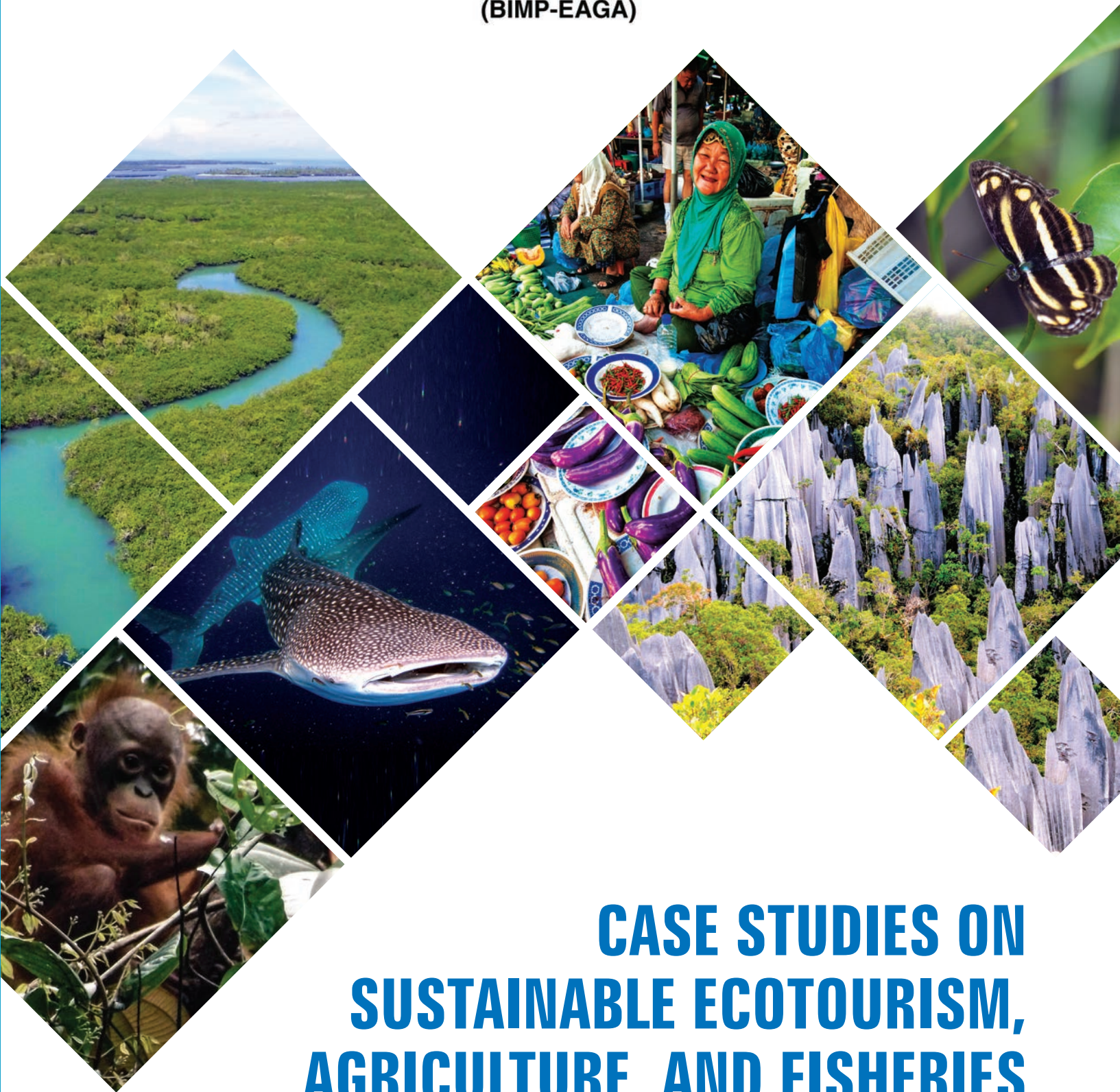




**Brunei Darussalam-Indonesia-Malaysia-Philippines
East ASEAN Growth Area
(BIMP-EAGA)**



**CASE STUDIES ON
SUSTAINABLE ECOTOURISM,
AGRICULTURE, AND FISHERIES
IN BIMP-EAGA**



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Foreword

The endorsement of the BIMP-EAGA Vision (BEV) 2025 on 29 April 2017 was a meaningful milestone for this regional cooperation with its important vision of a resilient, inclusive, sustainable, and economically competitive (RISE) BIMP-EAGA to narrow the development gap.

One of the outputs for the Environment Cluster under the BEV 2025 is to compile case studies of sustainable ecotourism, agriculture, and fishing practices to showcase successful approaches to the management of nature, culture, and heritage. The objective is to encourage all stakeholders to adopt, adapt, and champion the best practices through a collaborative approach in environmental management.

The successful compilation of these sustainable ecotourism, agriculture, and fisheries case studies in BIMP-EAGA is one of the significant contributions of the Environment Cluster in achieving the BEV 2025 vision.

It is my greatest hope that this document will be used meaningfully toward environmental sustainability for the benefit of this generation and the next.



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Sustainable Fisheries Conservation: Tubbataha Reefs Natural Park, Palawan prepared by Department of Environment and Natural Resources Region 4B

Sustainable Fisheries Conservation: Siargao Islands Protected Landscape and Seascape, Surigao del Norte prepared by Department of Environment and Natural Resources Region 13

Sustainable Agriculture in KASAMAKA Coffee Plantation, Pangantucan, Bukidnon: The Fruits of the National Greening Program prepared by Department of Environment and Natural Resources Region 10

Sustainable Agriculture in Allah Valley Protected Landscape Lake Sebu, South Cotabato prepared by Department of Environment and Natural Resources Region 12



Sustainable development. BIMP-EAGA initiatives consider environmental impacts and how to sustainably manage natural resources (photo by Asian Development Bank).

Introduction

The key objectives of this compilation of case studies are to

- share knowledge and information;
- provide references on existing best practices and guidelines in the Brunei Darussalam–Indonesia–Malaysia–Philippines East Asian Growth Area (BIMP–EAGA) region; and
- highlight lessons learned through case studies.

This compilation is important as a contribution to the pool of knowledge on effective environmental management in the region in line with the goal of sustainable development. It could assist in facilitating trade, business, and investment in each country, such as in the case of joint agricultural projects. Apart from communities, the document can also be utilized by relevant clusters in BIMP–EAGA.

Each case study showcases the best practices and their impact on environmental protection, socioeconomic condition, and well-being of communities.

Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987, pt. I).

Part 1

Sustainable Ecotourism

Brunei Darussalam

Sustainable Ecotourism for a Green Environment: Sumbiling Eco Village

Introduction

Established in 2008, the Sumbiling Eco Village (SEV) was initially founded as a community-based tourism (CBT) in collaboration with the local *iban* or indigenous community with support from various government agencies. Its main accommodation grounds are located in an existing indigenous community settlement on the upstream river banks of the Temburong River, providing visitors a scenic view of the rainforest in Temburong district.

According to the Association of Southeast Asian Nations (ASEAN), CBT is a new form of tourism that has emerged over the last 2 decades. It emphasizes a community-centered approach in its operation and essentially deems capacity development of people in the communities as the heart of tourism management. This type of tourism not only responds to the needs of tourists, but also empowers the locals to apply their knowledge in managing tourism within their own communities (*Community Based Tourism in ASEAN Region 2015, ASEAN Tourism*).

Since its operation, SEV has gained the trust of the local community in ensuring employment and the sustainability of tourism development, thus generating awareness of and support for conservation of local culture, and creating economic opportunities for local communities. Examples of sustainable tourism activities currently offered are fishing, kayaking, tubing, jungle trekking, and more. These activities are considered of low impact to the environment, cater to both small and large groups due to recent traveling trends, and utilize the natural assets of the Temburong River.

The management of SEV takes into consideration the demand for more accommodation. Over the years, the number of tourists has been growing, from 1,027 visitors in 2008 to 1,970 in 2018. What began as a *rumah panjang* or longhouse hosted by the head village has led to the development of five eco-friendly “glamping” tent-style accommodations. SEV also constructed a large, open-hall camping site that can accommodate 100 schoolchildren. It has an open-air concept and is built with flooring made of plywood and eco-friendly roofing materials to reduce the environmental and cultural impact in the area. The “glamping” tents at SEV are constructed with recycled materials and locally sourced sustainable hardwood to ensure its nature-friendliness.

Temburong’s flora is home to a wide variety of tropical and medicinal herbs and plants that are today still used by the locals for their medicinal benefits. The local village tour guides at SEV educate guests and the indigenous communities on the different types of plants growing in the jungle and organic farms, as well as their uses in everyday life such as for cooking and medicinal purposes.



Camping in style. Glamping at Sumbiling Eco Village (photo by Leslie Chiang, Sumbiling Eco Village).



Herbal farm at Sumbiling Eco Village. Visitors walk through farms where local villagers harvest herbs for cooking and medicinal purposes (photo by Leslie Chiang, Sumbiling Eco Village).

Best Practices in Community-Based Tourism

Brunei Darussalam has gained international prestige for having a world-class tropical rainforest of which the majority is still in pristine condition and protected by legislation. In fact, the 2015 Global Forest Resource Assessment of the Food and Agriculture Organization of the United Nations considered Brunei Darussalam among the top nations with 72% forest cover. Apart from the government's continuous effort in the sustainable management of the country's forests, the government has allocated 58% of its total land area as a commitment toward the Heart of Borneo initiative.

Sumbiling Eco Village practices responsible tourism and with the community, aims to achieve a plastic-free environment by practicing the 3Rs: reduce, reuse, and recycle plastic. The use of plastics such as bottles or plastic bags is not permitted within the premises. Before arriving, guests are also advised to bring their own water flasks.

Vegetables and fruits at SEV are locally grown. During their stay, visitors are able to interact with the community and visit the mini plantations with the locals who are employed as staff of SEV. Leftover food from SEV are given to local farmers to feed their livestock, or are used to produce compost and fertilizer to minimize waste.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

Community-based tourism seeks to empower communities to manage tourism growth and achieve community aspirations related to their well-being, and includes economic, social, and environmental aspects aligned with ASEAN CBT standards for sustainable development. Therefore, CBT not only



Taking a break. Since 2008, Sumbiling Eco Village has provided job opportunities to 15 locals by employing them as trekking guides, boatmen, kitchen staff, and craftswomen (photo by Leslie Chiang, Sumbiling Eco Village).

involves a partnership between tourism businesses and the community to deliver benefits to both, but also involves community (and external) support for small tourism enterprises, which in turn commit to providing support for community projects that improve collective well-being (*Community Based Tourism Standard 2012, ASEAN Secretariat*).

Since its operations began in 2008, SEV has provided job opportunities to 15 locals by employing them as trekking guides, boatmen, kitchen staff, and craftswomen. The direct impact to visitors through the hiring of local staff provides guests with an authentic experience and local knowledge about the daily life of the indigenous groups who were originally hunters and gatherers in their area. SEV has also sponsored four children in the community by funding their school fees, uniforms, and books.

Guests at SEV stay in the local village communities to get a first-hand experience of the local lifestyle, encouraging interaction between the guests and villagers. As described by the ASEAN CBT standards, such community involvement in the exchange of cultures involves the community presenting their day-to-day activities to the visitors including, for instance, shifting cultivation, weaving clothes, herbal medicine, and traditional fishing (*Community Based Tourism Standard 2012, ASEAN Secretariat*).

In terms of cultural conservation through engagement of the local community, SEV successfully preserves the cultural significance of everyday *iban* life in Temburong and showcases this by means of experiential tourism (or tourism connecting through history, people, and culture), whereby knowledge and skill transfers through the local community help achieve a realistic and memorable experience. The importance of conservation plays an important role in ensuring the success of SEV's sustainable ecotourism in a green environment, which safeguards not only the integrity of the ecosystem, but will also produce economic benefits for local communities for many years to come.

Indonesia

Sustainable Tourism Practices in Raja Ampat, West Papua: Best Practices on How Conservation Drives Tourism and Economic Growth

Introduction

Raja Ampat is part of the Bird's Head Seascape in West Papua, the epicenter of marine biodiversity in the world (Map 1). More than 75% of the world's hard coral reefs is found in Raja Ampat (Map 2), where the marine ecosystem plays an important role as a source of livelihood for more than 40,000 people in 135 villages. Raja Ampat is also one of the national geoparks in Indonesia.



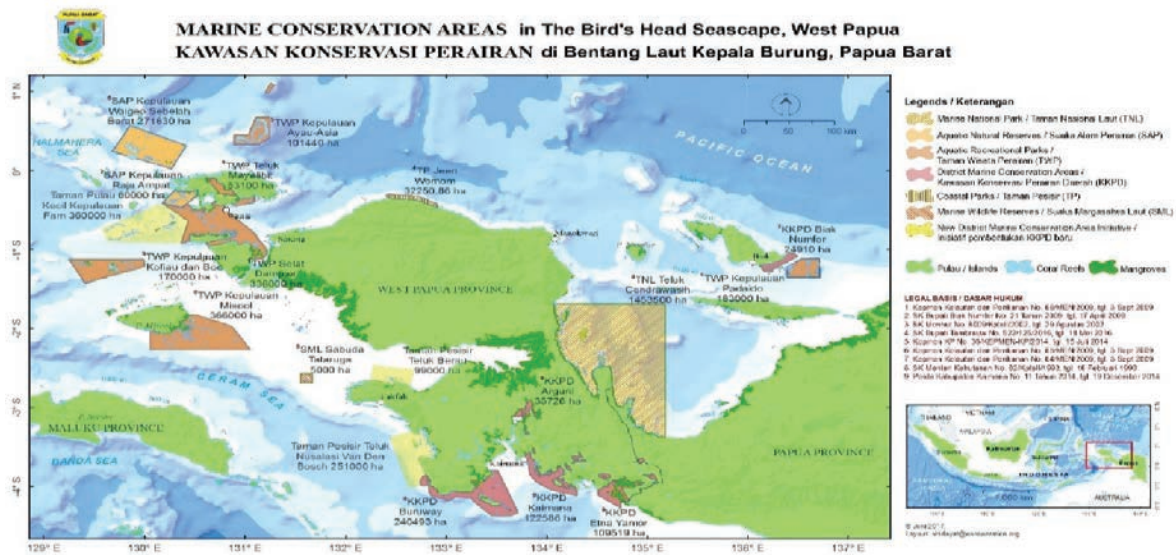
Aerial shot of Raja Ampat, West Papua. The area provides a source of livelihood for more than 40,000 people in 135 villages (photo by BUMD Raja Ampat).

Raja Ampat is a habitat for charismatic mega fauna such as the manta ray and whale shark. With the beauty of underwater life in Raja Ampat, the area has been nominated as the best dive site in the world.

Tourism in Raja Ampat has been growing for years. Its tourism potential is manifested in unique ways:

- The marine biodiversity and ecosystem provide a beautiful underwater experience for diving and snorkeling.
- Small islands, karst, and coral caves beckon to be explored.
- Beautiful coastal areas are conducive to sea kayaking and wind surfing.
- Tropical forests and high endemic species, including various bird species, invite bird watching.

Map 1: Bird's Head Peninsula Showing the Marine Protected Area Network

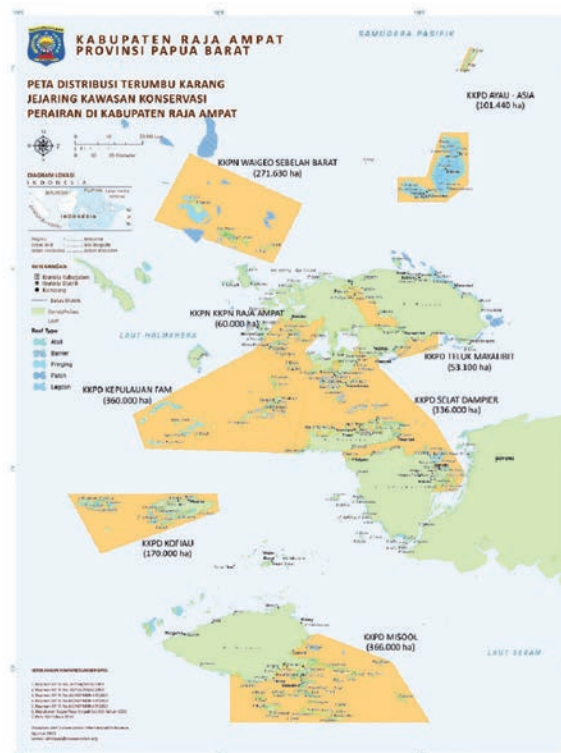


MPA = marine protected area.

Note: Map shows the MPA network in the Bird's Head Seascape, including Raja Ampat MPA network.

Source: BUMD Raja Ampat.

Map 2: Coral Reef Distribution in the Raja Ampat Marine Protected Area Network



Source: Nur Hidayat, Conservation International Indonesia.

As the global epicenter of marine biodiversity, there is no place like Raja Ampat, West Papua, which is the habitat for more than 75% of hard coral reefs and charismatic mega fauna. Tourism in the area has been growing for years.



The Star Lagoon in Piainemo. The karsts surrounding the lagoon create the shape of a star (photo by BUMD Raja Ampat).



White sandy beach in Saukabu. With the beauty of its underwater life, Raja Ampat has been nominated as the best dive site in the world (photo by BUMD Raja Ampat).



Homestay managed by the local community. Since 2005, several new tourism communities and organizations have sprouted in Raja Ampat (photo by BUMD Raja Ampat).

Between 2000 and 2005, there was no significant growth on tourism in Raja Ampat. At that time, there was only one liveaboard, one resort, 500 entry tickets per year, and no tourism facilities. But after 2005, tourism and fisheries became important sectors that significantly supported economic growth in Raja Ampat. The growth of infrastructure and tourism facilities has been significant, in addition to the promotion of Raja Ampat as an international tourism destination.

2015 was a golden year for Raja Ampat tourism, when tourism growth multiplied 14 times in terms of resort occupancy and 75 times for homestay. Yacht and local guides increased to 60 liveaboard and 70 guides, respectively. Financial benefits trickled down to the surrounding communities. Several new tourism communities and organizations have sprouted in Raja Ampat, such as the Local Homestay Association, Tourist Guide Association of Raja Ampat, Speedboat Association of Raja Ampat, Resort Association, and Liveaboard Association/JANGKAR.

The Role of Conservation for Tourism and Economic Growth in Raja Ampat

Before conservation practices were implemented in Raja Ampat, unsustainable fishing practices and destructive management were evident in the area. These practices in the long run would have harmed the existing marine biodiversity and ecosystem, the key elements of Raja Ampat's tourism potential.

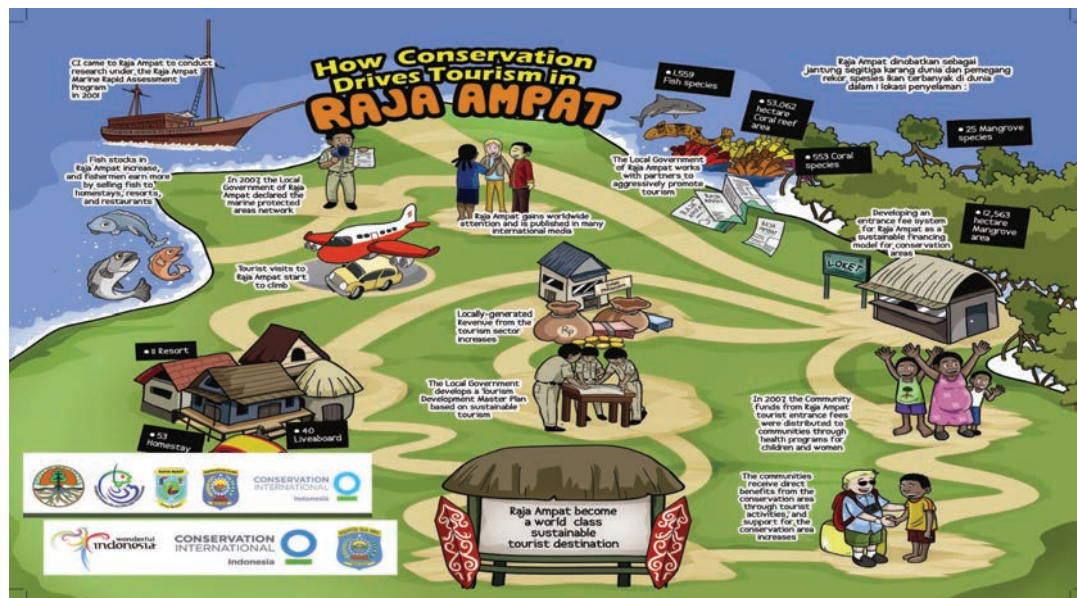
The development of the marine protected area (MPA) network in Raja Ampat proved important in ensuring the sustainability of Raja Ampat's important marine biodiversity and ecosystem. Rules are applied as well within the MPA as the tourism code of conduct. The effectively managed MPA plays a critical role in preserving marine biodiversity and ecosystem as key tourism assets.

2015 was a golden year for Raja Ampat tourism, with growth of tourism facilities reaching 14 times in terms of the number of resorts and 75 times for homestay. The marine protected area plays a critical role in tourism sustainability.

In 2015, Raja Ampat MPA achieved “green level performance management” based on the indicators of Management Effectiveness of Aquatic, Coasts, and Small Islands Conservation Areas (E-KKP3K) of the Ministry of Maritime Affairs and Fisheries. The green level, which indicates basic management of the MPA, gradually rose to “blue” then “gold” in 2017. The gold level indicates that the MPA has been managed optimally and with financial independence. This achievement was possible with strong support and ownership by the local government, in collaboration with the national government and Conservation International Indonesia.

As most of the tourism sites in Raja Ampat are located within MPAs, conservation plays a significant role in supporting the long-term sustainability of tourism. Figure 1 shows a summary on how conservation drives tourism in Raja Ampat.

Figure 1: How Conservation Drives Tourism toward Making Raja Ampat a Sustainable World-Class Tourist Destination



Source: BUMD Raja Ampat.

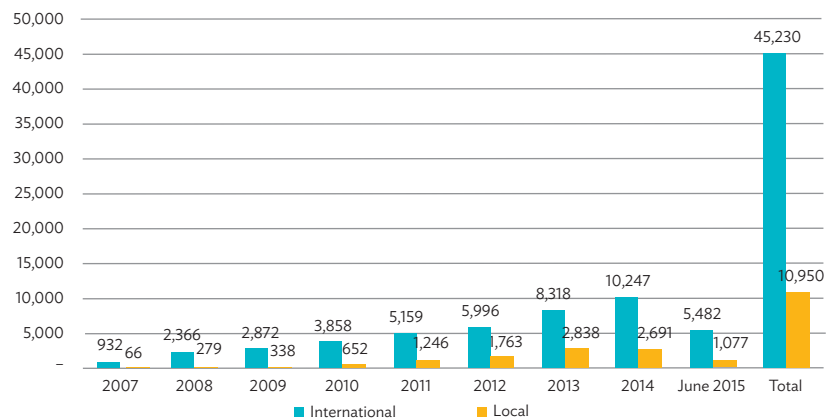
Examining Tourism Growth: Opportunity, Threats, and Actions

The following economic impacts account for Rp386 million a year, equivalent to \$26,620, according to 10 liveaboard surveys.

- The annual income of local staff is Rp156 million per year.
- An extra fee is charged for the local customary, such as Wayag, Piaynemo, Misool, etc., amounting to Rp130 million per year.
- Donations to local villages total Rp20 million per year.
- Expenses for logistics (spent in Sorong) total Rp80 million per year.

Despite the economic benefits, tourism growth must be managed carefully to ensure tourism sustainability, especially as natural tourist attractions depend on the beauty and the existence of resources. Figure 2 shows tourism growth in Raja Ampat from 2007 to 2015.

Figure 2: Number of Tourists in Raja Ampat, 2007–2015



Source: BUMD Raja Ampat.

In Raja Ampat, the number of tourists increased significantly to 21,233 in 2017. Several incidents of irresponsible behavior and threats occurred from this massive tourism growth, such as vandalism, littering, and overcrowding. Without immediate action toward sustainable tourism practices, tourism growth in Raja Ampat may start to decline.

The growth in tourism in Raja Ampat also changed the behavior of the community: people became proactively involved in protecting their natural resources as a result of the high level of awareness of the community about the importance of nature to their life. The community actively reported unsustainable fishing and other practices that potentially damage the environment.

Together with partners, the sustainable tourism program has started supporting tourism management and implemented practices that ensure the sustainability. Some activities carried out are as follows:

- the development of Raja Ampat Sustainable Tourism Master Plan/RIPPARDA;
- conducted carrying capacity study and developed tourism guidelines in Raja Ampat as a tool for government and partners or companies to apply sustainable tourism practices;
- development of the tourism Code of Conduct;
- establishment of the Raja Ampat Mooring System working group;
- establishment of the Manta working group; and
- sustainable tourism campaign, outreach, and education for government officials, guide association, home stay association, communities, resorts, and related stakeholders.

Sustainable Financing Mechanism for Raja Ampat

The sustainable financing mechanism was established in Raja Ampat via an entrance fee system in 2006. The entrance fee embedded into the Kartu Jasa Lingkungan (KJL) or environmental card started in 2015. The entrance fee is managed by the regional technical implementation unit of Raja Ampat MPA Management (*UPTD Pengelolaan KKP Kep. Raja Ampat*), in accordance with 23/2014.

The KJL price is Rp1 million and Rp500,000 for 12 months paid by foreign and domestic tourists, respectively. The money is allocated to support infrastructure development in the village; and to support MPA management activities such as patrol, monitoring, and education. In addition, a budget of Rp1.5 billion is allocated per year to support various community activities. UPTD Pengelolaan KKP Kep. Raja Ampat uses the funds to support MPA management, which also created green jobs for locals who became the managers/rangers of the MPA.

In 2016, 15,701 tourists generated \$1 million in revenue. Seventy percent of all tourism revenues were returned to the BLUD to fund the management of 1.4 million hectares of MPA. The BLUD is supported by 160 local staff members and manages key management functions including outreach, education, monitoring, and patrol.

The financing mechanism supports the tourism sectors that generate job creation and sustainable income to the locals and government, e.g., tax to the government, local homestays, liveaboards, resorts, and hospitality jobs.

Stories from Arborek Village: Community Participation in Sustainable Tourism

Located in the Meos Mansar District, Arborek Village was recently honored with the Green Award in the category of “Economic Utility for Local Community” at the Indonesia Sustainable Tourism Award (ISTA) 2017—a program of the Indonesia Ministry of Tourism.

