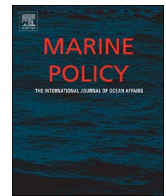




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Livelihood diversity and dynamism in Timor-Leste; insights for coastal resource governance and livelihood development

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ABSTRACT

Coastal communities within small island developing states are typically highly dependent on fisheries and other natural resource-based livelihoods. However, specialisation as a ‘fisher’ is rare compared to diverse livelihoods that can be adapted as opportunities and challenges emerge. Understanding this dynamic “livelihood landscape” is important for improving governance and livelihood opportunities associated with natural resources. Using data from 495 households across 15 communities on Atauro Island, Timor-Leste, this study evaluates the importance of fisheries within a suite of livelihoods; the correlation of livelihoods structure with wellbeing; and the spatial and temporal variation of those livelihoods. Activities linked to primary production were nominated by 67% of households as their primary livelihood, 41% fished, and of those 54% considered fishing their primary livelihood. Almost all households (95%) owned livestock, and even respondents who considered themselves ‘fishers’ ranked livestock disease, rather than fisheries related concerns, as their most critical livelihood challenge. Engagement in fishing varied by location and time of year. Communities in more protected locales fished throughout the year, and had less diverse livelihoods. This study highlights that interventions focused on self-identified ‘fishers’ would only engage a fraction of the population that derive benefit from fisheries resources, would likely overlook the most prevalent challenges fishers face, and would focus on those with relatively high food security and income. Measures of wellbeing were better explained by geography and socio-cultural settings, rather than dominant income sources. The results emphasise the value of cross-sector development interventions informed by contextualised analysis of livelihoods and wellbeing outcomes.

1. Introduction

People living in the archipelagic and island states of Asia-Pacific rely heavily on terrestrial, freshwater and marine resources for food and income [1,2]: in many situations, alternatives are limited [3]. As a result, these populations (particularly poorer households) are sensitive to resource decline [4] and this sensitivity is heightened by the vulnerable nature of (at least partially) closed island ecosystems [5]. Archipelagic and island states face a unique and persistent set of challenges in ensuring the benefits they derive from natural resources are secure and support human wellbeing. Crisis narratives of resource depletion are near-ubiquitous [1], while effective, affordable and scalable governance solutions remain evasive. Where post-colonial

centralised governance has come to prominence, it has often displaced customary institutions [6]. Inevitably the reach and efficacy of central government is impeded by the geographically dispersed nature of fisheries, social diversity of resource users and the variability of fisheries and associated concerns between different locales [7]; by contrast more collaborative forms of management better account for local knowledge and resource user buy-in [8,9]. Where customary institutions that control the use of resources persist, they risk being overrun to the point of ineffectiveness by new market penetration [10], increasing pressure on resources due to population growth [11] and rapidly evolving harvest technologies [12,13]. To secure and improve the wellbeing of island populations, innovative governance solutions must move beyond tired and ineffective sectoral paradigms, to engage

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simultaneously with natural system dynamics, institutional plurality and diverse livelihoods – and be designed in a manner that fits local, national and regional contexts.

Livelihoods are “... a set of capabilities, activities and assets (including both material and social resources) that contribute to a means of living” [14], and are central in mediating human-environment interactions. In coastal communities of developing countries, including small island states, livelihood portfolios of households and individuals are typically diverse – spanning fisheries, agriculture, casual or informal labour, and to a lesser extent, formal employment [15]. Households and individuals shift the focus of their livelihood pursuits in the face of seasonal change, exogenous shocks or emerging opportunities. The structuring, dynamism and diversity of livelihoods are key factors that affect governability of natural resources, the stability and degree of benefits that people derive from resources, as well as people's ability to respond to, and cope with, change [15,16].

Small-scale fisheries commonly feature as a dominant livelihood in many coastal communities across the Asia-Pacific region and fisheries play a central role in food systems of coastal communities globally, and within islands in particular [17,18]. Fisheries are well placed to provide income, quality protein and micro-nutrients to areas that are beyond the reach of formal market chains. In coastal regions away from urban centres, the level of household dependence on fisheries, and ultimately the substitutability of income and nutrition obtained from fisheries, is closely linked to cultural, institutional and demographic drivers [12,19] that play out in the structuring of livelihoods [20]. Small-scale fisheries themselves are characterised as being diverse and dynamic [7,21]. However, in practice small-scale fisheries are just one of many livelihoods that an individual or household might pursue within the same year, week or even day (e.g. [15]). This study, rather than delving into the diversity within fisheries, examines the diversity of livelihoods in livelihood portfolios that include fisheries. Development studies and livelihoods research (e.g. [16]) suggest that even if fisheries governance and development is an entry point for improving environmental outcomes and human wellbeing, understanding the “livelihood landscape” (sensu [15]), and interactions between livelihoods, is a critical early step to guiding the design of those interventions.

