

ECOSYSTEM ACCOUNTS TO DETERMINE SOCIAL, ECONOMIC & ENVIRONMENT TRADE-OFFS

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Summary Statement: **Paper summarizes policy papers using ecosystem accounts to determine social, economic and environmental trade-offs.**

Ecosystem Accounting (EA) is an integrated & comprehensive statistical framework for organizing data about habitats & landscapes using the System of Environmental Economic Accounting (SEEA) Ecosystem Accounting methodology approved by the UN Statistical Commission. This framework was used to create several ecosystem accounts for Palawan province in the Philippines, known as the Philippine's "last ecological frontier", with a focus on Southern Palawan which has a dearth of environmental data due to its remoteness and aggravated by conflicting land use, perpetuated by both the large-scale industries and escalating population pressure.

The paper's objectives are: 1) to present the results of the various policy analysis of ecosystem accounts prepared for Palawan measuring ecosystem services, tracking changes of the ecosystem assets, and linking information to the economic, social and other aspects of human activities and 2) to discuss with the decision makers at the local level the results of the EA and analyze the importance of natural ecosystems to the economy, both in physical units and the values they generate.

With more than 1 million hectares of officially declared biosphere reserve, Palawan is an archipelago of more than 1,700 islands, composed of highly diverse terrestrial, freshwater, coastal and marine ecosystems, with numerous unique endangered and threatened flora and fauna, some of them in the IUCN Red list of threatened species. Based on the IUCN classification, Palawan is home to 105 of the 475 threatened flora and fauna species in the Philippines, of the 67 species endemic to the Philippines, 42 are endemic to Palawan. Its abundant coastal and marine ecosystems include 379 coral reefs species, 13 seagrass meadow species, and 31 mangrove species found in 44,500 hectares of mangrove forests, the highest remaining mangrove cover in the Philippines. It is home to beautiful, endangered species like the horned frog, calamian deer, and rich aquatic species such as marine turtles, sea cows, and whale shark. It is also composed of the largest remaining forest cover in the Philippines composed of old growth and second growth tropical rainforest, karstic limestone, forest over ultramafic rocks, casuarinas and beach forest. They serve as habitats to unique freshwater fish (18 Philippine endemic species), amphibians (26 Philippine endemic species), reptiles (69 species), birds (279 species), migratory birds and terrestrial mammals, of which of the 58 Philippine endemic species, 16 are endemic to Palawan.

The ecosystem accounts were prepared and analyzed using baseline data that were collected and processed by the Palawan Council for Sustainable Development (PCSD) which conduct regular environmental monitoring in Palawan for the last decades. Supported by the World Bank Wealth Accounting and Valuation of Ecosystem Services (WAVES) program, various pieces of environmental information were put together in an environmental information platform, following the System of Environmental Economic Accounting (SEEA) framework for the ecosystem accounting methodology approved by the UN Statistical Commission in March 2021. Ecosystem accounting can be applied at different scales (from local to national) to analyze the contributions of ecosystems to the economy, both in physical units and in terms of value generated. Various reports on the ecosystem accounts in several countries are available at the World Bank website.

Trade-off relations can exist between environmental goods and services. Ecosystems donate (supply) either social or economic benefits that can be calculated using the ecosystem accounts. Setting up of ecosystem accounts can involve the gathering, estimating, analyzing the ecosystem assets or flows and calculating the costs of: 1) the ecosystem services (provisioning, regulating, cultural or social) as essential inputs of the natural environment and regular provision of physical materials (eg. timber, fish or water) to the local economy (eg. forests, hydrology, or coral reefs) and 2) damages caused by pollution and resource degradation to the local economy and overall well-being of the local communities. The effort to establish estimates of the economic values of the ecosystem is a big step towards a clearer view of the real value of the country's natural resources. This can also be used as a basis for innovative financing policies especially Payments for Environmental Services which the Philippine government plans to institutionalize, beginning with protected areas. While trade-off decisions are made for economic and social benefits, it is important that these trade-offs be made within sustainability thresholds and not cause permanent environmental damage.

Policy briefs using the Ecosystem Accounts of Palawan

The goals of these policies cover broader sustainable development, food security, sustained production, effective enforcement and management of resources, zoning and rehabilitation, establishing marine protected areas and specific policies that embodies the sustainable management of the environment and natural resources such forest protection and wildlife conservation and preservation.

The mandates of national agencies and the local government units with regard to land use planning are overlapping and at times conflicting, which increases the risk of land use conflicts that can ultimately lead to further degradation of the ecosystems and the services they provide. This situation is further compounded by the fact that the agencies do not share a common database for monitoring of land use and are thus not always sufficiently aware of information in other departments or agencies. To help address this issue, an integrated approach is needed to harmonize and address the competing use of lands and coastal areas to achieve the sustainability of natural resources.

For example, the present status of coastal ecosystems in the Philippines is in a decline and a cause for alarm. As a consequence of human activities, almost all Philippine forests and coral reefs are at risk -- only 4 to 5 percent remain in excellent condition. More than 70 percent of the nation's mangrove forests have been converted to aquaculture, logged, or reclaimed for other uses. The country lost mangrove forests at a rate of 1,400 ha/year between 1990-2010 (Long et. al. 2011). Approximately half of the seagrass beds have either been lost or severely degraded, and the rate of degradation is

increasing (Fortes. 1995). The country registered 36% coral cover between 1981-2010 (Magdaong, 2014) with 64% of coral cover being lost over the years.