With a population of less than 300 people located within the Dampier Strait Marine Protected Area (MPA), Arborek is one of the villages that has successfully developed collaborative participation through environmental conservation and preservation efforts over the past few years, as solid responses toward Raja Ampat’s tourism growth. Arborek consistently tries to develop and implement a concept of tourism-driven, village-managed principles of sustainability.



Arborek Village. Recipient of the Green Award for “Economic Utility for Local Community” during the Indonesia Sustainable Tourism Award (ISTA) 2017 program of the Indonesia Ministry of Tourism (photo by BUMD Raja Ampat).

The community supports sustainable tourism in Mayalibit by actively participating in conservation efforts, such as conserving mangroves, protecting coral reefs, and maintaining the local wisdom and culture to support natural resources conservation. In addition, they have also created various hand-made products for souvenirs and are involved in the Manta Sandy Station (area for manta ray tourism) by implementing the booking system and tourism Code of Conduct. As for the sustainable financing mechanism, UPTD Pengelolaan KKP Kep. Raja Ampat regularly supports funding for management of the Manta Sandy Station.

One of the impacts from this community involvement is the growing sustainable tourism in Arborek village, which supports the local tourism industry, such as through homestays, local guides, handicrafts, and transportation businesses that have become sources of income for the local communities.



Kasi makan laut. A local custom of requesting an ancestor’s blessing and protection (photo by BUMD Raja Ampat).



Arborek. A model for collaborative participation through environmental conservation and preservation efforts (photos by BUMD Raja Ampat).

The involvement of local communities (customary and church) in the management of Manta Sandy Station is through a ceremony of *kasi makan laut*, a local custom of requesting an ancestor's blessing to guard the area, so the program can provide economic value to the community.

Best Practices in Sustainable Tourism

1. **Strong multi-stakeholder participation and coordination.** Strong collaboration with nongovernment organizations (NGOs) is one of the main factors for the successful implementation of sustainable tourism practices in Raja Ampat. This has helped strengthen stakeholder awareness and collaboration toward implementing sustainable tourism practices.
2. **Conservation principles implemented.** Two key principles underpin protection and sustainable management of marine biodiversity and ecosystem in Raja Ampat:
 - a. Tourism development must be responsible, and must consider the ecological aspects, as well as respect the local sociocultural norms and tradition.
 - b. Tourism management should be planned as an integrated ecosystem and consider cross-sectoral collaboration.
3. **Strong commitment and ownership from the local government and communities.** The local government has shown strong commitment and leadership to ensure that tourism development in Raja Ampat considers conservation principles. This commitment is mirrored in Raja Ampat's Regional Tourism Masterplan (RIPDA), which was implemented beginning 2006. RIPDA's vision is "By 2035, to develop Raja Ampat as the world natural tourism based on conservation and maritime culture, to support the local economic growth." The RIPDA

was reviewed in 2013 to accommodate present conditions, including the need for sustainable development, local community empowerment, and alignment with recent regulations.

The communities also play an important role in supporting sustainable tourism in Raja Ampat, through active involvement in the planning process, maintaining and protecting the conservation of and social values in the village, controlling and monitoring tourists' behavior to minimize negative impacts to nature and the communities, and actively involving tourism operators and local tourism business actors.

Lessons Learned

Below are several lessons learned from the sustainable tourism practices in Raja Ampat:

- Conservation is important to support sustainable tourism and should be considered in developing a sustainable tourism plan, as the plan will ensure the protection of key important natural resources as tourism assets.
- The development of a sustainable tourism plan should take place before tourism development in the area. As part of the sustainable tourism plan, a code of conduct and regulations are also required before the tourism development begins, e.g., ship line, mooring, waste management, local guide, construction of homestay and resort, liveaboard, super yacht, and cruise.
- Engagement and collaboration with multi-stakeholders, including the private sector and investors, can strengthen the implementation of sustainable tourism in the area.

The Future of Sustainable Tourism in Raja Ampat

The President of the Government of Indonesia and the West Papua governor have recognized the importance of protecting the marine biodiversity and ecosystem of Raja Ampat, including support for sustainable tourism. Both the President and the governor have a strong understanding of the importance of sustainable tourism and the protection of natural ecosystems in Raja Ampat.

Aligned with the provincial government's Initiative for Conservation, the future of sustainable tourism in Raja Ampat will be strengthened through several follow-up actions from both local and provincial governments on the following:

- improvement of MPA management and zonation plan;
- implementation of the carrying capacity within the tourism area;
- code of Conduct for Sustainable Tourism in Raja Ampat;
- formulation of regulations on Raja Ampat Mooring System;
- regulations for tourist guides in Raja Ampat;
- regulations on environmentally friendly construction practices in tourism sectors;
- regulations on business best practices for resorts, homestay, liveaboard, dive-vessels, day-use speedboats, private yacht, and cruise ships;
- assessment of the effectiveness of monitoring irresponsible tourists; and
- assessment of the effectiveness of monitoring unsustainable fishing practices.

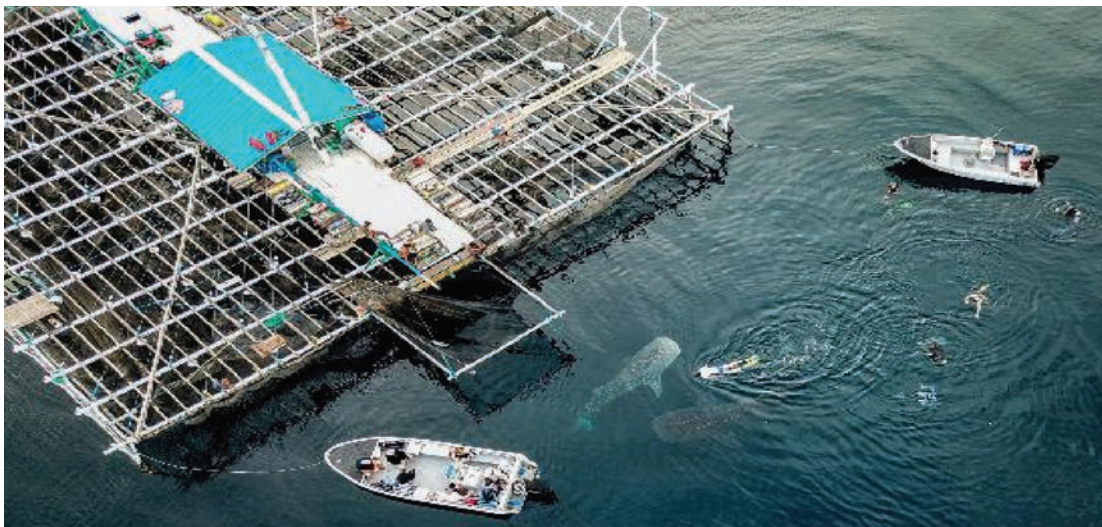
Indonesia

Sustainable Whale Shark Tourism in Cenderawasih Bay, West Papua: Best Practices on the Role of Science and Technology Innovation in Sustainable Tourism

Introduction

The whale shark (*Rhincodon typus*) is the biggest fish in the world and known as a highly migratory species. The most prominent recorded whale shark to date is 12.65 meters long and weighs 21.5 tons. The whale shark is currently listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). It is also listed as “endangered to extinction” in the International Union for Conservation of Nature (IUCN) Red List due to its specific biological characteristics such as slow growth cycle and low fecundity; and to the ongoing decline of its population in the world, according to the comprehensive assessment in 2017.

Since 2013, the whale shark has been a protected species in Indonesia by virtue of the Minister of Marine Affairs and Fisheries Decree No. 18/2013 (KEPMEN-KP No.18 Tahun 2013). This protection is driven by the aforementioned biological characteristics of the whale shark, and the high economic potential that could be provided to the community through tourism. By protecting the species, the Indonesian government is securing future economic value from development of whale shark-based tourism.



Whale shark tourism. Tourists swimming with whale sharks in Cenderawasih Bay (photo by Cenderawasih Bay National Park Management Authority).

Status

Several shark species are tourist attractions in Cenderawasih Bay (Map 3), but it is the whale shark that is now becoming the icon for tourism in several areas in Indonesia, particularly in Cenderawasih Bay. Whale sharks are harmless, graceful, and awe-inspiring, and provide high value to the burgeoning tourism industry. These species are a magnet for both domestic and international tourists, and if managed wisely, could provide a sustainable economy for the local community. Since the discovery of the whale shark population in 2006, the number of the visitors to Cenderawasih Bay has steadily increased.

Map 3: Cenderawasih Bay in West Papua, Site of Sustainable Whale Shark Tourism



Source: Cenderawasih Bay National Park Management Authority.

Since 2006 in the Bird's Head Seascape of West Papua, stakeholders have worked hand-in-hand with Conservation International Indonesia, the Local Government of Raja Ampat and Kaimana, Cenderawasih Bay National Park Authority (BBTNTC), the technical implementation unit of the Ministry of Environment and Forestry (MOEF), Universitas Papua, village and customary leaders, and the local community to build and effectively manage a network of marine protected areas in Bird's Head Seascape. In 2013, when the shark and ray conservation program started, the critical role that shark and ray species play to maintain balance for a healthy marine ecosystem was realized.

Unfortunately, those same shark and ray species are considered vulnerable to extinction due to their general slow growth; low fecundity; and the ongoing exploitation from fisheries, which targets their highly priced body parts, such as fins in sharks and gill rakers in mobulid rays. If the current rate of exploitation does not slow down, their growth and reproduction rate will not be able to withstand the fisheries pressure that their species are currently experiencing.

The Role of Science and Technology in Whale Shark Tourism in Cenderawasih Bay

Although whale sharks have been protected in Indonesia since 2013, the unfortunate reality is that some illegal hunting and incidental bycatch of whale sharks still occur from the neighboring regions of West Papua. Given the potential for whale sharks to migrate long distances, there is a possibility that the Bird's Head Seascape populations are in fact directly threatened by hunting and fishing activities in neighboring provinces. It is therefore imperative to gain a much more detailed understanding of the fine-scale movement and behavior patterns of whale sharks to be able to identify management, enforcement, and outreach efforts where they are most needed, to ensure the long-term survival of these species. For this, scientific data and technology are required to better understand the species, which in turn can influence decision making and the planning process in conservation and sustainable tourism.



Endangered to extinction. Whale shark aggregating in a *bagan* or lift net fishing platform (photo by Cenderawasih Bay National Park Management Authority).

The main issue that hinders efforts in studying the whale shark is that scientists are struggling to deploy electronic tags for a long period. The conventional tagging widely used by scientists elsewhere in the world simply could not work in Cenderawasih, where the sharks have a very high interaction with *bagan* (lift nets) on a daily basis, creating a very high chance of tag entanglement with the *bagan* net and fishing line. This has resulted in a very short deployment duration (between 1–2 weeks) before the tag is prematurely detached from the animal. This duration is simply too short to be able to document important behavior of the whale shark.



Satellite tagging. A finmount satellite tag is attached to a whale shark (photo by Cenderawasih Bay National Park Management Authority.).

In 2015, BBTNTC started a comprehensive whale shark satellite tagging program with Conservation International Indonesia. The satellite tagging program greatly benefited from information provided by the *bagan* fishermen who reported that in recent years, whale sharks are often accidentally caught during the pre-dawn hours in fishing nets as they feed on the baitfish. When caught in the net, the animals are docile, they said. This information provided the team enough time to get inside nets and deploy a custom-made finmount satellite tag that could track the shark for up to 2 years.

As of today, 33 whale sharks have been tagged in Cenderawasih Bay. The finmount satellite tags are attached to the dorsal fin using a novel tagging method invented in Cenderawasih Bay, which takes advantage of the unique interaction between the whale shark and *bagan* fishing platform in the area.

Since 2015, the team has managed to discover biological and behavioral information that used to be a mystery. One documentation is of several whale sharks undertaking an annual migration to the same area. This information is critical to designing management of whale shark tourism in the bay.

The success in tracking the movement of whale sharks confirmed that Cenderawasih Bay is one of the few places on earth where whale sharks occur throughout the year. This rare phenomenon has prompted BBTNTC to create the Whale Shark Center, which will be completed by late 2019. The Whale Shark Center will focus on advancing whale shark-based tourism in the region through the combination of conservation, science, technology, innovation, and the local wisdom of the Papuan community.

Between 2011 and 2017, whale shark tourism in Cenderawasih Bay contributed Rp2.5 billion (\$170,000) to the country from the sale of national park tickets alone. The Kwatisore village, being the customary owners of the area in which the *bagan* are operating, is also benefiting from tourism. The village now has an outdoor hall to perform a welcome dance for tourists, and a number of community members have been actively producing wooden whale shark artworks that are sold as souvenirs, such as keychains, paddles, and sculptures. In the past few years, some community members have opened tour operations to bring tourists to swim with the whale sharks. This shows that tourism has benefited the community.

Best Practices in Whale Shark Tourism

From the Cenderawasih Bay whale shark-based tourism model, the following lessons learned and best practices can be gleaned.

1. **Strong conservation core.** For any nature-based livelihood, conservation and sustainability should be the first priority. Whale sharks only occur in healthy oceans; therefore, to preserve the healthy habitat for the animals, conservation efforts in the area should be the priority. One of the conservation activities that could be done is the creation of effectively managed marine protected areas (MPAs). The MPA could provide the spatial blueprint for tourism activities, identify needed actions from multiple stakeholders, and tie up how these diverse activities could and should interact with each other to maintain a healthy ocean.
2. **Application of science and technology.** Better understanding of the whale shark in Cenderawasih Bay, particularly the information derived from the whale shark satellite tagging program, has proved critical to the design of whale shark tourism management in the area, and has influenced decisions on sustainable whale shark tourism and protection in the area.
3. **Economic viability.** After securing the conservation efforts, ensuring that whale shark-based tourism would provide a viable economic activity in an area is next. This would result in buy-in from the local community, and from the conservation perspective, tourism could be seen as a conservation tool to provide legal, sustainable, and profitable livelihoods to the community. This would then provide an alternative livelihood to the community that is still involved in destructive and illegal livelihoods. The model should aim not only to provide sufficient income to the community, but also to generate enough money, possibly through taxation or ticketing systems, to support the existing conservation efforts in the area. It is important to ensure transparency and smooth budget disbursement for ongoing conservation work.
4. **Community involvement.** There are two things that would never cease to exist in an area: the community and the government. All successful conservation projects and programs in Indonesia have one thing in common: active involvement of the community from the beginning of the work, during planning, and implementation. This would not only ensure that the conservation project or program would be tailored to the specific needs of the community and generate higher acceptance from the people. More importantly, there would be greater ownership of the area or project from the community itself. As the community's partner, government(s) and/or NGOs should provide the required capacity building that the community would need for this model to work effectively.

5. **Partnerships.** Heavy work is lighter when shared. For this whale shark-based tourism model, it is essential to map the stakeholders that would be potentially relevant to the activity, which include the national government (technical ministries such as Ministry of Environment, Ministry of Marine Affairs and Fisheries, Ministry of Tourism); local government (provincial, regency, village government bodies); tourism operators (resorts, liveaboards, homestays, other tourism operators); *adat* or traditional customary bodies (*adat* council, *adat* leaders); and the local community. With this partnership, each stakeholder would be able to support the initiatives within their respective capacity and duties. A key aspect of this partnership is to first realize each other's strengths and limitations, then ensure good communication and coordination between the parties.
6. **Code of conduct.** As mentioned earlier, nature-based tourism, especially those that involve endangered species, should be treated with great care. A whale shark tourism code of conduct will ensure that all tourism activities would not pose any threat toward the whale sharks' well-being, and would create minimum environmental impacts as possible. Essential aspects that should be managed strictly are
 - maximum number of tourists for each interaction;
 - maximum of one operator on each *bagan* if the interaction is to be done in the *bagan*;
 - interaction limitations (no touching, keeping safe distances, not to chase the shark, etc.); and
 - procedures for tourists and operators (permits, interaction payments, etc.).
7. **Patrol, enforcement, and socialization.** At the end of the day, no matter how well the code of conduct is designed, it is up to the tourists or operators to respect the regulations. This could be ensured through regular patrols and aggressive and unbiased enforcement by the tourism management body or other relevant officials. All of the rules at Cenderawasih Bay were designed so that tourism activities could provide as much benefit to the community, while ensuring that they do not pose any threat to the whale sharks and the environment. To maintain the sustainability of this model, it is crucial to raise the awareness of tourists and operators on the importance of adhering to the code of conduct, both for the well-being of the sharks and for supporting sustainability of the local economic activities.

Indonesia

Sustainable Ecotourism in Menua Sadap Village, West Kalimantan

Introduction

The Menua Sadap Village is a buffer zone in Kerihun National Park, with an area of 239.79 square kilometers or 6.73% of the area of Embaloh Hulu Subdistrict. The village is a tourist destination in Kapuas Hulu Regency, West Kalimantan Province. The village is inhabited by the Dayak Iban tribe with a population of around 600–650 people, and consists of three hamlets: Kelayam Hamlet, Sadap Hamlet, and Karangan Bunut Hamlet. Historically, the Dayak Iban in Kapuas Hulu are ethnic migrants who inhabit the country's border areas in West Kalimantan and Sarawak Malaysia.

The livelihoods of the residents are typically agricultural farming, fishing, hog raising, and gathering rattan, among others. The community is highly dependent on natural resources. To create alternative livelihoods, community-based ecotourism was developed, called Kelompok Pengelola Pariwisata Menua Sadap (KPP Menua Sadap). The village community has also formed SADAP RIMBA and KELAYAM NGUJI IKAT weaving groups. The SADAP RIMBA is a group managing the use of green energy for biogas. The KELAYAM NGUJI IKAT weaving group practices the preservation of coloring plants and performs weaving using natural dyes.

Status

The KPP Menua Sadap demonstrates a community-based management of ecotourism as an alternative livelihood for the community to maximize the tourism potential in Menua Sadap Village and regulate its tourism management. Ecotourism activities in Menua Sadap Village include culture and art of the Dayak Iban tribe, longhouse and homestay, use of biogas green energy, forest exploration and jungle tracking, riverside camping at Tekelan, tattoo art, handicraft, and weaving using natural dyes.



Menua Sadap Village. Community-based management of ecotourism in this area serves as an alternative source of livelihood for the community (photo by Betung Kerihun Danau Sentarum National Park).

The SADAP RIMBA group utilizes biogas green energy from cow and pig dung as an alternative energy source for lighting and cooking. Energy from biogas is also used to operate machines such as crabs and chainsaws, which previously used gasoline. Developing green energy from biogas is funded by ITTO and the National Park for the installation and provision of cattle and pigs, but maintenance is carried out independently by the community.



Biogas-powered lighting. The SADAP RIMBA group of KPP Menua Sadap manages the use of green energy in the village (photo by Betung Kerihun Danau Sentarum National Park).

The KELAYAM NGUJI IKAT weaving group is committed to producing environment-friendly woven fabrics. Residents are also introduced to the use of nontimber forest products to reduce their reliance on wood. A new natural coloring process has also been revived in Kelayam Hamlet.

In addition, the community has developed the Ethnobotany Garden in Sadap Hamlet, which grows plants useful for daily living like medicinal plants, fruit plants, natural dyes, plants for handicraft materials, and timber plants for building materials. Based on the results of plant identification, there are 37 types of plants in the Sadap Ethnobotany Garden.



Kelayam Nguji Ikat weaving group. Menua Sadap women showcase their woven scarves (photo by Betung Kerihun Danau Sentarum National Park).

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

Tourism in Medua Sadap Village is community-based, revolving around customs and culture and natural balance. Certain activities of the community in Menua Sadap support development of tourism in order to improve the welfare of the community. To accommodate this, the group creates rules that are linked to customary laws so that the people comply to these rules.

Tourism development reduces community dependence on forests and enhances forest protection. In fact, due to tourism activities, other activities that damage the forest have decreased. Meanwhile, in protecting rivers and forest ecosystems, strengthening customary laws is key.

The Green Energy Program through use of biogas generated from pig and cow manure in Betang Sadap is a concrete example of how a community undertook a collaborative project that used available resources with potential. Cow and pig dung were never considered useful before, but is now used for lighting, firewood, and fuel, among others. Through biogas projects, it is expected that the people in in Betang Sadap will be able to improve their economic state, and more importantly, contribute to the preservation of the natural surroundings. With the use of biogas, people can cook processed food products using ingredients that are available in their surroundings, such as *dodol*. These foods can be sold and could provide income for the community.



Food cooked with biogas. SADAP RIMBA group utilizes biogas green energy from cow and pig manure (photos by Betung Kerihun Danau Sentarum National Park).

The Kelayam NGUJI weaving group continuously enjoins residents to go back to using natural dyes. Its approach is to preserve local culture and thereby sell at premium prices. When residents prefer factory-made yarn, they stop using natural dyes. With undyed factory threads, the weaving process is shortened, and the fabric produced has sharper colors and looks more festive.

The Kelayam NGUJI also helps compile basic data or catalogs of natural coloring materials, such as *krerebai*, *rengat*, *jangau*, shoals, *noni*, *kemunting*, and *empait*. Other plant sources are also found in other areas in Kalimantan. The dyes are extracted from plant stems, roots, or leaves and produce different colors: for example, red from the leaves of *krerebai* or bark of shoals, bluish-black from *kemunting* and *rengat* leaves, and yellow from the *noni* root.

Residents now grow these plants in an area for customary management near Bukit Lanjak, where more than a thousand different types of plants are cultivated.

For craft marketing, the Small Business Women's Counselor Association (Asppuk) provides assistance, enabling residents to get more benefits and make weaving as a means of livelihood. High-value natural weaving is available in the market.



Tie weaving and nursery garden. (Left photo) The Kelayam NGUJI weaving group continuously enjoins residents to go back to using natural dyes. (Right photo) Plant sources for natural dyes are grown in an area for customary management (photos by Betung Kerihun Danau Sentarum National Park).

The benefit of the Ethnobotany Garden is not yet fully realized by the community, although the community already uses certain leaves for cooking or wound medication, or fruits for consumption.



Ethnobotany garden in Sadap Hamlet. Plants used in everyday life such as medicinal plants and fruit plants are among the 37 types of plants in the Sadap Ethnobotany Garden (photo by Betung Kerihun Danau Sentarum National Park).

Malaysia

Sustainable Ecotourism in Batu Puteh, Kinabatangan, Sabah



Batu Puteh village.

Supporting the conservation of natural forests and biodiversity (photo by Batu Puteh Community Tourism Cooperative).

Introduction

The Koperasi Pelancongan Mukim Batu Puteh Berhad (Batu Puteh Community Tourism Cooperative Ltd.) or KOPEL is a community-based organization located in the village of Batu Puteh, on the Lower Kinabatangan River in Eastern Sabah (North East Borneo). KOPEL was incorporated in 2003 as a “cooperative” (under the Malaysian Cooperative Commissions Act of 1968), limited by shares, with registration number S-4-685. KOPEL has over 270 members from four villages—Batu Puteh, Mengaris, Perpaduan, and Singgah Mata Villages—surrounding the central village of Batu Puteh. The cooperative was incorporated after the merger of five separate village associations in 2003. Its main purpose is to generate income within the community to alleviate rural poverty and, in doing so, support the conservation of the remaining natural forests and biodiversity surrounding this unique area.

Status

KOPEL’s core business enterprise revolves around ecotourism. The main ecotourism activities run by the village cooperative include a village homestay program (Misowalai Homestay), village riverboat service, forest guide services, village culture and arts program, and the Tungog Rainforest Eco Camp. Although not a business per se, a secondary but integral activity that KOPEL operates is a medium-scale forest restoration program that is funded through grants and government contracts.

KOPEL has been operating its forest restoration activities since 1999, and opened its community-based tourism activities in 2000 (Box 1). KOPEL also runs a number of long-term wetland restoration and wildlife monitoring programs. The Eco Camp was opened at the end of 2009. Today, KOPEL employs more than 170 villagers in full-time, permanent, part-time, and seasonal employment.

KOPEL’s office is located in Mengaris Village, and is primarily a social enterprise. The cooperative was established “by the community for the community” to ensure that the community remained in control of tourism development in their area, and to ensure that maximum income from tourism would stay in the community and support livelihoods, employment, and community development. What makes KOPEL stand out today is its program of natural resource and wildlife habitat conservation.

Box 1: KOPEL's Forest Restoration Story

The forest restoration story of Batu Puteh Community Tourism Cooperative (KOPEL) began in 1998 when the community of Batu Puteh was involved in fighting forest fires in the surrounding Pin-Supu Forest Reserve. The aftermath of the fires raised a compelling awareness about the damaged and degraded condition of forests. In 1999, the community began its first efforts to plant trees and restore 20 hectares of forest area. The work was undertaken initially with financial support from a number of corporate sponsors and nongovernment organization grants.

Many lessons were learned in these early years about flood plain forests, forest types, phenology, and restoration dynamics. The restoration activities have become a core part of tourism in this part of the Kinabatangan; hence, more than 70% of visitors to KOPEL are student groups and volunteers who participate in the forest restoration activities.

When KOPEL was formed in 2003, the community had already planted trees across 60 hectares of degraded forest. Since then, KOPEL has continued replanting more than 300 hectares of degraded forest, and a further 600 hectares for silviculture treatment. All in all, KOPEL has planted more than 300,000 trees representing 25 tree species. KOPEL's silviculture work involves removing smothering vegetation and weed species to enhance the natural regeneration of trees in affected areas. The best result from working on the forests' natural regeneration process is in the establishment of a closed canopy forest cover.



Conservation activities. KOPEL has replanted more than 300 hectares of degraded forest, and nurtures 600 hectares under silviculture treatment (photos by Batu Puteh Community Tourism Cooperative).



Source: Batu Puteh Community Tourism Cooperative.

Since 1999, the Batu Puteh community has worked to restore more than 900 hectares of critical rainforest habitat along the Kinabatangan Wildlife Corridor, and has planted more than 300,000 trees. The Kinabatangan floodplain contains numerous highly biodiverse ecosystems (including unique freshwater swamp forest and dryland dipterocarp rainforest) that harbor an abundance of wildlife. KOPEL's work has been instrumental in shifting communities' livelihoods toward sustainability and restoring these degraded ecosystems. More than two-thirds of KOPEL's employment is actually in the forest restoration program, even though KOPEL considers tourism as its core business.

Other important biodiversity conservation work funded by KOPEL includes the removal of the invasive waterweed, *Salvinia molesta*, from Tungog Lake; a long-term wildlife monitoring program; a

local water quality monitoring program; and a cave habitat restoration program (Box 2). KOPEL also supports community projects such as village waste collection and disposal, environmental education in local schools, and revolving funds and microloans for villagers for a variety of purposes ranging from micro-enterprises to improving household sanitation. All these activities are funded by tourists, students, and volunteers visiting the area.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

KOPEL's direct conservation interventions include its lake and forest restoration program, wildlife monitoring, water-quality monitoring, and cave restoration projects. Through KOPEL's approach, this community-based enterprise is contributing in direct long-term ways to the surrounding rainforest, wetlands, wildlife, and biodiversity.

