Rapid Assessment of the Gulf of Mottama
(East Coast)

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Some Acronyms

BANCA = Biodiversity and Nature Conservation Association
CLCMGM = Community-led Coastal Management in the Gulf of Mottama
EAAFP = East Asian-Australasian Flyway Partnership
EESC = Environmental Education and Sustainability Center
GOM = Gulf of Mottama
IBA = Important Bird Area
KNCF = Keidanren Nature Conservation Fund
MONREC = Ministry of Natural Resources and Environmental Conservation
NAG = Network Activities Group
NWCD = Nature & Wildlife Conservation Division
SDC = Swiss Agency for Development & Cooperation
WWD = World Wetlands Day

Rapid Assessment of the Gulf of Mottama[1]
(East Coast)

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Gulf of Mottama & Its Location

The Gulf of Mottama, named after the port city of Mottama (erstwhile Martaban) is situated at the eastern coastal region of the Bay of Bengal. It is an arm of the Andaman Sea which lies at the southern end of Myanmar.

The bell-shaped Gulf is part of the Ayeyarwaddy Delta Costal Zone in Myanmar. It is about 104 miles (166 km; 1 mile = 1.6 km) away from Yangon and can be reached through road (5 hours), train (7 hours) and cruise.

The Gulf, which is rich in resources but high in poverty, bounds Mon State, Bogo Region, Yangon Region and Ayeyarwaddy Region (**See the map below**). The area within a straight line between the southern point of Pyapon Township in Ayeyarwaddy Region and the southern point of Mudon Township in Mon State is what we call here, the Gulf of Mottama (GOM). Its area is 441,784 acre (178,848 ha; 1 ha = 2.47 acre) (**Saw Mon Theint & Pyae Phyo Aung, nd**). Surrounded by Yangon Region in the west, Mon State in the east, Bago Region in the north and the Andaman Sea in the south provides livelihoods to millions of people and supports a variety of aquatic species of fauna including shorebird, Spoon-billed Sandpiper, *Calidris pygmaea* (**Panwad Wongthong & True, 2015; Wikipedia; Pyae Phyo Aung, 2016**).

The Gulf included in the Yangon River & its west is called "West Coast"; the section in Bogo Region and northern part of Mon State is called "Central Coast" and the southern coast of Mon State is called "East Coast".

Major townships in the coastal areas of this Gulf are Kyaikhto, Bilin, Thaton, Paung, Chaungzon, Mawlamyine, and Mudon in Mon State; Kawa and Thanatpin in Bago Region; and Kungyangon, Kawhmu, Kyauktan, Thongwa, and Kayanin Yangon Region, and Dedaye and Paypon in Ayeyarwady Region.

The GOM is the most extensive and most significant intertidal mudflat system in the world. The Gulf was created by the discharge of waters and sediments from three rivers; Yangon, Sittaung and Thanlwin. The sediments are distributed by tides that come two times a day.

[1]The rapid assessment of the Gulf of Mottama was undertaken from the 29th January to 3rd February 2017. The financial support received from KNCF is greatly appreciated. Special thanks are due to BANCA, its staff and the fourth author, U Pyae Phyo Aung.
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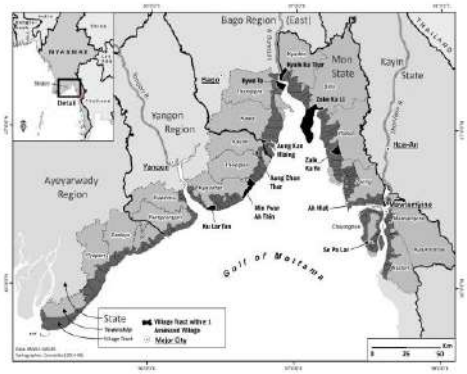
The Wikipedia, the free Encyclopedia mentions that tides are the rise and fall of sea levels caused by the combined effects of the gravitational forces exerted by the Moon, the Sun and the rotating Earth. The tides originate in the oceans every 12 hours and move gradually towards the coast line.The height of the tides ranges between 4–7 m at the Elephant Point in the western GOM. During spring tide, when the tidal range is around 6.6 m, the turbid zone covers an area of more than 45,000 km^2 making it one of the largest perennially turbid zones of the world's oceans. During neap tide, with tidal range of 2.98 m, the highly turbid zone coverage drops to 15,000 km^2. The edge of the highly turbid zone changes back-and-forth in sync with every tidal cycle by nearly 150 km (**Panwad Wongthong & True, 2015:6)**.

