



*Strengthening local capacity
in the economic analysis
of environmental issues*

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Assessing Natural Capital: The Case of Sogod Bay, Philippines

The Philippines is one of the most biologically rich countries in the world. However, it is also one of the most ecologically threatened areas in Southeast Asia. Although the country has put in place a number of important conservation policies and initiatives, much more work needs to be done. To provide a benchmark for this work and to highlight potential policies and actions, a new EEPSEA study assessed the status of the natural resources in Sogod Bay, an area of ecological importance in the Philippines.

The study found that Sogod Bay had relatively high levels of biodiversity both on land and in the sea. However, the ecological richness of the bay area is declining due to both natural and anthropogenic influences, and this is having a negative effect on the people who farm and fish in the region. The study also found that establishing marine protected areas (MPA) is effective in boosting biodiversity. It therefore recommends strengthening the support of the local government to farmers and fishers in terms of promoting practices that would rehabilitate and improve the quality of the natural assets in Sogod Bay. Likewise, this study recommends supporting the MPA approach for those non-MPA sites that have shown rich biodiversity.



A summary of EEPSEA Research Report No. 2015-RR12: 'Assessment of Natural Assets in the Agricultural and Aquatic Ecosystems in Sogod Bay, Southern Leyte',
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Assessing the natural resources of Sogod Bay

Sogod Bay is a large bay in the province of Southern Leyte, Philippines. The area is naturally endowed with natural resources such as forests, a rich fishing ground, agricultural lands, and fresh water bodies. Sogod Bay has fishing grounds teemed with various fish species, with frigate tuna as the most dominant and most important source of income. Likewise, coconut, abaca, and rice are important agricultural crops in the area.

However, Sogod Bay is currently facing challenges in the form of decreasing productivity in the traditional agricultural and fishery resources in the area, which stems from both natural and anthropogenic influences.

As such, this study looked at the existing natural resources in Sogod Bay in order to (1) identify and assess the status of the area’s available natural assets, (2) identify the range of goods and services that the local communities value and produce from the aquatic and agricultural systems in Sogod Bay, and (3) recommend policies that would enhance the capacity of these natural assets in providing livelihood opportunities to the local communities surrounding Sogod Bay.

It covered 5 of the 11 municipalities in the bay area, namely, Liloan, Libagon, Sogod, Tomas Oppus, and Padre Burgos. It assessed the health status of the following natural assets: marine and aquatic resources, agricultural land, and forest flora and fauna.

The research team was composed of economics, forestry, fishery, agriculture, and soil specialists. They used several methods of data gathering, namely, focus group discussions, actual resource assessments, household surveys with the residents in the five municipalities, and interviews with farmers, fisherfolk, LGU officials, and other stakeholders. Survey questionnaires were used to get information about households and farms, people’s livelihoods, the availability of natural resources, and physical infrastructure and facilities. The study team also used transect walks, soil sampling, quadrat methods, and other appropriate tools in their assessments.

Agricultural lands of Sogod Bay

The soil physical analysis conducted by the researchers in Sogod Bay showed that some nutrients in the sample sites were deficient. Soil nutrient availability tended to decrease from high elevation to low elevation because

of surface runoff, which erodes the nutrient from the soil. Since most of the towns are coastal areas, only the portions close to the shore are flatlands; thus, most agriculture activities are in the uplands.

The study also found out that among the nutrients needed by crops, phosphorus was the most deficient; total nitrogen and exchangeable potassium were in moderate and sufficient amounts. Accordingly, proper maintenance and improvement in the management of the soil resources for sustainable agricultural use would be important strategies that could help protect the biological diversity at the project sites from agricultural land expansion.

The biodiversity of Sogod Bay

Sogod Bay was found to have relatively high levels of biodiversity. For example, 19 species of mangrove were identified (representing about 50% of the total number of mangrove species found in the Philippines). The highest diversity of mangroves was found in Padre Burgos, which had 10 species. In terms of seagrasses and the associated macrofauna, the researchers were able to identify a total of 36 species of macroflora in the five municipalities. Among these, 8 species were seagrasses and 24 species were seaweeds. Brgy. Himay-angan in Liloan had the highest species diversity index of macroflora (H’ = 2.23), while Brgy. Mac in Sogod had the lowest (H’ = 0.04).

