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Views from the vulnerable: Understanding climatic and other stressors in the Sahel

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Abstract

In much of sub-Saharan Africa, considerable research exists on the impacts of climate change on social-ecological systems. Recent adaptation studies emphasize sectoral vulnerability and largely physical adaptation strategies that mirror anti-desertification plans. The adaptive role of subsistence farmers, the vulnerable 'target' population, is largely overlooked. This article aims to fill this gap by putting the views from the vulnerable in the center of the analysis. Drawing from participatory risk ranking and scoring among smallholders in central Senegal, data on multiple hazards indicate that farmers' adaptive capacity to climate change is undermined by poor health, rural unemployment, and inadequate village infrastructure. Results from conceptual mapping reveal incomplete understanding of causes and consequences of climate change. Yet, shared knowledge and lessons learned from previous climatic stresses provide vital entry points for social learning and enhanced adaptive capacity to both wetter and drier periods now and in the future.
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1. Introduction

Africa has been portrayed as one of the most vulnerable regions to the impacts of global climate change due to her low human adaptive capacity to anticipated increases in extreme events, resulting from widespread poverty, heavy reliance on rain-fed agriculture, lack of economic and technological resources, and insufficient safety nets and educational progress (IPCC, 2001; Reid and Vogel, 2006). Some argue that Africa, already close to the limits of her coping ability (Sokona and Denton, 2001), also encompasses the most vulnerable regions and populations to current climate variability (Davidson et al., 2003). While many African societies have been exposed to climate variability for a long time and have developed adaptive strategies to respond to it (Mortimore, 1998; Mortimore and Adams, 2001), this notion of victimization tends to downplay accumulated experience in the face of future climatic changes or extreme events that exceed the current adaptive range.

In much of sub-Saharan Africa, with the likely exception of South Africa, most research on vulnerability to climate change has focused on exposure to climate stimuli and impacts on natural and human systems, mainly from a sectoral perspective. A multitude of national reports exist to describe the impacts of climate change on agriculture, energy, water resources, and coastal areas (e.g. Mwandosya et al., 1998; EPA, 2000; SE/CNEDD, 2002). Much of the more recent adaptation studies also bear a strong resemblance to earlier impact assessments as they advocate primarily aggregate, sectoral strategies to respond to climate change stress. Sensitivity and adaptive capacity, the other two determinants of vulnerability (Adger, 2003; Smit and Pilifosova, 2003; Yohe and Tol, 2002), have received comparatively less attention. This bias is reflected in the largely technical types of adaptive responses that have been proposed in individual country reports on climate change vulnerability and the first National Adaptation Programs for Action (NAPAs). Drought-resistant crop varieties, micro-irrigation, the construction

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of dykes, reforestation, and seasonal climate forecasts are some of the favorite adaptation options for the agricultural sector (Nyong, 2005). These measures are essentially synergistic with anti-desertification plans. The adaptive role that these solutions offer to subsistence farmers, the vulnerable 'target' population, is tangential at best.

1.1. The legacy of climate change impact assessments

Impact-driven adaptation research, while providing vital information to scientists and policy makers, has viewed climate change mostly as a problem *for* society, not *of* society (Hewitt, 1997, cited in Vincent, 2004). It has added little to the understanding and enhancement of adaptive capacity among most vulnerable individuals and groups. International funding during the mid- and late-1990s spurred greenhouse gas emission inventories, the design of climate change scenarios, and sectoral impact assessments among African researchers (Dixon et al., 2003). Emerging 'Type 1' adaptation studies (Burton et al., 2002) reflect the preponderance of physical scientists in the growing adaptation community, most of whom also pursue research on climate change mitigation. Their proficiency and contributions notwithstanding, comparatively few efforts have been made to actively involve social science colleagues in the climate change arena and draw upon their expertise in rural livelihood studies, poverty reduction, and sustainable development.