Alongside this, there are also huge but indirect benefits toward conservation from awareness-raising efforts with students, visitors, volunteers, and the local community, whereby KOPEL has increased a sense of appreciation, pride, and ownership of the forest and local natural resources.

Today, KOPEL is regarded as a model for other remote and rural communities throughout Sabah. It is currently supporting capacity building for ecologically sustainable tourism development in other sites throughout the state in its Forever Sabah program. The aim of these activities is to enable communities to generate income through the sustainable management of resources, develop skills in diverse areas of ecotourism, and create community-based tourism programs that integrate many aspects of sustainability.



Tungog Rainforest Eco Camp. Removal of the invasive waterweed *Salvinia molesta* is an important biodiversity conservation work in Tungog Lake (photo by Batu Puteh Community Tourism Cooperative).

Box 2: KOPEL's Lake Restoration Story

Lake restoration in Tungog Lake began in 2002 when the invasive weed species *Salvinia molesta* began infesting the pristine waters after very large floods that year. Once established, *Salvinia* destroyed the local aquatic biodiversity and caused localized extinction. *Salvinia* removal in Tungog Lake is critical for the conservation of fish breeding and fresh water fisheries, as well as for preservation of three otter species and a host of rare water birds that thrive on this lake.

Initial attempts of Batu Puteh Community Tourism Cooperative (KOPEL) at removing the *Salvinia* were by hand; however, the use of local boats and nets proved to be the most effective mechanical approach. The mechanical approach using boats has been used since 2006 up to the present. *Salvinia* removal is funded by arrivals at the Tungog Rainforest Eco Camp as well as by other community tourism activities, and is supported by volunteers.



Tungog Lake infested with *Salvinia molesta*. Removal of this water weed is critical for the conservation of fisheries, as well as preservation of otter species and rare water birds (photo by Batu Puteh Community Tourism Cooperative).



Removing *Salvinia molesta*. KOPEL team removes the water weed using *sawak*, a local mechanical technique (photo by Batu Puteh Community Tourism Cooperative).

Source: Batu Puteh Community Tourism Cooperative.

Malaysia

Conservation and Ecotourism in Tabin Wildlife Reserve, Sabah

Introduction

Tabin Wildlife Reserve (TWR) was established in 1984 primarily to conserve and protect the natural forest and wildlife in Lahad Datu, Sabah. The TWR is under the custodianship of the Sabah Forestry Department, which has a mandate to carry out conservation activities encompassing protection of fauna species in the reserve. Over the years, this aim has slightly broadened to include education and ecotourism.

Nowadays, protected areas all over the world are important tourist destinations. Ecotourism is a perfect example of direct monetary value provided by nature. Increasing interest in nature-based tourism has made it one of the largest and fastest growing segments of the tourism industry.

Status

Tabin Wildlife Reserve is located in the bountiful eastern part of Sabah state, and is the largest wildlife reserve. It is the first wildlife reserve established under Sabah's Forestry Enactment (Amendment of 1984) enacted by the state government as a measure to protect the rich biodiversity. The TWR was formerly a commercial forest reserve, and until 1988 had been used for logging. It is known for its magnificent lowland forest ecosystem of approximately 120,521 hectares. TWR contains primarily forest features, and is able to attract a wide range of visitors (Map 4).

Map 4: Location of Tabin Wildlife Reserve



Source: Danau Girang Field Centre.

Tabin Wildlife Reserve is the first wildlife reserve established under Sabah's Forestry Enactment (Amendment of 1984), which was implemented by the state government to preserve and protect flora and fauna; geological, archaeological, historical, and ethnological features; and other scientific value and scenic interest.

While undertaking conservation initiatives is the primary aim in conserving its biodiversity, TWR's ecotourism vision involves making the tourism industry as one of the primary sources of state revenue and a major contributor to the socioeconomic development of the state.

The ecotourism sector has great potential for contributing numerous financial benefits, directly or indirectly. The reserve helps generate growth and development for the state, job opportunities, foreign exchange earnings, and government revenue. Tabin Wildlife Holidays Sdn. Bhd. operates in the western part of the reserve, where about 20 hectares are exclusively for rights to carry out ecotourism activities such as bird watching, nature trails experience, and special interest activities including nature photography.

Best Practices in Conservation and Ecotourism in Tabin Wildlife Reserve

Ecotourism in TWR first grew out of the global environmental movement in the late 1990s. While the development and growth of ecotourism took various paths in different parts of the world, by the early 2000s, ecotourism, along with nature-based, cultural, heritage, and adventure tourism, had become among the fastest growing sectors of the tourism industry worldwide.



Tabin Wildlife Reserve. The reserve helps generate growth and development, job opportunities, foreign exchange earnings, and government revenue (photos by Tabin Wildlife Holidays Sdn Bhd).

More recently, ecotourism has helped to spawn a variety of new terms, such as sustainable tourism, nature-based tourism, and responsible tourism, all of which encompass the concept that ecotourism can and should benefit conservation and host communities. An important trend within the development of sustainable ecotourism is the initiative to mainstream sustainability within travel and ecotourism, by taking the principles and good practices of ecotourism and applying them to a wider range of markets, e.g., hotel chains, urban tourist attractions, golf courses, and beach resorts.

The successful conservation management of TWR and its development of ecotourism are reflected in visitor satisfaction. From the visitors' perspective, better reserve conservation will improve their aesthetic appreciation and enhance their experience and satisfaction.

1. *Smart Partnership between Government and the Private Sector*

Ecotourism is more than an economic activity and an industry; it is inherently interrelated with culture and environment. It is a universal, dynamic, social and cultural phenomenon, touching people, culture, and environments. Ecotourism's interconnection of people and their environment means that its long-term survival depends on sustainable ecotourism developments that foster healthy and vibrant natural and cultural environments.

The public sector covers the whole range of public organizations, from state government ministries and departments, to government business enterprises. In the case of TWR, ecotourism products are based on public assets such as flora and fauna. Just as ecotourism has been identified as important to the Sabah government economically and politically, public sector (government) involvement is very important to the sustainable growth and development of the ecotourism industry in the state. The public sector makes up a core component of the ecotourism industry. A key role of the public sector is to provide basic infrastructure, essential services, destination management, and innovation.

In TWR, the Tabin Wildlife Holidays Sdn Bhd provides the basic ecotourism products, facilities, and essential services, such as accommodation, transport, various attractions, and even experiences. This sector ranges from large vertically and horizontally integrated global corporations such as tour companies, airlines, and hotel chains; to tiny, remote local family businesses, such as craft shops and lodges. The private sector therefore, plays an essential role in the development and management of ecotourism and must be equally involved with national, regional, and local governments in the management and sustainable development of ecotourism.

Worldwide, there is a growing awareness of the benefits of partnerships. Public and private ecotourism partnerships in TWR represent a pooling of knowledge, expertise, capital, and other resources from various stakeholders. They ensure consistency within a framework and act as an effective agent for planning, management, problem solving, and change, and therefore enhances rather than reduces the competitive advantage of the ecotourism product.

2. *Guidelines for Tourism in Tabin Wildlife Reserve*

Best practice management aims to protect the environment by setting clear environmental quality standards, along with guidelines and targets for reducing pollution from ecotourism and to prevent development where it would be inappropriate. To establish common approaches for best practice management, there must be cooperation and collaboration between industry and government. This will ensure that ecotourism and the environment are mutually supportive at all levels. Partnerships should aim to deliver agreed common standards and tools to enable the effective measurement of progress towards achieving sustainable development.

Best practice management includes

- responsible use of natural resources such as land, soil, energy, and water;
- reducing, minimizing, and preventing pollution and wastes including solid, liquid, and atmospheric emissions;
- maintaining or enhancing biodiversity through protection of plants, animals, ecosystems, and sensitive areas;
- maintaining or enhancing cultural diversity through the protection of landscapes and cultural heritage;

- respecting the integrity of local cultures;
- cooperating with local communities and people; and
- providing opportunities for local people to work as tour guides, etc.

As part of the travel and ecotourism industry's responsibility toward building and maintaining TWR as a sustainable ecotourism destination, tour operators especially are required to demonstrate initiative to ensure that the quality of the environment and social integrity of TWR are maintained and improved. There must be evidence that tour operators are integrating their objectives with the wider objectives of sustainability, and are contributing to balanced and diversified development in TWR.

3. *Laws Related to Ecotourism*

Since tourism is a federal affair, overall policy planning in TWR is carried out by the Ministry of Tourism and Culture Malaysia. The Secretary General of the ministry is given the responsibility for licensing and enforcement in all matters related to tourism under the Tourism Industry Act 1992. Section 34 of the Act allows the Minister to make such regulations as he or she may consider expedient for the purpose of the Act. Under this section the following regulations have been made:

- Tourism Industry (Compounding of Offences) Regulations 1992;
- Tourism Industry (Tour Operating Business and Travel Agency Business) Regulations 1991;
- Tourism Industry (Licensing and Control of Tourist Guides) Regulations 1991; and
- Tourism Industry (Licensing of Tourism Training Institution) Regulations 1994.

In East Malaysia, the Sabah Tourism Promotion Corporation is established under the Sabah Tourism Promotion Corporation Enactment 1981. Unfortunately, this legislation has no specific reference to the role of ecotourism or nature-based tourism.

Malaysia

Sustainable Ecotourism within the Sugut Island Marine Conservation Area, Lankayan Island, Sabah

Introduction

Private investment and management in marine protected areas (MPAs) offer a potential best approach for the development of conservation and ecotourism. This has been applied with initial positive results at the Sugut Islands Marine Conservation Area (SIMCA) in Sabah. Conservation fees charged to visitors at the Lankayan Island Dive Resort within the SIMCA have generated a sustainable source of financing to meet the majority of management costs for the conservation area, which is separately managed by a private organization called Reef Guardian. The availability of adequate funds has enabled Reef Guardian to invest in personnel training and surveillance technology to enforce the rules and regulations of the conservation area. In collaboration with government enforcement agencies, Reef Guardian has reduced threats such as illegal fishing and turtle egg poaching. As a result, there is a comparatively high abundance of commercially important fish in SIMCA, and turtle nesting at the Lankayan Island has increased.

Status

The Sabah Wildlife Department is the custodian of the SIMCA, which is located about 80 kilometers (km) northwest of the mainland town of Sandakan in northeastern Sabah. SIMCA covers an area approximately 467 square kilometers in the Sulu Sea, and includes the three islands of Lankayan, Billean, and Tegapil (Map 5). In 2001, SIMCA was classified under the provisions of the Sabah Wildlife Conservation Enactment 1997. SIMCA is protected and managed to preserve natural conditions and

Map 5: Location of Lankayan Island, Sabah



Source: Sabah Wildlife Department. <http://www.wildlife.sabah.gov.my/?q=en/content/protected-areas>.

to provide for recreation opportunities. More than 400 species of fish and 200 species of coral have been recorded, and SIMCA's islands are also frequented nesting grounds for endangered green turtles (*Chelonia mydas*) and hawksbill turtles (*Eretmochelys imbricata*). The islands of SIMCA are remote and far from populated towns. No island communities exist in the vicinity of SIMCA, and the surrounding waters are not known to be traditional fishing grounds.

Best Practices in Conservation and Ecotourism in Lankayan Island

In May 2003, Reef Guardian was officially appointed as the management company responsible for conservation activities within SIMCA, in collaboration with the Sabah Wildlife Department (SWD). SWD is involved only in enforcement operations, such as to train and certify Reef Guardian staff as honorary wildlife wardens, and to occasionally participate in sea patrols to enforce SIMCA boundaries. The SWD does not contribute financially to Reef Guardian, nor does Reef Guardian fund any aspect of SWD activities. Both parties maintain dialogue through meetings and special workshops.

Lankayan Island is the only developed island within SIMCA. The 0.05-square-kilometer island is the site of the Lankayan Island Dive Resort, which is the only structure in the otherwise uninhabited island. Lankayan is known for its diverse marine life and attracts mainly dive tourists. Reef Guardian's MPA enforcement team (four to five enforcement officers, at least two of whom are honorary wildlife wardens) carries out sea patrols to control the intrusion of fishing vessels in SIMCA. The Lankayan marine conservation program includes turtle conservation, marine biological assessments, monitoring of crown-of-thorns starfish (*Acanthaster planci*), and clean-up. Reef Guardian staff also conduct nightly turtle patrols to detect nesting females, and remove newly laid turtle eggs to an on-site hatchery where they are incubated until hatching. Reef Guardian staff started conducting underwater visual censuses of fish, invertebrates, and coral cover at six sites in 2006.

1. Smart Partnership between the Government and the Private Sector

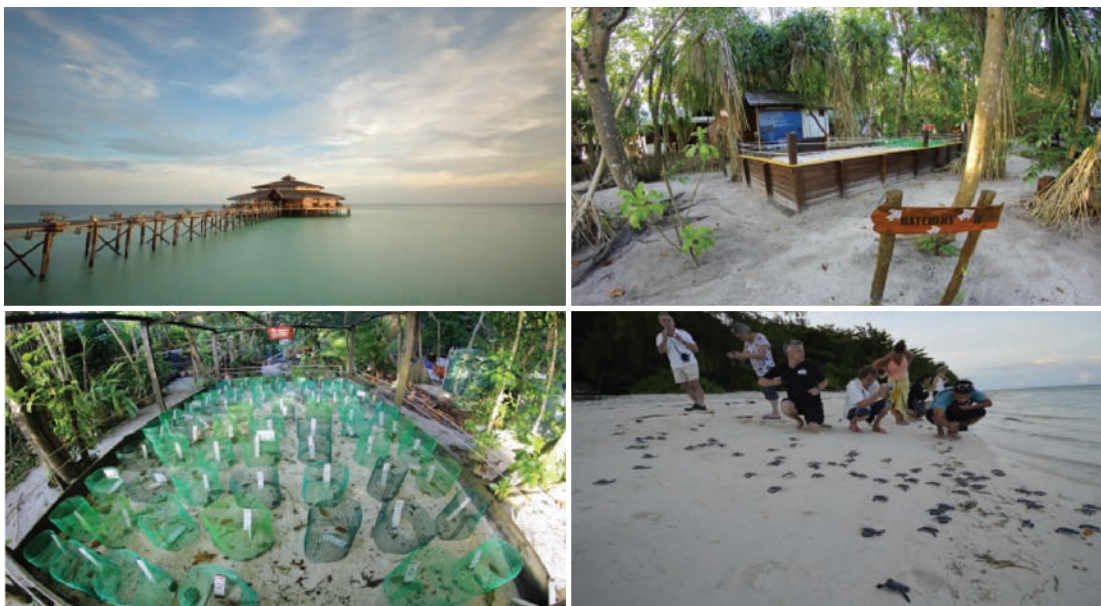
Private investment and management in MPAs offer an alternative approach that can address the problems of sustainable funding and enforcement faced by the government. Reef Guardian's management of SIMCA has contributed to initial positive results in marine conservation and drives against illegal fishing. Tourism can be a valuable financial resource for MPAs, though dive resorts that engage in conservation should consider separating business from conservation to avoid potential conflicts between diving interests.

2. Guidelines for Tourism in Sugut Islands Marine Conservation Area

The SIMCA ocean is beautiful and offers amazing opportunities for snorkeling and diving, which allow visitors to become a part of it. But visitors should be mindful that the harassment of wildlife, such as disrupting their natural behaviors, blocking their movement or entrance to their hiding spot, and chasing or manipulating animals, can have a negative effect on them. Therefore, the following are brief codes of practice required of visitors to follow while enjoying nature:

1. Approach the islands with care, and be well prepared.
 - To prevent unwanted behavior, an environmental briefing is conducted before the dive or snorkeling, to explain the area, the important habitats and wildlife, and the basic good practices expected from everyone.

- Normally designated sites are used for anchoring. When launching from the boat, visitors should be in an area where they can do it safely, so that the anchor does not land on any animal, algae, or rocks. Fins are not good for walking; therefore, visitors need to be very careful to avoid stepping on sensitive species and communities.
2. Keep an eye on tourists and on their diving.
 - Provide life jackets to snorkeling beginners and insecure swimmers. This will prevent them from stepping on sensitive communities or from kicking frantically if they get nervous. The degree of impact from divers depends highly on individual skill level; thus, inexperienced and careless divers must stay close to the guides. Visitors should stay with the group so that they do not get lost or enter the more sensitive areas. Visitors should keep enough distance from sensitive species or ecosystems, to avoid kicking them unintentionally and breaking them. Coralligenous communities, for example, grow very slowly, only millimeters or centimeters a year, depending on the species.
 - Both the crew and visitors must keep a safe distance from the bottom to avoid stirring the sediment and losing visibility. Be aware of the visitor's length, since fins serve as a propeller but can end up kicking other divers, animals, and rocks, or stirring the sand.
 3. Disturb as little as possible the environment being enjoyed.
 - When diving in caves or tunnels, try to shorten the stay so that bubbles will not damage the organisms living in the ceiling. Refrain from taking souvenirs from the ocean; never collect dead or live marine wildlife. Encourage crew and visitors to keep the ocean clean; enjoy the experience without littering or polluting the marine environment. Encourage visitors not to apply sun lotion or other products before getting in the water to avoid chemical pollution. Brief the crew and visitors in the area on the species they might see and on responsible behavior while in the water.



Marine conservation program. Turtle conservation, marine biological assessments, monitoring of crown-of-thorns starfish, and clean-up are carried out in Lankayan Island (photos by the Sabah Wildlife Department, Sandakan).

3. *Laws Related to Ecotourism*

SIMCA was established under the Wildlife Conservation Enactment 1997, which means that whatever natural resources that exist are assets protected by the law. Since tourism is a federal affair, overall policy planning is carried out by the Ministry of Tourism and Culture Malaysia. The Secretary General of the Ministry of Tourism and Culture is responsible for licensing and enforcement of all tourism-related matters under the Tourism Industry Act 1992. Section 34 of the Act allows the minister to make such regulations as he or she may consider expedient for the purpose of the act. Under this section the following regulations have been made:

- Tourism Industry (Compounding of Offences) Regulations 1992
- Tourism Industry (Tour Operating Business and Travel Agency Business) Regulations 1991
- Tourism Industry (Licensing and Control of Tourist Guides) Regulations 1991
- Tourism Industry (Licensing of Tourism Training Institution) Regulations 1994

In East Malaysia, the Sabah Tourism Promotion Corporation is established under the Sabah Tourism Promotion Corporation Enactment 1981. Unfortunately, this legislation has no specific reference to the role of ecotourism or nature-based tourism.

Sources: Sarawak Forestry Corporation.

Deer Cave, Lang Cave, and Wind Cave. Besides the beauty of the caves, Gunung Mulu National Park also has plenty of flora and fauna. The park has an enormous cave system that includes the world's largest chamber, the Sarawak Chamber, which is the world's largest cave passage; and Clearwater Cave, which is 215 km long. Other popular tourist activities are hiking to the pinnacles; bat watching, canopy walk, jungle trekking, adventure caving, and bird watching.

An average of 23,000 tourists, mostly foreigners, visit the Gunung Mulu National Park annually. The park is accessible by air, land, and boat, passing through scenic rivers and rugged roads, which is a great experience for tourists.

The park has chalets, hostels, a cafeteria, a discovery center, and a gift shop. The park management provides support services (in-house guide service, boat operators, and porters) to ensure that tourists have a memorable stay and are safe while in the park. Local community members are engaged to provide these services.

Best Practices in Ecotourism in Gunung Mulu National Park

1. Protection of the National Park

Among the legal instruments related to park management are the Sarawak National Park Ordinance 1998; National Park and Nature Reserves Regulations 1999; Wildlife Protection Ordinance 1998; Wildlife Protection Rules 1998; and Sarawak Forestry Corporation Ordinance 1995.

These legal guidelines assist in the operation and management of the National Park to ensure standards are met in operational management.



Gunung Mulu National Park. Sarawak Forestry staff patrolling and cleaning the boundary of the park (photos by Borsamulu Park Management).

2. Tourist Guiding

Researchers are requested to participate in sharing their expertise with the guides. Guides undergo technical rope work and refresher first aid training to cater to all the adventure activities, ranging from caving to trekking (including responding to water-based crises that could arise from boating

accidents), negotiating water in caves, and simple alertness when tourists are swimming at Clearwater or the Garden of Eden.

In 2018, the Gunung Mulu National Park special rescue squad, consisting mainly of guides, were invited by the Royal Malaysia Air Force to conduct rescues and evacuations with them on the Pinnacles and Summit.

The senior management also organizes weekly meetings among staff to discuss guiding issues and risk assessments. A special feedback form called MYGUIDE Assessment is prepared for guides or guiding services. The guides are given technical training to fix minor equipment in remote stations and camps.



Do's and don'ts. In-house park guides conducting safety briefing for tourists (photos by Borsamulu Park Management).

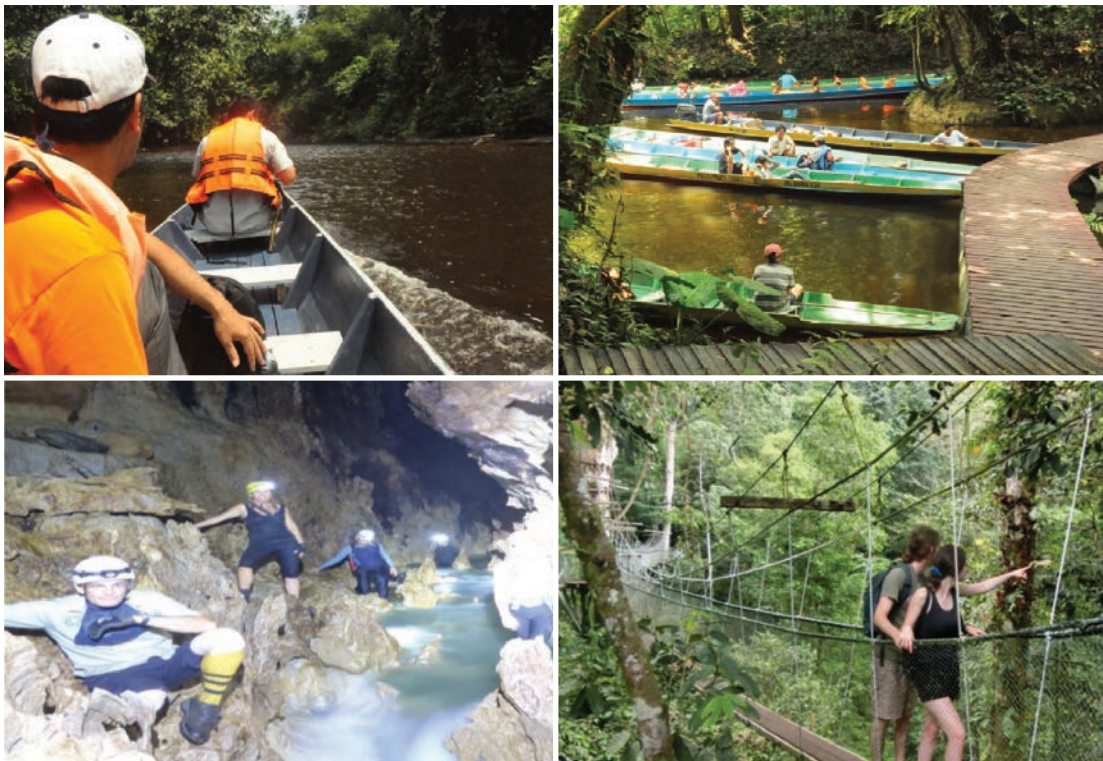
3. Assurance of Tourist Safety

Transportation to Clearwater Cave and Wind Cave is by boat that is operated by the local community. To ensure safety, boatmen or boat service providers must meet and abide by the following requirements:

- must have valid license (renewed by Sarawak River Board);
- life jacket is a must;
- regular checks by Sarawak River Board; and
- boat movement is based on monthly duty roster.

Do's and don'ts and safety briefing are given to all tourists once they are in Gunung Mulu National Park, including the following reminders:

- Tourists will get wet and dirty.
- Sturdy nonslip shoes and gloves are optional but handy.
- Cover up or protect skin.
- Wear a helmet or harness and use carabineer attachments.



Tourist activities. Boat ride on the Melinau River to Clearwater Cave for adventure caving. Canopy walking is likewise a tourist activity in Mulu National Park (photos by Borsamulu Park Management).

To conserve and protect the cave formations, these guidelines must be adhered to by tourists and emphasized by the guides:

- No smoking, eating, and drinking carbonated drink.
- No touching of any formation or cave animals (acidic sentiments).
- No tripods.
- No direct lights on bats.
- Stick to assigned group.
- Stay on pathways.



Community trading. Goods for sale displayed at Batu Bungan (photos by Borsamulu Park Management).

4. *Management and Disposal of Waste*

Plastics, carton, and tin are separated accordingly, the last two items being recycled. Composting is carried out on a smaller scale. There are only two recycling companies in Miri where recyclables need to be delivered to the premises.

All waste from Mulu National Park are compacted and transported by boat to the Marudi landfill. Having a dumpsite in Mulu itself could be problematic. Very little geohydrological work has been done in Mulu and the laterite soil and deposits are not deep enough. Hence, the best option is to transport rubbish to the Marudi landfill.

5. *Tourist Accommodations Blend with the Natural Environment*

The roof style in Mulu National Park is very steep, akin to the angles of roofs in countries with heavy snowfall. Gutters have been omitted to keep leaves from accumulating, except over entrance ways to protect entering and exiting inhabitants.

The floors are raised similar to a longhouse to guard against flooding (which happens regularly) and to keep the forest out of the living space, just like it has been done for years all over Sarawak. There is no new invention, just copying of existing good practices. Mesh screens allow cooler evening air indoors, without letting insects in. Fittings are rather standard and furniture are mostly ex-Marriott furniture that are made from top-quality timber and durable in quality. The toiletries are an acceptable biodegradable product.

For the plank walkways, various materials were experimented on to find a suitable, nonslip, and durable option. Mulu tested various plastic wood composites, and after 14 months of trial and error, found an acceptable nonslip material that requires cleaning once a year only. This was aluminum checkered plating, the cheapest and most replaceable and reusable. It is cut into strips, and screwed to belian decking (which does not need to be replaced often). If a tree falls on the plank walkways, the damaged portion is just unscrewed and the previous one nailed to the next plank. Belian plank walkways that are still good are painted with bitumen and paint granules to make them nonslip.



Tourist accommodations. The plank walkways are made of plastic wood composites that Mulu National Park itself developed (photos by Borsamulu Park Management).

Bat watching. Tourists watching bats exodus at the sighting platform (photo by Borsamulu Park Management).