The area covered by the Yangon river in north and Thanlwin river in south, particularly from Suppany Pagoda (at Sittaung Village of **Kyaikto Township of** the upper Gulf area, which is about 16 km up north from the Sittaung Bridge) to Mawlamyine (including the Belu Kyun) of Mon State at south (6-10 km either sides from the coast line) is proposed as a Ramsar site (**Panwad Wongthong & True, 2015**). It covers an area of **33,920 ha** or about 19% of the total area of the Gulf, as shown in the map (**Saw Mon Theint & Pyae Phyo Aung, nd**).

According to U Pyae Phyo Aung of BANCA, the GOM is under the jurisdiction of, and managed by, the Mon State Government; Yangon and Bago Regional Governments, and General Administrative Department.



Special Fauna & Flora

The distinctive types of fauna that are biologically important in the Gulf area are briefly described below.

(1) Fishes

Tint Wai *et. al* (2014) reported 39 species of fishes representing 26 families from the east coast of the GOM in Mon State. According to the report, none belongs to the threatened status. Nor, does the report mention their IUCN conservation status. However, the report mentions 8 species of least concern status and one species named Spadenose Shark, *Scoliodon laticaudus* Muller & Henle (1838) under the threatened status.

According to personal communication with Prof. Dr. San Tha Htun of the Department of Marine Sciences, Mawlamyine University, the flagship fish species of the GOM are;

1. Barranmundi (Giant Sea Perch), *Lates calanrifer*
2. Spotted Croaker, *Pterotolithus maculates*
3. Indian Threadfin, *Polydactylus indicus*
4. Toli Shad, *Tenulosa toli*

(2) Birds

The GOM is the most important wintering ground in the world for the critically endangered migratory bird, Spoon-billed Sandpiper, *Calidris pygmaea* (**Pyae Phyo Aung, 2016)**. In 2004 the status of the Spoon-billed Sandpiper was vulnerable but in 2008 it was upgraded to critically endangered status.

Globally these birds numbers only 500. In Myanmar their number is about 189-220 and they are found in 4 sites, Nanthar Island, Delta Region, GOM and Taninntharyi Region (**PyaePhyo Aung, personal communication).** GOM hosts half of the global population of Spoon-billed Sandpiper in wintering season.

Also, the Gulf is a wintering ground for over a dozen globally threatened species of migratory shorebird (**See Annex I: Important Waterbird Species**). According to EAAFP, about 200,000 migratory waterbirds winter here from October to mid-April. Over 70 waterbird species have been recorded at the site, including six species of ducks, 31 species of waders and 16 species of terns or gulls. Other important migratory species include Spotted Greenshank, Great Knot and Lesser Adjutant Stork (**See Annex II: Common Waterbird Species**).

(3) Seagrasses

Soe-Htun*et al.* (2001) have documented the distribution of 9 species of seagrasses along the coastal regions of Myanmar. But no species is found in the GOM. According to them seagrasses are totally absent in the Ayeyarwaddy Delta and the GOM. The reasons are attributed to (1) the high turbidity of water (caused by two rivers; the Sittaung river and Thanlwin rivers, which reduces light penetration that in turn causes the absence of seagrasses; (2) hyposalinity of the brackish water which also prohibits the luxuriant growth of seagrasses; and (3) the predominance of mud-or silt-covered shallow flats which moves seawards at a rate of about 50 m per year.

Regarding the absence of seagrass vegetation, Kochi University also confirms that sub-tidal vegetation of sea grasses is totally absent in the Ayeyarwaddy Delta and the Gulf of Mottama (GOM) coastal region. The reason is attributed to turbid water caused by the sediments of the Sittaung and Thalwin rivers (**Bulletin of Marine Science & Fish, Kochi University No 21, 2001, pp. 13-22)**.

However, in their PowerPoint presentation on the Myanmar Coastal Region, **Soe-Htun & Tint Swe** (2014) have reported the presence of only one species of sea grass *Halophila beccarii* in the Ayeyarwady Delta (west coast) and Mon State coastal zone (east coast) of the GOM. [*The authors of this report believe that this contradiction needs to be verified*.]

