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Framing the application of adaptation pathways for rural livelihoods and global change in eastern Indonesian islands

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ABSTRACT

In developing countries adaptation responses to climate and global change should be integrated with human development to generate no regrets, co-benefit strategies for the rural poor, but there are few examples of how to achieve this. The adaptation pathways approach provides a potentially useful decision-making framework because it aims to steer societies towards sustainable futures by accounting for complex systems, uncertainty and contested multi-stakeholder arenas, and by maintaining adaptation options. Using Nusa Tenggara Barat Province, Indonesia, as an example we consider whether generic justifications for adaptation pathways are tenable in the local context of climate and global change, rural poverty and development. Interviews and focus groups held with a cross-section of provincial leaders showed that the causes of community vulnerability are indeed highly complex and dynamic, influenced by 20 interacting drivers, of which climate variability and change are only two. Climate change interacts with population growth and ecosystem degradation to reduce land, water and food availability. Although poverty is resilient due to corruption, traditional institutions and fatalism, there is also considerable system flux due to decentralisation, modernisation and erosion of traditional culture. Together with several thresholds in drivers, potential shocks and paradoxes, these characteristics result in unpredictable system trajectories. Decision-making is also contested due to tensions around formal and informal leadership, corruption, community participation in planning and female empowerment. Based on this context we propose an adaptation pathways approach which can address the proximate and systemic causes of vulnerability and contested decision-making. Appropriate participatory processes and governance structures are suggested, including integrated livelihoods and multi-scale systems analysis, scenario planning, adaptive co-management and 'livelihood innovation niches'. We briefly discuss how this framing of adaptation pathways would differ from one in the developed context of neighbouring Australia, including the influence of the province's island geography on the heterogeneity of livelihoods and climate change, the pre-eminence and rapid change of social drivers, and the necessity to 'leap-frog' the Millennium Development Goals by mid-century to build adaptive capacity for imminent climate change impacts.

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1. Introduction

The rural poor in developing countries are the most vulnerable to the impacts of climate and global change. Such communities and households are highly dependent on climate-sensitive natural resources and the ecosystem goods and services that these provide, and they have limited adaptive capacity in terms of the assets which they can mobilise in response (Adger et al., 2003; Adger, 2006). Furthermore, the effects of mal-adaptive decisions (i.e. actions that impact adversely on or increase the vulnerability of other systems, sectors or social groups, Barnett and O'Neill, 2010) are likely to be felt disproportionately by these communities, exacerbating their vulnerability (Ensor, 2011). The Rural Poverty Report 2011 (International for Agricultural Development, 2010) concluded that globally 1.4 billion people continue to live in extreme poverty, and that two-thirds of these reside in rural areas of the developing world. Redressing the 'adaptation deficit' amongst these communities has become a priority for development agencies and practitioners (Brooks et al., 2011; Ranger and Garbett-Shiels, 2011).

However, responses to climate change must also be mainstreamed into initiatives focused on the achievement of human development goals, rather than being considered separately and risking potentially negative outcomes for one or other dimensions (Perch et al., 2010; Ensor, 2011; Eriksen et al., 2011; Ranger and Garbett-Shiels, 2011). This task is substantial given that the existing challenge of alleviating poverty through enhanced income, health, food security, gender equality, self-determination, biodiversity and ecosystem services, as enshrined by the Millennium Development Goals, is in itself formidable (United Nations, 2012). Hence there is a need to develop policy and research processes which can identify interventions that achieve co-benefits for poverty alleviation, climate adaptation and greenhouse gas mitigation but avoid mal-adaptation (Perch, 2011; Smith and Vivekananda, 2011) (Fig. 1), and are therefore 'no regrets' because they yield benefits under any future conditions of change (Hallegatte, 2009).

