

Private Sector Commitment to Biodiversity Conservation: A Case Study – ‘Song Saa’ Marine Reserve, Cambodia

INTRODUCTION

The coast of Cambodia is located along the Gulf of Thailand and stretches from the Thai border in the northwest to the Vietnamese border to the southeast. The coastal shoreline is 435 km long and includes several large bays and extends across the provinces of Koh Kong and Kampot, and the towns Preah Sihanouk and Kep. The offshore marine area has 69 islands¹.

Approximately 30 kilometers off the east coast of Preah Sihanouk town 6 islands form the Koh Rong Archipelago. Being a unique coastal environment to Cambodia, it is home to a rich diversity of marine and island fauna and flora. This includes a large variety of orchids, insects and birds, and worldwide endangered and protected species such as seahorses and marine turtles. Because of its relative distance from the Cambodian mainland this area has suffered less environmental impact than other coastal areas and islands in Cambodia, and has thus preserved most of its natural resources and beauty. However, due to several peripheral factors it is in great danger of irreparable environmental degradation.

The external impacts

The various reviews of Cambodia’s marine

ecosystems cite a wide variety of serious threats to its natural resources. Anthropogenic impacts in the sea, such as the excess fishing effort and habitat destruction are major threats². Fish traps are resulting in coral damage, as these are deployed near or onto reefs to target coral fish. Gill nets are frequently deployed to catch larger pelagic fish such as Barracuda and Jacks, however, they do not exclude non-target species such as marine turtles and dolphins that tend to get entangled in such nets and die.

Habitat destruction includes blast and cyanide fishing, and damage of mangrove forest for charcoal and housing. Although reduced over the past years occasionally these activities are still practiced. The use of trawling gear has also shown great negative impacts on the sea floor ecology³. Also increasing population and uncontrolled coastal development effect important habitats through discharge of untreated domestic waste and siltation.

Resulting from poor management, coastal and marine resources in Cambodia are now under threat of unsustainable development, pollution and fisheries⁴.

Pollution

The increasing population growth, poverty, and lack of education in coastal areas manifests in poorly

↓ Aerial view of the Song Saa Islands and surrounding Marine Reserve





↑ Christmas tree worms can be found in the 'Song Saa' Marine Reserve in various colors

constructed houses without adequate sanitation and solid waste disposal. Especially at isolated islands where education and waste management are missing, solid waste has traditionally been burnt, littered, or dumped in surrounding areas, and sanitation wastewater enters directly the sea. Additionally lots of waste littered in the sea by the many fishing boats washes up on beaches and shoreline directly posing health risks for people and wildlife.

Enforcement challenges

The enforcement of the National Fisheries Law and regulations are weak due to underdeveloped infrastructure, which is not able to monitor offshore poaching. This leads to adverse environmental impact of the overall marine biodiversity and especially economic social welfare of coastal communities⁴. The current exhaustive fishing practices in Cambodia have a deplorable impact on the livelihoods of local communities and severely damage vital marine ecosystems.

Because the majority of islands, including the ones in the Koh Rong Archipelago, are isolated and relatively distant from shore ranging from 18 to 100 km, consistent enforcement of the Cambodian Fisheries Law has been difficult. If illegal activity is suspected, enforcement authorities must be alerted, which may not be able to act immediately due to lack of capacity. As a response the national government prepared the Royal decree on Community

Establishment, Sub-decree Community management and Proclamation on Guidelines of Community Fisheries in respectively 2005 and 2007, in order to grant authority to local island communities in conserving marine areas for sustainable use. However, the current status of poverty amongst local communities limits them to react on destructive fishing and poaching from *intruders*.

While coastal communities and national authorities keep having difficulties in effectively protecting and managing the marine ecosystem alternatives need to be looked for. There are cases of successful private initiatives in the Philippines and Honduras, which suggest that entrepreneurial marine reserves perform valuable functions. They build local awareness, and protect discrete areas that serve as refuges for threatened marine life – marine reserves⁶.

Marine reserves or no-take marine reserves are areas of the marine environment protected from various forms of human or extractive exploitation, and they safeguard marine life by excluding fishing. The marine areas outside of reserves are referred to as non-reserves or fished areas, where fishers are allowed to fish using traditional, non-destructive fishing gears.