6. *Encouraging Visitors to Appreciate and Conserve*

Tourists appreciate the great biodiversity of Mulu National Park while visiting the showcaves, jungle trekking, hiking the pinnacles, bat watching, canopy walking, and bird watching. Activities like wildlife watching and night walk activities are also popular. For hardcore tourists, hiking to the pinnacles, adventure caving, and trekking the headhunter trails are their desired activities.



Favorite tourist activities. Jungle trekking and hiking the pinnacles are popular among tourists in Mulu National Park (photos by Sarawak Forestry Corporation; Borsamulu Park Management; and the Ministry of Tourism, Arts, Youth and Sports, Sarawak).

Malaysia

Ecotourism in Bako National Park, Sarawak

Introduction

Bako National Park is located about 37 kilometers (km) from Kuching city. To get there, a boat service is available at Kampung Bako Jetty, which takes approximately 20–30 minutes. Bako National Park is 2,727 hectares and was gazetted in 1957.

The forest biodiversity of Bako National Park consists of *kerangas* (scrubland, cliff vegetation, and pole forest); mangroves; beach forest; mixed dipterocarp; and peat swamp. Tourist attractions include the proboscis monkey, bearded pig, long tail monkey, flying lemur, pit viper, bird, frogs, and silver leaf monkeys. Besides the fauna, Bako National Park has various species of flora such as the primitive fern (*Paku laut*), pitcher plant, and *Rhu bukit*. Bako has a beautiful and unique rock landscape such as the sea stack and *Batu sapi*. It has 17 interesting jungle trails that makes trekking a popular activity (Map 7). There are many beautiful beaches such as Telok Pandan Kecil and Pandan Besar. Another interesting area is Pulau Lakei as a getaway island with its sandy beach, heritage, and aesthetic attraction.

Map 7: Trails of Bako National Park



Source: Ministry of Tourism, Arts, Culture, Youth and Sports, Sarawak.

Bako National Park has an average tourist arrival of 50,000 annually. The park has chalets, hostels, a cafeteria, and an interpretation center to cater to tourists' needs. The park management provides support services such as local park guide service, boat operators, and food and beverages. The local community is involved in boat services, cafeteria operations, laundry, and guiding services. Sarawak Forestry also employs some locals.

Best Practices in Ecotourism in Bako National Park

1. Protection of the National Park

Among the legal instruments related to park management are the Sarawak National Park Ordinance 1998, National Park and Nature Reserves Regulations 1999, Wildlife Protection Ordinance 1998, Wildlife Protection Rules 1998, and Sarawak Forestry Corporation Ordinance 1995.

These legal guidelines help ensure that standards are met in operational management.

2. Tourist Guiding

Park guides in Bako National Park are mostly from local communities in Kampung Bako who are certified and licensed park guides. Most operate as freelance park guides and offer guiding services before tourists enter the park, as it is mandatory under the ordinance that tourists engage a certified and licensed park guide. However, some park guides are also engaged by travel agencies to guide tourists.



Bako National Park guides. Certified and licensed guides giving safety briefings before the park tour (photos by Ministry of Tourism, Arts, Culture, Youth and Sports, Sarawak).

3. Encouraging Visitors to Appreciate and Conserve

Tourists appreciate the great biodiversity of Bako National Park by going jungle trekking to experience the different types of forests. Activities like wildlife watching and night walks are also popular. The beaches are popular for camping, swimming, and sunbathing. Wildlife can be easily spotted in the park center such as bearded pigs, pit viper, macaques, proboscis, silver leaf, and flying lemur. Deakin University Australia and various companies carry out tree planting activities annually in Bako National Park as part of their corporate social responsibility.



Tree planting and wildlife watching. Various companies carry out tree planting activities annually in Bako National Park as part of their corporate social responsibility (photos by Ministry of Tourism, Arts, Culture, Youth and Sports, Sarawak).

4. Assurance of Tourist Safety

Safety briefings are carried out to ensure tourists' safety. Records of those going trekking must be taken and tourists are advised to return before dark. Emergency response teams are ready for any rescue mission.

The boat services to Bako National Park are operated by the local community under the Koperasi Warisan Pelancongan, and most of the operators work as full-time boat operators. Below are the criteria to which they must adhere:

- must have valid license (renewed by Sarawak River Board);
- life jacket is a must;
- regular checks by Sarawak River Board; and
- boat movement is based on monthly duty roster.



Tourists cruising Sungai Bako to Bako National Park. Boat services are operated by the local community under the Koperasi Warisan Pelancongan (photos by Ministry of Tourism, Arts, Culture, Youth and Sports, Sarawak).

5. Tourist Accommodations Blend with the Natural Environment

The chalets in Bako National Park blend with the layout and biodiversity of the park. Most of the infrastructure are made of wood and a mixture of concrete. All this is done to minimize maintenance cost and to fit the surroundings in Bako National Park. The design is influenced by local architectural design. The trail's plank walkways are made mostly of wood, but most are nature trails that are good for the environment with less disturbance to the forest.

The walkways in the park use nonslip concrete slabs for easy maintenance, which bring less destruction to the environment. Walkways to some of the accommodation facilities are made of wood.

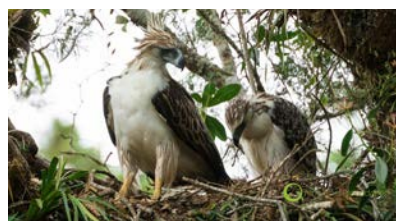


Local architectural design. The chalets in Bako National Park blend with the layout and biodiversity of the park (photos by Sarawak Forestry Corporation and the Ministry of Tourism, Arts, Culture, Youth and Sports, Sarawak).

Philippines

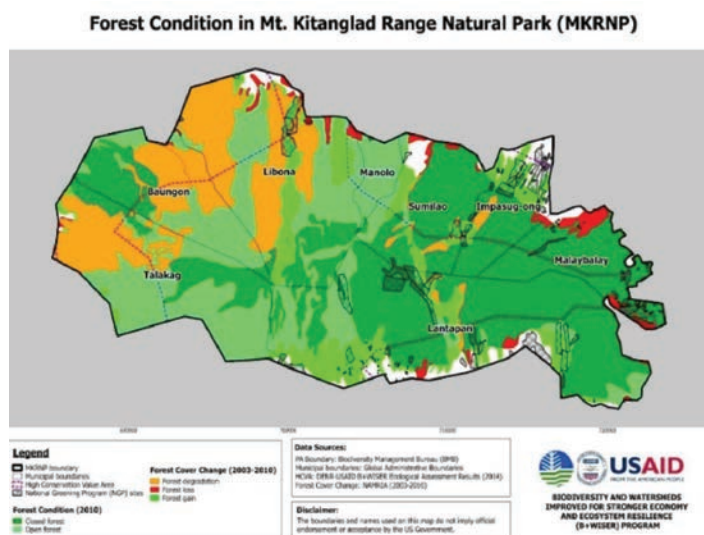
Sustainable Ecotourism in Mt. Kitanglad Range Natural Park, Bukidnon

The Mt. Kitanglad Range Natural Park (MKNRP) is the highest landmark in the province of Bukidnon and one of the prime nesting sites of the Philippine eagle. It has dozens of peaks, with Mt. Dulang-dulang as the highest at 2,938 meters above sea level. The 47,270-hectare park is spread over seven municipalities and one city. It is the socioeconomic driver of North and Central Mindanao (Map 8).



Prime nesting site. The presence of the Philippine eagle indicates a well-balanced forest ecosystem in Mt. Kitanglad (photo by Department of Environment and Natural Resources).

Map 8: Forest Condition in Mt. Kitanglad Range Natural Park



Source: Department of Environment and Natural Resources and USAID. Biodiversity and Watersheds Improved for Stronger Economy and Ecosystem Resilience (B+WISER) Program. <https://forestry.dennr.gov.ph/b+wiser/index.php>.



Mt. Kitanglad. The mountain range has dozens of peaks (photo by Department of Environment and Natural Resources).

Best Practices in Ecotourism in Mt. Kitanglad Range Natural Park

1. Governance

The Protected Area Management Board (PAMB) has run the park since 1993. It has passed 631 resolutions as of 2017. One notable resolution is the implementation of the users' fee for its water and land resources. In July 2017, the park scored 91% during the management effectiveness assessment using the management effectiveness tracking tool.

2. Engagement with the Local Community

In 1997, more than 200 individuals organized themselves as Kitanglad guard volunteers (KGVs), who were then deputized by the Department of Environment and Natural Resources (DENR) as SDENRO. Presently, 380 KGVs serve as a social fence and are instrumental in curbing park violations. Cases filed have been significantly reduced, and PAMB won 11 out of 84 cases filed since 1995.

Twenty-four barangays within MKRNP receive 5,000 Philippine pesos (₱) as monthly honorarium while the other four *barangays* within Malaybalay City receive ₱10,000 each. Each KGV member is covered with an accident insurance.



Kitanglad guard volunteers perform annual ritual ceremony. Indigenous people elders act as advisers in passing culture-sensitive policies and addressing boundary conflicts and resource use using customary practices (photos by Department of Environment and Natural Resources-Region 10 Protected Area Office).

The Mt. Kitanglad council of elders is composed of indigenous people elders who act as PAMB advisers in passing culture-sensitive policies, addressing boundary conflicts and resource use using customary practices. The council of elders also acts as PAMB's advocacy arm for the tribal communities.

3. Sociocultural and Ethno-Tourism

The celebration of "Aldaw ta Kitanglad" every November is in recognition of the contribution of the indigenous people in protected area management.

The following activities are spread over the 3-day festivity:

- annual Volunteers' Congress
- indigenous sports
- dance-drama competition
- tribal concert
- medical mission
- presentation of the local chief executives of their plans and accomplishments for MKRNP



Showcasing of indigenous talents.

Celebration of "Aldaw ta Kitanglad" every November is in recognition of the indigenous people's contribution in protected area management (photo by Department of Environment and Natural Resources).

4. Sustained Financing Mechanism

In 2001, Mt. Kitanglad mayors lobbied the provincial governor for financial support. A year after, local government units (LGUs) surrounding the park started to set aside portions of their internal revenue allotment for development activities. Through time, the fund commitment from the provincial LGUs has resulted in an increase in fund commitment to ₱4 million in 2018.



Through years of partnership and collaboration (from 2005 to 2013), the park has generated ₱1.81 million from other government agencies, ₱47.83 million from the private sector, and ₱10.35 million from nongovernment organizations.

A social fence. Kitanglad guard volunteers do not only curb violations but also nurture the natural environs (photo by Department of Environment and Natural Resources).

5. Sustainable Income

The MKRNP was declared as the 28th ASEAN Heritage Park on 29 October 2009. In pursuit of ecological tourism, the park's entrance fee was increased upon approval of a PAMB resolution. A resource use fee representing the amount to be paid by water users was implemented based on PAMB Resolution No. 555, Series of 2015 (A Resolution Adopting the Eligibility Criteria for the Issuance of Resource Use Permit within Mt. Kitanglad Range Natural Park). Land use fees for transmitters installed at the Mt. Kitanglad Peak were also charged.



ASEAN Heritage Park. (Top photos) Park markers and communication transmitters; (bottom photo) Mt. Kitanglad Range Natural Park as viewed from Malaybalay City (photos by Department of Environment and Natural Resources).

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

1. Social

Three members of the Council of Elders have served as resource speakers in international conferences: Datu Malunay Teofilo Sabaon in Indonesia, Bae Inatlawan Adelina Tarino in Thailand, and Datu Makapukaw Adolino Saway in Switzerland. For 2019, Datu Malunay Teofilo Sabaon was invited to share his experience in LAWIN Forest and Biodiversity Monitoring in Fiji Island.





People empowerment. Three members of the Council of Elders have served as resource speakers in international conferences (photos by Department of Environment and Natural Resources).

2. Ecological

The latest aerial survey reveals that the MKRNP has achieved a net forest gain of 3,768 hectares. This is manifested by the increased number of Philippine eagle nesting sites in the area.



3. Economic

Bae Inatlawan Adelina Tarino of Inhandig Tribal Multi-Purpose Cooperative received an international award during the Global Specialty Coffee Expo on 20–23 April 2017 in Seattle, Washington, which was hosted by the Specialty Coffee Association of America. The Philippine coffee farmers are now preparing to compete in the world market.

The Maputi family, a leading people's organization in Barangay Imbayao, earned the 2006 National Gawad Saka Awardee under the Family Approach Category.

The Dahilayan KGV was a beneficiary of draft animals for livelihood, and revealed that the number of live cows has grown to 34 heads from the original seven heads.

The Philippine Tropical Forest Conservation Foundation, Incorporated awarded the Federation of KGVs with a 2-year project worth ₱23.9 million.



Well-recognized. (Top photo) Bae Inatlawan receives an international award during the Global Specialty Coffee Expo; (bottom photo) recognition received by the Maputi family (photos by Department of Environment and Natural Resources).

Philippines

Sustainable Ecotourism in Mt. Hamiguitan Range Wildlife Sanctuary, Davao Oriental

The Mt. Hamiguitan Range Wildlife Sanctuary (MHRWS) comprises a north-to-south mountainous upland in the southeastern part of the Eastern Mindanao Biodiversity Corridor. Conservation International has designated it a priority site for conservation because of its high level of biodiversity. It belongs to the Philippine Biogeographic Zone 14 (Greater Mindanao), which has the highest land-based biological diversity in terms of flora and fauna per unit area.

The MHRWS is the only protected forest to have the largest and most unique area of “pygmy” trees, which are century-old trees thriving in a highly basic ultramafic soil.

Its highly unique and important biological and physical attributes are safeguarded by Republic Act 9303 of 2004. In its bid to be a UNESCO World Heritage Site, the adjacent Philippine Eagle Sanctuary with 20,581 hectares was considered an expansion site. Currently, Congress is working to amend Republic Act 9303.



Mt. Hamiguitan Range Wildlife Sanctuary. The only protected forest to have the largest and most unique area of “pygmy” trees. (Left to right) Almagica fruit, pygmy tree, and ground orchid (photos by Department of Environment and Natural Resources Region 11 and Lucky Mabayag).

Best Practices in Ecotourism in Mt. Hamiguitan Range Wildlife Sanctuary

The MHRWS collaborated with local government units in establishing the Natural Science Museum Research Center and Ecotourism Interpretation Trail. This facility showcases the physical features of globally important and threatened wildlife species and the vital role of the MHRWS as a watershed area.



Pandanus sp.

Allowing tourists to trek in the MHRWS is one way of giving them the opportunity to experience nature at its best. Specifically, trekkers get to see the spectacular 1,234.56-hectare pygmy forest.

International LTER is a network of scientists engaged in long-term, site-based research to improve understanding of global ecosystems and offer solutions to present and coming environmental problems. A 2-hectare permanent plot was established in the MHRWS as a monitoring tool for forest condition and species status.

Partnership with the academe and foundations enables the community and tourists to better understand the importance of conserving the MHRWS to ensure the sustainability of all available resources in the area and to solicit public support for its conservation. This is further reinforced with the establishment of a biodiversity research and conservation center.

The 1992 Earth Summit in Rio de Janeiro underlined the complementation of business and biodiversity. In the municipality of Governor Generoso, this brought forth the people's organization called Almaciga Resin Enterprise. Joint efforts between the public and private sector provided a biodiversity-friendly livelihood project to local folks who were previously engaged in environmental poaching activities.



Almaciga Resin Enterprise. Members are licensed as tappers, ending their previous poaching activities (photos by Lucky Mabayag and Local Government of Governor Generoso, Davao Oriental).

At present, about 200 members of the people's organization were licensed as tappers. Being a Bantay Gubat at the same time, they protect the source of their livelihood to ensure subsistence. Local individuals involved in Almaciga resin production earn about ₱2,000 a week.

1. *Related Policies*

- Republic Act No. 7586: An Act Providing for the Establishment and Management of National Integrated Protected Areas System, Defining Its Scope and Coverage, and for Other Purposes
- DAo No. 2008-26: Revised Implementing Rules and Regulations of Republic Act No. 7586 or The NIPAS Act of 1992
- DAo No. 2013-19: Guidelines on Ecotourism Planning and Management in Protected Areas
- MHRWS Resolution No. 2017-12 dated 2 June 2017, A Resolution Approving the Guidelines for Trekking, Mountaineering and other Activities in Mount Hamiguitan Range Wildlife Sanctuary
- Republic Act 10629 – Integrated Protected Area Fund Act
- DAo No. 2018-05: Revised Guidelines on Special Use Agreement in Protected Areas

2. Guidelines

- The Ecotourism Management Plan must be formulated before conducting any ecotourism activity, and its implementation shall be closely monitored.
- The Protected Area Management Board shall formulate implementing site rules and regulations based on the Ecotourism Management Plan.
- The PASU shall spearhead the implementation of the Ecotourism Management Plan.
- Capacity building shall be conducted to improve the management and implementation capacities of the concerned agencies and stakeholders.
- Ecotourism operation within the protected area should promote conservation and management of biodiversity.
- Ecotourism operation should be in close partnership with the local government units and should provide business opportunities to the community.
- Ecotourism operation should promote learning experiences and conservation awareness.

3. Trekkers' Guidelines

- All trekkers must attend the orientation and should obtain a climb permit.
- All trekkers should pay trekking fees and shall not be allowed to climb without a porter and a tour guide.
- Only 30 trekkers are allowed in every trek with a duration of 3 days.
- No walk-in trekkers are allowed. Booking must be done at least 10 days before the scheduled climb.

4. Researchers' Guidelines

- All researchers are required to hire a local scientist or technical guide when conducting research within the Mt. Hamiguitan Range Wildlife Sanctuary Park.
- No cause-oriented activities shall be conducted during the peak season from April to May and October.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

1. Environment

Sustainable conservation and protection of biodiversity and natural resources including Almaciga trees.

2. Social

Creation of people's organization increased the cohesiveness of the community and strengthened institutional capacity through a series of activities.

3. *Economic*

Significant increase of income among tappers, which has resulted in an improvement in the quality of life.

4. *Political*

Strong partnership and collaboration among local government units and other stakeholders.



Endemic flora. (Left to right) *Nepenthes hamiguitanensis*, Almaciga tree inventory, Almaciga fruit, and Pygmy tree (photos by Department of Environment and Natural Resources Region 11).



The Mt. Hamiguitan Range Wildlife Sanctuary and pygmy field. Conservation International has designated the Mt. Hamiguitan Range Wildlife Sanctuary as a priority site for conservation because of its high level of biodiversity (photo by Eden Jhan Licayan).

Philippines

Sustainable Ecotourism in a Heritage Protected Area: Turtle Islands Wildlife Sanctuary, Tawi-Tawi

The Turtle Islands Wildlife Sanctuary (TIWS) is part of the Sulu Archipelago. It is one of the municipalities of Tawi-Tawi within the territory of the Autonomous Region of Muslim Mindanao (ARMM). It is bounded by the Sulu and Mindanao seas in the western and northern portions, and on the eastern and southern tip by the Celebes Sea.



The TIWS was established as a protected area through Presidential Proclamation 171 in 1999 pursuant to the NIPAS Act of 1992.



The TIWS has a total aggregate area of 242,967 hectares, which include its surrounding waters. Except for Baguan Island, people inhabit Taganak, Boan, Great Bakkungan, Langaan, and Lihiman. Great Bakkungan hosts the largest population, followed by Taganak Island, the seat of the government.

Turtle Islands Heritage Protected Area. (Top photo) The green sea turtle; (bottom photo) Baguan Island nesting site. Turtle Islands Heritage Protected Area is the first and only transboundary protected area for marine turtles in the world (photos by Department of Environment and Natural Resources Region 9).

In partnership with Malaysia, the Turtle Islands Heritage Protected Area (TIHPA) was established in 1996 as the first and only transboundary protected area for marine turtles in the world. It is the 11th major marine turtle rookery in the world: an important nesting site for the green turtle and, to a lesser extent, the hawksbill turtle.

The TIHPA was a recipient of the J. Paul Getty Wildlife Conservation Prize award in 1997. In 2001, the Philippines signed the Memorandum of Understanding on the Conservation and Management of Marine Turtles and Their Habitats of the Indian Ocean and South-East Asia. Considering the connectivity of the Philippines' marine turtle population to Indonesia and Malaysia, a tri-national Marine Turtle Protected Area Network design was approved in 2009 by the Sulu-Sulawesi Marine Ecoregion committee.

Best Practices in Ecotourism in Turtle Islands Wildlife Sanctuary

1. Governance

The Protected Area Management Board (PAMB) is a 15-member multisector policy-making body composed of representatives from various national and local institutions and nongovernment organizations.



Turtle eggs. Marine turtles have the potential to reproduce abundantly but only few will survive due to predation (photos by Department of Environment and Natural Resources Region 9).

The Protected Area Superintendent (PASu) acts as the secretariat and implementing arm of the PAMB. Since the proclamation of Turtle Islands Wildlife Sanctuary as protected in 1999, PAMB has run the sanctuary. It has passed numerous resolutions pertaining to enforcement and ecotourism development. For ecotourism, PAMB adopted the TIWS Development Ecotourism Framework Plan in 2009.

2 Creation of Task Force Pawikan

The Department of Environment and Natural Resources (DENR) Region 9 facilitated the creation of “Task Force Pawikan” composed of enforcement agencies from the Philippine National Police-Maritime, Philippine National Police-Turtle Island, Philippine Navy, and Philippine Marines. A memorandum of agreement identifying the roles of each agency was forged by and among the parties and drafted the enforcement protocol.

3 Engagement with Local Communities

Nine park wardens tasked to safeguard marine turtle nesting and hatchery sites in four islands were hired from local communities. They are also tasked to monitor illegal activities.

Communities in the five islands were organized in 2017 by DENR Region 9, in close coordination with the local government of Tawi-Tawi and the Department of Tourism office in the Autonomous Region of Muslim Mindanao (DOT-ARMM). Initial capacity building relating to ecotourism operations was facilitated by DOT-ARMM in May 2018 and will become a regular activity of the DOT-ARMM.

4 Partnering with the Government and Nongovernment Organizations

The DENR has initiated meetings with the Office of the House of Representatives for the lone district of Tawi-Tawi and the ARMM. DOT-ARMM Regional Secretary Ayesha Vanessa Hajar Mangudadatu Dilangalen and Congresswoman Ruby M. Sahali both committed to extend all possible assistance within their authority. Partner NGOs like CI and CTI also continued expressing their interest to help TIWS.



Langaan Island. A heart-shaped sandbar amid crystal waters in Turtle Islands Wildlife Sanctuary (photo by Department of Environment and Natural Resources Region 9).



Law enforcement. (Top photo) Apprehension of five commercial fishing vessels. (Bottom photo) Provision of motorized boat with outboard engine for patrolling and monitoring anthropogenic activities (photos by Department of Environment and Natural Resources Region 9).



5. Enhancement of Women's Group in Taganak

The Women's Group in Taganak is known for its souvenir items from plastic waste and other local indigenous materials. Together with out-of-school youth, they attributed their increased annual income to the "Adlaw Sin Payukan" festival.

Under the Biodiversity Friendly Enterprise, the DENR provided additional livelihood activities such as t-shirt printing and production of key chains, button pins, and mugs as souvenir items.

Plastic shredders will soon be granted to other people's organizations in TIWS as additional equipment to enhance plastic waste recovery and recycling.



Livelihood activities. The Women's Group in Taganak is known for its souvenir items made from plastic waste and other local indigenous materials (photos by Department of Environment and Natural Resources Region 9).

6. Financing Mechanism

The TIWS was nominated as a UNESCO World Heritage Site in 2015 and since then, efforts have continued to pursue this declaration. There is regular provision of government funds and linkages with other government institutions for capacity building on community-based ecotourism and livelihood support for enhanced fishery.

7. Sustainable Income

Among the community-based tourism activities in TIWS are the following:

- production of souvenir items;
- approval of an ecotourism development framework plan, which establishes destinations and ecotourism products and activities;
- regular conduct of "Adlaw Sin Payukan"; and
- product development and packaging.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

1. Social

An empowered community has resulted from these continuous capacity building activities and financial and material assistance. In this way, the communities have become partners of the PAMB in conservation and protection of resources in TIWS.



Marine Turtle Hatchery. A conservation and protection initiative within the multiple use zone in TIWS (photos by Department of Environment and Natural Resources Region 9).

2. *Equipment Support*

Provision of machinery, equipment, and materials to people's organizations from partner agencies boosts economic activities and decreases illegal activities.

3. *Ecological*

The local government of Tawi-Tawi has ceased issuing permits to collect turtle eggs. It has likewise committed to support all conservation and protection endeavors of PAMB.



Boan Island in Turtle Islands Wildlife Sanctuary. The local government of Tawi-Tawi has ceased issuing permits to collect turtle eggs (photo by Department of Environment and Natural Resources Region 9).

Part 2

Sustainable Agriculture

Brunei Darussalam Hua Ho Agricultural Farm



From conventional to modern farming. Hua Ho Farm owner and manager Lau How Teck (standing at the back) describing his farm to a delegation from the People's Republic of China (photo by Department of Agriculture and Agrifood, Ministry of Primary Resources and Tourism).

Introduction

The Hua Ho Agricultural Farm was established in 1947. The Department of Agriculture and Agrifood awarded the farm with a 12-hectare agricultural land in 1999 located at Sibongkok, Kampung Masin area in Muara District. In September 2000, the farm started expanding into other agricultural development areas in the Muara District such as Batumpu, Sungai Tajau, and Junjungan; and in the Rampayoh area in Belait District. Today, several Hua Ho Agricultural Farms supply vegetables, fruits, chickens, and eggs.

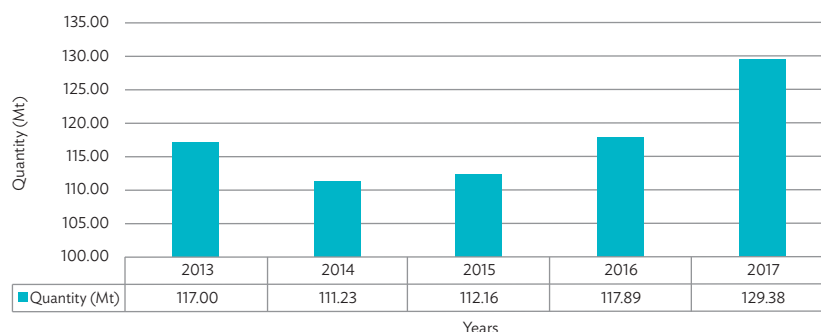
Best Practices

The Hua Ho Agricultural Farm was established in 1947 by Pehin Kapitan China Kornia Diraja Dato Paduka Lau Ah Kok. It is currently managed by his son, Lau How Teck, who has gradually transitioned the farm from the conventional system of farming to modern farming by introducing technological advances. Lau How Teck introduced the closed-house system in poultry production, hydroponics

and greenhouse system in vegetable production, and fertigation and protected cultivation for nonseasonal fruits production.

