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Small-Scale Fishing: Perceptions and Threats to Conserving a Livelihood in the Province of Phang-nga, Thailand

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Abstract

Limited understanding of small-scale fishing communities has hindered appropriate management initiatives in coastal communities which are threatening livelihoods. Informants' stakeholder interviews and questionnaires from local fishermen were used to gain knowledge of fishing factors, perceptions and threat to the small-scale fishing community in a coastal region in the province of Phang-nga, Thailand. Results revealed communities utilising multi-geared, multi-species fisheries with a preference for marketable species that sell on a local scale. Whilst subsistence and local markets share equally the use of catches, there is a noticeable decline in small-scale fishers being recruited into the industry. This was considered by some to be due to urbanisation and by others to opportunities in tourism but was viewed as a socio-economic shift by government informants towards medium sized operations formed by resilient groups. Current management can be classified as open access, with virtually no management or regulations in place. This has led to fishers listing failing stocks and commercial fleets as the biggest threats to their livelihoods. Management initiatives are needed to focus on protecting and improving coastal stocks by clamping down on illegal activity large-scale from fishers and reviewing fishers access for resource protection.

Keywords: Thailand; small-scale fishing; perceptions; threats

1. Introduction

Thailand is home to the worlds tenth largest fishing nation and the fifth largest in Asia (FAO, 2005). Before the 1960s, as with the rest of Asia, Thailand's waters were fished by small-scale fishers. However, with the introduction of trawlers in the 1960s the industry expanded and over-fishing ensued (FAO, 2005). Today's catch rates, "measured by catch per unit effort are about 7% of that in the early 1960s" (FAO, 2000). The reasons are believed to be excessive numbers of boats, destructive fishing practices, habitat alterations, fishing during banned periods as well as poor enforcement, and inadequate management compounded by insufficient and out-of-date information (FAO, 2000).

In Thailand, fish are a valuable domestic resource, especially in rural and coastal regions. This is recognized by the government, but "despite the plans to improve the standard of living for small-scale fishers, little is known besides the facts that they constitute the majority of the fishing population, account for less than 10% of the total catch by value and 5-6% by volume" (FAO, 2000). It is further acknowledged that statistics on fish extraction "under report or even ignore" small-scale fishers' catches (Lunn and Dearden, 2006). The consequences of not managing small-scale fishing grounds will be harmful to all, due to the importance of fish as a local commodity in Southeast Asia, where there are over 65 million undernourished people (Mulekom, 2006), a high percentage of whom are heavily dependent directly on the natural environment.

Hat Thai Mueang is situated in the southern region of Phang-nga on the Andaman coast. The neighbouring region of Phang-nga Bay is world-renowned for its extensive small-scale fisheries which, results in Hat Thai Mueang having little mention in official government records whilst it shares the limited manpower available within the governments' fishery department. In 2006 a 'new' 4 km^2 coral reef in Hat Thai Mueang was officially registered as a resource and proposed for protection by the National Park system (WWF, 2007). Little official data is available on local dependency, current management or local extraction which exposes this location to the risks of being protected without adequate data to disclose the impacts of limiting access by the local communities. The need to address this knowledge gap is paramount for resource as well as livelihood protection. This study therefore aims to; 1) increase knowledge of the factors that influence and shape fishing activities in the region; 2) Gain key informants' and fishers' perceptions of the fishing activities in the area and; 3) list perceived threats by informants fishers and to sustaining small-scale fishers livelihoods.

