Global Environmental Change 23 (2013) 40–50

Contents lists available at SciVerse ScienceDirect

Global Environmental Change

journal homepage: www.elsevier.com/locate/gloenvcha

Globalization, Pacific Islands, and the paradox of resilience

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ARTICLE INFO

Article history:
Received 13 February 2012
Received in revised form 18 July 2012
Accepted 5 October 2012
Available online 10 November 2012

Keywords:
Tsunami
Adaptive capacity
Resilience trade-offs
Globalization
Coral reef
Solomon Islands

ABSTRACT

On April 2nd, 2007 a 12 m tsunami struck Simbo, a relatively remote island in Western Province, Solomon Islands. Although Simbo's population continues to depend on their own food production and small-scale governance regimes regulate access to resources, the island's way of life over the last century has increasingly been affected by processes associated with globalization. In this context of a rapidly globalizing world, this article examines the island's resilience and vulnerability to the tsunami and the adaptive capacities that enabled the response and recovery. The tsunami completely destroyed two villages and damaged fringing coral reefs, but casualties were low and social–ecological rebound relatively brisk. By combining social science methods (household surveys, focus group and ethnographic interviews) and underwater reef surveys we identify a number of countervailing challenges and opportunities presented by globalization that both nurture and suppress the island's resilience to high amplitude, low-frequency disturbances like tsunamis. Analysis suggests that certain adaptive capacities that sustain general system resilience come at the cost of more vulnerability to low-probability hazards. We discuss how communities undergoing increasingly complex processes of change must negotiate these kinds of trade-offs as they manage resilience at multiple spatial and temporal scales. Understanding the shifting dynamics of resilience may be critical for Pacific Island communities who seek to leverage globalization in their favor as they adapt to current social–ecological change and prepare for future large-scale ecological disturbances.

1. Introduction

Some observers suggest that certain Pacific Island communities exhibit high levels of social–ecological resilience (Campbell, 2009; Gough et al., 2010; Hviding, 1996; Mercer et al., 2007), a condition defined as the ability to absorb disturbance without degradation of essential processes and structures (Holling, 1973). Resilient social–ecological systems (SESs) have been shown to have adaptive capacities that emerge from social factors such as in-depth local ecological knowledge, flexible governance systems, and diverse livelihood strategies, combined with ecological factors such as high biodiversity, greater abundance of key species, and a complete community structure (Berkes et al., 2003; Folke et al., 2005; Hughes et al., 2005). This is especially the case of more traditional SESs in the Pacific where small-scale governance regimes dominate. These communities have high levels of trust between community members and customary practices that structure resource use, characteristics that encourage sustainable management of local resources (Ostrom, 1990) and underpin robust response capacities. For example, the inhabitants of Tikopia, Solomon Islands demonstrated a high capacity to deal with a massive 2002 cyclone that destroyed the small island by relying on traditional practices of thatch housing and fleeing to sheltered locations under overhanging rocks as the cyclone hit (Anderson-Berry and Yates, 2003). Ecologically the island's marine and terrestrial ecosystems absorbed the cyclones impact and recovered, evidence that resource use patterns have not undermined the regenerative capacity of local ecosystems (Mertz et al., 2010). These and other examples suggest that, in certain contexts, Pacific Island societies are able to confine the impact of ecological disturbances to manageable levels.

However, many of the system characteristics of these local SESs are being altered by broader processes of globalization (Aswani and Armagan, 2009; Janssen et al., 2007; Young et al., 2006). As

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http://dx.doi.org/10.1016/j.gloenvcha.2012.10.011

local SESs are enmeshed in larger-scale systems such as national governmental policies, international economic development projects, and global markets they are exposed to novel circumstances or disturbances outside the SES. Local adaptive capacity that developed in response to local-scale ecological and social change may be rendered ineffective when faced with these new sources of variability. Slow, persistent changes in socioeconomic arrangements or technology associated with globalization have been shown to be particularly challenging to local SESs (Janssen et al., 2007). These kinds of changes alter resource use patterns over time that fundamentally transform the SES in response to new variability at larger spatial and temporal scales, a process that may enhance resilience at one scale but reduce it at another. Analyzing resilience tradeoffs and how they play out over temporal and spatial scales has increasingly become the focus of research (Gunderson, 2010; Janssen and Anderies, 2007; Nelson et al., 2007; Schoon et al., 2011; Walker et al., 2006).

