

Economically Valuable

Though often overlooked and undervalued, small-scale fisheries make key economic contributions and are overwhelmingly important for coastal communities

Small-scale fisheries are not so small after all. In a remote, rural, locally managed marine area along the southwest coast of Madagascar, we find that small-scale fisheries and their host ecosystems are crucial to supporting the welfare and livelihoods of over 6,000 coastal inhabitants. Nearly everyone fishes, earns their livelihood from fishing, and subsists on seafood. There is nothing small about their economic value, either—the fishery in this 1,000-sq-km, locally managed marine area was worth nearly US\$3.4 mn in 2010 alone.

National fisheries policies tend to ignore small-scale fisheries because their true value is obscured by their dispersed nature. Worse, fisheries policies privilege commercial/industrial fisheries due to their perceived market value. Our research shows that small-scale fisheries can have significant economic value, in addition to their role in food security and livelihoods for some of the poorest people on earth. Quantifying their economic contribution, such as we did in this study, should help this important sector gain more policy attention.

Small-scale fisheries (often also referred to as artisanal) provide a crucial source of food, income, and well-being for coastal populations worldwide. Over 90 per cent of the world's fishers work in the small-scale fisheries sector. Together, their fishing activity supports the livelihoods of over 500 mn people globally, many of whom belong to the world's most impoverished communities.

Despite small-scale fisheries' importance, very little information

exists on the worldwide scope and impact of small-scale fisheries. We, therefore, can only guess at the significance of small-scale fisheries for combating food insecurity and poverty, as well as their contribution to the broader local and regional economies. Due to this lack of information, small-scale fisheries are often undervalued and overlooked in policy.

In contrast, policymakers usually are better informed about the scope and value of large-scale industrial

...small-scale fisheries can have significant economic value, in addition to their role in food security and livelihoods...

fisheries. These fisheries are typically export-oriented, and, in many cases, access is granted to foreign fishing vessels through concessions. Since economic development is, typically, a priority, policies are often designed to favour these large-scale export-oriented industrial fisheries.

Considerable pressures

Meanwhile, marine and coastal fisheries face considerable pressures on a global scale, with several in a state of precarious decline. These pressures threaten the livelihoods of millions of people worldwide who depend on them for subsistence and income. In many developing countries, this situation is worsened by weak governance, which makes it even more difficult to design, implement and support effective fisheries policies.

*This report has been written by **Michele Barnes-Mauthe** (barnesm@hawaii.edu) and **Kirsten L.L. Oleson** (koleson@hawaii.edu) from the Department of Natural Resources and Environmental Management at the University of Hawaii, Honolulu, US*

GARTH CRIPPS



Small-scale fishers in Madagascar returning to shore in their traditional fishing crafts, called *pirogues*

In order to safeguard the livelihoods of some of the world's poorest communities, decisionmakers must recognize the crucial importance of small-scale fisheries and develop sustainable management policies. To support this process, we need a better understanding of the scope and significance of small-scale fisheries and their social and economic value.

The developing country of Madagascar, located in the western Indian Ocean off the east coast of Africa, is a prime example of the issues surrounding small-scale fisheries globally. Madagascar is one of the poorest countries in the world, and is plagued by chronic political instability and declining economic trends. The majority of people in Madagascar depend directly on small-scale fisheries or other natural resources to support their livelihoods. Yet the country is increasingly threatened by ecological degradation and a growing population.

To demonstrate the crucial contribution that small-scale fisheries make to the daily survival of coastal populations, and to highlight the need for their consideration in policy discussions, we conducted a large and comprehensive study on the total economic value of small-scale fisheries in the Velondriake locally managed marine area in southwest

Madagascar, which we summarize here.

Velondriake spans over 1000 sq km of Madagascar's southwest coast. This region is home to indigenous people who support their livelihoods primarily by fishing and gleaning on coral reef flats, or "reef gleaning".

In 2010, we interviewed over 150 fishers, held discussions with several groups of fishers, surveyed over 300 households, and talked with several other key individuals in Velondriake about all aspects of fishing. We asked fishers about what fish they caught, where they caught it, what they did with it (for example, did they eat it, share it, sell it or trade it) and what gear they used.

From household members, we collected information on how much of their income depended on fishing or reef gleaning, and how many people they supported with their catch and income. In the group discussions, we gathered information on the cost of different fishing gear items, and how often they had to replace them. Finally, we asked key individuals the price in the local market for the different species of fish or other seafood items gathered when reef gleaning.

We summarize below the information we gathered, and its implications for fisheries policy and management globally. We estimate that in 2010 alone 5,524 tonnes of fish and other seafood species were extracted by small-scale fishers in the region, primarily from coral reef ecosystems. The total economic value of the fishery for 2010 was \$3.4 mn. Eighty-three per cent was sold commercially, generating fishing revenues of nearly \$2.9 mn.