It is out of place to mention the functions of seagrasses. The root-like stems of seagrasses stabilize the sea bottom as well as shoreline. Seagrass beds filter and export organic nutrients to the nearby ecosystem of coral reef and mangroves. They also serve as feeding, spawning, nursery and breeding grounds for marine invertebrates and vertebrates (**Soe-Htun *et al.* 2001:13**). Both vertebrates and invertebrates need to be further studied in detail.

In another study, Aye Mon Sein *et. al* (2003) have reported that seeweed, *Prophyra suborbiculata* Kjellman, identified as *P. crispate* Kjellman in Myanmar grows well in the intertidal zone of tropical and sub-tropical waters of Asia but not along the Ayeyarwaddy Delta and the coastal area of the GOM due to perhaps the hyposalinity of water coming from major rivers, namely Sittaung and Thanlwin.

(4) Mangroves

The direct uses of mangrove include timbers for construction and fuel (charcoal and firewood), providing nurseries and artisan products. Besides, mangroves provide various ecological goods and services such as protecting coastal lands, settlements and infrastructure

against the effects of cyclones and tidal surges. **Panwad Wongthong & True (2015)** report that the western side of the Gulf (Bago and Yangon Regions) had extensive areas of mangrove forests but in the eastern side (Mon State) of the Gulf, only remnants of two species of mangoves *Avicenia spp* and *Nypaspp* are found (**Panwad Wongthong & True, 2015; San Than Htun, Personal Communication 2017).**

The depletion and degradation of mangroves is comparatively greater in Ayeyarwady region than in other areas due to higher population, easier accessibility to the forest and the devastated impacts of Cyclone Nargis (**Hutn Paw Oo, 2016)**. The common species reported from the Chaungtha Township area of the Ayeyarwady region are (1) *Xylocarpus granatum* (Pile-ohn), (2) *X. moluccensis* (Kyana), (3) *Avicenia officinalis* (Thame), (4) *Rhizophora mucronata* (Byu-chidaukAma), (5) *R. candelaria* (Byu-chidaukApho), (6) *Kandelia candel* (Byu-baing-dauk), (7) *Ceriops decandra* (Madama) and (8) *Heritiera fomes* (Kanaso) (**U Htun Paw Oo, Powerpoint Presentation, 2017**)

(5) Mammals

Panwad Wongthong & True (2015)**,** on the basis of anecdotal evidences suggest that the Gulf supports marine mammal, Finless Porpoise, *Neophocaena phocaenoides* which is ranked as vulnerable or critically endangered in the IUCN Red List. Like in other Asian countries, the population of Finless Porpoise in Myanmar is affected by habitat loss and degradation, entanglement in fishing gears, boat traffic and pollution.

Maung Maung Lwin (2007) in his article *Conservation Status of Leatherback Turtles in Myanmar from the Department of Fisheries* reported the sighting of the nesting of the Leatherback Turtle in Andaman Island, GOM and the Bay of Bengal but it is almost in extinct now in Myanmar. A dead leatherback turtle was found in 1976 and another in 1993. It can be said that the turtle is history in the GOM. The cause of death was attributed to fishing activity.

> "According to the report of Marine Turtle Conservation Volunteers, a nesting Leatherback Turtle with 82 eggs was found on Ashaet Phya Beach, Bogalay Township, in Ayeyarwady Division on 13 August 2007 at 4:15 PM. Her carapace length was about 1.85 meters. After nesting, she returned to the sea the same day at 6:30 PM. About 51 eggs were sent to Htaung Gyi Tan Beach Station in Bogalay Township on 14 August 2007. Some 27 of the eggs were found to be undeveloped. The rest were destroyed during the searching process." (http://www.ioseaturtles.org/pom_detail.php?id=61)

(6) Benthos

U Soe-Htun of the Mawlamyine University, in the outstanding Research Paper 2010 titled *The Seaweed Resources of Myanmar* (http://www.ioseaturtles.org/pom_detail.php?id=61) has reported 229 species of marine Algae along the 3 coastal regions; Rakhine Coastal Region, Ayeyarwaddy Delta & GOM and Tanintharyi. In Ayeyarwaddy Delta & GOM coastal regions he has reported 11 species of Marine Benthic Green Algae, 3 species of Marine Benthic Brown Algae and 22 species of Marine Black Red Algae. The commonly found Red Seaweed is *Catenella nipae*. Also, he has reported that these species *Colpomenia, Amphiroa, Gracilaria, Catenella, Laurencia* and *Acanthophora* are commonly found in these regions.