This research focusses on Timor-Leste; a young post-conflict island state. The nation exhibits rapid population growth and significant social and economic development concerns. Timor-Leste faces multiple challenges in lifting its people out of food insecurity and generating wealth to fuel national and local economic growth. Timor-Leste is ranked eighth on the Global Hunger Index [22] and has among the highest global prevalence of childhood stunting (low height for age), with more than 50% of children under five stunted [22]. A looming challenge for the nation is to look beyond the current heavy reliance on oil (currently ca. 90% of national income) to a future with a diversified, sustainable and distributed income base that makes optimal use of renewable natural resources.

Fisheries have the potential to play an important role in this nation-building process, however the sector is currently considered to be functioning well below its potential [18,23] – a diagnosis that contrasts with that of most developed and developing countries [24]. A recent consumption survey estimated national average per capita fish consumption to be 6.1 kg per person per annum [25], well below Timor-Leste's neighbour Indonesia (27 kg per person per annum) or the global average (over 20 kg per person per annum)[26]. Low fish supply has been attributed to Timor-Leste's land-based cultural focus [27], physical constraints (e.g. small areas of coastal habitat), supply-demand dynamics [18] and a lack of economic incentive to invest in the sector due to poor infrastructure and low economic returns [28]. Fisheries do, however, play an important role in nutrition and livelihoods of coastal communities. Coastal communities consume an estimated 17.6 kg of fish per person per year – almost three times the national average [25]. There are about 4000 to 5000 fishers in Timor-Leste [29,30]; and about 3000 registered fishing boats [29].

This study comes at a time when the Government of Timor-Leste is pursuing the re-design of fisheries governance systems in line with national strategies to improve nutrition security and food sovereignty. There is broad acknowledgement that existing policy does not capture the potential of fish in food systems, and is not suited to the institutional context of today's Timor-Leste. This study represents the first analysis from a comprehensive livelihood and food security baseline study. The purpose of the study is to ultimately guide the integration of livelihood development activities with improvements to fisheries governance. The study focuses on the most fish-dependent communities in the country. It set out to understand the livelihoods on which households and individuals depend, which of these can be characterised as “natural resource dependent”, and the position of fisheries relative to other livelihoods. Secondly, it aims to determine how different livelihoods and livelihood combinations correlate with three indicators of human wellbeing (i.e. assets, income and food security). Third it seeks to determine temporal and spatial variations within livelihood portfolios. Finally, it seeks to determine where people perceive there to be threats or vulnerabilities associated with their livelihoods.

2. Methods

2.1. Study site

Timor-Leste lies at the eastern end of the Indonesian archipelago and the northern edge of the Arafura Timor Sea (Fig. 1). Timor-Leste is situated within the most marine biodiverse region in the world: the Coral Triangle [31]. Our study concentrates on those communities on Atauro Island, some 26 km north of the nation's capital, Dili, and at the intersection of the deep oceanic straights of Wetar and Ombai. Extreme topography, rising rapidly to 999 m at the peak of Mt Manukoko, continues underwater with very narrow fringing reef giving way to walls and steep slopes often exceeding a 1:1 slope ratio. Strong currents interacting with monsoonal wind systems can effectively cut Atauro off from Dili for days or weeks at a time. The recent development of an airstrip has improved year-round access for emergencies or those who can afford to fly. Atauro has a population of approximately 10,000 residents. The main towns or administrative centres are on the eastern side of the island, and road systems span the eastern side and extend up the mountainous spine. Western coastal villages are reached by foot or boat only. Atauro Island is the most fishery-dependent region of Timor-Leste [23] and for this reason has become the focus for a number of fishery governance and livelihood interventions supported by government, non-government and international development investments.

2.2. Survey design and field methods

A household socio-economic survey was conducted using a structured questionnaire in 15 coastal and inland villages (Fig. 1) of Atauro Island between December 2014 and April 2015. The study was designed to collect both integrative long-term indicators and short-term indicators that could be re-sampled on a seasonal basis with a reduced survey; (only results from the initial survey are presented here). The research team partnered with a local NGO based on Atauro Island for survey implementation. Men's and women's focus groups were held to ensure that questions were appropriate to local context. The survey team comprised six Atauro Islanders who were familiar with the culture, and were fluent in Tetum (one of two official languages spoken across Timor-Leste) and at least one of the 3 dialects of Wetarese spoken on the island (Rahesuk, Resuk/Wawa and Raklungu). Training of the team included a day of classroom training prior to conducting any surveys, a day of field testing, and a review of data after each of the team had completed five surveys. Data were entered into an MS Access database by the field team leader, allowing for further questioning of the field team if answers were unclear.

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