Using new technologies, Lau How Teck has been able to increase farm productivity, production, and sales since 2000. Figure 3 shows that in 2013, the farm produced 117 metric tons of fruits and vegetables. In 2014, there was a slight decline in production to only 111.23 metric tons valued at 0.30 million Brunei dollars (B\$), but production rose again in 2015 to 112.16 metric tons (B\$0.28 million). In 2016 and 2017, the production of the farm rose to B\$0.30 million for vegetables, and 129.38 metric tons (B\$0.42 million) for fruits.

Figure 3: Production of Hua Ho Agricultural Farm, 2013–2017



Mt = metric ton.

Source: Department of Agriculture and Agrifood, Ministry of Primary Resources and Tourism.

Through his achievement and involvement in the agriculture sector, Lau How Teck was awarded with the Peladang, Petani dan Penternak Berjaya in conjunction with Hari Peladang, Petani dan Penternak dan Nelayan in November 2011.

On 15 April 2014, Hua Ho Agricultural Farm and Ladang Tunas Harapan Sendirian Berhad farm, also under Lau How Teck's management, were accredited with the Brunei Darussalam GAP (Good Agricultural Practice) seal by the Department of Agriculture and Agrifood.



“Pesticide Free.” Vegetables produced by Hua Ho Agricultural Farm, with the Brunei Darussalam Good Agricultural Practice seal (photos by Department of Agriculture and Agrifood, Ministry of Primary Resources and Tourism).

Lau How Teck is committed to meet food safety and product quality standards, and has also introduced “pesticide-free” vegetables.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

Because of increased product safety and quality awareness, modern technologies in crop production adopted by Hua Ho Agricultural Farm, such as the use of polytunnel protected houses and semi-protected houses, have increased the farm’s quality and quantity of production.

The benefit of using a protected house is that it can minimize pest and disease infestation to crops. The farm also uses biopesticides to substitute for chemical pesticide, thus avoiding chemical leaching to drains and the nearby river, which reduces pollution.

The farm also used its own natural compost from chicken manure from its poultry farms to improve the nutrients in the soil. Therefore, this farm is able to reduce its farm inputs in terms of fertilizers, and has also minimized overuse of fertilizers. Besides benefiting the environment, this practice also benefited the well-being of the communities, as they produced high-quality and safe products.

However, not all of the company’s farming experience has been easy. It has faced natural disasters such as flooding during the rainy season, which causes substantial damage to crops, since the farm is in a low-lying area. To mitigate floods, the farm could build retention ponds and a proper drainage system. With this, production could continue to flourish in the years to come.



No pest and disease infestation. Protected house and semi-protected house at the Hua Ho Agricultural Farm (photos by Department of Agriculture and Agrifood, Ministry of Primary Resources and Tourism).

Indonesia

Danau Sentarum Periau Association: Sustainable Forest Honey Bee Farming in Danau Sentarum National Park



Forest honey bee farming. It is estimated 20–25 tons of honey per year can be harvested from Danau Sentarum National Park (photos by Department of Agriculture and Agrifood, Ministry of Primary Resources and Tourism).

Introduction

Danau Sentarum is one of 15 priority lakes in Indonesia and one of 25 national strategic tourism areas. Because of its importance and strategic location, the Indonesian government not only established the Danau Sentarum area as a national park, but also designated it as the Ramsar Region (the most important wetland in the world). With an area of 127,393.4 hectares based on the provisions of 2014, Danau Sentarum is also part of the Heart of Borneo region, which is an initiative of three countries, namely, Brunei Darussalam, Indonesia, and Malaysia. Danau Sentarum National Park is currently also part of the core zone of the Kapuas Hulu Betung Kerihun Sentarum Biosphere Reserve that was established on 25 July 2018.

The traditional communities that have settled in the Danau Sentarum conservation area have lived there since the end of the 17th century. One of the natural resources with unique economic potential in the DSNP that is used by the communities is forest honey. Based on the type of flowering season, three types of honey are produced by forest honey bees (*Apis dorsata*): (i) Putat flower honey, (ii) Masung flower honey, and (iii) honey from a mixture of various types of flowers.

The harmonious use of natural resources by local communities is a traditional practice in the interior of Kalimantan, specifically in Lake (Danau) Sentarum. Periau or traditional groups of forest honey bee farmers in Danau Sentarum National Park (DSNP) use potential and natural resources. As members of Asosiasi Periau Danau Sentarum or APDS (Danau Sentarum Forest Honey Bee Farmers' Association), they have contributed to economic and social development and are preserving their folk wisdom and cultural practices.

Honey produced by a single *Lalau* tree can reach 140 kilograms (kg), while honey produced by each *tikung* (artificial branch) can reach 20 kg per honeycomb, with an average production of 6 kg. It is estimated that the total honey that can be harvested every year from *Lalau*, *tikung*, and *Repak* (the place where bees produce no more than one comb on any tree branch) in the DSNP area ranges from 20 to 25 tons.



Methods of forest honey bee farming in Danau Sentarum National Park. Forest honey is cultivated either in *Lalau* trees, on artificial branches, or on natural branches (photos by Danau Sentarum National Park Regional Office).

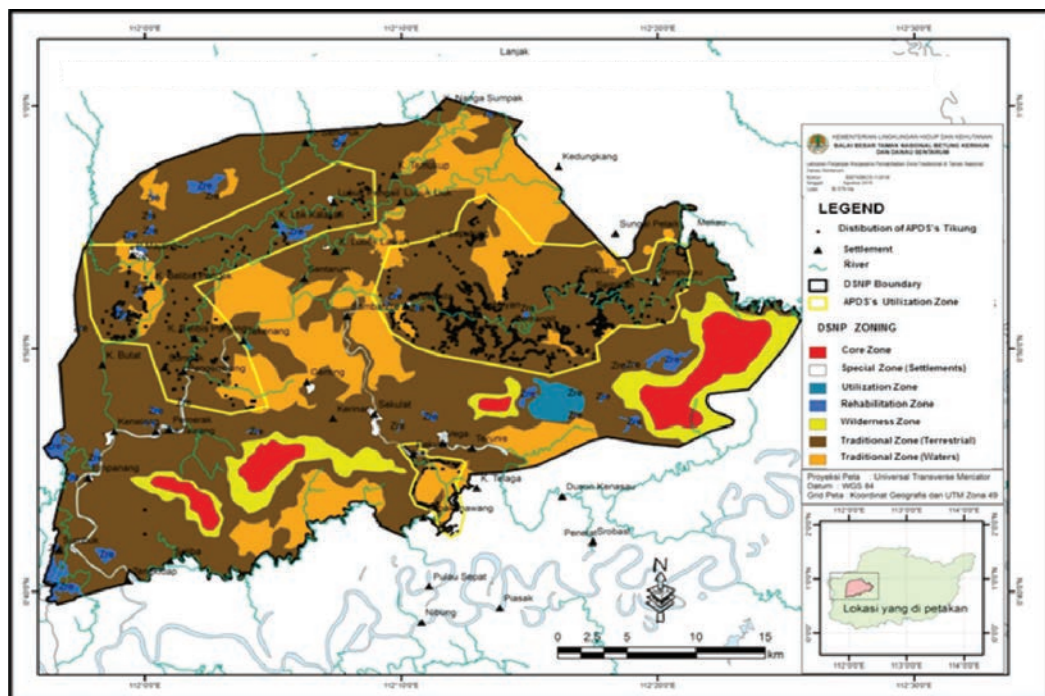
In the past, price instability, below-market-standard quality of honey, and harvesting methods that are less environmentally friendly contributed to the low price of forest honey in Danau Sentarum. In 2005, the price of forest honey averaged 20,000 Indonesia rupiah (Rp) per kilogram (\$1 = ± Rp9,985 as of April 2005). Concerned about this condition, a local group of forest honey farmers or *periau* formed the Danau Sentarum Periau Association (APDS) in 2006, comprising 89 people from five *periau*s. The APDS is a group of forest honey bee farmers in the DSNP area, particularly in the Leboyan river basin. At present, there are 305 APDS members consisting of 15 *periau* from Dalam, Leboyan, Lubuk Pengail, Melemba, Pulau Majang, Sekulat, Semalah, and Tempurau villages.



Semangit Hamlet. The APDS Management Center in Nanga Leboyan Village (photo by Danau Sentarum National Park Regional Office).

The Danau Sentarum National Park Regional Office (BBTNBKDS) exercises management authority over the DSNP and has approved a scheme of cooperation agreements for the APDS to collect forest honey in the traditional zone, which covers around 36,579 hectares (Map 9).

Map 9: Utilization Areas of Traditional Zones in the Danau Sentarum National Park



Source: Danau Sentarum National Park Regional Office.

Status

In 2007, forest honey produced by APDS was certified by BIOCert, SNI 01-6729-2002, and v for honey. The APDS is the first in Indonesia to obtain organic certification. Its success in obtaining organic honey certificates has made APDS honey popular in local, regional, and national markets. Even the demand from Sarawak in Malaysia is quite high.

High market acceptance has encouraged an increase in the price of APDS organic forest honey, which currently reaches Rp150,000/kg (\$1 = ± Rp14,009 as of August 2018). This is more than six times its price in 2005. Although this price is quite high compared with the average price in Indonesia, market appetite remains high for APDS organic forest honey.

Through sustainable harvesting methods and implementation of an internal control system (ICS), organic honey produced by the APDS is of high quality and highly sought after by the market (Figure 4). In addition to obtaining high-quality organic honey, ICS techniques are used to ensure the survival of honey bee populations (*Apis dorsata*).

Figure 4: Sustainable Process in Organic Forest Honey Production of Danau Sentarum Forest Honey Bee Farmers' Association



Source: Danau Sentarum National Park Regional Office.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

1. Socioeconomic Conditions and Well-Being

The main livelihood of the majority of residents in the DSNP area is fishing. Income from fishing is sometimes uncertain as a result of the fish season, lake waves, drought, and other natural factors. Forest honey bee farming as an alternative business has increased the income of local communities in the DSNP area.

To implement the regulation of sustainable harvesting techniques, the APDS uses customary rules agreed upon by all *periau*. The customary rules are written in agreement among members as the ICS. In developing the organization, the APDS has increased social interaction between the local communities in the DSNP.

2. Environmental Protection

Sometimes harvesting forest honey in the DSNP cannot be done every year due to lack of bee colonies and the risk of forest fires in certain years. Moreover, occurrence of forest fires can cause sales failure in the following year.

To prevent the risk of loss to the DSNP area and economic losses to *periaus*, two important aspects have been included in the cooperation agreement between the APDS and the BBTN BKDS in the utilization of traditional zones in the DSNP: the protection of biodiversity and the prevention of forest fires.

The effort to change the way local people meet their daily needs (through hunting, fishing, and gardening activities) by introducing and developing community-based sustainable livelihood requires collaboration and strong commitment from all stakeholders.

Malaysia

Good Agricultural Practices (MyGAP)

Good Agriculture Practice (GAP) is an integrated system to manage the hazards associated with the elements of land, input, processes, and output of agricultural production to achieve productivity, sustainability, quality, and safe produce. The Malaysian Good Agriculture Practice (MyGAP) certification scheme recognizes farms that adopt good agricultural practices. MyGAP is now one of the criteria required by importing countries.

Evidences of GAP are examined and evaluated according to the following 17 elements to ensure a sustainable agriculture production system (crop, fishery, and veterinary) that produces safe and quality food, ensures that the welfare of workers is adequately protected, and ensures that the environment remains resilient.

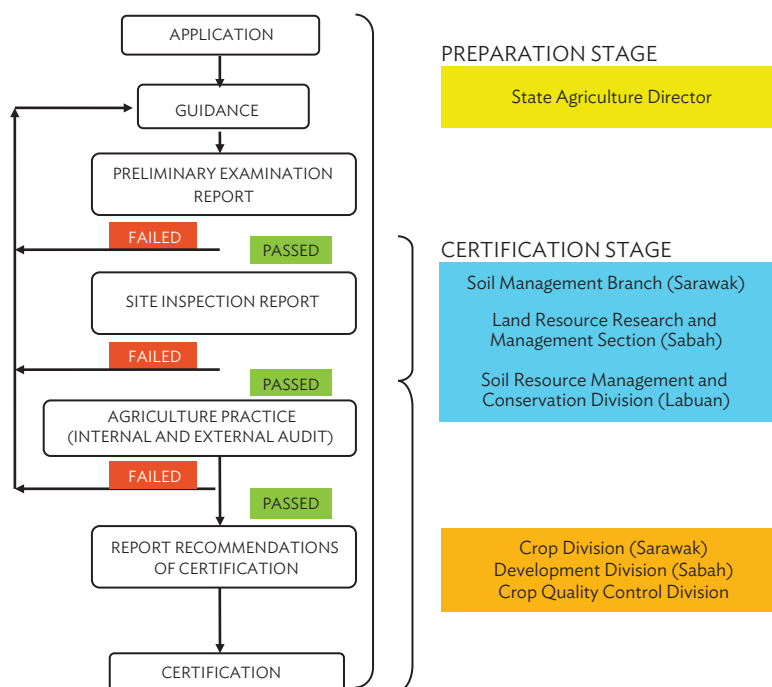
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|--------------------------------------|--|
| 1. Traceability | 10. Postharvest handling |
| 2. Record keeping and internal audit | 11. Packaging |
| 3. Planting materials and rootstock | 12. Pesticide residue |
| 4. Site history and site management | 13. Waste and pollution management, recycling, and reuse |
| 5. Soil and substrate management | 14. Workers' health, safety, and welfare |
| 6. Fertilizer management | 15. Environmental issues |
| 7. Irrigation and fertigation | 16. Record of complaints |
| 8. Crop protection | 17. Recall and withdrawal procedure |
| 9. Harvesting | |



The implementation of the MyGAP certification scheme is voluntary but importers of fruits and vegetables have made it one of their requirements, as farms that are not certified will not have access to outside markets. The implementation of MyGAP is shown in Figure 5. The time frame for a farm to receive certification is between 6 months to 2 years.

The following success stories illustrate the application of MyGAP: Shrimp Farm Syarikat Warisan Hikmat Sdn. Bhd., Kota Belud, Sabah; Seaweed Cluster Kg. Lok Buton, Semporna; Poh Lian Plantation Sdn. Bhd., Sarawak; Sustainable Bird's Nest House Project, Sarawak; and "Center of Excellence"—Kilan Agriculture Park, Labuan Federal Territory.

Figure 5: Flow Chart of MyGAP Certification Process



Source: Adapted from J. Ritonga. 2018. Overview of myGAP Certification. Paper presented at the Seminar on Tropical Fruits: The Next Golden Crop for Sabah. Kota Kinabalu, Sabah. 14 August.

Malaysia

MyGAP Success Story: Shrimp and Seaweed Farming

Shrimp Farm Syarikat Warisan Hikmat Sdn. Bhd., Kota Belud, Sabah

Warisan Hikmat Sdn. Bhd. began its tiger prawn aquaculture operation in 1998 with only two ponds and subsequently ventured into commercial white shrimp aquaculture. The company was awarded as *Penternak Jaya* (Marine Aquaculture category) during the Sabah State Farmers and Fishermen Day.

Warisan Hikmat is owned by Wah Keng Jieng or more popularly known as Jimmy. When Jimmy found a huge potential for culturing white shrimp, he opened 36 ponds in a 46-acre (18.6 hectares) area. The company was awarded with the Malaysia Good Agricultural Practices (MyGAP) and Fish Quality Certificate in 2009, the first farm in Sabah and among the earliest farms in Malaysia to achieve these certifications. These certifications allowed Jimmy to export his prawn products to the European Union. Since then, because of the increased demand for quality products and food safety from Europe as well as from other countries, Jimmy increased his number of ponds to 76.



Shrimp farm. Warisan Hikmat Sdn. Bhd. in Kampung Dudar, Kota Belud, Sabah (photo by Department of Fisheries Sabah).

The company has been able to maintain its certifications with the continuous support, guidance, and monitoring of the Sabah Fisheries Department at the state level; and the monitoring of residues at the farm level by the Fisheries Biosecurity Division of the Fisheries Department of Malaysia. The MyGAP and farm-based biosecurity procedure practiced by the company saved it from the early mortality syndrome or EMS outbreak in 2013 and 2014.

With MyGAP certification, the farm has successfully increased its production to 1.8 tons per year since 2009, compared with 1,200 tons per year before the certification. It is targeting production of 2,000 tons per year.

The MyGAP certification introduced by the Department of Fisheries ensured product quality and sustainability to compete internationally.



Vehicle dipping. Biosecurity control to prevent cross contamination (photos by Department of Fisheries Sabah).

Seaweed Cluster Kg. Lok Buton, Semporna, Malaysia

The seaweed cluster of Lok Buton in the waters of Semporna district, Sabah was introduced to local villagers in 2012. The objective of this cluster system is poverty alleviation: to help poor communities in the Lok Buton area and listed in e-Kasih to undertake the cluster planting projects.

With an area of 150 acres (60.7 hectares), Lok Buton was divided by the Sabah Fisheries Department among 50 participants, each participant receiving an area of 2.5 acres (1 hectare). These participants have all earned MyGAP certification. In 2014, 16 more participants achieved MyGAP certification, and currently, 48 participants are MyGAP-certified.

As a result of MyGAP certification and seaweed culture based on good aquaculture practices, Lok Buton has been able to increase each participant's income from less than RM350 a month to an average income of RM2,500 per month.

The MyGAP certification has opened up markets and raised the value of the products. The comfortable seed preparation system using special tables has shortened the duration of preparation and reduced pressure to the seed, which is a factor in the good quality of the products.



Seaweed farming. Cluster planting has contributed to poverty alleviation for 50 participants (photos by Department of Fisheries Sabah).



International competitiveness. Since 2012 when the Seaweed Cluster in Semporna was introduced, 48 of 50 participants have received the MyGAP certification, which is one of the criteria required by importing countries (photo by Department of Fisheries Sabah).

Malaysia

MyGAP Success Story: Good Agricultural Practices— Poh Lian Plantation Sdn. Bhd., Sarawak

Introduction

In Sarawak, there are already 140 certified MyGap farms and 4 MyOrganic farms. Of these, Poh Lian Plantation Sdn. Bhd. is the largest leafy vegetables farm enterprise, with a total area of 51.51 hectares. Located at Serian, Asajaya and Sadong Jaya in Samarahan, Poh Lian is also involved in the supply and wholesale chain distribution of their produce. Poh Lian cultivates 15 types of leafy vegetables, including *chai sim*, *bong kim pek*, *siaw pek chai*, Chinese Lettuce, *kiew chai*, *kai chai*, *pak choy*, *kai lan*, *cangkok manis*, *kang kong*, *bayam*, and lettuce.

In 2018, Poh Lian produced about 280,000 metric tons of leafy vegetables and sold their certified quality packed vegetables through many established supermarkets in Kuching, Samarahan, and Serian. Poh Lian uses the block planting system, which makes their agriculture produce traceable to their four farms or blocks in the farm, as all their produce bear the farm registration tagged numbers. Poh Lian's farm management system also adheres to the MyGAP requirement of detailed record keeping for auditing purposes.



Nursery at Poh Lian Plantation.

Vegetable production using netting system (photo by Liew Ju Jeng).

Following the advice of the Agriculture Department regarding crop protection, Poh Lian must reduce the use of pesticides based on basic requirements and recommendations and practice integrated pest management. All plantation workers must use protective clothing when handling pesticides and observe postharvest intervals for every pesticide used. The welfare of workers is carefully protected in the farm—they are provided decent places to stay with proper toilets, washing area, and cooking facilities. They are given proper training on their day-to-day work. All field observations and sampling of farm produce for analysis must be done in government-recognized laboratories.

Status

The plantation must adhere to the environmental acts and laws as below, to show that it is concerned with biodiversity and wildlife.

- Soil Conservation Act 1960
- Federal Marketing Authority Act 1965
- Pesticides Act 1974
- Environmental Quality Act 1974
- Environmental Quality Regulation 1974
- Environmental Quality Law
- Plant Quarantine Act 1976
- Food Act 1983
- Food Regulation 1985
- Workers' Safety and Health Act 1994
- New Plant Variety Act 2004

With four farms and one processing center operating in Sarawak, Poh Lian employs over 30 workers, both locals and foreigners. This creates a very healthy growth for the local economy, making the production system sustainable, aside from providing job opportunities for both local and foreign workers. The company has won several outstanding awards and recognition during the State and National Farmer's Day Celebrations.



Collecting center. Harvested vegetables at a collecting center (farm level) (photo by Liew Ju Jeng).



Nursery at Poh Lian Plantation. The block planting system allows agriculture produce to be traced back to their particular farm or block in the farm (photo by Liew Ju Jeng).



Vegetables ready for transplanting. Following the advice of the Agriculture Department, Poh Lian is reducing pesticide use and practices integrated pest management (photo by Liew Ju Jeng).



MyGAP-certified. Well-packed agriculture produce sold in a local supermarket (photo by Liew Ju Jeng).

Malaysia

MyGAP Success Story: Sustainable Bird's Nest House Project, Sarawak

Introduction

There are only three species of swiftlets with underdeveloped legs and which cannot stand:

- *Aerodramus maxima* – black-nest swiftlets found mainly in caves,
- *Aerodramus fuciphagus* – white-nest swiftlets easily farmed in wooden and/or concrete houses,
- *Collocalia esculent* – black-nest swiftlets.

These swiftlets are found only in Southeast Asia: in Indonesia; in most parts of Malaysia; and in some parts of Cambodia, the Philippines, Thailand, and Viet Nam. Bird's nest is considered as an oriental high-value health food, and is very popular in the People's Republic of China (PRC); Hong Kong, China; Japan; the Republic of Korea; and Malaysia. They are also now being sold in Australia, European countries, New Zealand, the United States, and other parts of the world. It is believed that bird's nest has aphrodisiac and anti-aging properties.

Sarawak has been exporting bird's nests as raw or processed products since the 1960s. The export value reached RM100 million in the 1980s but has declined to RM60 million at present. Sarawak started with house swiftlet farming in early 2000 and majority are in shophouses along the swiftlet path corridor. The number of properly constructed swiftlet houses on agriculture land has increased in the last few years, which are now estimated to number around 4,500 premises throughout Sarawak. Technology in swiftlet farming is quite well established now. Generally, the prices of raw house bird's nests range from RM3,000 to RM4,500 per kilogram (kg), whereas the prices of processed bird's nests range from RM5,000 to RM10,000 per kg depending on quality.

Status

In Sarawak, licenses to build, erect, or maintain any building or structure for swiftlet farming are required under Section 33 (2)(b) of the Wild Life Protection Ordinance 1998. The Controller of Wildlife Department is the licensing agency. However, all applications need comments from the Local Authority, Land and Survey Department, and Natural Resources and Environment Board, with final approval from the State Planning Authority (SPA). The Veterinary Public Health Ordinance 1999 deals with import and export of the raw or processed bird nests, for which a permit from the Controller of Wildlife Department is a prerequisite. Bird's nest processing factories or premises also require license issued by the SPA.

Under the strict licensing, no town land or sub-urban land can be used, and applicants need to follow the guidelines of Environmental Protection Rule 29. However, majority of swiftlet houses are set up illegally. This creates problems such as disturbing bird call sounds, and environmental public health issues related to bird diseases.

Table 1 shows the status of edible bird's nest houses in Sarawak. So far, the total number of bird's nest houses are as follows.

- Total number of bird houses = 4,500 units (estimate)
- Licensed with the Forestry Department Sarawak = 514 units
- Installed with radio frequency identification (RFID) = 1,465 units
- Licensed processing plants = 47 units
- MyGAP certification = 121 units

Currently, five local processing plants are accredited by the Certification and Accreditation Administration of the PRC, and able to export to the PRC.



Bird house in Sarawak. External view of a 2-storey bird house (photo by Department of Veterinary Services Sarawak).



Swiftlet industry in Sarawak. Interior view of a bird's house (photos by Department of Veterinary Services Sarawak).

Swiftlet farming is generally very sustainable because it requires a one-off capital investment and no special feeding. Operators need to regularly check the controlled environment inside the bird houses, especially temperature, humidity, ventilation, and the birds' sound system. The production and processing system also targets MyGAP and Veterinary Health accreditation and/or RFID requirement, and aims at an average of RM3,000 to RM4,000 income per month per farm family. This project attracts many rural investors where there are estate crops freely providing small insects as feed for the swiftlets, and where there is minimal pollution problem. The government can extend assistance on simple bird house construction.

Table 1: Status of Edible Bird's Nest Houses in Sarawak, 2018

Division	Estimated Number of Premises	RFID-Installed	MyGAP-Certified
Kuching	220	40	6
Samarahan and Serian	600	149	13
Sri Aman	297	47	7
Betong	530	202	11
Sarikei	700	122	25
Sibu	580	140	17
Kapit	20	10	0
Mukah	828	500	23
Bintulu	325	134	16
Miri	200	63	2
Limbang	200	58	1
TOTAL	4,500	1,465	121

MyGAP = Malaysian Good Agriculture Practices, RFID = radio frequency identification.

Source: Department of Veterinary Services Sarawak.



Preparation of the harvested nests. Raw bird's nests being manually cleaned (photo by Department of Veterinary Services Sarawak).



Bird's nest ready for the market. Prices of processed bird's nests range from RM5,000 to RM10,000 per kilogram (photo by Department of Veterinary Services Sarawak).

Malaysia

MyGAP Success Story: “Center of Excellence”— Kilan Agriculture Park, Labuan Federal Territory

Introduction

Kilan Agriculture Park or Taman Pertanian Kilan (TPK) is located 9 kilometers from the center of Labuan City (Map 10). With a total area of 7 hectares, this land is fully utilized, with fruit orchards, recreation ponds, incubator centers, agrotechnology (fertigation and Set Pengeluaran Tauge Automatik), training center, information center, hostel, *surau*, and canteen.

Since its inception, the TPK has become a place that provides accommodation and leisure facilities for tourists, camping site and recreational activities for schools, and a training center for farmers and agro-based industry entrepreneurs in Labuan. Most people visit the park to obtain agricultural technology information and “agri education”; attend courses, trainings, or seminars; or have recreation and leisure, as well as community activities.

Map 10: Wilayah Persekutuan Labuan, Malaysia



Source: Geographical Names. https://geographic.org/geographic_names/name.php?uni=-3318997&fid=4181&c=malaysia.