1. Quantifying and Valuing Forest Carbon Sequestration in Southern Palawan: Understanding its Importance and Role in Climate Change Mitigation

For the Philippines, it was estimated that a major portion of the conditional 70% target emission reduction in the Intended Nationally Determined Contribution (INDC) will come from the forestry sector. The identified mitigation options from forestry are forest protection and forest restoration and reforestation. In Palawan, the records show that the top five drivers of deforestation are: 1) slash and burn; 2) mining 3) land use conversion; 4) settlement; and 5) forest fire. Also in Palawan, the top five drivers of forest degradation are: 1) illegal logging; 2) natural calamities; 3) timber poaching; 4) charcoal-making; and 5) fuelwood gathering. These driving forces are also common in other parts of the Philippines and can be cited as a basis for setting the assumptions for the determination of ecosystem accounts elsewhere.

The policy brief was prepared based on a carbon account in Southern Palawan which assesses the carbon storage, carbon sequestration, and monetary values of carbon sequestration as a function of growth and loss of trees in its forests.

2. Declining Municipal Fisheries Catch in Palawan Linked to Coral Reef Destruction Evidences from the Ground

Coral reef destruction is continuing in Palawan and will impact municipal fisheries, tourism opportunities and coastal zone protection. The policy paper is based on a scenario analysis that focuses on the potential impacts of coral reef degradation on municipal fisheries. Coral reef condition, expressed as the average percentage of live coral across a representative sample of reefs in Palawan, has declined from 49% in 1999 to 35% in 2015. If this trend continues, average live coral reef cover will be reduced to 21% in 2030.

3. Scenario Analysis on the Impacts of Coral Reef Destruction on Municipal Fisheries¹ in Palawan

A scenario analysis of trends in coral reef condition was prepared to study how municipal fisheries production will be affected in the next 20 years. Using the available data from PCSD and the Philippine Statistics Authority (PSA), the scenario analysis showed the effects of the continued practice of dynamite and cyanide fishing, both leading to irreversible destruction of coral reefs. The policy analysis presented the possible scenario for fish production if reef destruction follows the trend of the last 15 years. It also presents the effects on fisheries that could be avoided if the degradation of the reefs is halted. The scenario analysis is based on the widely recognized interdependencies between coral reef fishes and coral reefs. Studies have shown that the relationship between these two groups of marine organisms run two ways. Coral fishes depend on coral reefs for food, habitat and refuge. Coral fishes, on the other hand, facilitate coral settlement and potentially keep the spread of diseases in check.

Coral reef condition in Palawan, 2014



¹Municipal Fishery/Fishing refers to fishing within 15 kilometers of municipal waters using fishing vessels of three (3. gross tons or less, or fishing not requiring the use of fishing vessels).
Republic Act 8550

4. Enhancing policy implementation to address land use conflicts in Southern Palawan

The policy brief presents the following trade-offs and conflicting land policies that are rife in the entire province. A spatial analysis of land uses and land classifications following the zoning regulations was conducted to identify key areas of overlapping land use claims and overlapping policies.

- a. Core Zone vis-à-vis Land Classification – despite intention of forestry and core zone policies to intensify the protection and preservation of the different types of forests, encroachment and violations resulting in the degradation of these ecosystems persist
- b. Core Zone vis-à-vis Tenurial Instrument – land allocations were non-compliant with regulations
- c. The policy analysis shows that there are major inconsistencies between land appointed as crucial for conservation and ecosystem services supply (the ECAN core and restricted use zones), land use classification, issuance of tenurial instruments and land titling.

5. Reversing Mangrove Degradation in Southern Palawan

The pilot coastal ecosystem account developed for the one of the municipalities, Sofronio Espa ola and showed marked degradation of ecosystems conditions. The net decline of mangrove area was noted to have occurred between 2003 and 2014. Meanwhile, the overall volume of trees decreased from 337,053 m³ in 2001 to only 189,652 m³ in 2010, a decline by over 43% in just 9 years. The account also showed that seagrass cover and density declined during the period 2001-2010. Along with the decline of ecosystem extent and conditions, the account demonstrated that the average contribution of coastal marine ecosystems to fishery production in the municipality of Sofronio Espa ola is only Php42/kg (USD0.84/KG) based on results of a fishery survey in the municipality.

6. Using River Water to Irrigate Crops in Southern Palawan

The policy analysis started with reviewing the water use for drinking, irrigation for rice paddies and oil palm plantations in municipalities around Mt. Mantalingahan, the highest mountain in Palawan and a protected landscape, where new species are still being discovered up to this day. The municipal water intake from the Pulot River upstream of the irrigation reservoir is around 3,900 m³/day. The calculations showed that water is the main limiting factor to rice paddy production. Especially in May, even in a year with average rainfall, all water is required to support paddy production. A further loss of forest cover will increase water flows during the rainy season (when there is a surplus) and reduces water flows in

the river during the dry season. This will mean that less rice can be produced. It was concluded that preserving the forests in Southern Palawan is important for maintaining a hydrology conducive to irrigated rice farming. Given the significant demands for water use and the value it brings to the communities, it was recommended that palm oil can be irrigated after demands for drinking water supply and for irrigating rice have been met.