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Not just a passing FAD: Insights from the use of artisanal fish aggregating devices for food security in Kiribati

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1. Introduction

Fish[1] are the most important renewable resource in Pacific Island Countries and Territories (PICTs) for food protein, livelihoods, and economic growth (Bell et al., 2009; Gillett and Cartwright, 2010). Considering food protein benefits alone, subsistence and small-scale commercial (i.e., artisanal) catches of fish account for over half of the total animal protein consumed annually in most PICTs (Bell et al., 2009; Gillett, 2009). The sustainable use and development of coastal Pacific fisheries resources plays an accordingly key role in strategic policy developments around the region (see e.g., Vava'u Declaration, 2007; Apia Policy 2008; Cairns Compact 2009; FSPWG, 2010). These same policies often emphasise the protection of domestic food security among their core goals and objectives. While these policies seldom define 'food security' outright, here it is understood to mean the physical, social, and economic access to sufficient and safe food fish for all people, at all times, so that they can lead healthy and active lives (FAO, 1996).[2]

Despite the importance of fish to this region, many PICTs are projected to experience food fish insecurity by 2030, meaning that these countries will not have access to sufficient fish supplies to meet their population's per capita requirements for 'good nutrition'[3] (Bell et al., 2009). This projected insecurity is largely driven by domestic trends in population growth, urbanization, and migration combined with current trends in coastal fisheries exploitation and productivity (Newton et al., 2007; Bell et al., 2009; Hoegh-Guldberg et al., 2011; World Bank, 2014).

Even if these projections fall short of predicted outcomes, they highlight a food security risk that heavily food fish-dependant PICTs cannot afford to ignore. The need to proactively diversify food protein sources is clear; however, it is also clear that most PICTs are limited in their practical options for doing so. Constraints to food protein and livelihood[4] diversification in what are primarily Small Island Developing States (SIDS) include limitations to: disposable income; physical geography and natural resources; human and financial resources; physical and institutional infrastructure; and viable markets. However, most PICTs do have abundant oceanic tuna and associated pelagic resources. Making oceanic fish more available and accessible to artisanal fishermen through the use of Fish Aggregating Devices (FADs) has therefore been identified as one of the more immediate and practical means of improving food fish security throughout the region (Bell et al., 2009; Sharp, 2011; Bell et al. 2015a).

Both industrial and artisanal FADs alike have enjoyed a lengthy popularity across the Pacific. Their capacity to increase the quantity and consistency of pelagic fish catches and to decrease vessel search time and some operating costs when compared to open-ocean conditions has been empirically verified over time (Matsumoto et al., 1981; Désurmont and Chapman, 2000; Dempster and Taquet, 2004; Sharp, 2011; SPC, 2012; Sharp 2014). FAD-associated food security and livelihood improvement efforts

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[1] Includes finfish, crustaceans, and molluscs.

[2] Definition adapted from FAO World Food Summit (1996).

[3] The World Health Organization defines 'good nutrition' as 0.7 g of protein/kilogram body weight/day (WHO, 2015). Using this ratio, Bell et al. (2009) calculate that an average of 35 kg of fish/person/year is needed to provide 50% of PICTs' recommended protein intake.

[4] Defined as the means of securing the necessities of life, the details of which are context-dependant and may vary by individual.

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typically focus on the use of artisanal FADs. These offshore, nearshore, and lagoon FADs are sited closer to shore than their industrial counterparts, i.e., within 1500 m from shore (SPC, 2012). Theoretically, this means that artisanal FADs, and the presumably under-utilised fish that they aggregate, are more physically accessible to the artisanal fishermen who supply local households and markets with food fish (Beverly et al., 2012).

Artisanal FADs deployed for over one year have also been shown to increase total catch value and positive returns on investment in some SIDS (Sims, 1988; Detolle et al., 1998; Sharp, 2011, 2014). Additional but empirically-unverified FAD use benefits include a capacity to transfer artisanal fishing effort away from often heavily exploited coastal reef habitats, to provide options for rural economic development and livelihood diversification, and to increase artisanal fisher safety (Beverly et al., 2012; SPC, 2012; Bell et al., 2015b). All of these described benefits have evident implications for the long-term health and well-being of Pacific Islanders. It is therefore not surprising that the deployment of artisanal FADs continues to be so widely and keenly considered by governments and development assistance donors alike. Even so, the enthusiasm for using FADs as a tool to strengthen food security is currently based on little empirical evidence.