PROJECT DESCRIPTION

Owned by two native families the island Koh Phoonne had been home to a fishing village for

nearly 20 years. About 60 people were living in over-water houses without ample sanitation and solid waste disposal. In 2006 these families sold their land to Brocon Investments Co., LTD who plans to develop the first island resort in Cambodia, Song Saa Private Island. The majority of the small community decided to move to a nearby coastal area. Without any environmental perception they left behind an area of thick sludge and waste posing a severe threat to the marine ecosystem. With great support from a small group of local people who remained living on Koh Phhoonne (Koh Ouen in some literature), and Prek Svay village from Koh Rong, the company started cleaning up the island and surrounding waters for over 18 months in order to retrieve its original status. A protection effort has been put into preserving this ‘rich’ ecosystem under a collaborative approach between local communities and the private sector cooperating with the Department of Fisheries Conservation of Fisheries Administration.

Song Saa

The Song Saa Private Island will be the first island

↓ The truly weird and wonderful Lantern bug



resort in Cambodia and located on the two small adjacent islands Koh Phhoonne and Koh Bong. The Resort comprises 17 bungalows and 8 villas in a pristine setting of jungle, beaches, and ocean. Song Saa is committed to offer an exclusive luxury retreat and spa. Compared to similar resort destinations in this region, Song Saa will not only create a unique destination for tourism but will be developed to the highest environmental standards, with a strong emphasis on social and environmental responsibility.

The vision is to establish a unique sustainable development effort that serves as a role model for coastal development and conservation in Cambodia and the wider region of South East Asia. The holistic approach ensures sustainable benefits on different levels such as environmental research and education; increase livelihoods; and protection of ecosystems with high biodiversity value. The development of the Song Saa Private Island involves environmental conservation initiatives and responsibilities that have been independently developed in light of the limited environmental regulations enforced in Cambodia. The project is seen by a variety of wildlife conservation and sustainable development organizations as a best practice pilot project for ecotourism developments that are proposed for this and the surrounding islands in the region.

In late 2007, Song Saa Private Island offered ideal conditions for small-scale protection and declared the first private marine reserve surrounding the two islands.

The shelter

The ‘Song Saa’ Marine Reserve is a private reserve that surrounds both the islands of Koh Phhoonne and Koh Bong and covers one million square meters. Extending 200 meters from the outer edge of the reefs around the islands, the reserve has a coral coverage of approximately 11 ha⁵. The Reserve is a no-take marine reserve prohibited to any boat traffic either than scientific purposes (marine research), patrolling, and recreational (swimming, snorkeling, SCUBA). Within the Reserve there are mainly well-developed fringing reefs, and several patchy reefs that include coral species of *Acropora*, *Favites*, *Goniostrea*, *Pavona*, *Porites* (hard corals), *Sarcophyton*, *Ellisella* (soft corals), and *Actinaria* (sea anemones). The reefs are reasonably shallow ranging from 2 to 8 meters depth.

Some terrestrial wildlife communities, while not resident, frequent the area. These include the Stork-billed Kingfisher, Brahminy Kite, Spotted Wood Owl, White Bellied Sea Eagle, plovers, fruit bats, Oriental Pied Hornbill, skinks, spiders and insects.

There is dense vegetation on the islands, in particular on Koh Bong. Fragments of true-mangroves (*Bruguiera gymnorrhiza*) are present on the northwestern side of Koh Phhoonne and provide the critical link between terrestrial and marine environments.

Patrolling

Marine reserves are vulnerable to illegal fishing and poaching of protected and endangered species effecting entire ecosystems. To reduce these threats patrolling and surveillance is necessary. At the same time patrols also help to monitor activities outside the boundaries of the ‘no-take’ zone, which is helpful for future conservation plans. Since 2006 the Song Saa Private Island works closely together with the existing regional fishery committee, a forum of local people with the knowledge and desire to protect their own livelihoods through marine conservation. Building onto this trust the ‘Song Saa’ Marine Reserve is now patrolled under the watchful eye of this committee in close cooperation with local staff to ensure it’s not affected.

