implementing such strategies is questionable, particularly in places with limited resources (Bakker and Morinville, 2013). Second, a focus on adaptive management might increase attention to adaptation at the expense of important mitigation efforts (Bakker and Morinville, 2013). Third, adaptive management systems have the potential to occlude power dynamics between the actors involved in governance (Bakker and Morinville, 2013). In particular, there is potential for state and international level policies to override local adaptive efforts and undermine existing informal risk management strategies (Eakin et al., 2014). Further, environmental governance strategies can have differential impacts within communities, due to uneven adaptive capacities and power relations at the local scale (Goldman and Riosmena, 2013). As such, more attention is needed to how power dynamics within multi-scalar environmental governance systems impact adaptation possibilities for all actors (Eriksen et al., 2015).

This paper offers empirically grounded insights on adaptive management from a research project in the Okavango Delta, Botswana. This dynamic wetland ecosystem provides a critical source of water for Northwest Botswana (Mosepele et al., 2009). Many of the livelihood strategies used by residents or this rural region are dependent on wetland resources (King et al., 2016; Bendsen and Meyer, 2002) and are designed to respond to some level of environmental variability (Kgathi et al., 2007). This includes the practice of transitioning between dryland and floodplain agriculture (known locally as *molapo* farming) in response to flooding and drought (Motsholapheko et al., 2011; Magole and Thapelo, 2005). In 2009–2011, higher than average floods inundated many floodplain fields past the point of production, causing many *molapo* farmers and others living near the floodplain to transition temporarily to dryland areas (Shinn et al., 2014). At the same time, the highly centralized Government of Botswana (GOB) began to enforce stricter regulations over access to wetland resources. Some of these regulations originated with a new adaptive management plan developed for the region. Many residents felt that these regulations threatened the viability of their preferred wetland and transitional livelihood practices. Findings from the project thus reveal that top-down government responses to flooding variability in this region are undermining adaptive management efforts and are reducing the adaptive capacity of many residents. Drawing on these findings, the central argument of this paper is that adaptive management efforts must better attend to the complex relationships between changing biophysical dynamics and the unequal power relations within multi-scalar systems of environmental governance.

2. Background

2.1. Centralized environmental governance in Botswana

Botswana is often touted as an African success story, sometimes even referred to as "The African Miracle" (Taylor, 2006, 2003; Samatar, 1999). While the country has indeed had a number of political and economic successes, it still faces significant challenges. This includes an unequal distribution of political power, which has been concentrated with the Botswana Democratic Party (BDP), in power since independence with no viable opposition to date (Hillbom, 2008; Taylor, 2003). The BDP has maintained a highly centralized state government, including in relation to natural resource management and environmental governance (Hoon, 2014; Motsumi and Cassidy, 2012; Magole, 2008).

Two government ministries are particularly important to environmental governance in Botswana. First, the Ministry of Environment, Wildlife, and Tourism (MEWT) is tasked with overseeing environmental and natural resource management in the country. A number of important Departments are housed under MEWT, including the Department of Environmental Affairs (DEA). The DEA is the governing body for wetland management in the Okavango Delta. Second is the Ministry of Local Government (MLG), which is mandated "to deliver effective local governance, social services, social protection and basic infrastructure by creating an enabling environment for improvement of the quality of lives of [citizens]" (MLG, 2014). The Tribal Authority and the Land Board are housed under the MLG. The Tribal Authority is part of the national government, but is connected to traditional chiefs (singular *kgosi*, plural *dikgosi*) and the traditional court system (*kgotla*). The Chieftainship Act of 1987 gave the government formal authority over the *dikgosi* and established "complete supremacy of the central government over the traditional leaders of Botswana" (Sharma, 2005, 3). As a result, Botswana law now requires *dikgosi* to carry out instructions given to them by the GOB, including those related to natural resource access and environmental management. While *dikgosi* are still elected in customary fashion at *kgotla* meetings, a designated government minister must also formally recognize their appointment and has the power to remove the *dikgosi* from office (Sharma, 2005, 5). As such, the Tribal Authority remains a governing institution in Botswana, but its autonomous power has been steadily reduced over time. Soon after independence from Britain in 1966, the new government established regional Land Boards, which also assumed some of the traditional responsibilities of the dikgosi, including land allocation (DeMotts et al., 2009). At this time, the GOB designated three types of formal land tenure for the country, which are still in place today: tribal