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## Scenario planning to leap-frog the Sustainable Development Goals: An adaptation pathways approach



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### ABSTRACT

Few studies have examined how to mainstream future climate change uncertainty into decision-making for poverty alleviation in developing countries. With potentially drastic climate change emerging later this century, there is an imperative to develop planning tools which can enable vulnerable rural communities to proactively build adaptive capacity and 'leap-frog' the Sustainable Development Goals (SDGs). Using an example from Indonesia, we present a novel participatory approach to achieve this. We applied scenario planning to operationalise four adaptation pathways principles: (1) consideration of climate change as a component of multi-scale social-ecological systems; (2) recognition of stakeholders' competing values, goals and knowledge through co-learning; (3) coordination of responses across multiple decision-making levels; and (4) identification of strategies which are 'no regrets', incremental (tackling proximate drivers of community vulnerability) and transformative (tackling systemic drivers). Workshops with stakeholders from different administrative levels identified drivers of change, an aspirational vision and explorative scenarios for livelihoods in 2090, and utilised normative back-casting to design no regrets adaptation strategies needed to achieve the vision. The resulting 'tapestry' of strategies were predominantly incremental, and targeted conventional development needs. Few directly addressed current or possible future climate change impacts. A minority was transformative, and higher level stakeholders identified proportionately more transformative strategies than local level stakeholders. Whilst the vast majority of strategies were no regrets, some were potentially mal-adaptive, particularly for coastal areas and infrastructure. There were few examples of transformative innovations that could generate a step-change in linked human and environmental outcomes, hence leap-frogging the SDGs. We conclude that whilst effective at integrating future uncertainties into community development planning, our approach should place greater emphasis on analysing and addressing systemic drivers through extended learning cycles.

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#### Introduction

For many rural communities in the developing world, change is occurring at an unprecedented rate, resulting in increasing uncertainty for their livelihoods (Scoones et al., 2007; Leach, 2008). Whilst the effects of drivers of change such as population growth and modernisation are already evident (Armitage and Johnson, 2006; Curry et al., 2012; Butler et al., 2014a), extreme climate change may only emerge later this century (Stafford Smith et al., 2011). Hence in many regions there is an 'adaptation window' of approximately three decades in which to build the adaptive capacity of vulnerable communities and other stakeholders to face potentially drastic change, but also high levels of uncertainty (Butler et al., 2014a).

This challenge can be framed as the necessity to 'leap-frog' the Millennium Development Goals (MDGs; United Nations, 2014) and their successors, the Sustainable Development Goals (SDGs; United Nations, 2015). 'Leap-frogging' implies the rapid development and adoption of affordable technology which can by-pass environmental impacts and accelerate poverty alleviation (Goldemberg, 1998). In terms of adaptation, it refers to investing in innovative 'green development' that is pre-adapted to the future (Palutikof et al., 2013). Whilst the MDGs are largely human development-orientated, focussing on poverty and hunger alleviation, education, gender equality and health, they will be expanded in 2015 by the SDGs to include stronger elements of environmental sustainability (Griggs et al., 2013). Leap-frogging the SDGs therefore requires rapid identification and implementation of innovations that achieve improved human and environmental outcomes (Leach et al., 2012; Griggs et al., 2014), generating a step-change in communities' adaptive capacity (Butler et al., 2014b).

To achieve this requires frameworks and tools which can mainstream anticipatory adaptation into development planning (Metz and Kok, 2008; Conway and Mustelin, 2014). By taking a systems approach, the recent construct of adaptation pathways provides a potentially useful decision-making framework (Wise et al., 2014) which is applicable to community development planning (Butler et al., 2014b). It combines four core principles for planning processes and outputs. First, climate change impacts and responses cannot be considered in isolation, but are components of dynamic, multi-scale socialecological systems. Second, adaptation involves multiple stakeholders with competing values, goals and knowledge which must be recognised and negotiated. Third, responses to change must be coordinated across spatial scales, jurisdictional levels and sectors. Fourth, planning processes should design and implement incremental adaptation strategies to address proximate causes or symptoms of vulnerability, plus transformative strategies to tackle systemic causes, which in developing countries are often the institutional and political roots of disadvantage (Lemos et al., 2007; Pelling, 2011; Rodima-Taylor et al., 2012). Also, to avoid mal-adaptation (i.e. actions that impact adversely on or increase the vulnerability of other systems, sectors or social groups; Barnett and O'Neill, 2010), strategies should be 'no regrets' (i.e. yielding benefits under any future conditions of change: Hallegatte, 2009).

Scenario planning is a popular and flexible tool used to inform anticipatory adaptation (e.g. Ravera et al., 2011; Ruiz-Mallén et al., 2015). By providing descriptions, rather than forecasts or predictions of plausible futures that reflect different perspectives on development (van Notten et al., 2003), scenarios can help explore complexity and uncertainty in social-ecological systems (Wilkinson and Eidinow, 2008). When applied in multi-stakeholder processes, scenarios act as boundary objects to promote social learning, collective action, the co-production of knowledge and innovation, and to form reference points for development planning (Gidley et al., 2009; Chaudhury et al., 2013; Johnson et al., 2012; Foran et al., 2013; Oteros-Rozas et al., 2015). When linked, scenarios created by stakeholders from different administrative and social levels can provide opportunities for the inclusion of diverse knowledge and perceptions, enhancing understanding of cross-scale system interactions (Biggs et al., 2007; Kok et al., 2007; Özkaynaka and Rodríguez-Labajos, 2010). 'Back-casting' can also be applied to identify the strategies required to achieve a desired goal under future uncertainty (Kok et al., 2011; Robinson et al., 2011). Consequently scenario planning can potentially operationalise adaptation pathways principles by encouraging social-ecological systems analysis, engaging multiple stakeholders in a learning process, and back-casting to identify strategies required to achieve development. However, few studies have attempted to integrate these principles and practices to enhance development decision-making (Vervoort et al., 2014).

In developing countries there are numerous challenges which may impede such integration, however. Stakeholders are often fatalistic (Wollenberg et al., 2000; van Aalst et al., 2008) and tend to focus on immediate development needs (Conway and Mustelin, 2014). Local level actors also tend to conceive the future in short time horizons (Bohensky et al., 2016). Exacerbated by limited formal education, these cognitive biases may constrain some stakeholders' concerns to current issues (Enfors et al., 2008), and thus only incremental or 'coping' strategies (Scoones, 2009). Including the knowledge of higher level stakeholders and science experts is then necessary to collectively identify systemic and long term issues, and related transformative strategies, but risks disempowering community members (Fazey et al., 2010; Butler et al., 2015a). Consequently planning processes must encourage participants, particularly those from local levels, to conceive the future over short and long time horizons, whilst mitigating potential power asymmetries associated with the involvement of higher level actors and their knowledge.

This paper has three primary objectives. First, we demonstrate a participatory approach which combines scenario planning and adaptation pathways principles to mainstream future uncertainty into decision-making for community development. As a component of a multi-stakeholder planning process in Nusa Tenggara Barat Province (NTB), Indonesia, we designed the approach to address the challenges of anticipatory futures planning in a rural development context. Second, we analyse outputs from the process to understand different stakeholders' perspectives of livelihoods and priority adaptation strategies. Third, we assess whether the strategies devised may enable communities to leap-frog the MDGs and SDGs, thus critiquing our approach. Download English Version:

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