Building on this intellectual backdrop, this article examines the social–ecological resilience, vulnerability, and adaptive capacity on Simbo, a small, relatively remote island in the western Solomon Islands, that on April 2nd 2007 was faced with a major ecological disturbance its habitants had never previously experienced—a massive 12 m tsunami. The waves struck the island just minutes after an 8.1 magnitude earthquake rattled the seafloor 30 km to the southeast (Taylor et al., 2008). The tsunami killed nine people on Simbo and completely destroyed two villages, while the entire northern half of the island subsided nearly 1 m (Fritz and Kalligeris, 2008). As we detail below, indigenous ecological knowledge, customary land tenure, and sustainable resource use were key adaptive capacities that buffered the island from the impact of the catastrophe. However, Simbo, like many local SESs in the Pacific, is increasingly under the influence of social and economic changes associated with globalization, a context that has influenced local adaptive capacities and presented new challenges as well as opportunities. Below we assess Simbo's resilience and ability to cope with the tsunami in an increasingly globalized world.

2. Social–ecological systems, resilience, and globalization

Our analysis is guided by the resilience framework, a systems perspective that emphasizes the dynamic feedback and interplay between humans and the biophysical environment (Adger, 2000; Berkes et al., 1998; Gunderson and Holling, 2002; Gunderson et al., 1995; Holling, 1973). Resilience thinking conceptualizes the ecological and social components as interpenetrating processes, hence the term socio-ecological system (SES) to describe the analytical frame. SESs typically present complex interactions and changes between processes at different spatial or temporal scales and as a result are understood more broadly as complex adaptive systems. Complexity produces emergent properties, non-linear change, and unpredictable dynamics, all of which are important areas of research (Holling, 2001; Liu et al., 2007).

Resilient SESs are defined as persistent, adaptable, and transformable, a suite of properties that enable them to absorb shocks, avoid crossing thresholds into new states, and regenerate after disturbances (Berkes et al., 1998; Folke, 2006; Gunderson and Holling, 2002; Walker and Salt, 2006). Resilience scholars distinguish ecological resilience from the more conventional concept known as engineering resilience. Engineering resilience refers to the speed at which a system returns to a stable, equilibrium state (Pimm, 1984) whereas ecological resilience assumes that change rather than equilibrium are a system's normal or natural state and that disturbances can transform a system into another regime of behavior. From the perspective of ecological resilience, all systems are vulnerable in that they are susceptible to disturbances. What determines system vulnerability is its exposure and sensitivity to perturbations and its capacity to adapt. Understanding adaptive capacities (also called adaptability) is crucially important when assessing the resilience and vulnerability of an SES because they are the preconditions necessary to enable individuals, households, or communities to adjust to current or future change (Nelson et al., 2007). In this way, resilience thinking conceptually links the resilience, vulnerability, and adaptive capacity of a system.

When an SES responds to perturbations, short-term adjustments will inevitably occur that may take the form of emergency responses or other measures that mitigate impact and facilitate recovery. These short-term, coping strategies are analytically separated from adaptive capacities since they normally occur at smaller-spatial scales involving individuals or households and they occur over shorter temporal scales. Adaptive capacities, on the other hand, are generalized characteristics of larger social groupings and grounded in cultural values, worldviews, or social–political arrangements. They also have a longer temporal horizon and change more slowly, although adaptive capacities may develop from shorter-term coping strategies.

Issues related to scale also demand attention when assessing the effects of globalization on local SESs. Although the meaning of globalization remains contested, four of its most salient characteristics include: changing connectedness, increased speed, spatial stretching, and declining social and ecological diversity (Young et al., 2006). In some cases, globalization enables local communities to subsidize their livelihoods with inputs from larger-scale systems, but this typically involves significant transformations of local social and economic arrangements, a process that can shift adaptive capacity to be more attuned to variability at larger social and temporal scales. Some Polynesian islands, for example, have, in response to new opportunities, transitioned their economies from diversified, subsistence-based systems to monocultures for cash cropping (Colding et al., 2003). This provides a number of benefits including improved overall material well-being, but when faced with large-scale ecological disturbances (e.g., cyclones) these islands must depend on foreign aid and other subsidies from outside the region to buffer the impact. Local adaptive capacity was, in effect, replaced by outside help, a transformation that makes the SESs more dependent on external resources and presents new forms of larger-scale vulnerability.

The 2007 tsunami presents a unique situation to explore a number of fundamental questions raised by resilience research. How do human societies cope with large-scale ecological disturbance? What are the adaptive capacities that underpin response? How do the opportunities and constraints associated with globalization influence resilience and vulnerability to disturbances? To what extent are SESs like Simbo who are undergoing rapid social and economic change more or less resilient to disturbances now than in the past? What resilience trade-offs are most relevant when disasters strike? And how effectively do communities negotiate resilience trade-offs that manifest themselves at different spatial and temporal scales? Below we attempt to answer these questions by examining the initial social and ecological impact of the tsunami, the ensuing coping strategies to deal with the catastrophe, and the underling adaptive capacities.

3. Methods

3.1. Study site

Six main islands constitute most of Solomon Island's landmass, although in total there are hundreds of smaller islets in the archipelago. It is one of the poorest countries in the Pacific with a GDP per capita of $2546 (United Nations Development