In the Pacific, the lack of evidence-based FAD-associated food security benefits may be partly attributable to the data-intensive complexity of determining what it is to be 'food secure' in often data-poor developing countries. Nevertheless, a confirmed ability to aggregate fish and earn fishing income in the short term is an incomplete measure of a FAD's 'success' at helping a country or people be more 'food secure' in the medium-to-long term (Désurmont and Chapman, 2000; Albert et al., 2014). As the prospect grows of more widespread increases to the number of nearshore FADs around the Pacific, ensuring that PICTs are on the path to achieving food security success will rely on more than just improvements to the quantity and quality of quantitative monitoring and evaluation data. To date, few studies have examined the enabling governance conditions that support successful nearshore FAD use for food security purposes in the Pacific (see e.g., some of the analysis in Bell et al., 2015b). Fewer studies investigate the linkages between successful FAD use and awareness, understanding, and appropriate responses to the barriers to FAD benefit delivery. These barriers may have one or more social, economic, environmental, or governance contexts and they may exist at the level of individual deployment, across the whole domestic programme, across the government more broadly, and even regionally.

Having awareness and understanding of these barriers can assist food security decision-makers and practitioners in determining context-relevant, timely, and adaptive responses to food security policy, planning, and management challenges in their country. The aim of this study is therefore to expand the understanding of what some of these barriers to artisanal FAD benefit delivery mean in practice when it comes to meeting policy-based food security objectives. Using a qualitative mixed-methods approach, this study identifies and discusses the governance barriers to nearshore FAD benefit delivery in the Republic of Kiribati, a Pacific island SIDS with approximately 30 years' experience in FAD deployment and a strong reliance on fish for domestic food security and livelihoods (MFMRD, 2014). Governance is described here as the formal and informal structures and processes that influence how power is exercised, responsibilities are allocated, and decisions are made in a multi-level and multi-actor system.

Using this approach, this study assesses Kiribati's current nearshore artisanal FAD information, policy, and practice and asks the following research questions: 1) Is the realization of FAD-associated food security benefits supported to reach its full potential in Kiribati?; 2) What barriers to food security benefit optimization exist?; and 3) What are some potential responses to addressing these barriers? To answer these questions, we analyse the available information, identify some barriers, and discuss their implications for FAD benefit delivery. Building on these insights, we then propose some precautionary policy responses that can better inform PICT decision-makers and practitioners of the challenges and potential ways forward for using artisanal FADs to more effectively meet food security goals.

2. The status of nearshore artisanal FAD use in Kiribati

2.1. Study site and context

Kiribati's population of 103,000 continues to grow at an average annual rate of 1.5% per year (KNSO, 2012; World Bank, 2014). Around half of the population is concentrated into the urban centre of South Tarawa at a density of more than 3000 people per square kilometre (KNSO, 2012). This has placed significant exploitation pressure on Tarawa Island's immediate coastal marine environment (MFMRD, 2013). This pressure is expected to increase in the face of static coastal reef fisheries production and projected future climate-driven declines in reef productivity (Newton et al., 2007; Bell et al., 2009; Hoegh-Guldberg et al., 2011; Pratchett et al., 2011).

Kiribati is a remote and dispersed group of predominantly rural islands with a largely subsistence-based and cash-limited economy. Combined with a limited land area for agricultural development and a limited practical scope for increasing food imports, the solution to Kiribati's looming food security problem lies in its oceans. Kiribati as a whole is expected to meet total domestic food fish consumption demands to 2030 and beyond (Bell et al., 2009). However, as Tarawa Island's coastal fisheries resource base becomes less reliable and its human population grows, supplying sufficient quantities of fish to its population centre may become a significant challenge (Bell et al., 2009).

As the leading agency responsible for fisheries management in Kiribati, the Ministry of Fisheries and Marine Resource Development (MFMRD) is acutely aware of these challenges. The MFMRD, and the Government of Kiribati more broadly, have identified artisanal FAD deployments as a short-term priority strategic action for addressing Kiribati's food security and livelihood objectives in the National Fisheries Policy (MFMRD, 2013).

The next section builds on the social and environmental context provided above and gives an overview of the current status, policy, and practice of Kiribati's artisanal FAD programme. Kiribati's near-absence of quantitative coastal fisheries data and the considerable time, cost, and logistical challenges of robustly remedying this issue lend a practical dimension to the analysis methodology, which combines information gathered from semi-structured interviews of MFMRD members and regional scientists engaged in local projects with an analysis of Kiribati's limited policy and practice literature. In the absence of more detailed data from which to inform action, such an approach can provide government decision-makers with a rapid appraisal of how FAD policy and practice may be performing against desired outcomes. This 'best available information' can also highlight areas of concern for which adaptive responses may be discussed and implemented in order to strengthen the likelihood of achieving policy goals. Interviews covered a range of topics, including programme history, current management practices, operational capacity and support, available statistics, and deployment details.

2.2. Artisanal FAD programme status

The history of artisanal anchored nearshore FADs (hereafter 'FADs') in Kiribati goes back to at least the 1980s (MFMRD, 2014).