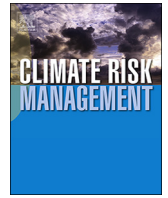




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Risks and responses in rural India: Implications for local climate change adaptation action

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ABSTRACT

People in drylands face multiple climatic and non-climatic risks and subsequently engage in various response strategies to manage these risks. Research on risk management has typically focussed on a static, location-specific understanding of risk and response. However, empirical evidence suggests that risks and vulnerability vary across space and time. Increasingly, responses traverse multiple locations e.g. people move across rural and urban areas, women move beyond the household/community to earn additional incomes. To highlight this dynamic reality of risks and responses, we study livelihood transitions in South India. We unpack risk and response portfolios across scales – household, community, and sub-national (district) levels – and classify them as coping, adaptive and maladaptive. Our findings emphasise that present responses do not necessarily qualify as climate change adaptation strategies. While certain strategies do improve household wellbeing in the short run, there is relatively lower evidence to suggest an increase in adaptive capacity to deal with climatic risks in the future. These findings point to critical gaps in understanding current risk management and how it can contribute to local adaptation policy-making and implementation.

1. Introduction

Livelihood vulnerability in drylands is characterised by a range of interacting social, economic, political, and environmental changes (Reynolds et al., 2007; Tucker et al., 2015; Stringer et al., 2017), which impact agricultural and non-agricultural livelihoods. This vulnerability is exacerbated by inherently low agricultural productivity (Thornton et al., 2009), rapid and increasing natural resource degradation (Stringer et al., 2017), inadequate governance responses to aid diversification and adaptation processes (Tucker et al., 2015), and an overall poor performance on development indicators due to economic marginalisation (Tucker et al., 2015). Climate change is projected to exacerbate these problems, pushing dryland systems to cross biophysical thresholds with long-term implications on local livelihoods and agricultural sustainability (Fraser et al., 2011; Tucker et al., 2015).

The drylands of India face similar challenges. Home to 40% of the country's population, (Harriss-White, 2008), these regions are characterised by low and erratic precipitation, heterogeneous soil profiles, a relatively short growing season, and a complex system of agricultural production. Increasing climatic variability has already halved agricultural incomes in parts of dryland India (Bantilan and Anupama, 2002). Real rural incomes across India have increased by only 34 percent from 2003 to 2013 (Chandrasekhar and Mehrotra, 2016). Further, uneven regional development, low investment in rainfed agriculture, and a policy focus on irrigated agriculture have undermined local survival and adaptive capacities (Raina, 2014; Kumar et al., 2016; Yadav and Lal, 2017). Despite

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being exposed to these risks, there is a rich literature documenting how dryland communities adjust livelihoods through experimentation; drawing on past experiences of variability and leveraging human and social capitals (Mehta, 2000; Thomas et al., 2007; Forsyth and Evans, 2013; Eakin et al., 2014; Kattumuri et al., 2015; Raina, 2015; Singh et al., 2016b). However, these practices of adjustment are increasingly being challenged by growing climate variability and longer-term manifestation of climate change.

Extant vulnerability and adaptation research has typically focussed on a static, location-specific understanding of risk and response. In India, a systematic literature review of 120 vulnerability assessments found very few studies examine how vulnerability is changing over time (Singh et al., 2017a). However, empirical evidence suggests that risk and response portfolios are spatio-temporally dynamic (Cutter and Finch, 2008; Kaspersen, 2017). Increasingly, risk management strategies and spaces traverse multiple locations through, for example, higher human mobility and changing social norms (Benz, 2014; Nguyen, 2014). Emerging vulnerability and adaptation literature highlights the necessity of capturing this temporality through novel methodological approaches (Fawcett et al., 2017; Singh, 2018a) and using it to understand how adaptive capacity (a latent property) is realised as adaptation (a desirable outcome) (Mortreux and Barnett, 2017).