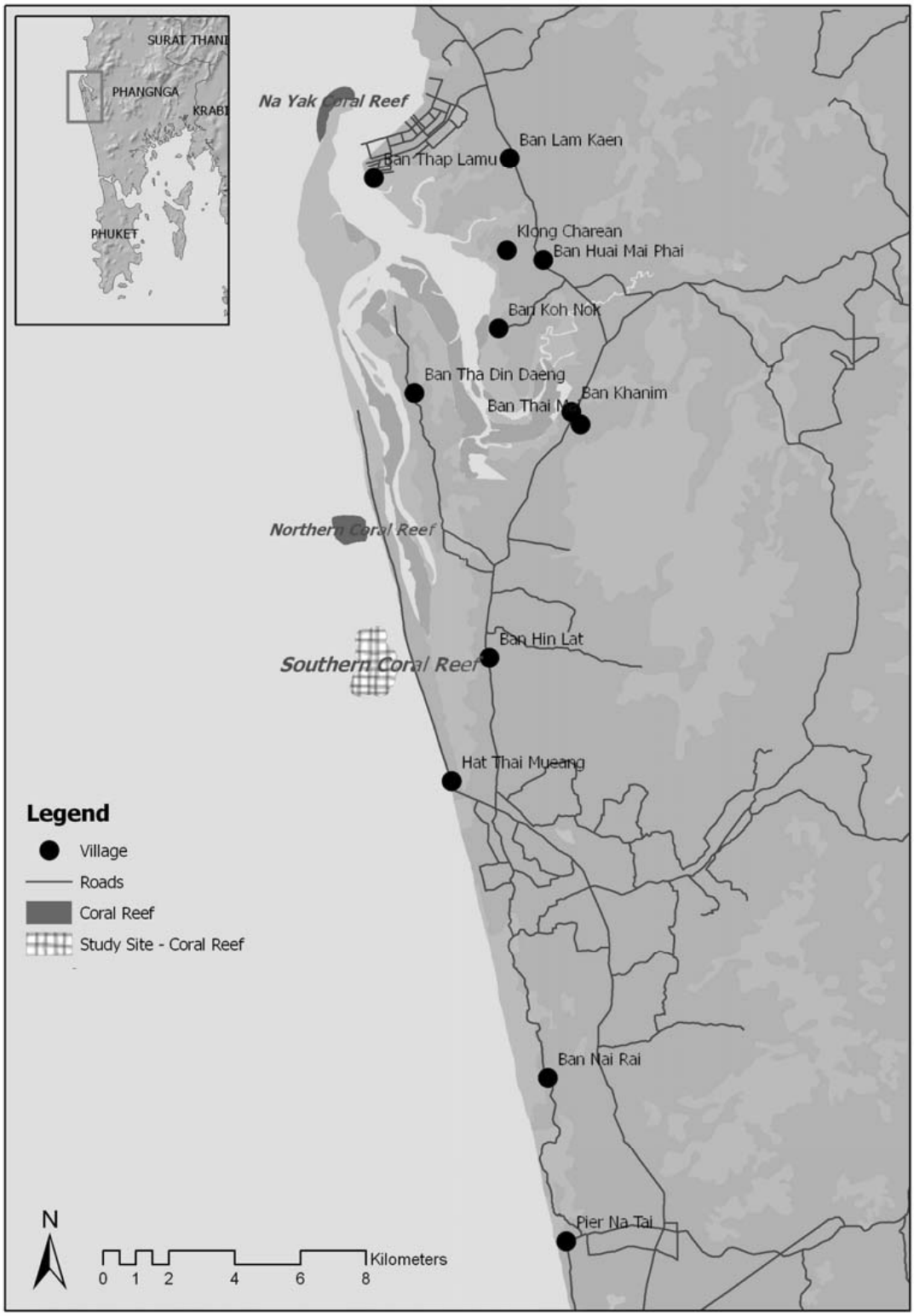

Figure 1. Map of Study Site - Phang-nga Province, Andaman Coast

2. Material and Methods

2.1. Study Site

The site for this study consists of the coastal region north of Pier Na Tai up to the town of Tablamu (Fig. 1). Hat Thai Mueang town and the National Park are positioned directly in the middle along with a number of fishing villages dotted along the main road that runs between the two. The coral reef declared in 2006 is located 600m off the beach front from the national parks headquarters. Small-scale fishing takes place on and around this reef and 12 fishing villages are believed to be operating within the area. The study site was therefore confined to these villages and the coral reef, which equates to approximately. 90 km^2 of marine area along 30 km of coastline. Data collection was limited to fishers that used the marine resources only.