(7) Coral Reef:
In his PowerPoint Presentation titled *Status and Challenges of Coral Reef Monitoring in Myanmar,* Zau Lunn reports the presence of only three species of coral reefs in the Ayeyarwaddy Delta Coastal region. Soe-Htun *et al.* (2001) further reported that Seagrass, which is called *Leik-Sar-Phat-Myet* in Myanmar is a food for marine turtles such as the green, *Chelonia mydas*, the loggerhead, *Caretta caretta*; the Hawksbill, *Eremochetys imbricate*; the Leatherhead, *Dermochelys coriccea*. Based on this finding we can also come out that there are no turtles in the GOM. Or in other words, marine turtles can't be found in a place where there is no seagrass.

Management Initiatives

(1) Since 2011 Biodiversity and Nature Conservation Association (BANCA), the species guardian of the Spoon-billed Sandpiper in Myanmar, has been working with the Ministry of Natural Resources and Environmental Conservation (MONREC) and Mon State Ministry for Forestry and Mining to push the Gulf for its inclusion in the Ramsar site (**Myint KayThi, 2015**) . It has been regularly updating the Ramsar Information Sheet for the nomination (**Panwad Wongthong & True, 2015).**The BANCA is using a special software called Special Monitoring and Reporting Tool (SMART) to monitor the wildlife in the area. The BANCA also has established its field office in Theingu Village of Bilin Township. The office is called Environmental Education and Sustainability Center (EESC).

(2) Several organizations (MONREC, HELVETAS, IUCN, NAG & BANCA) are engaged in the implementation of the 10-year long community-led management plan for the conservation of the Gulf area (**SDC, 2016**).

(3) The MONREC and the East Asian-Australasian Flyway Partnership (EAAFP) are working together to designate the area as a Flyway Network Site [EAAF117] covering over 195,000 ha. of the greater GOM.

(4) The GOM is also designated as an Important Bird Area (IBA) of Myanmar in June 2014 in World Bird Data Base, Important Bird Area in Danger (IBA in Danger) status by BirdLife International 2015 and Asian Bird Data zone for Myanmar.

Coastal Village and Livelihoods

On the 29th January, we were able to visit two villages; Kyarsi Aung and Zoke Ka Li, which were coastal villages as their daily activities are affected by the movement of tides. According to SDC (2016) coastal villages are the small villages in Myanmar situated within a short distance from the coast. The main occupations are either fisheries or rice cultivation or both but mostly dominated by fisheries. Fisheries are suspended in the rainy season due to weather conditions and turbid water. These villages become island in the rainy season and dry land in summer (streams filled with sand, and salt marshes) resulting in boat transportation in the rainy season and on foot or vehicles in the winter. There is a great scarcity of freshwater in summer. Regarding vegetation, mangroves or associated species are the dominating vegetation because of the circulation of salt, brackish and freshwaters. In short, the life of the coastal village is determined by sea tides (both ebb and neap tides).

A quick participatory assessment of people and life of Kyarsi Aung and Zoke Ka Li Villages, as discussed in the community meetings provided us some information on the general socio-economic status of the coastal villages. The following are the major points of the meetings.

1. Kyarsi Aung Village consisting of 85 houses has about 99 children, who go to the primary school in the village and many of them complete only up to Grade 4. Villagers can't afford the schooling of their children because of no high school nearby and economic hardships.
2. The situation of "*Too much water in the rainy season but no water in summer*" has caused a great shortage of freshwater in summer. In dry season, some benevolent people (*Ahlushin*, social workers) bring freshwater from the city and distribute 10 gallons per households. Sometime, the villagers have to bear the transportation cost and food for *Ahlushin*. In order to address this issue, the BANCA with financial assistance from the Darwin Initiative has built ponds in these villages, one each to collect rain water for drinking purpose. These ponds have mitigated their water problems to some extent. Besides, in Zoke Ka Li village, a 3 km long check dam is under construction (with two excavators in operation) to protect their rice fields from high tide and the intrusion of saline water. The check dam along with channel and road on the side are being constructed with assistance from the Ministry of Irrigation.
3. Fuelwood is a big and serious problem in the villages because no vegetation grows in this village due to saline water.
4. The village does not have any Kala people. The Kla is a general term for migrants, especially the people of Nepali and Indian origin.
5. Major economic activities include fisheries, renting boats and farming, while others work for cash. Given the choice to economic activities, people would choose fisheries as it gives regular income whereas farming gives results at the end of the season. Also, it would be interesting to note their viewpoint that famine occurs when farming fails but no famine in sea fisheries excepting natural calamities with low harvest.