The construct of 'adaptation pathways' as an iterative decision-making process which aims to steer societies towards sustainable futures while maintaining adaptation options (Wise et al., in this volume) provides a potential solution. Because it deliberately goes beyond focussing on climate impacts and responses in isolation, and instead includes other forces of global to local change which may interact unpredictably with climate change, the approach broadens the focus to complex and dynamic multi-scale social-ecological systems rather than their individual components. It also proposes that the values and interests of multiple stakeholders are likely to be contested and will evolve within systems, necessitating adaptive governance frameworks which can foster conflict resolution, integrate knowledge cultures and catalyse collective action. In this way an adaptation pathway accounts for climate and other change within the broader objective of achieving equitable and sustainable growth and improved human well-being, and recognises the roles and agency of multiple stakeholders.

So far the concept as presented by Wise et al. (in this volume) remains untested and generic, and its' framing and application in different cultural or socio-economic contexts has not been fully explored. Further, the modalities of addressing poverty alleviation through an adaptation pathways approach have not been considered. Consequently there is a need to examine whether the adaptation pathways construct is appropriate for bridging the adaptation deficit in developing countries, and if so, how to operationalise it.

We assess this issue by examining one of Indonesia's poorest regions, Nusa Tenggara Barat Province, as a case study. We present

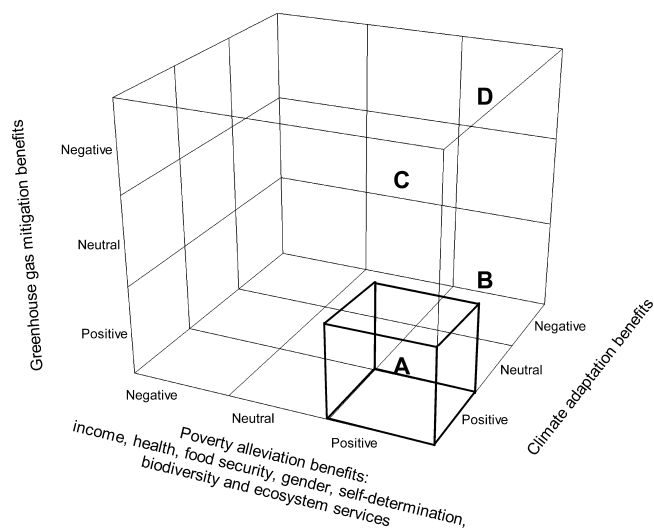


Fig. 1. To redress the adaptation deficit, interventions in developing countries should aim to achieve co-benefits for poverty alleviation, climate adaptation and greenhouse gas mitigation (A), while avoiding those that are mal-adaptive (B), increase greenhouse gas emissions (C), or both (D).

our findings in four sections. First we review Wise et al.'s five justifications for the adaptation pathways construct. Second, we present the context of climate and global change, rural poverty and development in Nusa Tenggara Barat, including the perceptions of a cross-section of decision-makers. Third, using this information we consider whether the justifications are tenable for Nusa Tenggara Barat, and identify points of consistency and divergence. Fourth, based on the results of this comparison we frame how an adaptation pathways approach could be applied in the province in terms of analysis, process and governance. Finally, we contrast this with agricultural regions of developed nations such as neighbouring tropical Australia, and discuss the broader relevance of our findings for other developing countries.

2. Adaptation pathways and rural development

2.1. Five justifications for adaptation pathways

Wise et al. (in this volume) argue that there is a growing shift in climate adaptation science from a problem-orientated (i.e. estimating impacts and vulnerabilities) to a decision-orientated focus, which aims to assist decision-makers to assess and implement alternative policy options within highly uncertain, dynamic and complex social-ecological systems. Reeder and Ranger (2011) originally introduced the 'pathway' metaphor to focus on the process of decision-making, emphasising the inherent uncertainty and inter-temporal complexity of climate change. Fundamentally, this approach envisages a series of decision points where no regrets interventions are made which also maintain flexibility for potential future adaptation.

However, to date the construct has only been applied to contexts where goals are unambiguous and decision-making is centralised. As a result adaptation actions have been focused on proximate causes of vulnerability rather than the root causes such as societal institutions and values (Pelling, 2011). Wise et al. emphasise that adaptation problems are often more complicated, being nested within complex and evolving social-ecological systems, and involving multiple stakeholders across scales who have competing values, goals and knowledge influencing their decisions. Consequently a broader adaptation pathways construct is needed which fosters an iterative and adaptive governance process for designing and implementing collective action, tackling

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