To understand this dynamic reality of risks and responses in the context of climate change, we examine livelihood responses and their outcomes at household, community, and sub-national scales in rural Karnataka – a large state in Southern India. We unpack household risk portfolios and assess their responses for their long-term implications on household wellbeing and systemic sustainability. We use the heuristics of survival, accumulation, erosion (see Table 1 for details) to highlight the variations in risk management across households. While reaffirming the argument that interventions to build adaptive capacity must be contextual (Adger et al., 2005; Smit and Wandel, 2006), our findings push this thesis further to suggest that many responses that may not necessarily fall under ‘adaptation’ help households cope with the risks they face. Moreover, while certain strategies are improving household wellbeing, there is little evidence to suggest an increase in their adaptive capacity to deal with future climatic risks. Our findings thus, identify critical gaps in understanding current risk management and how it can contribute to local adaptation policymaking and implementation.

The structure of the paper is as follows. In the next section, we review the literature on risk and responses, with a geographical focus on drylands, and thematic focus on temporality. Section 3 describes the methodology and study sites followed by Section 4 which presents the results. In Section 5, we conclude by reflecting upon our findings and suggest some entry points for enabling local adaptation.

2. Characterising risks, responses, and wellbeing outcomes

Risks to livelihoods include biophysical drivers (extreme events, natural resource quality) and structural factors (inequality, poverty, infrastructure), all of which are embedded in specific social contexts (norms, rules, networks), (Otto et al., 2017). These drivers are inherently dynamic, rooted in historically shaped pathways (Wisner, 2004; Reynolds et al., 2007; Ribot, 2010; Tschakert et al., 2013; Kaspersen, 2017), and mediate individual responses (Singh et al., 2016b). Capacities to adjust livelihoods and cope or adapt to dynamic risks are further influenced by financial capital and infrastructure, social norms and practices, wider institutional regimes and agendas, and the ability to harness and share knowledge (Berrang-Ford et al., 2011; Sietz et al., 2011; Patnaik and Das, 2017).

Household responses can be understood as falling along a continuum from no response to coping to adapting (Singh et al., 2016b). Responses can be categorised by scale (individual, household, community-level or regional), by actor (vulnerable communities, non-state actors, government) and by timing of response (autonomous, planned). Autonomous responses, which are spontaneous responses to non-climatic changes such as market dynamics or ecological change, include strategies such as livelihood and income diversification (Ellis, 2000), investment in assets or social capital (Olsson et al., 2014), and shifts in sociocultural practices such as regulating food intake by some household members, inclusion of children into the workforce (Singh et al., 2016b; Choudhury and Sindhi, 2017).

Planned responses, on the other hand, are the result of deliberate policy decisions which recognise or pre-empt certain risks and aim to maintain status quo or transition towards a desired state (IPCC, 2014). In India, planned responses to strengthen rural livelihoods were mostly undertaken through the Green Revolution. This policy focus prioritised cereal cultivation, benefited irrigated regions, and privileged large farmers best endowed with natural, financial and social capitals (Pingali, 2012). Smallholder farmers in drylands were rendered particularly vulnerable, as they could not benefit from increasing returns to scale (Harriss-White, 2008). Furthermore, agricultural policy has seen relatively lower support for strengthening allied sectors such as livestock rearing and non-agrarian rural livelihoods, which are crucial for dryland economies.

Responses may be specific to climatic risks or leverage generic capacities that enhance economic and human wellbeing outcomes (Eakin et al., 2014; Lemos et al., 2016). At an individual level, responses are typically autonomous and cover a range of actions such as livelihood security and management functions (e.g. diversification of livelihood, investment etc.), adoption of technological solutions (e.g. irrigation facilities), management of societal ties and knowledge (e.g. fall back options enabled by social cohesion) (Ravera et al., 2016).

While several studies examine response strategies in rural India (Panda et al., 2013; Tripathi and Mishra, 2016), the outcomes of these responses for adaptation and future adaptive capacity remain understudied. In an attempt to address this gap, we map out responses as coping, adaptive or maladaptive and further differentiate between generic strategies (e.g. to improve agricultural incomes, meet daily sustenance) and specific strategies that are in direct response to climatic risks (Table 1). This heuristic of generic versus specific draws from Eakin et al., (2014) and distinguishes climate change adaptation from ongoing development interventions that strengthen household capacities. It also embeds individual responses within wider development interventions aimed at providing

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