Within the context of African smallholder farming systems, this prevailing emphasis on technical and infrastructural adaptive strategies is problematic for three reasons. First, it tends to overlook non-climatic drivers of vulnerability. Vulnerability is now increasingly seen as shaped by multiple causes that are also likely to aggravate impacts to climatic stress (Reid and Vogel, 2006; Schipper and Pelling, 2006). 'Double' exposure, for instance to climate change and globalization, has been demonstrated to alter vulnerability patterns among farmers in South Africa (Leichenko and O'Brien, 2002). Contextual weaknesses of rural livelihoods and factors of susceptibility that underpin people's daily lives, independent of climatic stress, are understood as components of social vulnerability (Adger, 1999). Examples that further heighten such intrinsic vulnerability are HIV/AIDS, deteriorating social networks, and poor governance (Reid and Vogel, 2006). Second, sectoral adaptive responses often disregard the fact that vulnerability and adaptation to climate change are exceedingly variable and linked to local contexts and places (O'Brien et al., 2004; Leichenko and O'Brien, 2002). One-size-fits-all approaches are likely to miss socio-economic and political–institutional dynamics of vulnerability and, hence, risk being ineffective, if not counterproductive. Third, the focus on agriculture as a sector and adaptive responses as predominantly technical solutions downplays the sensitivity of real people and vulnerable populations—mostly small-scale, resource-poor farmers—to the impacts of climate change and variability. Worse, it robs them of their agency to mediate hazards and successfully cope with and adapt to adverse impacts.

1.2. Putting the vulnerable first

An alternative approach is 'putting the vulnerable first', as advocated by Paavola and Adger (2006). This requires an appreciation for vulnerability that is broader than the notion most impact-driven sectoral adaptation research and programs currently support. It embraces components such as initial well-being, livelihood resilience, self-protection, and social capital (Cannon, 2000), all of which go beyond the reductionist exposure perspective. It fosters the recognition of non-climatic factors, including sources of livelihoods, assets, access to resources, institutional networks, education, gender, race, ethnicity, and poverty that delineate vulnerable populations (Pelling and High, 2005; Reid and Vogel, 2006; Paavola and Adger, 2006). It allows conceiving complementary adaptation measures that either reduce human sensitivity and exposure, or minimize adverse non-climatic factors that, in turn, lessen sensitivity to climate-related stressors. Füssel and Klein (2006) cite vaccination against climate-sensitive vector-born diseases and the improved nutritional status as examples for alternative adaptation strategies. In other words, healthier people are more likely to respond effectively to climatic stress that those that are sick and frail.

Most importantly, this notion of 'putting the vulnerable first' entails a much stronger focus on resilience and adaptive capacity. The term resilience, with its origin in ecology, is usually defined as the capacity of a system to absorb sudden changes and disturbances while maintaining its function and control (Gunderson and Holling, 2002). Adaptive capacity is a key element of resilience. It is the capacity for renewal and reorganization and the element of learning in response to disturbance (Carpenter et al., 2001; Folke, 2006). According to Folke (2002), vulnerability is the flipside of resilience as declining or lost adaptive capacity lowers the ability of social actors to absorb changes.

In the climate change debate, adaptive capacity constitutes a central component of what Füssel and Klein (2006, p. 319) depict as 'second-generation vulnerability assessments.' Here, vulnerability of certain sectors to climate change is examined in concert with other stress factors, and the ability of people to respond to risks is emphasized. The authors define adaptive capacity as "the ability of a system to adjust to climate change (including variability and extremes) to moderate potential damages, take advantage of opportunities, or cope with the consequences" (2006, p. 319). This view challenges the deterministic notion of presumably vulnerable groups as passive victims by highlighting people's skills, strategic responses, and agency. Examples of resourcefulness at the household and community level have been demonstrated by Few (2003) in the case of responses to floods and by Thomas and Twyman (2005) for natural-resource-dependent societies

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