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Policy misfits, climate change and cross-scale vulnerability in coastal Africa: how development projects undermine resilience

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ABSTRACT

Coastal social ecological systems in eastern Africa are subject to a range of environmental, social and economic changes. They are already vulnerable to these multiple stressors, and the impacts of climate change are likely to further exacerbate their vulnerabilities. Some of these impacts may be observed and experienced already. The analysis presented in this paper is based on mixed methods empirical research exploring local perceptions of recent changes at four sites in coastal Tanzania and Mozambique. People recognise and rank a number of climate and non-climate stressors which have contributed towards more risky and less diverse livelihoods. Importantly, regional and international policy initiatives – in the form of river basin management in Mozambique and South Africa, and development of a Marine Protected Area in Tanzania – are perceived to further erode resilience and exacerbate vulnerabilities. We suggest this is a form of policy misfit, where policies developed to address a specific issue do not take account of cross-scale dynamics of change, the interactions between multiple stressors, nor longer term climate change. This policy misfit may be remedied by a move towards adaptive forms of governance, and necessitates an explicit focus on building the adaptive capacity of the poor and most vulnerable in society.

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1. Introduction

Recent studies highlight links between human vulnerability in the world's poorest countries and exposure to multiple stressors acting across scales in synergy with climate change (Leichenko and O'Brien, 2008). The 'double exposure' analysis by Leichenko and O'Brien, and the later Southern Africa Vulnerability Initiative (SAVI) framework (O'Brien et al., 2009) show how multiple stressors interact through three pathways related to context, outcome and feedback. However, many scientific studies continue to examine the impacts of climate change in isolation from other changes (Felton et al., 2009).

Indeed, in this paper we argue that the failure to consider how different types of change interact and undermine the ability of poor people to cope with multiple stressors may lead to policy interventions which in themselves act as stressors.

In this paper we explore perceptions and responses to multiple stressors at four coastal study sites in south-eastern Africa. We highlight how deliberate interventions to advance development interact with other climate and non-climate stressors. Many past vulnerability studies in poor countries have focused on land and agricultural systems, with relatively little consideration of coastal and marine social-ecological system components (Reid and Vogel, 2006; Paavola, 2008;

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Bryan et al., 2009). However, coastal zones will experience significant impacts arising from storms, floods and sea level rise. In Africa, coastal cities such as Cape Town, Maputo and Dar es Salaam with large and growing populations will be affected. With climate change, Africa's climate generally is predicted to become increasingly more variable, and extreme weather events are expected to be more frequent and severe, with increasing risks in socioeconomic and biophysical terms (Boko et al., 2007). Southern Africa is likely to experience higher temperatures and more erratic rainfall although the differences between coastal and inland areas, and between different locations, are not well accounted for in the generalisations from current model predictions. Any impacts in coastal areas may be especially varied. However, production systems and economic growth are likely to be affected across the region (Twomlow et al., 2007).

Thus, there is a need for greater understanding of how vulnerability in coastal areas is shaped, for example by climate interacting with changes such as new tourism development, urbanisation and land use transformation, and how it may be reduced amid such complexity. The paper sets out the methods employed, and then outlines the multiple stressors that people at our study sites are exposed to. These stressors include climate change but also past and present policies, including river management and coastal conservation and development. The paper explores how these interventions affect peoples' ability to cope with other stressors. We then discuss how policies might be re-orientated to enhance rather than undermine local scale resilience and adaptive capacities.¹

2. Research sites and methods

Coastal communities in Africa face pressure from inward migration, urbanisation, resource extraction, pollution and industrialisation. This research was undertaken in two eastern African coastal states, Tanzania and Mozambique, which both rank highly in international comparisons of vulnerability, and face rising risks of impacts from a wide range of human and natural stressors (Brooks et al., 2005; Allison et al., 2009). In each country, we selected two research sites to reflect these coastal trends. Fig. 1 shows the location of the research sites.

¹ Adaptive capacity broadly represents peoples' latent ability to cope with and respond to a variety of shocks and disturbances, and can be defined as 'the preconditions necessary to enable adaptation, including social and physical elements, and the ability to mobilise them' (Nelson et al., 2007, p. 397). It is generally identified as a core component of vulnerability and as a source of resilience in both social and ecological systems, manifest in individuals, households and communities. Adaptive capacity is widely understood to be a function of assets or wealth, livelihood security and diversity, socio-cognitive factors such as self-efficacy and risk perception, and external support derived from social capital and infrastructure and services. Resilience perspectives conceptualise adaptive capacity as predicated on the existence of institutions and networks that learn and store knowledge and experience, create flexibility in problem solving, and balance power among interest groups. Thus, the policy and institutional context is influential in determining resilience and adaptive capacity at multiple scales.

We selected poorer coastal communities with reported or evident dependence on marine as well as terrestrial ecosystem goods and services. As we also wished to include in our study the role of any climate variability and/or climate change among the potential range of multiple stressors, we selected sites in low-lying coastal areas susceptible to river floods, droughts and storm surges. We used local maps, and completed site visits and scoping interviews with local officials and resource users to identify prospective sites. Sites were selected to include communities that according to local and official accounts have grown from smaller to larger settlements, located in economically and environmentally marginal areas, dependent on natural resources, and in proximity to new development and/or conservation projects. Two of the sites lay in peri-urban and outlying rural fringes of the national capital (Maputo) in southern Mozambique (Bairros dos Pescadores and Macaneta) (see Fig. 1). These sites are located, respectively, within the urban expansion belt of Maputo city and the tourism expansion zone of Maputo province. Poverty levels in these regions are high, with 53.6% and 69.3% of the population living below the poverty line (MPF et al., 2004). The two other sites (Msimbati and Msamgamkuu) lie in Mtwara district, in southern Tanzania, near the border with Mozambique (see Fig. 1), where poverty incidence levels are also high, at 36.8% (R & AWG, 2005). Msimbati is located within the boundaries of the Mnazi Bay – Rovuma Estuary Marine Park (MBREMP), a Marine Protected Area (MPA) created in 2000; Msamgamkuu lies on an isolated sandy peninsula facing Mtwara town from the opposite side of its port entrance. Msamgamkuu is located within the buffer zone of MBREMP, which was set up as a multi-zoned protected area with varied land and reef lagoon components. Its aims include conservation, fisheries management and ecotourism (including user fee revenue generation), although it also has an upstream gas development project at its centre. Livelihoods at all sites are highly natural resource-dependent and reliant on seasonal farming, fishing and trading typical of coastal sub-Saharan Africa. Farming in Tanzania includes both subsistence and cash cropping. In Mozambique, farming is very limited and people depend more on fishing. Fishing is important at all sites, but the ecosystems which support fishing are different. In Tanzania, fisheries are mostly associated with coral reefs, whereas in Mozambique the sites are situated in estuarine and coastal lagoon and sandy bay systems, with corals further offshore and less important for fisheries.

Our research approach recognises that perceptions of local stakeholders are important for understanding processes by which multiple stressors and climate affect livelihoods in Africa (Reid and Vogel, 2006). To gain insights into these perceptions, we undertook a rapid exploration of local knowledge employing a number of different data collection techniques, shown in Table 1. These included the participatory construction of timelines and mental maps to contextualise, define and compare the stressors which affect people and their relative importance to different households. Such techniques have been applied in African and other developing country contexts to distinguish multiple stressors, their linkages, causal pathways, and relative importance, for example in studies by Abel et al. (1998), and Lynam et al.

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