Best Practices

Kilan Agriculture Park has many attractions. Nature conservation is the top priority while developing the TPK as an agriculture referral center for Labuan community. Three hectares of the TPK have been planted with four types of premier durian: D197 (*Raja kunyit*), D168 (*Hajah hasmah*),

D99 (*Kop kecil*), and D24 (*Bukit merah*). These are among the popular durian varieties in Malaysia. Soil conservation methods like terracing has been applied to ensure that the soil structure is unchanged or not threatened due to erosion.

A few hectares of the TPK are planted with rambutan, mangosteen, star fruit, and some rare fruits. These plots are nurtured with care and pesticide use is prohibited in order to maintain the natural environment and to keep the stingless bee safe, as there are more than 20 hives in these plots.

Stingless beekeeping is one of the top attractions in the TPK. Most visitors request for information about stingless bees, how they look like, and how sweet the honey is. The stingless bee is also a crop pollinator and is advantageous for crops planted in the park. Stingless bees maintain the natural environment of the TPK. Pesticides, especially insecticides, are strictly prohibited in the TPK. However, to control weeds, herbicides can be used in minimal quantities and must be applied 100 meters away from the stingless beekeeping plot. Stingless bees have a short flight range.

The Department of Agriculture Labuan provides a 3-hectare plot complete with irrigation system known as *taman kekal pengeluaran makanan* (TKPM, or The Permanent Food Park Programme) to committed and dedicated individuals practicing open fertigation planting systems.



Open fertigation system. (Clockwise from bottom) Open fertigation system; crops starting to produce yield; land preparation; installation of irrigation system; (center photo) *taman kekal pengeluaran makanan* (photos by Department of Agriculture Labuan Federal Territory).

This 3-hectare TKPM plot was developed in 2015 for the land preparation phase. In 2016, irrigation infrastructure and systems were developed, which began operating in 2017. Two participants maintain the area. The TKPM aims to establish a permanent food crop production zone in the Federal Territory of Labuan, which will help increase the production of sustainable and quality food for the country,

in addition to developing and enhancing the involvement of entrepreneurs in commercial food crop production. TKPM Kilan is also seeking MyGap certification, which emphasizes safety and the production of fresh food.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

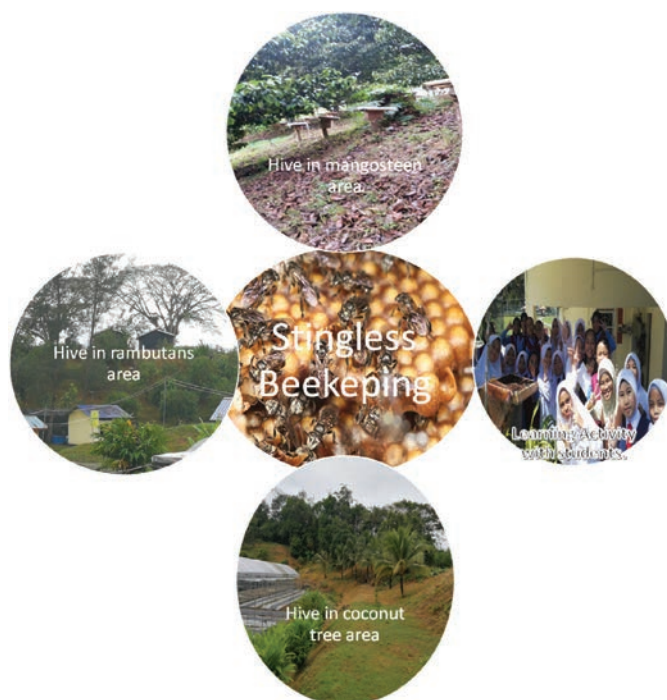
1. Environmental Protection

Although the wild forest is cleared and replaced with crops, terraces are created to prevent soil erosion. Shrub grass around the crop plot is also left intentionally to strengthen soil-holding capacity and also to protect the soil from direct exposure to rainwater. As bee hatcheries are the largest contributor to the natural pollination process of crops in the TPK, the use of all kinds of poison is minimized (used only when needed) to ensure that the bees are safe and can produce high-quality honey while preserving nature. The TKPM participants are always monitored to avoid excessive use of chemical fertilizers and pesticides. Participants are strongly encouraged to use organic fertilizers such as oriental herbal nutrients, indigenous microorganisms, and plant boosters; as well as biopesticides for organic pest control to reduce environmental pollution due to excessive use of chemicals.

2. Agri-Tourism Attraction



Fruit orchards. (Clockwise from bottom) Planting of *Durio zibethinus*; installation of irrigation system; installation of shading net; land clearing; land preparation; holes preparation; (center photo) view before forest clearing (photos by Department of Agriculture Labuan Federal Territory).



Stingless beekeeping. (Clockwise from bottom) Hives in coconut tree area; hives in rambutan area; hives in mangosteen area; learning activity with students (photos by Department of Agriculture Labuan Federal Territory).



Urban farming in Taman Pertanian Kilan. The land is devoted to fruit orchards, recreation ponds, incubator centers, agrotechnology, training and information centers, and recreation (photos by Department of Agriculture Labuan Federal Territory).

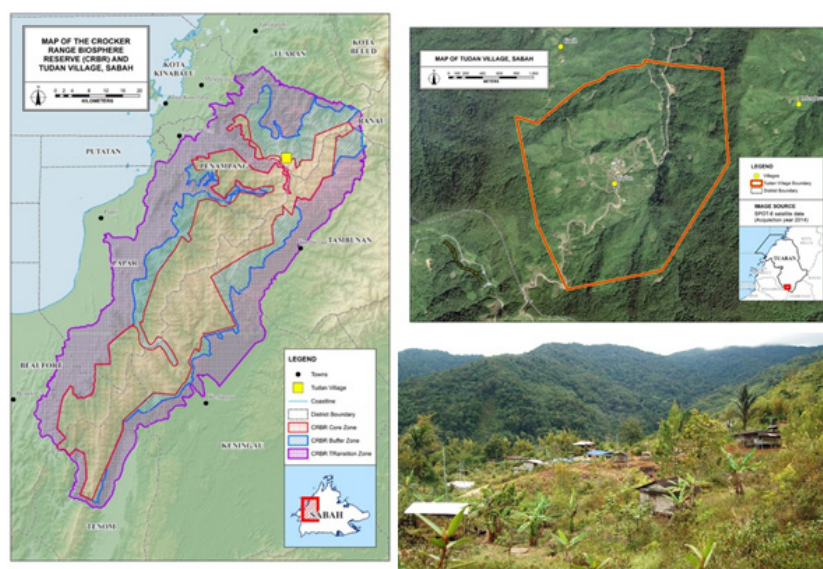
Malaysia

Sustainable Land Resource Management at Tudan Village, Sabah

Introduction

Tilling the soil for their livelihood is a typical day for the upland community of Tudan situated at the buffer zone of the Crocker Range Man and Biosphere Reserve (Map 11). Even as traditional farming has sustained their day-to-day living, the Tudan villagers have to contend with the topography and soil constraints imposed by the land.

Map 11: Map of the Crocker Range Biosphere Reserve and Tudan Village, Sabah



Sources: Sabah Parks and Department of Agriculture Sabah.

Cultivation of hill paddy as a subsistence crop is the main activity in Tudan village; however, cash crops are integrated into the same plot. Field preparation includes the clearing of vegetation by slash-and-burn method, and hill paddy is planted for 2–3 years. The fields are then left fallow for 7–10 years, although the period can be shortened to 3 years for small plots of land owned by families. Fallowing allows the area to undergo extensive growth of secondary forest, to replenish the soil nutrient status, and to allow cultivation of crops without additional fertilizers.



Hill paddy cultivation. Paddy is planted for 2–3 years after which the land is left fallow for 7–10 years (photos by Roslan Mahali).



Concept of subsistence in farming. Farming in Tudan observes a conscious respect for nature (photo by Roslan Mahali).

The agriculture ecosystem of Tudan village has the typical characteristics of other traditional villages in Sabah:

- small-scale cultivation on family plots,
- use of traditional tools,
- crop rotation (hill rice cultivation), and
- mixed farming.

Farming is carried out in harmony with nature; the concept of subsistence to sustain their livelihood and the conscious respect for nature. Pest management is based on traditional knowledge and practices acquired over generations. The traditional calendar planting method based on the phase



Growing of vegetables on slopes. The staircase arrangement of rocks prevents soil erosion (photo by Elizabeth Malangkig).

and shape of the moon is followed, where every movement and phase has its own meaning and influences the social, cultural, and agricultural practices of the community. There is a right time to plant crops in order to avoid or minimize pests and diseases to get optimum yield. Development in certain trees is also used to time their cultivation cycle. For the cultivation of hill paddy, the sequence consists of field selection, felling, burning, dibbling, weeding, and harvesting.

Best Practices

The traditional agriculture system is increasingly challenged by the increase in population, which requires Tudan to produce more food. As such, fallow periods are getting shorter or not practiced at all. In order to minimize the adverse impacts such as nutrient depletion and soil erosion, agricultural development must be regulated through clear regulations and guidelines. In Tudan, this is done with the active involvement of the village, whereby traditional practices are incorporated into guidelines to reflect the community's contributions in conserving nature.

A project on Sustainable Development on Biodiversity and Ecosystems Conservation supported by the Japanese International Cooperation Agency and the Department of Agriculture carried out a baseline soil survey to formulate a sustainable land resource plan based on soil–crop suitability, and to implement soil conservation measures. The unsuitable area for agriculture was recommended to be maintained, protected, and conserved for biodiversity and watershed function.

With the Tudan Village community's involvement, new guidelines were developed consisting of the following, which aim to reduce land degradation from soil erosion and ensure sustainable use of soils for crop production:

- area development in stages,
- clean cutting (for vegetable growing),
- selective cutting (for tree crops cultivation),
- manual cutting,
- maintain buffer zone near the river (natural vegetation),
- open up the area during the dry season,
- pull out the stumps (only if needed),
- recommend crop types based on terrain class and soil depth class, and
- emphasis on Good Agriculture Practice (GAP).

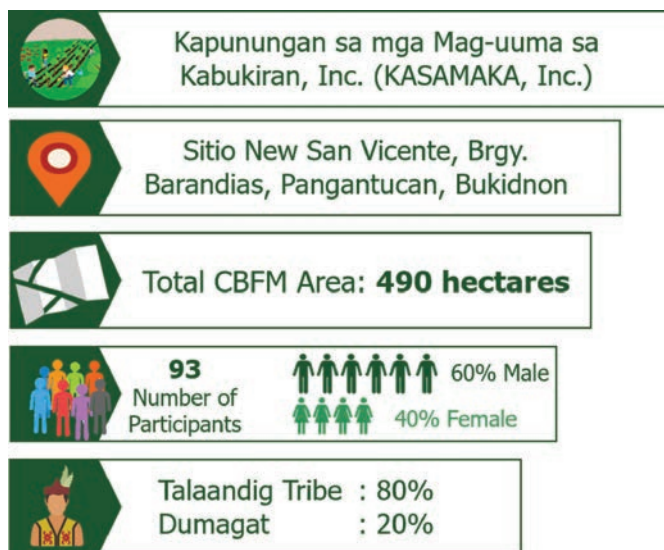
To enhance the village's income, alternative agricultural activities were introduced, such as the use of modern hives for rearing of bees for honey production, and the processing of mulberries into jams.



Honey production. (*Top photos*)
Traditional bee hive; (*bottom photo*)
training on modern bee hive preparation
(photos by Elizabeth Malangig).

Philippines

Sustainable Agriculture in KASAMAKA Coffee Plantation, Pangantucan, Bukidnon: The Fruits of the National Greening Program



Community-based forest management (CBFM) was launched in KASAMAKA Coffee Plantation, Pangantucan, Bukidnon by virtue of the following laws:

- Executive Order No. 263: Adopting Community-Based Forest Management as the National Strategy to Ensure the Sustainable Development of the County's Forestland Resources and Providing Mechanism for Its Implementation
- DAO No. 2004-29: Revised Rules and Regulations for the Implementation of CBFM
- Executive Order No. 26 Series of 2011: Implementation of National Greening Program



Best Practices

1. *Strong Participation of Community Members*

The *bayanihan* (mutual help) system among the people's organization, Kapunungan sa mga Mag-uuma sa Kabukiran, Inc. (KASAMAKA, Inc.) members is practiced in the CBFM area. The members developed 96% of the area for multi-crop production as an additional source of income.



Bayanihan. Maintenance and protection of the plantation is a shared responsibility (photo by Department of Environment and Natural Resources Region 10).

2. Capacity Building of People's Organization Members

Members are technically equipped in rubber budding and cacao grafting agricultural technologies and are mass producing rubber seedlings for the market.

3. Strong Governance by People's Organization

Officials of KASAMAKA, Inc. lead 93 members and actively coordinate with other funding institutions.

4. Public-Private Partnership

Support from government agencies for postproduction facilities and market-to-farm linkages have yielded the following:

- 12 solar panels donated by the Department of Energy,
- 1 coffee huller donated by the Catholic Relief Services of Davao City, and
- organic fertilizers donated by Nestle Philippines.

5. Sustainable Financing Mechanism

KASAMAKA, Inc. is a beneficiary of the National Greening Program (NGP) and the Community-Based Forest Management-Comprehensive Agrarian Reform Program (CBFM-CARP) and tasked with developing 472 hectares of forestland. The People's Organization received ₱2,391,223.00 in financial support from 2011 to 2014. A portion of the funds was earmarked for livelihood support for members.

6. Sustainable Income

- The 100 hectares of coffee plantation established in 2012 started bearing fruit in 2013. With the assistance of Nestle Philippines, KASAMAKA, Inc. has inked a memorandum of agreement consigning 14,000 kilos of coffee beans with a projected annual income of ₱1.2 million.
- Seedling production for rubber and cacao species is sold to other people's organizations.
- Intercropping of rootcrops (taro and ginger) is practiced. In 2015, a 1-hectare harvest of ginger yielded an annual gross income of ₱612,574.
- Establishment of a 50-hectare cacao plantation was started in 2013.

Plantation fruit. (Top photo) coffee plant; (bottom photo) cacao fruit (photos by Department of Environment and Natural Resources Region 10).



Capacity building in people's organization. (Top photo) A member pruning rubber trees as part of maintenance and protection; (bottom photo) members are trained on budding of rubber seedlings (photos by Department of Environment and Natural Resources Region 10).





Intercropping. (Top photos) Rubber tree intercropped with ginger and taro is practiced under the community-based forest management scheme in Kasamaka Coffee Plantation; (bottom photo) budded rubber (photos by Department of Environment and Natural Resources Region 10).



Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

1. Ecological

Through the community-based forest management scheme in KASAMAKA Coffee Plantation, a total of 470 hectares of idle forestland was developed into a productive plantation by planting high-value crops such as coffee, cacao, rubber, and forest trees. This will also mitigate the impact of climate change in the locality.



KASAMAKA Coffee Plantation. The central forest tree nursery holds up to 1.3 million seedlings while 35 hectares is devoted to coffee farming (photos by Department of Environment and Natural Resources Region 10).

2. Socioeconomic

Through livelihoods generated by the project, the economic status of members is uplifted. Most of the beneficiaries' children have undertaken college-level studies.



From idle forestland to plantation. (Top photo) Production yield of 35 hectares of fruit-bearing trees; (left photo) a female plantation worker; (top right photo) coffee huller donated by the Catholic Relief Services; (corner right photo) solar panels donated by the Department of Energy (photos by Department of Environment and Natural Resources Region 10).

Philippines

Sustainable Agriculture in Allah Valley Protected Landscape, Lake Sebu, South Cotabato

The Community-Based Agri-Ecotourism Pilot Project (CBAEPP) is pioneered by the Department of Environment and Natural Resources (DENR) through the initiative of PASu. CBAEPP is a form of ecotourism located at Sitio Lower Talubek, Lamalahak, Lake Sebu, South Cotabato. It is part of the Allah Valley Protected Landscape, which has an aggregated area of 102,350 hectares.

CBAEPP adheres to the guidelines found in PAMB-AVLP Resolution No. 2 (Resolution endorsing the ecotourism development plan of the Community-based Agri-Ecotourism Pilot Project of DENR at Sitio Lower Talubek, Lamalahak, and Isla T'bowow, Brgys. Bacdulong and Poblacion, Lake Sebu, South Cotabato).

Best Practices

1. Project Components

- Communal farm
- Visitor information center
- Products display shop
- River pool and park
- Inland fishery
- T'boli house with museum
- Concrete hand and footrail
- Butterfly garden
- Lake cruise stopover area

The communal farm is divided among 87 participating households and practices organic vegetable cultivation. Every 160-square-meter plot of each beneficiary grows a variety of indigenous cash crops like taro, cassava, squash, beans, and *pechay*; as well as flowers and medicinal plants that are sold for livelihood. This scheme has improved the living conditions of beneficiaries by making their lands productive and sustainable.

Communal farming. The project fostered social cohesion and participation, galvanizing the people to care for the environment (photos by Department of Environment and Natural Resources Region 12).





Green farming. In search of the cleanest and greenest household, program participants were given parcels of land where indigenous crops were planted for a source of livelihood, and soil and water conservation and protection (photos by Department of Environment and Natural Resources Region 12).

Since the implementation of the CBAEPP in 2016, social cohesion and participation have been strongly observed in the community. The project galvanized the people to care for the environment as it promotes environmental protection and preserves the indigenous knowledge and culture of the indigenous peoples. The project addressed one of the evident threats to the environment—the *kaingin* (slash and burn) practice of the indigenous peoples. Residents were initially resistant to the project, but with the implementation of CBAEPP, their mindset changed from apathetic to adaptive and participative.

2. Infrastructure Support Program

The water requirements of CBAEPP are provided through a small water impounding system. The reservoir benefits the CBAEPP and also serves as a potential supplemental source of water for domestic use of the beneficiaries especially during the dry season. The water impounding project was completed on 10 March 2017.



Community-Based Agri-Ecotourism Pilot Project. Fishing activities and facilities at the resto for picnickers and other guests (photo by Department of Environment and Natural Resources Region 12).

The upland water catchment model site was one of the activities during the 3rd School Nature Festival at the project site in November 2017. It served as the learning site for soil and water conservation.



Tribal house and museum. Historical, archaeological, and ethno-cultural collections such as artifacts and novelty items showcase the culture of the T'boli tribe (photos by Department of Environment and Natural Resources Region 12).

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

1. *Social*

- Social cohesion can be observed in the community especially in maintaining the project components.
- Local communities are now concerned about the 3Rs (reuse, reduce, and recycle) of waste management
- The culture of apathy toward environmental conservation was eliminated.
- Environmental awareness among the residents improved.
- The rich tradition of the indigenous people in the community is highlighted.

2. *Economic*

- The CBAEPP provided a sustainable source of organic foods.
- The project increased communal farming.
- Wider livelihood opportunities were provided for the community as the project also offers souvenir and handicraft-making, catering, and entertainment services.
- Agri-ecotourism was boosted, benefiting the economy of the communities and the municipality of Lake Sebu.

3. *Ecological*

- Proper waste management became a habit for individual community members.
- CBAEPP became a community role model for environmental awareness and sustainable farming.
- Environment-friendly farming is now practiced in the community.

Part 3

Sustainable Fisheries

Brunei Darussalam

Good Aquaculture Practices for Shrimp Farm

Introduction

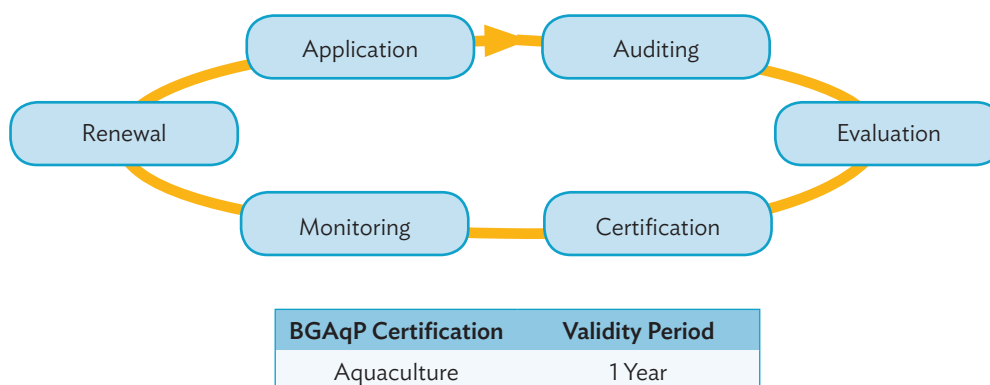
The Brunei Darussalam Good Aquaculture Practices (BGAqP) for Shrimp Farm is a set of guidelines to help local shrimp farms improve in key areas such as farm infrastructure management, farm management, shrimp health management, and farm environment management. These guidelines comprise a voluntary scheme developed in keeping with internationally recognized standards, and adapted to the local farming industry to ensure relevance. Local farms can request to be certified for implementing BGAqP, upon which farm audits will be carried out to ensure that the farms comply with certification requirements.

Certified farms are awarded a BGAqP certification and certification mark (Figure 6), which distinguishes their product from others in the market. The aim is to raise awareness of local shrimp and fish farms among consumers, as well as provide assurance to both retailers and consumers by setting the benchmark for the production of safe and quality products.



BGAqP status. This certification assures clean and safe products free from biological or chemical contamination (photo by Department of Fisheries, Ministry of Primary Resources and Tourism).

Figure 6: BGAqP Certification Process and Validation



BGAqP = Brunei Darussalam Good Aquaculture Practices.

Source: Department of Fisheries, Ministry of Primary Resources and Tourism.

Status

In 2017, the Department of Fisheries Certification Approval Committee approve six local shrimp farmers for BGAqP certification with a passing mark of 90%. These farmers have complied with the criteria set in BGAqP standards. They are continuously monitored by the Shrimp Culture Industry Section, Industry Management and Support Services Division; and Fisheries Biosecurity Division, Department of Fisheries to ensure that they maintain their BGAqP status in producing clean and safe products free from biological or chemical contamination, and that they minimize adverse effects to the environment.

Best Practices for Shrimp Farms

1. Evaluation and Compliance

There are four main evaluation and compliance criteria for the BGAqP standard, which can be simplified as follows:

- (i) **Food safety and quality.** Prevent contamination from biological, chemical, or physical substances that are harmful to human health and which may come from inputs such as water, feeds, fertilizer, and other sources; and contamination from all processes such as production, harvesting, handling, and transportation.
- (ii) **Fish health requirement.** Observe measures to prevent, minimize, or control any outbreak of diseases, which cover aspects related to monitoring, control of movement, eradication, treatment, hygiene, disposal method and others.
- (iii) **Environmental sustainability.** Prevent or minimize disruption to the ecosystem, and negative environmental impacts such as discharges and effluents to the surrounding areas.
- (iv) **Socioeconomic aspects.** Ensure the welfare of workers and train them on adequate knowledge of safety protocols and food safety issues.

These four aspects are detailed in nine areas for compliance by farm operators:

1. Surrounding, Location, and Construction

The shrimp farm site should be in the gazetted land area, registered under aquaculture activity for shrimp farm, and must have obtained an operational license from the Department of Fisheries. The Department of Fisheries shall conduct on-site visits and observe the farm layout and design; structure of the facilities and equipment, taking into account hygiene; and practices to minimize damage to the product and contamination.

2. General Practices

The Department of Fisheries shall observe daily farm activities, practices, and procedures on product safety, cleanliness, stocking protocols, pond preparation, management of feeds, water quality, fertilizers, veterinary medicine, handling, storage, and transportation. The department shall inspect the farm standard operating procedure (SOP) document and ensure that it is followed accordingly.

3. Water Drainage and Treatment

The Department of Fisheries shall observe the drainage system—from the location of the sources of water, inlet canal, reservoir, drainage canal, and settlement pond, down to the outlet canal by taking into account the structure, hygiene, and adverse effects of effluent waste discharged to the sea and river.

4. Management of Feed

The Department of Fisheries shall monitor and inspect the types of feed brand used, their quality and origin, condition of storage area, and the feeding scheme adopted in the farm to ensure that they are done correctly and adequately. This is to ensure that inputs such as feeds, fertilizer, and other supplements used in the operation are approved and authorized by the Department of Fisheries.

5. Management of Veterinary Drugs and Other Chemicals

The Department of Fisheries shall monitor and inspect the veterinary drugs and chemicals used in the farm, the way they are labeled, expiry date, quality and origin, and the condition of the storage area. This is to ensure that inputs used in the operation are approved and authorized by the Department of Fisheries.

6. Disease Risk Management

The observance of SOP measures in everyday practices is done to avoid disease infection and spread of infection in implementing biosecurity measures. In addition, all workers should know or be well informed of the various types of diseases and their treatment and prevention.

7. Postharvest Management

The Department of Fisheries shall observe and inspect every aspect of postharvesting procedures in the farm such as the usage of ice and water supply, harvesting equipment, handling of fish, temperature control, storage containers, and transporting the product from the farm to the processing plant.

8. Record Keeping

The Department of Fisheries shall check on the availability of farm documentations produced from farm activities such as sampling data, water quality data, feeding regimes, animal health analysis record, harvesting records, feed and fertilizer reception storage, and transportation for traceability purpose.

9. Staff Training

The Department of Fisheries shall check with the farm supervisor on whether training sessions on food safety issues related to handling of feeds, veterinary medicines, chemicals, harvesting protocols, and other applicable procedures are carried out regularly.

2. Legal Documents Supporting BGAqP

- Fisheries Order 2009
- Fisheries Regulations, 2002

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

- Farmers are obligated to produce aquaculture products in a manner that best serve domestic and export markets. This opens doors and opportunities for trading.
- Risks to food safety, the environment, health, welfare of workers, and product quality are minimized.
- Importing countries are assured of the safety and quality of local aquaculture products.

1. Implementation of Biosecurity Measures in the Farm



Seawater filtration system



Tire bath and fences



Handwash and footbath provided



Control of feed ingredients and fresh feed

2. Farms with BGAqP Certification



Voluntary scheme. BGAqP guidelines are voluntary, and local farms can request to be certified for implementing BGAqP (photos by Department of Fisheries, Ministry of Primary Resources and Tourism).

