

# **The Economic Value of Reef-associated Fishing: Case Studies from Three Countries in the Wider Caribbean**

## **El Valor Económico de Pesca de Arrecife: Estudios de Casos en Tres Países del Caribe**

## **La Valeur Économique de la Pêche de Récif: Études de Cas en Trois Pays de la Caraïbe**

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### **EXTENDED ABSTRACT**

Although generally recognised as important to coastal communities for food and income, few detailed data exist on small-scale fisheries in the Caribbean (Salas et al. 2007). This is particularly true for the multi-species, multi-gear, reef-associated fisheries, where data are often unavailable or recorded landings are aggregated with non-reef species. Nevertheless, information on reef fisheries is necessary for management, where the level of exploitation and economic gains should be determined in order to implement effective policy at the appropriate scale. This study investigated the economic value of reef-associated fishing in three types of communities (i.e. dominated by reef fishing, tourism or mixed fishing/tourism) within three disparate countries (St. Kitts and Nevis, Honduras, Barbados) across the Wider Caribbean. The intention was to examine the diversity of reef fishing values across the region and explore some of the drivers of reef exploitation at each site. This study is an integral part of the social science component of the Future of Reefs project (FORCE), a four year, interdisciplinary study focused on the expected future of Caribbean coral reefs and their management.

Socioeconomic and fisheries data were collected from 217 commercial reef fishers in St. Kitts and Nevis, the Bay Islands of Honduras and Barbados from March 2011 to March 2012. This included data on fishing costs and revenues, fishing effort, yields, space-use patterns, market orientation and alternative livelihoods. Detailed information on data collection and treatment can be found in Gill (2014).

Reef-associated fisheries was an important source of revenue for fishers at all of the sites, accounting for more than half of their average income. Most fishers target multiple species utilising multiple gears (e.g. hook and line, traps, nets, spears), at times on the same trip. In all the study sites, demersal reef fishes were targeted by almost all the interviewed fishers (95.8%) using a wide variety of gear types. The fisheries in St. Kitts and Nevis and Barbados appeared to be quite similar where fishers that target schooling reef pelagic species (e.g. gar, big-eye scad, small jacks) receive the highest yield per trip (St. Kitts and Nevis: 57.8 kg; Barbados: 62.9 kg per trip). In all the study sites, these species were primarily sold at low prices to community members and likely represent an important food source for poor persons in these coastal communities. One feature that is unique to St. Kitts and Nevis is the high conch and lobster catch rates (average catch per trip: 50.4 kg and 32.2 kg respectively) which was over three times as much as in the other two countries. Due to gear restrictions, line fishing was the main fishing gear used in the Bay Islands and snappers and groupers were the dominant target species. These were primarily sold to middlemen for export to the Honduran mainland and other countries such as the United States.

For the nine study sites, estimated total annual net revenues from reef-associated fishing ranged from US\$0.03 - 0.95 million for each site (PPP dollars; Figure 1). Average annual net revenues per fisher ranged from approximately US\$2,549 - 26,489 (PPP dollars), with a smaller range apparent when using other measures of central tendency (median: US\$726 - 14,994 PPP dollars; Figure 2). Fishing revenues were highest in St. Kitts and Nevis and lowest in Barbados (Figure 1). Contrary to expectations, fishing values were generally higher in the tourism and/or mixed sites than in the fishing sites. To examine some of the factors behind the differences in fishing revenues, linear mixed effects models were estimated. The best fit models indicated that between and even within sites, fishing income values in the Caribbean are extremely heterogeneous. Factors that were associated with higher income from reef fisheries included: fisher role (i.e. boat owners and shore fishers earn higher revenues than crew members); greater fishing experience; and low occupational diversity. Further, those who fish with a large crew, target lobster, use SCUBA, use multiple gear types and spend more on fuel (proxy for distance to fishing sites) earned more income from reef fishing. The models also indicated that site-level factors were associated with higher earnings from reef fishing. For example, sites where fishers have access to an export market earned more income from reef fishing than their counterparts in other sites, especially those in MPA sites.

These results not only show the high economic value of reef-associated fishing to these Caribbean communities, but also illustrate the diversity among sites, making it difficult to generalize about the value of Caribbean reef fisheries. This heterogeneity highlights the need for fisheries policy and management to be guided by site-specific information, especially recognising the additional role that reef fishing may play as an important social safety net in communities where few employment alternatives exist. The high current values also serve to illustrate the economic value that stands to be lost in the near future in the absence of sustainable management at sites where over-harvesting is occurring, and/or where climate

change is likely to damage reef integrity, lowering its current fish yield capacity. Such losses will have high societal costs in these coastal Caribbean communities.