In this region, the local small-scale fishing sector employs 87 per cent of the adult population, generates an average of 82 per cent of all household income, and is virtually the only non-rice source of protein people eat.

Men and women

Fishers are predominantly men, while reef gleaners are predominantly women. Fishers primarily target

finfish, while reef gleaners primarily target octopus, sea cucumber, shellfish and crab. Other species, such as Madagascar round herring, squid and urchin are also occasionally caught by both fishers and reef gleaners.

The majority of the total annual catch in the region is cheaply priced finfish, such as *mojarras*, damselfish and squirrelfish. Second is octopus (mainly *Octopus cyanea*), which is closely followed by average priced finfish, such as sea bass and groupers. We found that cheaply priced finfish contributes the highest revenues, followed by sea cucumber, octopus and average-priced finfish.

Gleaners typically gather their catch by hand or use wooden spears on coral reef flats and seagrass beds. The majority of fishers use nets. Fishers find their catch primarily on coral reefs, but also in mangroves, seagrass beds, pelagic waters, mud and other miscellaneous habitats.

Fishers catch the most per fishing day, followed by those who both fish and reef glean, and then those who only reef glean.

All of the octopus, sea cucumber, crab and lobster, and almost all of the Madagascar round herring, is sold commercially in local markets. Approximately three-quarters of the total catch of finfish, squid, shrimp and shark is also sold. Shellfish, urchins, bivalves, turtles and rays are primarily consumed and shared locally, as is the remainder of finfish, squid, shrimp and shark.

Fishers generate the highest revenue per day, but those who both fish and reef glean reported a greater number of days of fishing/gleaning per year.

Accounting for the cost of fishing gear for each type of fisher, those who both fish and reef glean generated the highest net annual income, where the costs of fishing are subtracted from total revenues.

Though national policies typically disregard small-scale fisheries due to their assumed minor contribution to the greater economy, this sector can generate substantial revenues. Our findings indicate that the small-

scale fisheries sector in this single 1000-sq-km region of Madagascar is at least one-and-a-half times as valuable as the total annual revenue Madagascar earns from concessioning its exclusive economic zone waters to European Union tuna vessels, and a sixth as valuable as the country's entire domestic shrimp industry—two industries that receive substantial policy attention.

Extrapolating our local results to the national level, we estimate that subsistence and artisanal fishers in Madagascar catch over 350,000 tonnes of fish and other seafood species per year. Though this estimate is uncertain and should be updated as more regional-scale data become available, it suggests that the small-scale fisheries sector is likely much more valuable than previously thought.

Our findings also pointed to the crucial role that small-scale fisheries play for food security and in combating poverty. In Madagascar, nine out of ten people live in poverty, and half of all children are malnourished. According to our results, virtually all meals with animal protein and nearly all household income depended on small-scale fisheries resources. Daily per capita income from fishing and reef gleaning amounted to \$1.04, which is

...we estimate that subsistence and artisanal fishers in Madagascar catch over 350,000 tonnes of fish and other seafood species per year.

only slightly above the international poverty line. Small-scale fisheries thus play a crucial role in sustaining local populations and preventing households from falling further into poverty.

Institutional capacity

Considering the overwhelming significance of small-scale fisheries, as demonstrated here, there is an urgent need to improve institutional capacity and re-orient national fisheries

GARTH CRIPPS



Local fisherwomen gleaning octopus in Velondriake, southwest Madagascar. Wooden spears are the most commonly used gear in this region

As small-scale fisheries are both of considerable importance for millions of people throughout the world, and worth a lot economically, national and regional policymakers need to re-examine existing fisheries policies that neglect this sector.

Determining the economic value and contribution of small-scale fisheries can help ensure their consideration in policy; efforts should, therefore, be undertaken to quantify them wherever possible. **3**

policies toward the small-scale sector. This is necessary not only for the country of Madagascar, but for regions throughout the world, where small-scale fisheries have likewise been undervalued and overlooked.

Long-term sustainability should be a fundamental goal of small-scale fisheries policy in order to protect and maintain their contributions toward food security and poverty alleviation.

Small-scale fisheries face a range of impacts, including the looming threat of climate change. Further, small-scale fishers face increasing resource competition from commercial fleets, sparked by declining catch.

Sustaining small-scale fisheries should, therefore, be viewed as a human-rights issue, and given precedence over export oriented commercial or foreign access to fishers in circumstances where they are vital for supporting local populations.

The establishment of locally managed or co-managed marine and coastal areas, such as the one we studied in Madagascar, may help to sustain and even increase benefits provided by small-scale fisheries. However, these initiatives will need to be supported at the regional, national and international level to be successful in achieving long-term sustainability.

For more



www.sciencedirect.com/science/article/pii/S0165783613001537

The Total Economic Value of Small-scale Fisheries with a Characterization of Post-landing Trends: An Application in Madagascar with Global Relevance