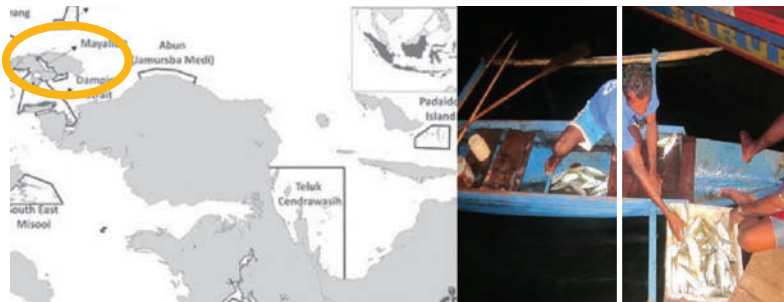
Indonesia

Customary Fisheries Area in Mayalibit Bay, Raja Ampat

Introduction

Mayalibit Bay is one of the marine protected areas (MPAs) in the Raja Ampat MPA network (Map 12). It has an area of 53,100 hectares covering three districts: Mayalibit Bay, Tiplol, and East Waigeo. The vast areas of mangroves and seagrass provide spawning and nursery grounds for a number of fishes in the MPA, especially Indian mackerel (*Rastrelliger kanagurta*), which is locally known as *lema*. Commercially important species such as blue swimming crab, mudcrab, shrimp, and sea cucumber are also found in Mayalibit Bay. In addition, lobster and reef fishes are also abundant, especially at the springhead of the bay.

Map 12: Mayalibit Bay in West Papua



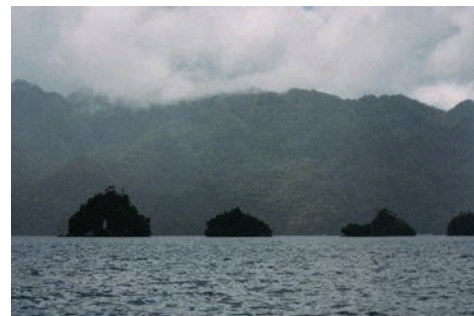
Mayalibit Bay. The vast areas of mangroves and seagrass provide spawning and nursery grounds for lema fish (photo by Natural Resource Conservation Agencies of West Papua Province [BBKSDA Papua Barat], Ministry of Environment and Forestry).

Source: Natural Resource Conservation Agencies of West Papua Province [BBKSDA Papua Barat], Ministry of Environment and Forestry.

Status

Mayalibit Bay has an immensely narrow springhead facing the open sea, while its interior is more similar to a big lake with a tranquil flow. The inner water rarely undergoes nutrient exchange with the waters outside the bay. This phenomenon causes low growth of coral reefs as well as less fish biomass inside the bay.

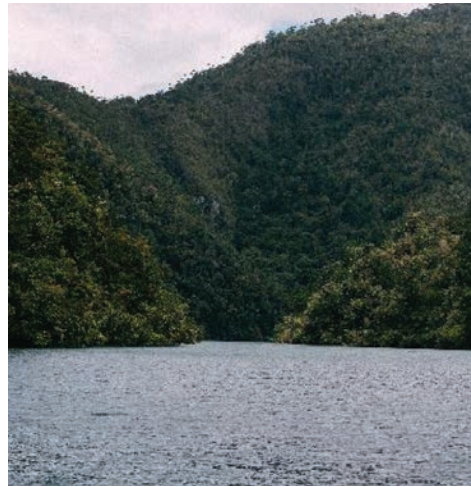
Despite the advantage of nursery and spawning from the mangroves and seagrasses found at the tip of the bay, the interior is vulnerable to pollution because of the limited exchange of water mass flushing the bay. Overfishing is also one of the challenges in the area,



Marine protected area. Uninhabited small islands surrounded by dense, hilly forests (photo by Natural Resource Conservation Agencies of West Papua Province [BBKSDA Papua Barat], Ministry of Environment and Forestry).

with high fishing pressure and fish production that may supersede natural stock recruitment. In addition, conflict of marine resources utilization between claimed villages or tribes has always been an issue that needs to be tackled. Fisheries management challenges in Mayalibit Bay include the low growth of coral reefs, lesser fish biomass inside the bay, overfishing, and conflict in natural resources utilization between villages or tribes located in the bay. Mayalibit Bay needs an appropriate fisheries management approach.

Consequently, Mayalibit Bay fisheries need an appropriate management mechanism to improve its biological condition and enhance social and economic benefits to the local communities. The customary community area-based fisheries management has been defined as a solution for overfishing and overclaiming of the bay's resources.



Well-preserved tropical rainforest. One of the corners of Mayalibit Bay (photo by Natural Resource Conservation Agencies of West Papua Province [BBKSDA Papua Barat], Ministry of Environment and Forestry).

Best Practices for Customary Community Area-Based Fisheries Management

The people in Mayalibit Bay, as with other Papuans, have a tradition of exercising sovereignty and utilization rights over the bay resources, locally known as *hak ulayat* (customary rights). The rights to use, eat, and possess are regulated in a customary manner, as discussed by the owners and users. When communities agree on the rights and responsibilities over the resources, they raise what they have decided in a common prayer to God, and commit to adhere to and uphold these rights and perform their responsibilities. They believe that whoever violates these rights will receive sanction from nature.

Seeing the opportunities for improving both ecological and economic aspects of the community, an approach for customary community area-based fisheries management was implemented in partnership with local communities, Conservation International (CI) Indonesia, and RARE, which focused on sustainable fisheries management based on ownership. To improve the ecological condition and pursue the welfare of the community, a collaborative program named Fish Forever was implemented by CI Indonesia, RARE, and local communities in Indonesia from 2015 to 2017. The program aimed to reinvent local community capacity to manage their own fisheries through a customary fisheries area approach. This approach is also widely known as the Territorial Use Rights for Fisheries (TURF). TURF is basically a local management approach in sustainable fisheries zones of MPAs.

The TURF program focuses on sustainable fisheries management based on ownership. Each village has its own rights and responsibilities. The villages, led by the village head and traditional leaders, collaboratively manage their own customary fisheries area.

Fishing grounds and boundaries for each village are commonly determined by the local communities. Other matters that are regulated include who can enter and fish in the area, the allowable species and size to catch, and fishing gears and seasons. Each village, depending on its resource type and availability, may have different sets of rules.

1. The Establishment Process

The Maya Tribe Customary Council played an important role in the establishment of the Mayalibit Bay customary fisheries area. The tribe customary council, the smallest structure in the Papua customary council, focused its attention on the protection of customary community basic rights including natural resources protection as the main asset of the community.¹ Specifically, in Raja Ampat, all tribes were grouped under the Maya Tribe Customary Council. Considering their important roles, the Maya Tribe Customary Council members were carefully selected and assigned as the host of the customary fisheries area establishment process.

The first step in the process was a meeting of all key stakeholders, which consisted of customary members, village government, and fishermen representatives. This meeting discussed fisheries condition, utilization, and challenges in Mayalibit Bay, as well as the customary fisheries area concept and how it is implemented. This meeting went well and the stakeholders supported the idea of establishing a customary fisheries area on Mayalibit Bay, with a shared objective to have sustainable fisheries management in the MPA.

The second step was socialization. This step aimed for greater buy-in from the community. There was suitable interaction to ensure the community's full understanding and their behavioral responses. In this socialization step, discussions centered on (i) the customary fisheries area boundary; (ii) the mechanism of allowing outside fishers fishing in their area; and (iii) customary fisheries management responsibilities.

The succeeding processes included a series of meetings facilitated by CI Indonesia, RARE, and the Regional Technical Implementation Unit of Raja Ampat MPA Management (*UPTD Pengelolaan KKP Kep. Raja Ampat*) to gain community (villagers) acceptance on the proposed management. In general, the customary fisheries area boundary of every village was accepted. However, some neighboring villages needed further facilitation to discuss overlapping boundaries. Eventually, all the boundaries were clearly determined and widely agreed upon by the bay communities. Aside from each village TURF area, jointly utilized areas were also determined. All community agreements were well documented.



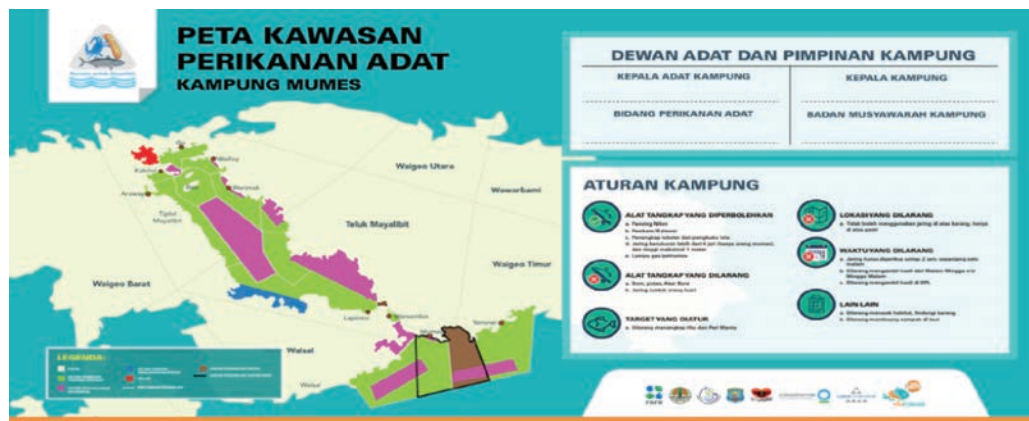
Establishment of the customary fisheries area. (Left photo) The first step in the process involved a meeting with all key stakeholders across Mayalibit Bay. (Right photo) The draft of the customary fisheries area being discussed (photos by Natural Resource Conservation Agencies of West Papua Province [BBKSDA Papua Barat], Ministry of Environment and Forestry).

¹ The Papua Customary Council is a customary institution formed in 2002 to facilitate wide discussion by the Papuans in Jayapura. With headquarters in Jayapura, tribal customary councils across Papua are divided according to their geographies, tribes, and traditions.

2. Customary Declaration of Mayalibit Bay Territorial Use Rights for Fisheries

The customary declaration can be considered an important history of TURF management in Indonesia. Although the managed areas and regulations have been determined and accepted, the customary declaration needs to be conducted for TURF to be officially endorsed by the regent of Raja Ampat. The declaration is proof to the regent that all bay communities have customarily agreed and accepted the TURF (Maps 13 and 14).

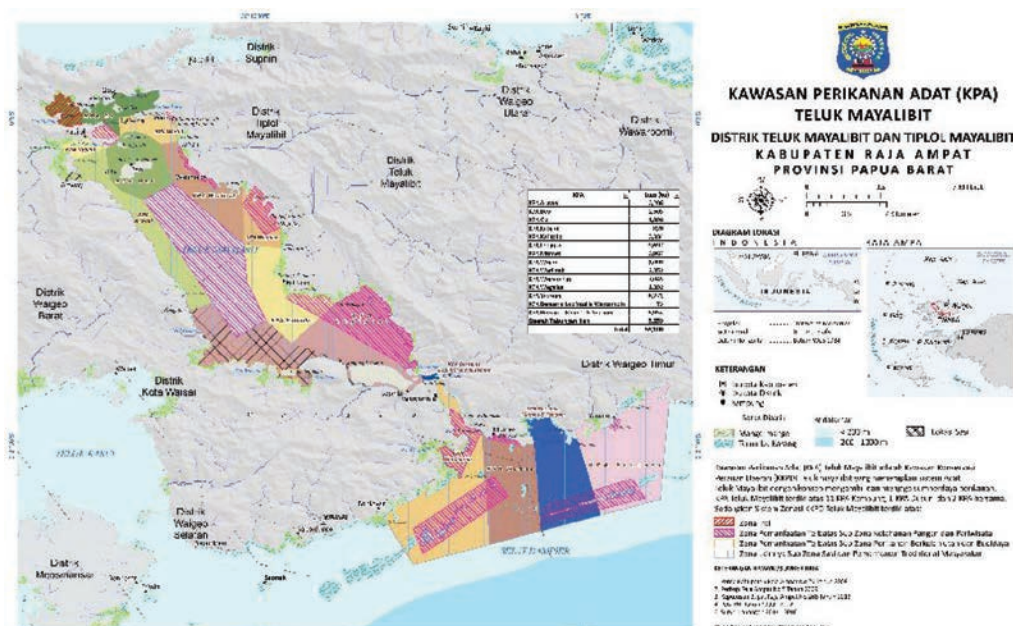
Map 13: Detailed Customary Fisheries Area in Mumes Village



Note: This is an example of a detailed customary fisheries area and its regulations, which are validated in the customary declaration.

Source: Natural Resource Conservation Agencies of West Papua Province [BBKSDA Papua Barat], Ministry of Environment and Forestry.

Map 14: Customary Fisheries Area in Mayalibit Bay



Source: Natural Resource Conservation Agencies of West Papua Province [BBKSDA Papua Barat], Ministry of Environment and Forestry.

The declaration statement, signed by all customary leaders on 17 February 2017 at Warsambin through a customary ceremony, was enlivened by various community art performances. In addition to the statement, the Maya Tribe Customary Council also issued a decree on Mayalibit Bay customary fisheries area management system. The Government of Raja Ampat also officially issued the Mayalibit Bay TURF map.



Feeding the sea. This is one of the customary processes, and led by customary leaders (photo by Natural Resource Conservation Agencies of West Papua Province [BBKSDA Papua Barat], Ministry of Environment and Forestry).



Customary declaration. Key stakeholders in one of the villages assemble for the customary declaration (photo by Natural Resource Conservation Agencies of West Papua Province [BBKSDA Papua Barat], Ministry of Environment and Forestry).

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

Every village has its own rules and regulations for their customary fisheries area. Any violation is resolved according to the customary rule in each village. Sanctions and fines for violators are determined by each village, involving religious and customary leaders. So far, there has been no violation and rule breaking. Rules and regulations are highly respected and observed by all communities.



Harvest from the sea. Fish, crab, lobster, and sea cucumber from Mayalibit Bay (photos by Natural Resource Conservation Agencies of West Papua Province [BBKSDA Papua Barat], Ministry of Environment and Forestry).

The TURF is expected to minimize conflict between fishermen in regard to utilizing the marine resources inside the bay, increase the quantity of catch, and strengthen the protection of the habitat. Data also show improvement in overall biological, social, and economic benefits to the communities.

Implementation of and strong community involvement in the customary fisheries area management resulted in improvements in overall biological, social, and economic benefits, as well as sustainability of fisheries.

Currently, CI Indonesia is working with the local government and community to support TURF implementation by assisting the Maya Tribe Customary Council. The partnership between CI Indonesia and RARE has allowed the team to continue sustaining the Mayalibit Bay marine ecosystem. At the same time, CI Indonesia and other nongovernment organizations have actively provided training on integrating TURF with the national fisheries management system, and have enhanced the capacity of the community to produce high-quality fish products.

Malaysia

Sustainable Fisheries Conservation: Tagal System, Sabah

Introduction

The *tagal* system is a smart partnership between local communities and the Department of Fisheries Sabah to protect, revive, conserve, and manage the river resources in Sabah, Malaysia. As of June 2018, there are 543 *tagal* in Sabah involving 221 rivers throughout the state.

The objectives of the *tagal* system are

- (i) to promote cooperation among local communities and with the Department of Fisheries Sabah toward ensuring the sustainability of river resources;
- (ii) to protect and conserve the river environment, including the river ecosystem and fish habitat;
- (iii) to increase and sustain fish production and income for rural communities; and
- (iv) to develop new, alternative, sustainable livelihoods for local communities by promoting ecotourism and sport fishing activities in *tagal* sites.

Status

The Department of Fisheries Sabah implemented certain guidelines in the process of implementing the *tagal* system:

- (i) The length of the river intended to be *tagal* should be at least 0.5 kilometers (km) or maximum 5 km in consideration of sand and stone mining activity in the area. The distance of the *tagal* site should be 500–1,000 meters from the sand and stone mining location.
- (ii) The *tagal* system can be shared by other villages, provided it is agreed upon.
- (iii) The establishment of the *tagal* committee is under the Majlis Pengurusan Kemajuan Kampung or Village Development Management Council, which comprises the following roles:
 - The patron (temporary chairman) – to be appointed by the community.
 - The patron – will hold a meeting to form a committee.
 - Once the committee is formed, a meeting with the JKKK or other bodies recognized by the government and the head of the village is held.
 - The *tagal* committee will be established in the said village (A copy of the minutes of the meetings and the reviews of relevant agencies should be submitted to the Department of Fisheries Sabah for further action).
- (iv) The *tagal* systems that had signed the memorandum of understanding with the Department of Fisheries are eligible to apply for assistance in basic infrastructure, equipment, and services in line with the guidelines and limits of the Tagal Management Committee, Department of Fisheries Sabah.
- (v) The *tagal* systems are divided into three zones:
 - Green zone: Fishing is allowed the whole year through, fish harvesting will be done in a controlled manner (sustainable fishing);

- Yellow zone: Fishing is allowed once in 2 or 3 years (the frequency depends on the *tagal* committee); and
- Red zone: Fishing is prohibited (spawning or ecotourism site).
- Any encroachment on the *tagal* sites will be fined under the jurisdiction of the head village or the native court. The JKKK or *tagal* committee can adhere to these guidelines:
 - For any encroachment, the JKKK or the *tagal* committee refers to the zone in which the encroachment happens. If it is proven that the person is wrong, the maximum fine is 1 buffalo or 2,500 Malaysian rupiah (RM).
 - Encroachment in a *tagal* system can take the form of fishing by outsiders, fishing in yellow zones (not during harvesting season), fishing in red zones, mine activity or sand mining without approval, tree cutting along the river without approval, and use of illegal fishing methods such as electrical devices and arrows.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

The *tagal* system has been successfully applied in two locations: Kampung Luanti Baru in Ranau; and Kampung Kinolosodon in Kimanis Papar. Tagal Kg. Luanti Baru was the first *tagal* in Sabah that practiced ecotourism, and has been operating since 12 October 2002. It won the Rivercare Awards 2006 and World Water Day Awards 2015 (National Level). Tagal Kg. Kinolosodon is another *tagal* that practices ecotourism in Sabah. It is very popular with visitors from Brunei Darussalam and Sarawak due to its location.



Kampung Luanti Baru in Ranau. Luanti Baru was the first *tagal* in Sabah to practice ecotourism (photos by Department of Fisheries Sabah).



Kampung Kinolosodon, Kimanis Papar. The *tagal* system is a smart partnership between local communities and Department of Fisheries Sabah to protect, revive, conserve and manage the river resources in Sabah (photos by Department of Fisheries Sabah).

Malaysia

Sustainable Fisheries Conservation: Tagang Project, Sarawak

Introduction

The word *tagang* comes from the *Dayak* (Iban ethnic) word that means outsiders restricted, or for the local community only. The term has been adopted in the Tagang project, a local fish conservation program in selected *luboks* in river tributaries. The Tagang project is agreed to and enforced by the local village committee, with the Department of Agriculture Sarawak (DOA) as advisor. *Tagang* is a smart partnership between the local community and DOA Sarawak that aims to protect, conserve, revive, and manage the river environment and its biodiversity, especially the riverine fisheries resources.

The Tagang project consists of an open culture system of wild indigenous river fish that have commercial value. It aims to help increase the income of the community living along a selected river system. This system requires strong leadership and close cooperation of the community to conserve the natural river fish habitat for tourism purposes. With tourism, the community can also sell other agriculture produce and handicrafts, and hold cultural shows for local and international visitors.

Since the implementation of the Tagang project in 2005, DOA Sarawak has assisted 105 community areas in fisheries conservation. Of these Tagang projects, 86 are active and 19 have been upgraded to ecotourism projects.



Releasing fish fry at Abok Tagang project. *Tagang* is an open culture system of wild indigenous river fish (photo by Department of Agriculture Sarawak).

Status

1. *Roles and Responsibilities of the Tagang Committee*

- Protect the river environment from river-polluting activities.
- Protect fisheries resources from illegal fishing and overfishing.
- Revive and restore the river environment and fisheries resources with the assistance of and supervision from DOA Sarawak.
- Work toward the concept of total public responsibility to conserve and manage the natural environment for future generations, and for the sustainability and continuous availability of river resources.
- Formulate and enforce Tagang rules effectively for each village.
- Schedule fish harvest (in selected areas when they reach marketable size) and share the catch equally among the local community members.
- Liaise with DOA Sarawak staff for advice.

2. *Roles and Responsibilities of the Department of Agriculture Sarawak*

- Provide advisory services to the community.
- Provide fish feeds and other necessary basic facilities and infrastructure for the project.
- Invite other related agencies as collaborators in establishing ecotourism activities.

Best Practices for Sustainable Fisheries Conservation: Tagang Project

1. *Best Practices to Implement the Tagang Project*

- Awareness campaign on Tagang system.
- Selection of suitable stretch of the river for the Tagang project.
- Initial survey and record an inventory of existing species, populations, and sizes found in the river.
- Establishment of the local Tagang committee and laws for enforcement.
- Official launch of the Tagang, inviting important guests, all *kampong* folks, local community leaders, local government department heads, etc. (Normally, the launch is best officiated by a local State Assembly member or Member of Parliament to obtain strong support.)
- Regular sampling surveys by DOA Sarawak staff to ensure good progress.
- Fixing of first harvest by the Tagang committee after 2 years in certain green or orange zones where fish populations have grown to mature or marketable stage.
- Continued practice of the Tagang system to attract agro-tourism in the area.

2. *Laws Related to Sustainable Fisheries Conservation*

Under the Sarawak State Fisheries Ordinance, 2003, the Minister of Modernisation of Agriculture, Native Land and Regional Development Sarawak, can officially declare Tagang zones with the intention to gazette them subsequently. There are two relevant provisions in this ordinance:

- Section 21: Power to declare prohibited fishing zone
- Section 65(2)(c): Power to control or regulate activities of any kind within a fisheries sanctuary or a prohibited fishing zone



Long Lidong. Feeding fish at Long Lidong Tagang project, which is considered one of the best, as the river fish are now very tame (photos by Department of Agriculture Sarawak).

The declaration of prohibited fishing of all fish species is to observe the buffer zone, prevent pollution, and create agro-tourism under the community-based resource management system. The second law empowers the local village committee to enforce, regulate, conserve, and manage activities within a prohibited zone.

One of the successful applications of the Tagang project is in Long Lidong, Lawas. Long Lidong is about an hour from Lawas town and accessible via 4-wheel drive vehicles traveling along a timber track. The Long Lidong village embarked on the Tagang project on 1 July 2006. Long Lidong is considered one of the best Tagang projects, as the river fishes are now very tame. During good weather when the water level in the “protected” river is low and clear, one can feed and touch the fish. The main species available is the *semah* (*Tor duronensis*).

The success of each Tagang project rests on strong leadership and the cooperation and initiative among the committee members and the local community. There is a need for interagency and intra-agency collaboration in providing the necessary assistance for Tagang projects, particularly access roads, facilities, and amenities required for the convenience of visitors (tourists). The Tagang project can contribute to conserving the environment and can provide plenty of benefits to the community as well as to future generations. A good partnership between the government and the community can help ensure sustainability of this project and create impact on people who appreciate a pristine and peaceful environment.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

The Tagang project aims to create awareness of conservation and the role of community members in managing local fishery resources to ensure sustainability and continuous availability. The project helps to increase the fish population as a source of food protein, since all the fish harvested is shared equally among all community members.

The fishes in the river were initially wild but slowly grew accustomed to commercial feeds and fruits collected from the wild. The continued practice of feeding the fish in the river eventually resulted in the fish staying and breeding within the area. The community was advised to interact with the fish during feeding time, and eventually play with the fish and feed them from their hands. After some time, the fish became tame and swam freely along the river bank.

The successful Tagang projects will be promoted to become ecotourism or agrotourism destinations. These activities will create employment opportunities, such as for local guides to bring tourists around, and for anglers who wish to fish under a “catch and release” concept in certain fishing zones along the river.

The project helps to educate the younger generation on the importance of conservation and their engagement in community development. It also allows for regular monitoring and evaluation by the DOA staff of the local fish species.



Harvesting fish at Pa’puti Tagang project.

Initially wild, the river fish eventually grew accustomed to commercial feeds and feeding by hand (photo by Department of Agriculture Sarawak).

Malaysia

Sustainable Fisheries Cage Culture Project: Batang Ai Hydroelectric Dam Reservoir, Sri Aman Division, Sarawak

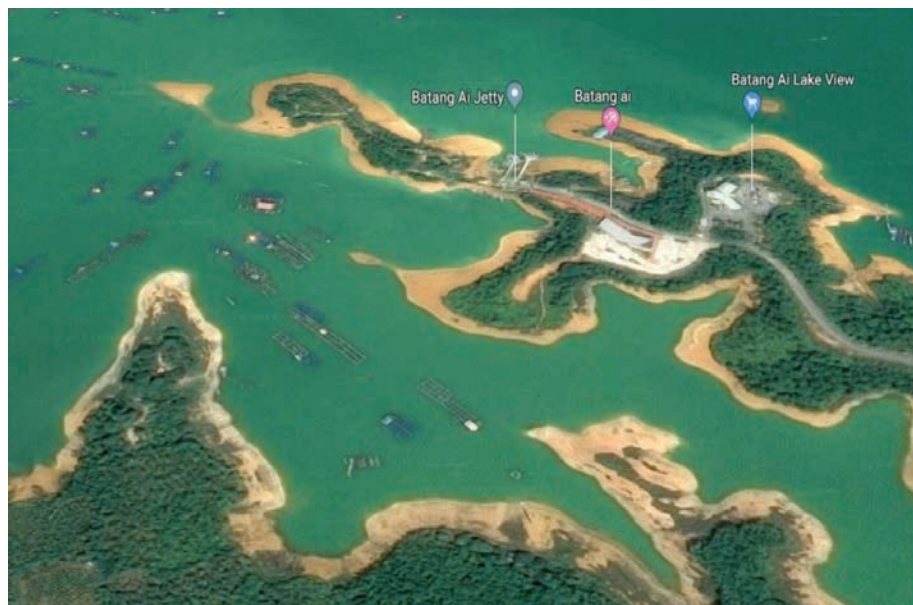
Introduction

The Batang Ai Hydroelectric Dam Reservoir is a concrete rockfill hydroelectric dam located 14 kilometers from the interior town of Lubok Antu, Sri Aman Division, Sarawak, Malaysia. It is close to the intermediate boundary with Kalimantan, Indonesia. Dam construction began in 1982, with the river diversion work undertaken by Kaeda Okumar Joint Venture. The last turbine was completed in 1985, and starting 1 December 1985, the 600 million rupiah (RM) dam was fully operational.

Status

Freshwater cage culture is an important industry in Sarawak as it fulfills the high market demand for freshwater fish, which provide a source of protein. The main freshwater cage culture activity is concentrated in the aquaculture industrial zone of the 8,400-hectare Batang Ai Dam (Map 15). Cage culture was initiated by the Department of Agriculture Sarawak in 1993. Currently, there are 9,224 cages belonging to 146 fishpen operators. Each cage is stocked with 500 fish fry, mostly

Map 15: Existing and Potential Cage Culture Areas in Batang Ai



Batang Ai Dam. Satellite image of fish cage project in the 8,400-hectare Batang Ai Dam (photo by Department of Agriculture Sarawak).

Source: Source: Department of Agriculture Sarawak.



