How Do Marine Protected Areas Affect the Welfare of Local Fishing Communities?
A Study from the Philippines

In the Philippines, fishing is a major source of food, income, and export earnings. However, overfishing and degradation have been threatening the country’s fishery sector for many years. The establishment of marine protected areas (MPA) is one of the key initiatives aimed at addressing these problems. MPAs can have both positive and negative impacts on the livelihood of those living in their vicinity. Although their ecological impact has been well documented, their economic impact has not been studied in much detail.

In order to fill in this information gap, a new EEPSEA study assessed the impacts of MPAs on the welfare of fishing families. The study, which is the work of a team led by Dr. Alice Joan G. Ferrer from the University of the Philippines Visayas, found that MPAs had improved the composition of fish catches and the size and diversity of fish. However, it also found that MPAs had not had a significant impact on local people’s income and livelihood. The study assesses why this is the case and makes recommendations for policies that would help maximize the local economic benefits of the MPA.

A summary of the EEPSEA research ‘Assessing the Impacts of Marine Protected Areas on the Welfare of Small Scale Fishers in Southern Iloilo, Philippines,’ by Alice Joan G. Ferrer, Herminia A. Francisco, Benedict Mark M. Carmelita and Jinky C. Hopanda. Comments should be sent to: Dr. Alice Joan G. Ferrer, Division of Social Sciences, University of the Philippines Visayas, 5023 Miagao, Iloilo, Philippines. Tel: +63-33-5137012. Email: aj_ferrer2005@yahoo.com
Challenges faced by fisheries in the Philippines

The Philippines is an archipelago of about 7,500 islands, with a coastline of more than 36,000 km. Its highly productive marine water area contains the world’s highest diversity of species of corals, reef fishes, seagrasses, and mangroves. These waters face various problems, which include declining catches and poverty among small-scale fishing families. These problems are compounded by governance issues such as a lack of institutional capacity, inadequate and inconsistent policies, and weak law enforcement.

One of the key initiatives aimed at addressing these problems has been the establishment of marine protected areas (MPA). These areas were first introduced in the 1970s and have become common all over the country. As of July 2014, more than 1,800 MPAs have been set up, with the majority found in the Visayan Sea area. Most of the MPAs in the country are in municipal waters and are community-based.

The primary objective for MPA establishment has been habitat protection, the restoration of degraded habitats, and the enhancement of coral reef fisheries.

As a management tool, MPAs can impact on people’s welfare in a number of ways. While MPAs can help fish stocks to recover or increase, they can also negatively impact local fishers’ livelihoods by, for example, blocking access to fishing grounds.

Assessing MPAs’ socioeconomic impact

Past studies of the MPA approach have put emphasis on the biological impacts of these areas and have not adequately assessed their socioeconomic impacts. To provide policymakers with information on this vital aspect, the study compared the fishing income of families in an area with an MPA with that of families in an area with no MPA.

The study took place in two adjacent municipalities: (i) San Joaquin as the MPA area; and (ii) Miagao as the area without an MPA to serve as the control site (Figure 1). These sites are in the southern part of the province of Iloilo, which is located in the Philippines’ Visayas area.

San Joaquin has 15 MPAs, with three pilot sites established in 2009 and the rest set up in 2011. On the other hand, although Miagao has an MPA, it was established only four months before the study took place (November 2015) so its impact can be discounted.

The 15 MPAs in San Joaquin are located up to 400 m away from the shoreline. Each has a uniform core zone area of 0.02 km² in which fishing and other similar activities are not permitted (only research and monitoring activities are allowed). There is also a buffer zone around each MPA in which only hook and line fishing is allowed. The combined area of the core zones and the buffer zones of San Joaquin’s MPAs makes up only 0.44% of its total territorial waters.

Each MPA site in the study area adopts a site-specific management approach that is set out in an individual sanctuary management plan. The responsibility to manage and administer the marine sanctuaries in each MPA rests on the Marine Sanctuaries Management Board (MSMB), which is headed by the barangay (village) captain. The local government of San Joaquin allocates funds and seeks external financial support for the operation of the marine sanctuaries; it also assigns a monitoring officer who conducts a monthly assessment of the MPAs.

Collecting information on local impact

Data for the study was collected through interviews with 240 fishing households in San Joaquin and with 240 fishing households in Miagao. Focus group discussions and key informant interviews were also conducted to supplement the

Figure 1. Location of the two study sites, San Joaquin and Miagao, Iloilo.
survey data. Fishing and household incomes were estimated for all the households that took part in the survey. Seasonality, price variations, and fishing operations were all taken into account.

Propensity Score Matching (PSM) was used to assess the effects of MPAs on the welfare of the fishing families. This was assessed both in terms of catch (i.e., the volume of catch per fishing trip) and fishing income (i.e., net profits = revenue minus fixed and variable costs).

The data used for PSM came from 70 fishing households from the San Joaquin barangays where the first three marine sanctuaries were established in 2009. They were chosen to ensure that enough time had passed for the marine sanctuaries to have had demonstrable impact. These 70 San Joaquin fishers (treatment group) were matched with the 240 Miagao fishers (control group) to allow for a meaningful comparison between the two groups.

**Fishing in San Joaquin and Miagao**

Nearly all of the municipal fishers in San Joaquin and Miagao used only one type of fishing gear each, with hook and line being the most common. The majority of fish caught by the fishing households, regardless of where they were from, were small pelagics. A few reef species were also caught (i.e., mangrove red snapper and bigeye trevally in San Joaquin; moonfish and bigeye scad in Miagao). Fishing households normally exploited several fishing grounds. The decisions they made about where to fish depended on fishing conditions and on the weather and season.