2.2. Data Collection

2.2.1. In-depth Interviews

Informal in-depth interviews with key informants from the local communities were used to gain an overview of the local fishing capacity. Pre-designed questions directed the interviews with assistance from a Thai translator. A representative sample was achieved by creating four subgroups from the main stakeholders of influence: 1) government departments (GO); 2) non-governmental organizations (NGO); 3) commercial fisherman (CF); and 4) small-scale fishermen (SSF)[1]. The samples consisted of two GOs; one NGO; one CF; and three SSFs. From primary surveys, these ratios are considered to reflect the profile of the population, who could supply a fair representation of the situation and are willing and able to disclose the relevant information. Interviewees with the suitable knowledge of the area were identified from government offices while heads of fishing villages were recognised through national park officers and cross-checked with local villagers.

2.2.2. Fishers' questionnaires

The questionnaire was developed to obtain individual fishers opinions on; volume and composition of fishing gear used; fishing factors that influenced activities; ultimate use of catch and; perceptions and threats to small-scale fishing. The questionnaire was delivered directly to the fishermen working in the study area and completed on site. Due to cultural shyness, it was deemed more appropriate to collect the data in a structured interview to explain any ambiguity in the questions and extract the desired data. A local translator conducted the interviews and accompanied the researcher on all village visits. Cluster sampling was used to group fishing villages. Each cluster was chosen with practical limitations in mind, with two days assigned in which to collect data. Convenience sampling was used to obtain participants when on site. Sample size was difficult to calculate, due to data on fishers' numbers varying from 160 to 450 depending on source, area sampled and data composition. In total 160 fishers were identified by WWF in 2006 but this figure also included fish farmers and mangrove fishers. This figure was taken as the local population in the survey area.

3. Results

Descriptive statistics were assembled from the 7 informal interviews conducted with key informants and 110 valid questionnaires obtained from the 119 questionnaires completed from the 12 fishing villages/ locations believed to be using the reef area for fish capture. fishers that did not visit the marine site were excluded.

3.1. Fishing communities

The fishing communities in the Hat Thai Mueang region can be divided into three sectors 1) marine; 2) mangrove; and 3) fish farming, each utilising different resources. Most individuals interchange between sectors depending mainly on season, but also weather and resource scarcity which complicates data collection on the volume of local dependency in each sector. Most informants believe each fishing household consists of one main fisher with the possibility of up to three. All informants felt that small-scale fishing members are declining in number due to indifference in the younger generation. This indifference has, by some (NGO) been attributed to increased opportunities in tourism, while others believed urbanisation is the stronger draw (GO). This trend can be observed in Fig. 2 which displays a decrease in villagers partaking in the occupation through data collected on fishers' years in the occupation. There was no direct mention to a lack of resources for supporting future recruitment and making the occupation unappealing.

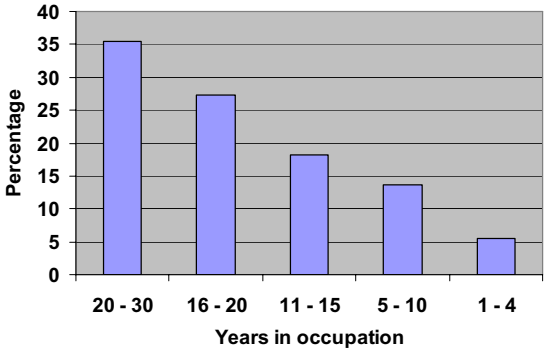

Figure 2. Distribution in years that fishers have been in the occupation.

Permanent migration is not considered an issue by all informants due to local saturation. Some informants (NGO, CF, SSF) reported on seasonal migration for the high fishing period which stretches from October to May. This migration is considered to be a two-way exchange from coast to coast, dictated by the monsoon seasons.

3.2. Fishing Factors and Perceptions

3.2.1. Seasons and Fishing Locations

Fishing seasons fall into two distinct periods, the north-eastern (NE) and south-western (SW) monsoons. Whilst weather limits fishing opportunity (mainly during the SW monsoons) seasons do not seem to reduce fishers' willingness to fish. Most informants state that small-scale fishers 'need to fish whenever possible to sustain their income' and utilise all available habitats along the coastlines with gear types adapted to suit that environment. Rocky and coral areas are reported to be specifically frequented, even with the reported risk of costly damages to fishing equipment from entanglement as stated by one SSF informant. Most informants reported that many small-scale fishers now have to travel further from land and outside the 3 km national non-commercial fishing zone to catch fish of a suitable size - this was one of the first indictors from the informants and fishers that resources were in decline.