The assessment

In 2010, nearly 3 years after the inception of the ‘Song Saa’ Marine Reserve, biologists conducted reef monitoring inside the Reserve in which the status and abundance of fish, corals and other invertebrates were assessed. Further local fishermen and community residents, who have been living in the area for at least 12 years, were interviewed. The effectiveness of the ‘Song Saa’ Marine Reserve was compared to similar types of habitat at nearby unprotected reefs and with data obtained by the Department of Fisheries in 2003 prior to Reserve establishment.

During interviews fishermen recalled that

approximately 10 years ago the area had been heavily exploited using explosives and bottom trawlers with a fishing pressure of nearly 24 hours per day. Using unselective fishing gear and indiscriminate practices, marine life was harvested including large quantities of non-target species that were discarded, usually dead or dying. It wasn’t uncommon to see sharks, stingrays, seahorses, horseshoe crabs, and eagle rays in the nets – all ecologically important marine species that were overexploited and are seldom encountered in the area nowadays. After 3 years of intensive fishing, resources were entirely exhausted and fishermen were destined to move to more remote areas where commercially interesting species were still available.

Reef surveys conducted in non-protected marine areas, such as Koh Tonsay, off the coast of Kep municipality – South coast of Cambodia, found that the species diversity, and density of fish and benthic invertebrates is extremely low⁷. Kim et al., 2003, recorded similar findings. The marine habitat near the southeastern tip of Koh Tonsay has been heavily exposed to fishing pressure, as large pieces of coral were broken off, damaged by anchor deployment and destructive fishing. The bottom substrate mainly consisted of dead coral and rubble⁷.

Anecdotal and photographic evidence from the island Koh Rong Samleom shows the emerging decline in seahorses (*Hippocampus* spp.), seamoths (*Pegasus* spp.), and pipefish resulting from bottom trawling and poaching. In particular seahorses have been numerous in the Koh Rong Archipelago, however, in recent years sightings are rare.

With respect to commercial and predatory fish, group sizes and individual body length of fish are drastically declining. 2009 Surveys, that covered the surrounding reefs of Koh Rong Island, found fish

↓ Frequent patrolling secures the high biodiversity value of the ‘Song Saa’ Marine Reserve





↑ Bubble corals are one of the many coral species that build the Reserve's reefs

Thriving new life; cuttlefish eggs ↓

densities including Groupers (Serranidae), Parrotfish (Scaridae) and Snappers (Lutjanidae) very low indicating significant fishing pressure on the reefs. Recorded densities per hectares were ~40 (Groupers), ~190 (Snappers), ~450 (Rabbitfish) and ~70 (Parrotfish), respectively. Individual length of several species of Grouper (*Cephalopholis argus*, *Cephalopholis formosa*, *Epinephelus merra*), and Parrotfish (*Scarus ghobban*) did rarely reach mature sizes. Group size of rabbitfish (*Siganus veratus*, *Siganus javus*, *Siganus guttatus*) was estimated to maximum 10 animals (*pers. observ. V. Bush, Coral Cay Conservation*). Follow up surveys in the Koh Rong Archipelago, currently conducted by Bochove, again exclude juveniles from groups of schooling fish and immature fish sizes. Surveys conducted at the island Koh Rong Samleom resulted in ~50 (Groupers), ~170 (Snappers), and ~70 (Parrotfish) per hectares.

Recent surveys conducted in the 'Song Saa' Marine Reserve, using permanent transect, show significant difference in body length and group sizes of fish. Individual body length of Grouper (*Epinephelus bleekeri*, *Cephalopholis boenak*) and Parrotfish (*Scarus ghobban*) have been estimated between 30 to 60 cm and go up to 70 cm, which was recorded for the potato cod (*Epinephelus tukula*) in March 2010. Group sizes of Rabbitfish, Yellow tail barracuda, Snappers, and Parrotfish are 2 to 3-fold higher than reported by Bochove et al., 2009, and occasionally reach up to 60 or more individuals. Recorded densities per hectare were ~790 (Rabbitfish), ~120 (Grouper), ~330 (Parrotfish), and ~340 (Snapper). Besides (pre)adults the majority of encountered groups also include juveniles. Additionally, eggs of nudibranchs, squid, and cuttlefish have been



regularly recorded while surveying the 'Song Saa' Marine Reserve.