KEY WORDS: Economic valuation; Reef fisheries

LITERATURE CITED

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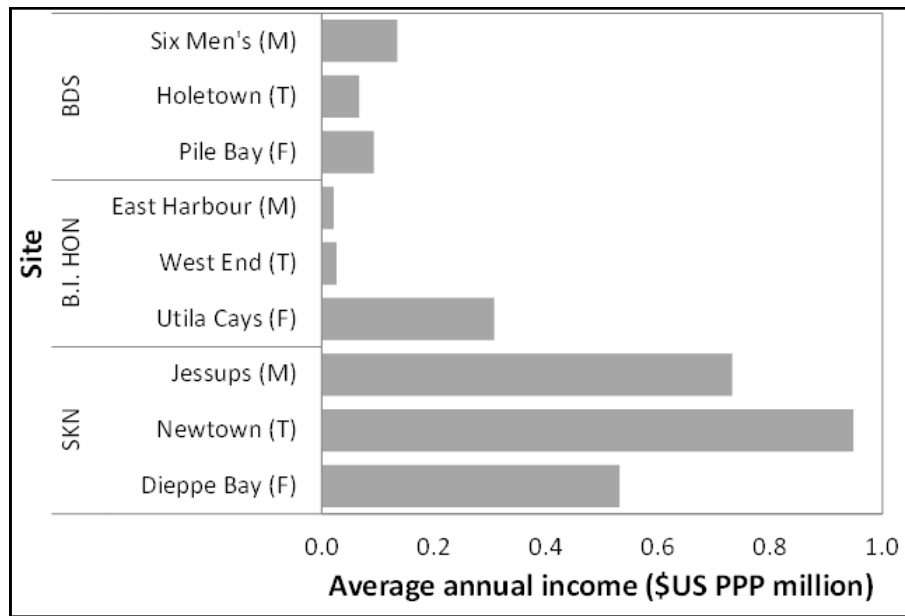


Figure 1. Estimated average annual net revenues (fishery income per site; US\$ PPP) generated from commercial reef fishing by all fishers in each of nine sites in St. Kitts and Nevis (SKN), the Bay Islands, Honduras (B.I. HON) and Barbados (BDS). Site categories: F: fishing site; T: tourism site; M: mixed tourism/fishing site. PPP values are in US Purchasing Power Parity dollars.

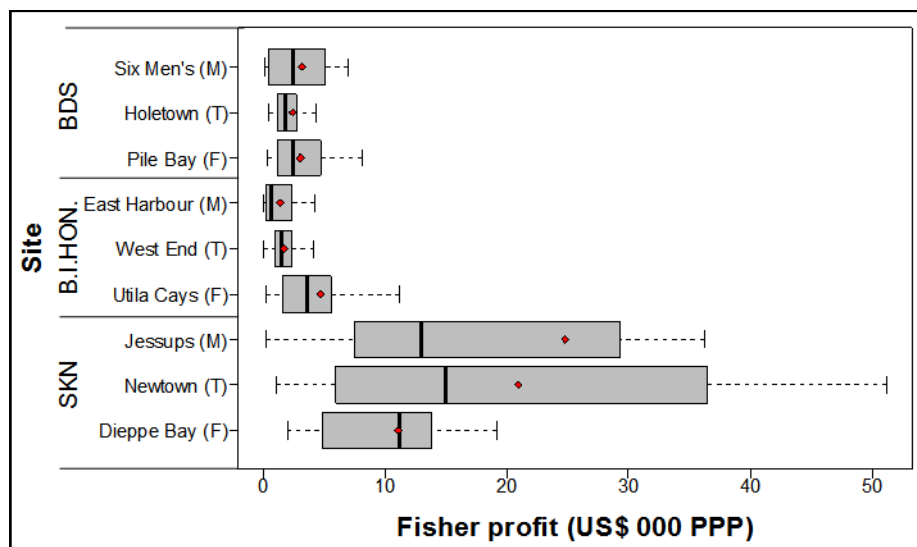


Figure 2. Error! No text of specified style in document.. Average annual net revenues (profit per fisher) of commercial reef fishers at nine sites in St. Kitts and Nevis (SKN), the Bay Islands, Honduras (B.I. HON) and Barbados (BDS). The red diamonds and vertical lines within the boxes represent the mean and median values respectively. Boxes represent the inter-quartile range and whiskers represent 1.5 times the inter-quartile range. Outlier values are not shown in the plot. PPP values are in US Purchasing Power Parity dollars.