3.2.2. Income

Data on small-scale fisher's gross annual income reported 56% ranged between 36,000 to 65,000 THB equating to $1,160 - $2,100 respectively from fish (bony species only - squid and shrimp were excluded). A further 38% stated their earning are below 35,000THB (Fig. 2). Chi-square analysis on the data collected from the fisher's questionnaires revealed no statistical significances between 1) income and experience 2) income and fish species or 3) income and gear type.

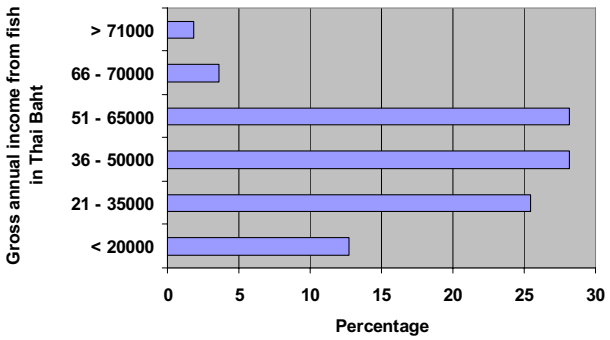

Figure 3. Percentage distribution of gross annual income of fishers from fish capture (non fish products excluded)

3.2.3. Value of Fish

When key informants were questioned about the value of targeted species, no one fish outranked another, but species in the families Carangidae, Serranidae, Lethrinidae and Scombridae were listed as the most valued. Heavy emphasis was placed on squid (*Loligo sp*.) due to its high price and, as reported by one SSF informant, and catchability being limited to small-scale operations. Scombridae, Carangidae and Serranidae command the highest price with the former two's price currently inflated [2008] due to low catch rates. The value of Serranidae is highly dependent on catch size which explains the interaction between marine fishing and fish farming to raise wild caught Serranidae (grouper) fingerlings. Lethrinidae is next in price followed by Lutjanidae. Price fluctuations and subsequents income are considered to be linked to the tourist season by one GO informant.

3.2.4. Uses of catch and distribution

Informants have varying opinions as to the destination of fish products. It is agreed that all species sell on a local scale and that subsistence and local markets make up the majority of consumption. Some informants (GO) declared that the tourist areas of Phuket receives specific species such as Lutjanidae and Lethrinidae, while another (CF) mentioned an international market operating out of Tablamu for *Thunnus spp* (tuna) and squid which has a modest contribution from small-scale fishing. Aquarium species are also considered to make up some of the international market by one GO. Data from the fishers (*n = 119*) place subsistence at 50%, local market at 48% and the remaining 2% for regional and international.

3.2.5. Gear Type

Fishing gear identified for small-scale fish capture totalled 12 types: 6 types of nets, 3 hook and line methods, 2 types of traps and spear fishing. Questionnaire data revealed that, in line with informants' opinions, gillnets made up the majority, totalling 31% overall, deployed at three different locations in the water. Of the three locations, heavy nets which sink to the substrate make up the highest percentage (13%) followed by sink nets (12.3%) which hang in the middle to lower water column and lastly float nets (5.7%) which are positioned at the surface. Rods are the next most

[1] The difference between small-scale and commercial fishers is the size of operation. Small-scale fishers operate from long tail boats with a range of lengths not exceeding 13m and without any winching equipment. Commercial fleets are excluded from fishing within 3 km of the coastline, small-scale fishers are not.