The benthic communities of the five sampled municipalities were also assessed in this study. Several areas in the coastal areas of the study sites have already been declared as marine protected areas (MPAs). Accordingly, results showed that Brgy. Gud-an in Liloan (MPA) had the highest percent coral cover with 57.8% (considered to be in “good” status). Meanwhile, Brgy. Pangi (non-MPA) in Libagon had the lowest coral cover (12%), while

Table 1. Percent cover of corals and other resources in the reefs, Sogod Bay, Southern Leyte

Stations	Percent Cover (%)								Category
	Live Coral	Dead Coral	Sponge	Algae	Rock	Sand	Water	Others	
Gud-an*	57.8	25.5	0.7	8.4	0.3	5.3	0.0	1.7	Good
Himay-angan	21.4	38.9	0.0	3.9	13.3	2.3	19.1	1.1	Poor
Biasong*	37.3	26.0	0.0	0.0	8.3	14.7	13.7	0.0	Fair
Pangi	12.0	1.6	0.0	0.0	2.9	80.2	0.0	3.3	Poor
San Isidro	25.1	27.7	0.0	0.0	0.0	12.0	33.6	1.6	Fair
Mac*	22.2	5.7	0.0	0.0	15.3	49.9	5.2	1.7	Poor
Buenavista*	34.5	3.7	0.0	0.0	0.8	44.1	15.6	1.3	Fair
San Juan	13.1	0.0	0.9	0.0	4.0	80.7	0.0	1.3	Poor
Higusuan	42.2	3.5	0.0	0.1	15.5	0.0	37.8	0.0	Fair

Notes: (1) Brgy. Tampoong did not have coral covers due to the garbage deposits in the area; thus, only nine barangays are presented in this table. (2) * are municipalities with marine protected areas (MPA).

Brgy. Tampoong (non-MPA) in Sogod had no coral cover at all due to the garbage deposits in the area.

In general, the results of the assessment indicate that MPAs have high life-form diversity, the highest life-form composition, and the highest live coral cover. Because MPAs are no-take zones, they are less prone to anthropogenic influences. These findings reinforce the importance of MPAs in preserving reef ecosystems.

The study also found that there were non-MPA sites that exhibited high values; Brgy. Higusuan in Tomas Oppus had high percent coral cover and high biodiversity index, even surpassing the values found in those barangays with MPAs. Likewise, all surveyed barangays had similar life-form components, which indicate that all of them can be candidates for MPAs.

The livelihoods of local people

Despite the diverse species of flora and fauna found in the marine ecosystem, surprisingly, most households were less dependent on fishery as an income source. Only 12% of the total 500 respondents considered fishing as a primary occupation. The same trend was observed for farming as a livelihood source, with only 50%

of the total respondents having considered farming as a primary source of income. Most households had alternative nonfarm income sources.

The decreasing dependence of households on the natural resources in Sogod Bay manifested in the small share of farming and fishery income in the total household income. In almost all municipalities, the biggest share (more than 50%) of household income came from salaries and wages and from businesses. Income from forest and farm products contributed only 30%, while income from marine products contributed only 6.4%.

Farmers and fishermen have reported that farm productivity

and fish catch in Sogod Bay have declined over the years, and thus income from farming and fishing have not been enough to support their families. This may be because of the decrease in the quality of these resources, such as nutrient deficiency in the soil and declining fish population. This accordingly indicates that the natural resources in Sogod Bay are no longer as productive as they have been in the past.

The value of Sogod Bay’s natural resources

The study also assessed the value of the provisioning services of the marine and terrestrial ecosystems of Sogod Bay. Results of the valuation analysis of Sogod Bay’s