Fish cage culture project. Fisheries is practiced in the aquaculture industrial zone of Batang Ai Dam (photo by Department of Agriculture Sarawak).

Tilapia nilotica as the main fish species cultured. In 1993, the production was only 3.01 metric tons (mt), which had increased to 434.4 mt in 2003, and 563.3 mt in 2017.

Red tilapia (*Oreochromis niloticus*) is the most popular species being cultured in Batang Ai due to its characteristics and fast growth. Also, it has wide acceptance for its good taste, good texture, and absence of mud smell. Moreover, its size is just right for home preparation, for big functions or parties, and other events. Other than tilapia, *patin* (*Pangasius sutchi*) and *tengadak* (*Puntius schwenfeldii*) are the next popular species being cultured by operators in Batang Ai.



Red tilapia fishpen. Red tilapia is the most popular species being cultured in Batang Ai Dam (photo by Department of Agriculture Sarawak).

Best Practices for Sustainable Fisheries in Batang Ai Hydroelectric Dam Reservoir

Cage culture is generally less controversial compared to shrimp farming. It does not involve mangrove clearing, nor does it compete with other economic activities for land. Environment issues related to cage culture consist of the following:

- site selection: must have good water quality;
- farm design and construction: must observe proper alignment of cages;
- water use: must have adequate water exchange;
- brood stock fry: must be of good quality and undergo disinfection before introduction into nursery cages; and
- culture management: must avoid overcrowding by having cages regularly cleaned, and grading in the early nursery and production stages.



Fish feeding at Batang Ai Dam. Fisheries is suitable when water quality parameters meet the standards for fish culture (photo by Department of Agriculture Sarawak).

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

Man-made impoundments may be built for various purposes such as reservoirs for domestic supply, irrigation, flood mitigation, and energy generation. Fisheries is popular in such bodies of water, which are normally suitable when water quality parameters meet the standards for fish culture. Big water bodies impounded at the upper reaches of the rivers have better quality of water since catchment areas are free from human waste and pollution. As in all aquaculture systems, a cautious approach is recommended, with culture level and intensity controlled to ensure that the ecosystem is able to take the possible impacts from the various effluents produced.

The success of fish cage culture in Batang Ai Dam is mainly due to the cooperation among and initiative of the farmers, local community, association, and potential anchor farm. Data show that 60% of the cage operators earn below RM2,000 per month; 20% earn between RM2,000 to RM3,000 per month; and 20% earn above RM3,000 per month. There is a need for interagency and intra-agency collaboration in providing the assistance needed for cage culture projects, especially access roads, facilities, and amenities required for the convenience of visitors (tourists).

The cage culture project in Batang Ai Dam plays an important role in improving food safety and food security not only in Sarawak but in the country. Improvement in these fisheries projects can help Sarawak to become a net food exporter by 2030. A good partnership between government and the community should be pursued to ensure that these projects are sustainable and would lead to an economically improved life for the people.



Harvesting in a cage culture project. Improvement in fisheries in Batang Ai Dam can help Sarawak to become a net food exporter by 2030 (photo by Department of Agriculture Sarawak).

Malaysia

Sustainable Fisheries Cage Culture Project: Bubu Emas Fishing, Labuan Federal Territory

Introduction

Federal Territory Labuan measures 91.64 square kilometers and is surrounded by smaller islands, namely, Burong Island, Kuraman Island, Papan Island, Rusukan Besar Island, Rusukan Kecil Island, and Daat Island. Labuan is bounded by the South China Sea, which makes fishing one of the important sectors of the economy. Currently, there are 396 fisherman operating 264 traditional fishing vessels under the Department of Fisheries Labuan. Apart from the traditional fishing vessels, there are 11 tuna *jongkong*, 3 deep sea vessels, and 16 commercial vessels under the Sabah Fisheries Department operating in Labuan.

In 2017, total fish landing in Labuan was 18,384.94 metric tons (MT), equivalent to 130,338,238.76 rupiah (RM) in terms of total gross value of landing. Meanwhile, fish landing using the *bubu emas* method in 2017 reached 329.49 MT, an increase from 225.2 MT in 2016.

Status

Fishing activities in Labuan are governed by the Fisheries Act 1985 (Amendment 317). The act allows a few fishing methods: crab trap; rod and line; and various types of fish net such as gill or drift nets, mini purse seine (for anchovy or small pelagic fish), and innovated fish trap called *bubu* (bamboo fish trap).

Traditionally, fish traps for fishing are made of bamboo. Nowadays, *bubu* is made of BRC wire mesh that is tied together to make a square-shaped iron enclosure. An inlet or valve allows the fish to enter but not to exit. The *bubu emas* (gold) system is a new technique and considered to be a more suitable method in Labuan.



Bubu fish cage. (Left photo) Traditionally, *bubu* fish traps were made of bamboo, but today are made of BRC wire mesh (photos by Department of Fisheries Labuan).

Aside from the low production cost, the *bubu* is easy to build, easy to handle, and can be used for a longer period. The normal size of the *bubu* is approximately 4 feet wide (1.22 meters [m]), 6 feet (1.83 m) long, and 2.5 feet (0.76 m) high. Fish caught by *bubu* are usually demersal species, which associate with reef and rough ground such as red snapper (*Lutjanus fulvus*), rabbit fish (*Siganus canaliculatus*), emperor fish (*Lethrinus lentjan*), sweetlips fish (*Diagramma pictum*), and redbelly yellowtail fusilier (*Caesio cuning*).

Bubu fishing areas are between 5 to 30 nautical miles from the coastline, and normally placed on the seabed, which can be up to 40 meters in depth.

Best Practices for Sustainable Fisheries Using Bubu Emas

The case of Asiran Jamal illustrates the modern fish trap fishing of *bubu emas* in Labuan.

Asiran Jamal is a 45-year-old entrepreneur who lives in Kampung Lubok Temiang with his wife and six children. He is also a licensed diver with the National Association of Indicator Institute. Jamal started *bubu* fishing in 2007. Initially, he had entered a competition called “Ilham Desa” to make *bubu emas*—*emas* because the *bubu* returns are like gold in value. He won the championship in 2010. Subsequently, he entered the “Ilham Desa” competition at the national level in 2011 and again emerged as the champion. As a result, Jamal became a mentor and pioneer for *bubu* fishing in Labuan.

Jamal acquired *bubu* fishing skills from the Department of Fisheries, Federal Territory of Labuan and the Fisheries Development Authority of Malaysia. These are some of his achievements throughout the years:

- 2010: Johan Anugerah Ilham Desa Peringkat Zon Sabah/Wilayah Persekutuan Labuan bagi Projek Ikan Bubu
- 2011: Johan Anugerah Ilham Desa Peringkat Kebangsaan Bagi Projek Ikan Bubu
- 2015: Anugerah Nelayan Jaya Wilayah Persekutuan Labuan
- 2016: Anugerah Nelayan Jaya Wilayah Persekutuan Labuan
- 2017: Anugerah Nelayan Jaya Wilayah Persekutuan Labuan

As a pioneer, entrepreneur Jamal has inspired other fishermen to also adopt *bubu* fishing. Presently there are 55 *bubu* entrepreneurs in Labuan, with an estimated 2,000 units of *bubu*.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

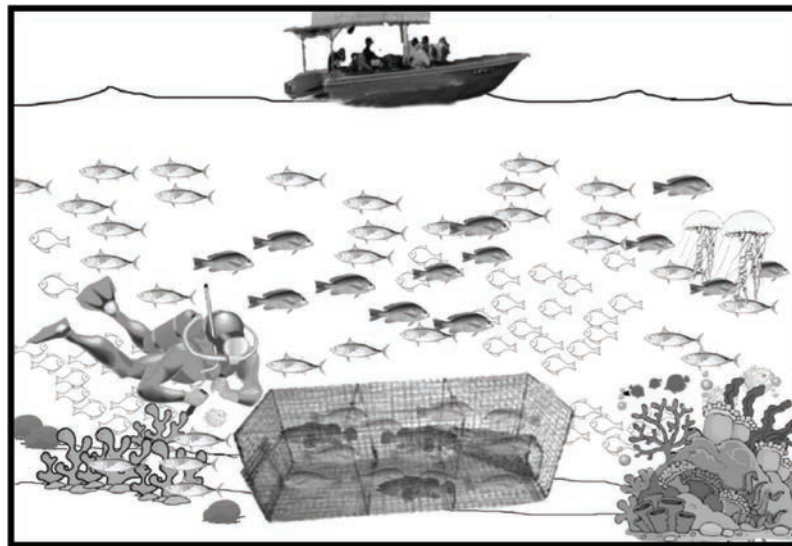
The *bubu emas* system has influenced and contributed to the fishing industry of Labuan. The method is not only successful but also plays a crucial role in sustaining the ecosystem by protecting the environment, and benefits the socioeconomic condition and well-being of communities.

The *bubu* system does not disturb the natural condition of the sea. However, expert skill is required to ensure success. If done properly, the *bubu* system can sustain lucrative incomes for a better quality of life.

1. Environmental Protection

The *bubu emas* system is resource-friendly and chemical-free and does not harm the ecosystem and natural habitat of the sea. The placement of *bubu* on the seabed can preserve juvenile species because they can escape from the mesh (Figure 7).

Figure 7: The Bubu's Position on the Seabed



Source: Labuan Corporation.

The *bubu* is fitted with a global positioning system and reallocated using an echo sounder or fish finder. Normally, the *bubu* is not placed on any part of a navigation route, port area, and coral reef especially a marine park gazetted area. *Bubu emas* fishing is considered resource-friendly due to its selective fishing method.

2. Economic Benefit

The income earned by Asiran Jamal from *bubu* fishing has increased progressively over the years. When he started his project in 2007, he had only five units of *bubu* and was earning about RM400 monthly. His project has since provided jobs, related business opportunities, and economic benefits including the following:

- The *bubu emas* industry has opened up employment opportunities and Jamal has employed a few villagers under him called *awak-awak*.
- Jamal has also employed seven single mothers to sell his fish catch.
- Besides selling to customers from Labuan, Jamal's business also attracts domestic and international tourists, particularly from Sabah, Sarawak, Peninsular Malaysia, and Brunei Darussalam.
- Jamal is also able to supply local seafood restaurants with fresh seafood.



Visitors welcome. Signage at entrance to a fishing area (photo by Labuan Corporation).

3. Social Benefit

Part of Jamal's social responsibilities to the community is selling his catch 30% lower than market prices (Table 2).

Table 2: Market Price for Fish Catch from *Bubu Emas* Fishing

Type of Fish	Bubu Emas (RM)/kg	Market Price (RM)/kg	Price Difference (RM)/kg
White fish	14.00–15.00	22.00	7.00–8.00
Red snapper	16.00–18.00	25.00	7.00–9.00
Squid	12.00	20.00	8.00
Cuttlefish	8.00–10.00	18.00	8.00–10.00
Lobster (<i>ikut gred</i>)	50.00–60.00	120.00	60.00–70.00
Others (<i>Belais/ Anduping/Lapi</i>)	5.00–10.00	15.00–18.00	8.00–10.00

kg = kilogram, RM = rupiah.

Source: Labuan Corporation.

Asiran Jamal has been sharing his expertise, knowledge, and experience with other entrepreneurs. He has been invited as a trainer for new entrepreneurs in Brunei Darussalam. In 2017, he was awarded the Muzakki Award by Pusat Pungutan Zakat for his contribution to zakat payment (Asiran Jamal, *Bubu Entrepreneur, Lubok Temiang, Labuan, 2018*).



Customers buying fish. Presently there are 55 bubu entrepreneurs in Labuan, with an estimated 2,000 units of bubu (photo by Labuan Corporation).

Philippines

Sustainable Fisheries Conservation: Tubbataha Reefs Natural Park, Palawan

Introduction

The Tubbataha Reefs and Natural Park is located in the Municipality of Cagayancillo, Palawan. It is situated within the Coral Triangle, about 92 nautical miles from Puerto Princesa City. It has about 10,000 hectares of coral reefs.

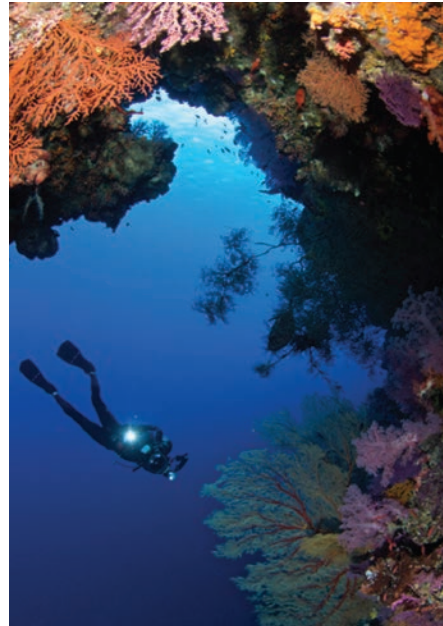
Tubbataha was declared as a Protected Area by virtue of Republic Act (RA) No. 10067 and Strategic Environment Plan for Palawan Act, RA 7611.

The park is composed of two uninhabited atolls and a reef with almost submerged platforms. The oblong-shaped North Islet encloses a lagoon of sand and corals with a maximum depth of 30 meters. The South Islet with a triangular reef structure has a 21-meter deep lagoon. These islets are separated by a channel.

As the largest marine protected area in the Philippines, Tubbataha is strictly a “no-take” zone area. It was inscribed as a World Heritage Site by UNESCO in 1993, and included in the Ramsar List of Wetlands of International Importance in 1991 because of its outstanding universal value and importance as a habitat of fish, corals, invertebrates, and seabirds.

Tubbataha is recognized as one of the “oldest ecosystems” of the Philippines, showcasing excellent pristine reefs and high marine life diversity.

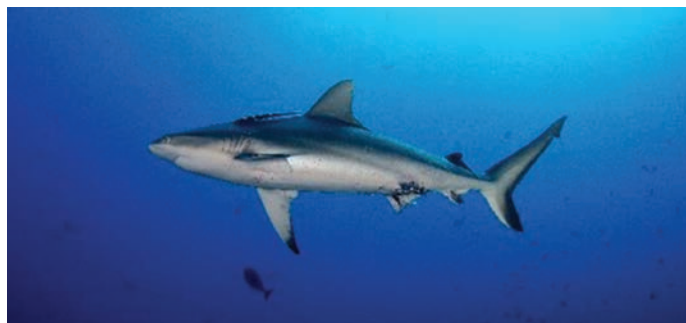
It has an important contribution in ensuring food security in some parts of the country because it is a major source of coral and fish larvae that are seeding the greater Sulu Sea.

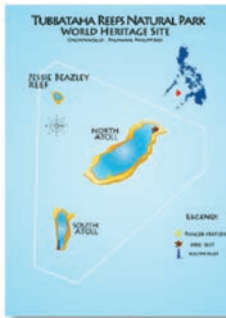


Tubbataha Reef. Steep walls and overhangs characterize Tubbataha diving (photo by Department of Environment and Natural Resources Region 4B).

Female grey reef shark.

The bite marks are inflicted by a male shark during copulation (photo by Department of Environment and Natural Resources Region 4B).





Corals and marine life. Tubbataha is the largest marine protected area in the Philippines (photos by Department of Environment and Natural Resources Region 4B).

Best Practices for Sustainable Fisheries in the Tubbataha Reefs

1. Management and Protection

Explicitly provided in the law is that the management of the park shall be consultative and participatory. The Tubbataha Protected Area Management Board (PAMB) is the policy-making body for the TRNP and is composed of 20 members from the national and local government, academe, and the private sector, all of whom are considered stakeholders of the park. The Tubbataha Management Office (TMO) serves as the TPAMB's executive arm, carrying out day-to-day park administration. Personnel from the Philippine Navy, Philippine Coast Guard, local government unit of Cagayancillo, and TMO comprise the team of marine park rangers. The rangers reside in the ranger station in Tubbataha, which is equipped with a satellite-based spatial monitoring system that allows the marine park rangers to spot illegal entry and illegal activities within the park. These rangers work on 2-month rotations, conduct monitoring, law enforcement, research, and visitor management.



One of the “oldest ecosystems” of the Philippines. (Top photo) Schooling jacks are a common sight in Tubbataha Reefs (photo by Bo Mancao). (Left photo) The masked booby (*Sula dactylatra*) reappeared after 21 years of absence but it has no mate, therefore its future in the park is still unknown (photo by Teri Aquino). (Right photo) Colorful gorgonian sea fans festoon the walls of Tubbataha (photo by Yvette Lee).

2. *Education Outreach and Programs for Schools and Coastal Villages*

Education and information activities are conducted with the assistance of the Tubbataha Youth ambassadors. Further, capacity-building projects for local youth were conducted with funding assistance from Pilipinas Shell Foundation, Inc.

Since 2008, the TMO has visited schools and coastal villages in Palawan and some communities outside the province. School visits bring much-needed marine conservation awareness to local youth. Visits to coastal communities of fisherfolk provide essential information about the TRNP Act (RA No. 10067), which aims to bring about voluntary compliance with rules and regulations.

3. *Educational Programs for Divers: Predeparture Briefings*

The TMO provides an educational briefing for divers before entering Tubbataha to ensure that all divers are well informed, thereby preventing the negative impacts of tourism, such as damage to the reefs and indiscriminate throwing of garbage, among others.

Predeparture briefings take place on board dive boats and aim to

- increase appreciation for the Tubbataha Reefs;
- increase understanding of park rules and regulations; and
- serve as a channel for visitors and boat operators to present comments and suggestions to improve park management.

4. *Financing Conservation*

The Tubbataha Reefs Natural Park is being administered with financial assistance from a range of sources. The main source of funding is from the conservation fees paid by visitors, comprising 59% of the annual budget. There are also grants from government (e.g., Department of Environment and Natural Resources, Local Government of the Province of Palawan); nongovernment organizations; the private sector (Pilipinas Shell Foundation, Inc.; Antonio Floirendo Foundation, Inc.; and World Wildlife Fund-Philippines); as well as the German government. These grants comprise about 26% of the budget earmarked for specific activities and projects. Most of these funds are deposited in the TRNP Trust Fund and administered by the TPAMB. The remaining 15% of the annual budget is provided in kind by the Armed Forces of the Philippines and the Philippine Coast Guard, who provide personnel and logistical support.

5. *Benefit Sharing*

The communities of Cagayancillo, Palawan receive 10% of the annual tourism revenue from the park. This fund enables the TPAMB to support sustainable coastal resource management strategies and alternative livelihood projects.

The TPAMB has set up a microcredit facility through the help of World Wildlife Foundation-Philippines to support livelihood activities for the communities. Through this fund, a road network connecting communities to the market was constructed. Seaweed farming is being encouraged as an alternative to fishing, and farmers are given loans and marketing support for their new businesses.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

1. *Social*

Strong leadership supported by an active citizenry has contained illegal fishing in the park. Inspired by the success in Tubbataha, local officials of the municipality of Cagayancillo have established five marine protected areas and a seabird sanctuary. The compliance of stakeholders with the conservation strategies employed by TRNP management has been achieved and the “no-take” zone policy is willingly adopted. Cagayanons as well have been empowered to protect and manage their own reefs and contribute to wider and intensified efforts to save corals in the Sulu Sea. The private sector also supports conservation efforts from compliance to regulations. The permitting system has been successfully implemented with 100% compliance. Scuba diving operators, tourists, and dive guides report illegal activities by fishers or by irresponsible divers.

2. *Economic*

The socioeconomic development and living standards of the communities have increased with the implementation of conservation strategies. Fish catch in the surrounding waters of Cagayancillo increased from 10 kilograms (kg) per day to 15–20 kg/day from 1999 to 2004. Furthermore, the TRNP was ranked 8th best dive site in the world by the CNN travel website.

Tourism revenues have increased as a result. Benefits from tourism revenue are being shared among the communities of Cagayancillo, Palawan, with 10% provided to the local government unit as a livelihood fund—which is the first and foremost direct compensation for the residents. Aside from local economic gains, tourism in Tubbataha contributes to the national economy through gains from the expenditures of tourists for airfare, accommodations, food, and souvenirs.

3. *Ecological*

The Tubbataha Reefs Natural Park has gained international recognition because of its outstanding universal value. More importantly, these values are being effectively conserved as gleaned from annual monitoring results. Fish biomass production remains high, and coral cover is increasing, so is the population of seabirds. Sea turtle populations are stable, and the shark population is one of the highest known in the world. Its rich marine life continues to colonize the surrounding waters, hence enriching fisheries.

Philippines

Sustainable Fisheries Conservation: Siargao Islands Protected Landscape and Seascape, Surigao Del Norte

Introduction

Located within the Greater Mindanao biogeographic zone, Siargao is one of 117 important bird areas; and among the 206 conservation priority areas in the Philippines. Owing to its 8,600 hectares of mangrove area, it is classified as a wildlife sanctuary, and protection of the islands was an initial component of the National Integrated Protected Areas System Act 1992 (Republic Act No. 7586 of 1992).

The selection of Siargao Islands as a priority site for conservation led to Presidential Proclamation No. 902 in 1996, declaring Siargao Islands as a protected landscape and seascape. Siargao's rich in biodiversity was further emphasized when it was identified as one of the 128 key biodiversity areas of the country (Map 16).

Map 16: Siargao—Surfing Capital of the Philippines



Source: Department of Environment and Natural Resources Region 13.



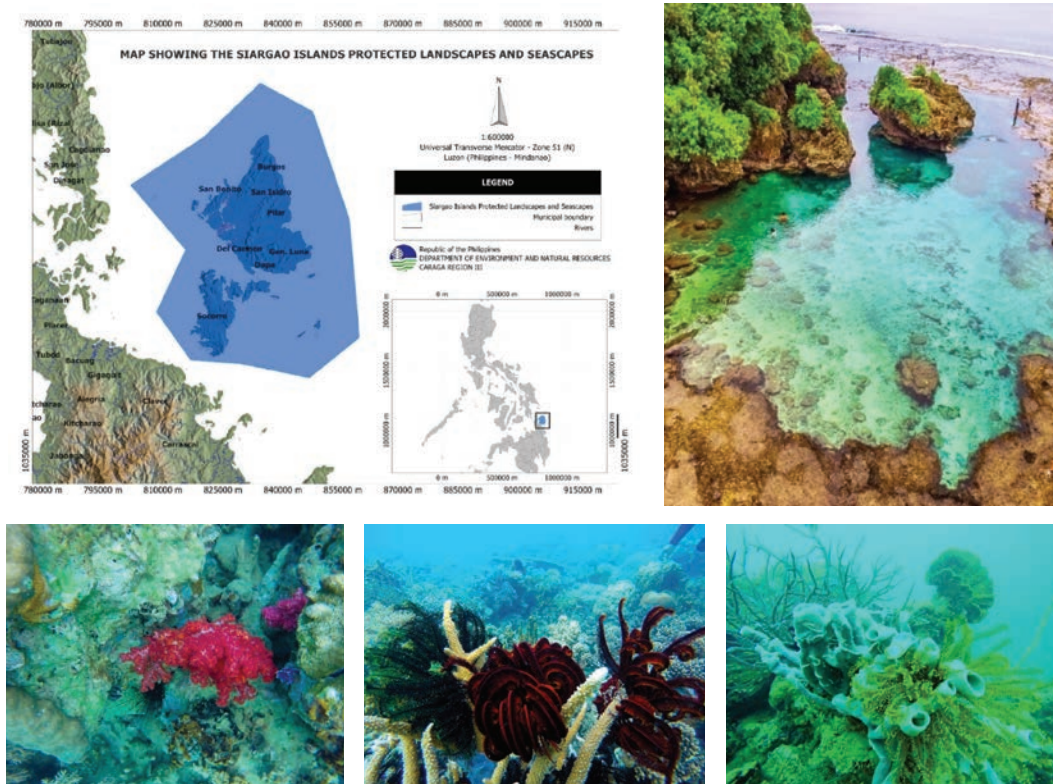
Siargao Islands. (Left photo) Brgy. Caub, Surigao del Norte. (Right photo) Del Carmen mangrove forest (photos by Department of Environment and Natural Resources Region 13).

Best Practices for Sustainable Fisheries in Siargao Islands

There is strict enforcement of laws, regulations, policies, and local ordinances for the management of community-based ecotourism in Siargao. These are implemented by the Siargao Islands Protected Landscape and Seascape (SIPLAS) Protected Area Management Board (PAMB). PAMB ensures the following:

- linking of public–private partnership for ecotourism development and livelihood support to the community;
- involvement of the community in protecting, developing, and managing forest and coastal resources;
- involvement of the community in ecotourism activities and livelihood programs related to natural resources use; and
- issuance of protected area community-based resource management and other tenurial instruments for protected areas (Map 17).

Map 17: Siargao Islands Protected Landscapes and Seascapes



Protected landscape and seascape. Magpungko rock formation and live aquarium at Brgy. Pilarong, Pilar, Surigao del Norte (photos by Department of Environment and Natural Resources Region 13).

Source: Department of Environment and Natural Resources Region 13.

Benefits and Impacts on Environmental Protection, Socioeconomic Condition, and Well-Being of Communities

1. Social

- Improved socioeconomic condition as a result of alternative livelihoods for the community such as tour guiding and handicraft and souvenir making
- Increased awareness of sustainable fishing practices
- Improved perception of natural resources and attractions as important capital assets of Siargao



2. Economic

Marine livelihood projects such as

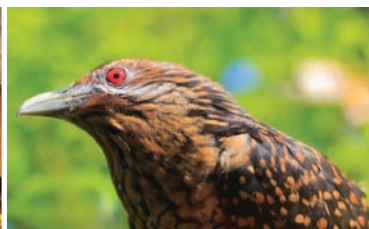
- fish pots, locally known as *bubo*;
- fish shelter, locally known as *payaw*;
- island and adventure ecotour services; and
- sustainable agri-fishing activities for local communities.



Increased awareness. The community now appreciates sustainable fishing practices and natural attractions as important assets (photos by Department of Environment and Natural Resources Region 13).

3. Ecological

- Presence of thick mangrove forest
- Preserved endemic species, in particular the *mancono*, the iron wood of the Philippines
- Presence of high fauna endemism
- Presence of species of seagrasses, which represent half of the species found in the Philippines
- Tropical climate gives the islands high tourism value due to its location and exposure to strong winds from the Pacific Ocean, producing waves 6–12 feet (1.83–3.66 meters), making the island the surfing capital of the country
- Presence of pristine white beaches caused by thick limestone deposits, which attracts local and foreign tourists
- Presence of rare fox corals (*Nemanzophyllia turbida*), an Evolutionary Distinct Globally Endangered coral species



Key biodiversity area. (Left to right) Soft corals in Talisay Marine Sanctuary; Patag Cave, Burgos, Surigao del Norte; and Philippine Koel (photos by Department of Environment and Natural Resources Region 13).

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