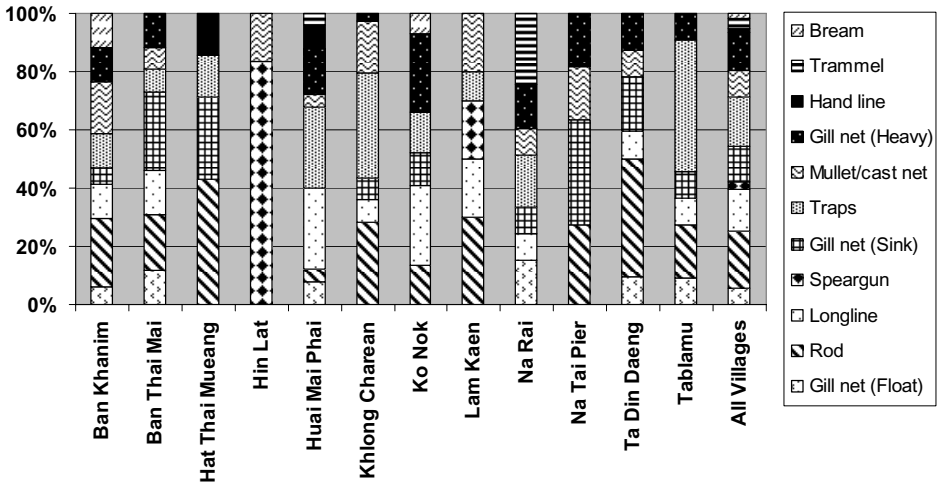

Figure 4. Percentage distribution of gear types used by fishers in the 12 sample villages.

important gear type (20%) followed by traps (16.9%). Most fishing villages have a relatively even distribution of gear types (Fig. 4). The highest diversity with 7 to 8 types of gear is found in Ban Khanim, Ban Thai Mai, Huai Mai Phai and Na Rai. Other villages have methods ranging from 4 to 6 gear types. Only one village, Hin Lat, seems to specialise in one particular method, spear fishing.

3.3. Threats

Almost all villages considered declining fish stocks to be a major problem, followed by the commercial fishing fleet, which are reported as having a direct link with the failing stocks (Fig. 5). This year [2008] fishers' claim catch rates to be particularly bad with a decline of up to 50%. Their concern with the large fleets also extend to equipment removal with almost all fishers reporting lost gear to trawlers especially from violations within the 3 km non commercial fishing zone. Similar statements were made during the informant's interviews, with commercial boats considered the biggest threat. Trawlers, Purse seines and medium-sized boats that attract fish with lights were blamed for failing stocks by attracting fish away from coastal areas, and heavy extraction of all fish sizes as well as substrate damage. The GOs were further concerned about the heavy gillnets used by small-scale fishers and nets that surround coral, with the latter considered accidental rather that deliberate, due to the high cost of net replacement. One informant (SSF) supports the GO's concerns about heavy nets, and further mentions small-scale ray fishing with nets, which although prohibited is still practised in some areas.

The fluctuation in gasoline prices was reported as reducing profit margins because they could not be offset by an increase in fish prices (Fig. 5). With the increasing need to travel farther from shore for sizable fish, many fishers listed the price of gasoline as a further burden. Another area of concern was water quality, which is believed to have altered since the 2004 tsunami, with increased levels of phytoplankton, incidents of harmful algae blooms (red tide) and higher annual sea temperatures which the fishers attributed to increased levels of fish mortality. Reports of poor water quality also extended to the mangroves with small-scale fish farmers losing high number of Serranidae (grouper) fingerling. One GO informant also expressed concern over water exchange practices by some shrimp farms.

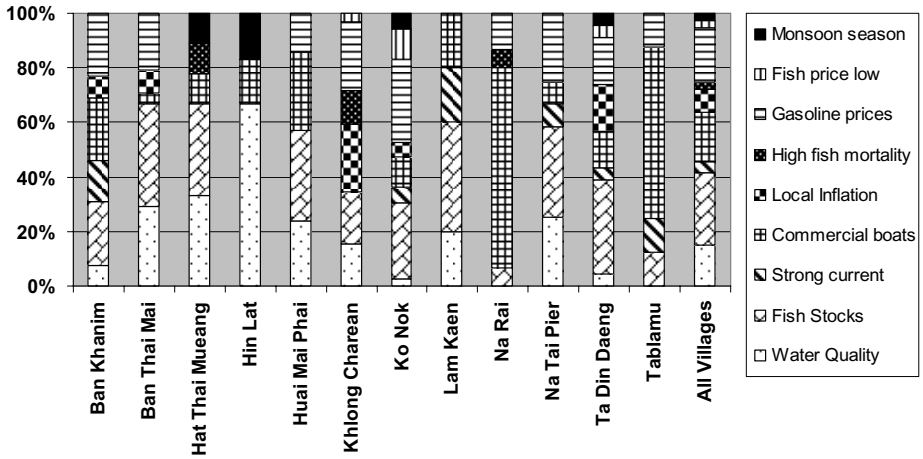

Figure 5. Percentage distribution of threats as perceived by fishers from the 12 sample villages