Inventories of catchments and interviews with local fishermen, who fish in the vicinity of the Marine Reserve, did not show any signs of Sygnathidae – *seahorse*, *pipefish*, and *seamoth* – whereas reef surveys conducted inside the 'Song Saa' Marine Reserve with similar habitat conditions recorded frequent sightings of at least 5 different species including juvenile animals.

Densities of long-spine (*Diadema*) sea urchins were high indicating slight instability in the reef ecosystem, possibly as a result of past overfishing of its key predators such as Surgeonfish, Wrasses, and starfish. Bochove et al., 2009, recorded double densities, ~12600/hectares. Future surveys need to investigate population densities of species that prey on *Diadema* spp. to monitor ecosystem shift to more favorable conditions.

Giant clams (*Tridacna* spp.) are an important local food source and have been traditionally harvested for centuries. They are important reef filter feeders that contribute to the reef structure and rugosity. Giant clams are a good indicator of a healthy reef because of their high sensitivity to changes in water conditions. The density of Giant clams also differed between the non-protected marine areas and the ‘Song Saa’ Marine Reserve with ~95 clams per hectare and ~245 clams per hectare, respectively.

CONCLUSION

Because corals were monitored for their percentage coverage and a only a few data sets are available from Cambodia, it would be inaccurate to assess the effectiveness of the ‘Song Saa’ Marine Reserve on coral conditions in such a short period of time. For that reason corals are not discussed in this case study. However, it must be acknowledged that some corals such as the *Acropora* spp. in the ‘Song Saa’ Marine Reserve show new growth.

Nevertheless the data comparison on predator fish

show clear evidence that populations are denser in the no-take Reserve and shows that through reducing fishing pressure species can thrive and become more numerous. The presence of Barracuda, Jacks, Grouper, Snapper and large Potato Cod in the Reserve, which are the predators in the food chain, indicate that there is a healthy balance of fish in the reef. Even though Barracuda (*Sphyraena jello*) and Jacks (*Carangoides ferdau*, *Gnathanodon speciosus*) exist in relatively small numbers, it indicates the reef is recovering from a decline.

Well implemented no-take areas can allow fish to grow older and larger (thus producing more eggs and juveniles) and cause fish density to increase. This should result in the replenishment of adjacent fished areas through the export of larvae and movement of adults (the ‘spillover’ effect) across the ‘Song Saa’ Marine Reserve boundary. On turn this supports local communities that are highly depending on fisheries who have already been enjoying increased catches outside the Reserves boundaries.

Despite the relatively small surface area of the ‘Song Saa’ Marine Reserve, the discussed results clearly show the positive effect of the Reserve contributing to the preservation and healthy populations of marine fauna and flora in Cambodia with in particular endangered species such as seahorses and horseshoe crabs.

Besides the positive effects of a no-take reserve on the marine ecosystem, this case study also shows the

↓ Over 25 different colors and shapes of nudibranchs, like this *Plakobranchnus ocellatus*, can be found in the Reserve



significant role of the private sector in preserving the natural resources. Because the current protection of marine ecosystem in Cambodia is weak due to lack of human and financial resources, processes to establish protected reserves may take years. Through island lease, the Song Saa Private island has been able to take immediate action. Subsequently they can bring in revenues for management generated from ecotourism. Especially in Cambodia that has already many species at the brink of extinction this could help a conservation success without being a financial burden to the government or the donor community.

Broader impact

It is obvious that no-take areas are beneficial for the purpose of fisheries production. They are important tools for biodiversity conservation and fisheries management especially when implemented in close consultation with stakeholders.

This case study is an effective example of a restored marine ecosystem through cooperation between national government, local communities and the private sector. Involved local communities will see the immediate results and long-term livelihood benefits. Whilst information is disseminated from community to community the impact is broadened.

Based on the initiative of the Song Saa Private Island and with support of the national conservation plans for coral reef and sea grass protection this case study is a supportive tool for a future Marine Protected Area. The ‘Song Saa’ Marine Reserve as a test case provides a core area around which larger parks could be developed.

Further steps have been undertaken to connect the existing marine reserve to a Marine Protected Area within the Koh Rong Archipelago and increase its impact on the preservation of this rich marine ecosystem. It is obvious that without immediate

action further loss of the marine ecosystem in Cambodia will be inevitable.

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