In general, all of the fishing households that took part in the study felt that fish catches had declined in recent years, but it was felt that this decline had been more pronounced in Miagao than in San Joaquin. San Joaquin fishing households felt that fish catch composition and size and diversity of fish had improved. In comparison, more than two-thirds of the Miagao fishing households felt that fish diversity had declined over the same period.

**Impact on income**

In general, the monthly fishing income of fishers from San Joaquin and from Miagao were almost the same, at around Php 2,600 (Table 1). The mean income of fishers from San Joaquin was slightly higher than the mean income of those from Miagao (Php 2,626 vs. Php 2,591, respectively). The PSM results show that the weight of fish catch in San Joaquin was higher than that in Miagao (by 0.70 kg to 1.23 kg per fishing trip). It also showed that the MPAs helped to increase monthly fishing income by between Php 200 and Php 495. However, it should be noted that this impact is not particularly significant.

Overall, there was a positive perception amongst the fishing community in San Joaquin that the MPAs have had a positive biophysical impact. This perception is supported by the results of an underwater assessment that monitored the performance of the pilot MPAs, and found that fish densities and fish biomass had all increased.

**Why is the impact on income not significant?**

The economic impact of the MPAs in the study site is not particularly pronounced. There are a number of reasons for this, including the fact that the MPAs in the study areas are not well designed. Many are too close to shore, subject to continual
disturbance, and do not match with the natural habitat of the fish species that families in the area prefer to catch (e.g., the habitats of small pelagic fish extend to open water well outside the MPAs).

Moreover, the impact of the MPAs is undermined by the continued existence of a number of key threats, which include the encroachment of commercial fishing in municipal waters, the presence of fish aggregating device (FAD), collusion between municipal and commercial fishers, and the use of beach seines.

**How to enhance MPAs’ socioeconomic impact**

The study shows that there is a need to review both the size and the location of the MPAs in the study area. Monitoring of the MPAs should continue. This will provide updated performance information and help inform the ongoing management of the project. Also, more should be done to respond to the key threats faced by the marine resources in the study area. A review of existing local policies is needed, especially of those that relate to issues such as use of beach seines, FADs, fine mesh nets, and active gears in municipal waters.

To fully realize the benefits of MPAs, other management measures should be put in place. The MPAs should be seen as part of a larger scheme of fishery management that includes complementary tools and techniques for habitat protection, conservation, and rehabilitation.

**Better management and community participation**

The management and administration mechanism of MPAs needs to be reviewed and the MSMB needs to be strengthened if this approach is to continue. This could be done through the provision of technical assistance and funds. Community participation in MPA management also needs to be strengthened, as the success of the MPA rests on people's support. Community members cannot be expected to support endeavors that they cannot relate to, understand, or to which they make no contribution. Community engagement and consultation needs to be continuous so people realize they play an important part in MPA management and that their feedback is incorporated in the MPAs' management plans.

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**Table 1. Monthly fishing and household income of San Joaquin and Miagao fishers, by fishing ground**

<table>
<thead>
<tr>
<th></th>
<th>Fishing near the marine sanctuary</th>
<th>Other fishing grounds within the municipality</th>
<th>Outside of municipality</th>
<th>Near FAD</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>San Joaquin fishers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fishers near the pilot marine sanctuaries</td>
<td>n=45</td>
<td>n=1</td>
<td>n=12</td>
<td>n=25</td>
<td>N=70</td>
</tr>
<tr>
<td>Fishing income (mean)</td>
<td>2,677.58</td>
<td>351.67</td>
<td>2,394.59</td>
<td>2,427.75</td>
<td>2,625.85</td>
</tr>
<tr>
<td>HH income (mean)</td>
<td>7,187.17</td>
<td>1,351.67</td>
<td>5,540.07</td>
<td>4,300.85</td>
<td>5,709.63</td>
</tr>
<tr>
<td>Share of fishing income to HH income (%)</td>
<td>37.25</td>
<td>26.02</td>
<td>43.22</td>
<td>56.45</td>
<td>45.99</td>
</tr>
<tr>
<td><strong>All fishers</strong></td>
<td>n=119</td>
<td>n=11</td>
<td>n=51</td>
<td>n=105</td>
<td>N=240</td>
</tr>
<tr>
<td>Fishing income (mean)</td>
<td>2,550.49</td>
<td>1,875.00</td>
<td>2,479.54</td>
<td>2,700.02</td>
<td>2,578.12</td>
</tr>
<tr>
<td>HH income (mean)</td>
<td>6,224.27</td>
<td>2,612.50</td>
<td>5,408.56</td>
<td>4,567.29</td>
<td>5,182.94</td>
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<tr>
<td>Share of fishing income to HH income (%)</td>
<td>40.98</td>
<td>71.77</td>
<td>45.84</td>
<td>59.12</td>
<td>49.74</td>
</tr>
<tr>
<td><strong>Miagao fishers</strong></td>
<td>n=150</td>
<td>n=64</td>
<td>n=99</td>
<td>n=99</td>
<td>N=240</td>
</tr>
<tr>
<td>Fishing income (mean)</td>
<td>-</td>
<td>2,575.58</td>
<td>2,987.12</td>
<td>2,983.12</td>
<td>2,591.39</td>
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<tr>
<td>HH income (mean)</td>
<td>-</td>
<td>6,031.76</td>
<td>7,873.45</td>
<td>5,846.41</td>
<td>6,594.19</td>
</tr>
<tr>
<td>Share of fishing income to HH income (%)</td>
<td>-</td>
<td>42.70</td>
<td>37.94</td>
<td>51.02</td>
<td>39.30</td>
</tr>
</tbody>
</table>

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