3.4. Current Management

There is much confusion in the collaborated data as to whether any fishing cooperatives exist. One Go stated that cooperatives do exist, and when questioned further, clarified that these groups were formed for funding opportunities after the 2004 tsunami. This was later confirmed by the second Go and stated that they were not cooperatives. Other informants (NGO, SSF and CF) believed that no cooperatives have been formed, but informal groups have been established in villages to agree on regulations such as mesh sizes. One SSF head said that these groups were registered with the fisheries department as local cooperatives. Of the informants who said that fishing cooperatives exist, one GO claimed they were self-organized and received assistance from the fisheries department. The SSF, who stated that they were a cooperative, claimed that they had no communication with the fisheries department but dealt with the local NGOs on fishery and tourism related matters. Another SSF discussed a funding scheme available via the fisheries department but believed that few groups utilised the scheme.

Generally all informants agreed that there were no extra restrictions in the area beyond the countrywide regulations which permit no commercial fishing within 3 km of the coast line, and mesh sizes for nets. There did not appear to be any specific fishing plan for the region.

4. Discussion

The composition of data collected on fishing factors is similar in nature and assortment as other studies on multi-gear fisheries in tropical waters (Mangi and McClanahan 2001, 2004; Pet-Soede *et al*., 2001; Mangi and Roberts, 2006; Campbell and Pardele, 2006). As observed by Ascota and Appleton (1995) the relative cheapness of gillnets makes them a popular choice. The high return for squid encourages trap use, and by-catch from this gear also contributes to the region's fish capture. Carangidae and Scombridae, Lethrinidae, Lutjanidae and Serranidae were reported as targeted families by the majority of fishers, which supports general trends in fisheries (Russ, 1998a, 1998b; Jennings and Polunin, 1997; Pérez-España *et al*, 2007; Pet Soede, 2001; McClanahan and Mangi, 2001; 2004) for targeting higher trophic feeders. Left unmonitored these activities can lead to overfishing and trophic decline. The controversial gear types used in other locations such as beach seines (Glaesel, 2000; Mangi and Roberts, 2006) push nets (FAO) and cyanide/blasting do not seem to be used in this area. Nevertheless, weighted nets are of concern due to the resultant high diversity of catch and the reported destruction of substrate.

The mode of fisheries governance in this region can be classified as open access, with virtually no management or regulations in place. This mode of non-governance has allowed illegal activity by larger vessels to go unpunished and therefore proliferate. This has lead to disillusionment amongst small-scale fishers and negativity towards management initiatives focused on protecting stocks. Tackling illegal activity and increasing local participation in stock management is critical to achieving any management objectives, and is in essence a public duty for resource protection (Mulekom *et al*., 2006).

The general opinion that small-scale fishing numbers are decreasing on a local scale is a social concern in the region. It would appear that opportunities for revenue generation are increasing in other sectors, but also evidence of stock failures may be forcing small-scale fishers towards other forms of employment. Current management is doing little to redress the balance. The evolution of small-scale operations into medium sized operation will, we fear, do little to aid stock improvements without sufficient management interventions which in the past had been managed by top-down initiatives. These initiatives have proved ineffective in managing the medium and large commercial fleets to date with overfishing considered rife in most waters (Pomeroy *et al*., 2007; Stobutzki *et al.*, 2006; Mulekom, 2006).

A range of threats identified by fishers have long term implications such as water quality, and changing water parameters which necessitate further research, however reducing pressure on stocks, through a reduction in fishing capacity as well as focusing development on effective access and property rights between small and large scale fisheries as recommended by Stobutki *et al* (2006) is paramount to resource protection as well as preserving small-scale fishers livelihoods.

5. Conclusion

Overfishing is a concern in this region and the sustainability of small-scale fishers livelihoods under question. Current management efforts appear insufficient at protecting stocks, with illegal activity perceived as undermining biological protection and therefore damaging community's sense of social justices. The current open access policy is doing little to promote conservation and prudence from local communities therefore reviewing access rights of large-scale operations is needed to support small-scale fishers in coastal waters.

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