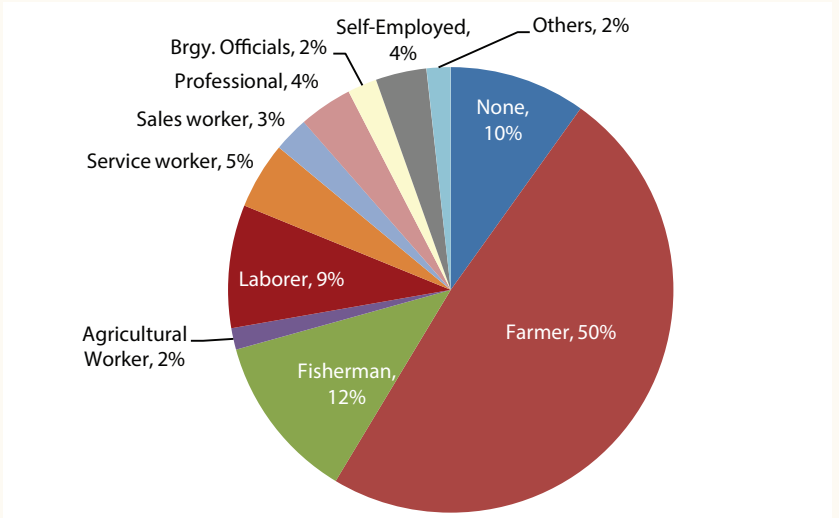


Figure 1. Primary occupation of respondents, five municipalities, Sogod Bay (n = 500)

farmland resources indicate that well-cultivated land is worth significantly more than land that is not managed well or properly cultivated. Much of this difference in value can be attributed to nutrient availability.

For example, for land under coconut, the net present value (NPV) per hectare of those farmers with traditional practice (i.e., without proper cultivation) would be only about PHP 62,000 and over PHP 154,000 for the farms that has best practice (i.e., with proper cultivation).

The value of water resources varied by municipality. Sogod had the water resources with the highest value (the average amount collected each month was PHP 695,688); however, all of the other municipalities also had water resources that were worth significant sums of money. The high value of the region's water resources provides a good reason to preserve or restore the forest resources in the area (which act as watersheds). Note that the calculated value of this water resource was for home use only, and did not include other uses such as water for agriculture and industry.

The study also found that in areas with an MPA, NPV of fishing would be over PHP 948,000/ha. In areas without an MPA, this NPV would be PHP 5,676/ha. This finding indicates that restoring the health of coral reefs by establishing MPAs is an effective way to improve the livelihoods of local people since healthy coral reefs would lead to greater fish catch levels. Establishing a marine sanctuary requires a large financial outlay but, as the study shows, the economic benefits a MPA provides are high.

Recommendations for action

Based on the results of the natural resource assessment, this study recommends strengthening the technical support of the local government, through the municipal agriculturist office, to farmers in ameliorating the soil nutrient quality in the areas surrounding Sogod Bay. Vermiculture is one possible technology to address poor soil quality. Using organic fertilizer should also be promoted as this can be sourced from local materials.

In the same vein, the municipal agricultural office also needs to assist and teach farmers on how to choose the right crops and technologies that would reduce soil erosion considering the erosion-prone topography of the area. The results have shown that only a few farmers adopt practices that would reduce soil erosion. The only practice mentioned was crop rotation, which was done by a few of the farmers interviewed.

The study also recommends establishing MPAs in those sites where diverse species abound (e.g., Brgy. Higusuan). Likewise, rehabilitating the degraded coral reefs is also recommended, which could be done through coral transplantation. These mechanisms can improve the health of coral reef covers, which would consequently lead to increase in fish biomass.

The national government or other funding organizations should also extend financial and technical assistance to the local communities to help them monitor and guard their existing sanctuaries in order to prevent outsiders from encroaching these protected areas. This should be complemented

by strict implementation of MPA regulations.

Likewise, efforts to rehabilitate the mangrove ecosystem should be continued. Proper care and management of new mangrove areas should be implemented to reduce mortality.

In terms of the declining farm productivity, this study recommends initiating interventions that would restore the productivity of the agricultural ecosystems in Sogod Bay. Rehabilitating those abaca farms infested with the bunchy-top virus should be done through replanting those farms with virus-free planting materials. Coconut farms should also be rehabilitated, which can be done through planting early-maturing coconut varieties to help address the problem of low-yielding coconut trees. Such technical support would help restore the important sources of household incomes.

Finally, the results of the valuation study indicate that the provisioning services of Sogod Bay's ecosystem are important. Interventions to conserve these natural assets should start with identifying and providing livelihood opportunities and installing mechanisms where payments for ecosystem services can be collected from the users.

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