Ecological and socio-economic responses to change in subsistence fishing societies

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Introduction

Traditional Fijian fishing grounds (qoliqoli) provide a useful case study of social-ecological systems subject to ecological, economic and social drivers of change from local to global scales. Reduced goods and services from degraded coral reef ecosystems are expected to have significant socio-economic impacts on isolated island communities with strong reliance on coral reefs.

Methods

A combination of semi-structured interviews, oral histories, key informant interviews and a household survey were used alongside ecological surveys to investigate drivers of change.

Socio-economic changes were investigated at five qoliqoli in the Lau Islands (Fig. 1), where recent environmental degradation caused by large-scale climate-induced coral bleaching (2000 and 2002) and local outbreaks of coral-feeding crown-of-thorns starfish (COTS) had been documented.

Results

Interviews with fishers
- Many were unaware of the consequences of habitat disturbances to the coral reef or fish stock (Fig 2).
- Heterogeneous perceptions suggest knowledge was localised and based on observation and experience.

Household survey
- The importance of fishing was low relative to other occupations:
  - Primary occupation
    - 6% (3) Primary occupation
    - 17% (9) Secondary occupation
  - Fresh fish consumption had declined over the last decade, with greater decline linked to higher mean income (Fig 3).
  - Changes in fish consumption and marine resource exploitation were linked to socio-economic factors (need to derive income and new income-generating opportunities) rather than being attributed to change in the marine environment.

Conclusions
- Habitat impacts resulting from large-scale climate change are expected to have an increasing contribution to change in fish community composition, although the implications for future fisheries yields are uncertain.
- Socio-economic drivers influencing resource use behaviour and fish consumption mean that at the sites studied, loss of habitat is an increasingly important driver of change relative to fishing pressure.
- Reduced reliance on marine resources may confer greater flexibility to adapt to future ecological change, but may also result in limited awareness of environmental change, with implications for long term adaptive capacity.
- These findings highlight the need to identify the dynamics driving change in both marine ecosystems and marine resource use, the scales at which they operate and how they interact. Identifying how societies respond to ecological and socio-economic change is essential to identify opportunities for adaptive management.

Acknowledgements: People of the Lau Islands, Lau Provincial Council, Prof. Leon Zann & Prof. Bill Aalbersberg (USP, Fiji), Fijian Fisheries, and the crew of the ‘Mothership’. Research was funded by National Geographic and the Leverhulme Trust.