6. Generally fishermen borrow money for repair and maintenance of their boat from the middlemen amounting something like 200,000 Kyat upon the conditions that they sell their fish to them at the cheaper price. Then the lenders sell the fish at higher price. Generally fishermen are being immersed in debt. The loan is used for boat repair, net and other accessories. Debt is a serious problem for the fishermen. In Zoke Ka Li, villagers borrow money from the cooperative as well.
7. The best season for fishing is October-January and April –June including rainy season.
8. Fisheries can be divided into two types;
    a. Daily fishing: small fishing done by both male and female. Sometime, females do crabbing as well.
    b. Medium fishing: fishermen go to sea for a period of 5-6 days with their ice box. They return home and sell their catch in Kyaikhto.
9. To our question on "What time of the day do the fishermen go to sea for fishing?" they told us that their schedule is determined by tides, which come 2 times a day. We were informed that today they are expecting tides at 6 pm. Tides make a special sound. To our next question on the catching of fish species, the villagers responded as many as 10 species of fishes they

have caught over a period of time. Regarding their monthly income, villagers told us that their average monthly income ranges from USD 200 to 300. However, the highest income is about USD 600-700 per month.

10. Ritual activities include some offerings to boat every month. They worship when they get new net. In June, they celebrate a festival collectively. Fresh coconuts and bananas are offered to the superpower. In case these offerings are not fresh, then the offering is considered incomplete and fresh ones are offered again to the superpower.
11. Concerning the problems they are facing in the area, the following are the major ones.
    a. Lack of technological and geographical knowledge, especially alternate livelihoods
    c. Suffering from high interest rate from the middlemen.
    d. Decreasing annual harvest mainly due to the use of the net of small mesh by the private fisher. They catch all the fishes including juveniles.
    e. Schooling problem for their children
    f. Great shortage of freshwater especially in summer
    g. Transportation problem (both in rainy as well as dry seasons)
12. HELVETAS, Network Activities Group & IUCN prepared a 10 year long community-led participatory Management Plan for the Gulf of Mottama in 2014. The Project was undertaken with support from The Swiss Agency for Development & Cooperation (SDC) of the Swiss Embassy. Its overarching goal is "Biodiversity of the GOM conserved and sustainably developed to benefit human community that depend on it". Three outcomes and responsible agencies as follows.
    a. Biodiversity conservation by IUCN
    b. Resilient livelihood by HELVETAS
    c. Sustainable fisheries management by Network Activities Group.
13. The Project also prepared a report titled *Livelihoods and Fisheries Management in the Gulf of Mottama, Myanmar*. Its brief summary highlights are presented in Box A under below *Livelihoods in the Coastal Villages*.

Box A: Livelihoods in the Coastal Villages

1. Ten coastal villages out of 83 in the GOM were studied employing rapid participatory methods.
2. The total population of the area is 62,000 enumerated from 25,419 households. About 34% of them are fisher households with the remaining as farming, livestock and wage earning ones.
3. According to landownership categorization, 16% owned land over 20 acres, whereas 26% owned less than 10 acres and the remaining 58% owned no land. The landless groups are engaged in faming, fishing & wage-earning activities.
4. The accessibility to these villages is by vehicle in the dry season and only by boat on the stream and artificial channel in the rainy season.
5. Village governance is managed by a headman elected by the community consisting of 10 groups for 100 households. This is not for livelihood but only for day-to-day administration of the village. Besides, other existing groups include cooperative of 100 members, forest user group, Village Development Committee associated with the Rural Development Department, Local Community Group and Fishermen's Community Groups. Some villages have Parent-Teachers' Association, Social Welfare Group, Elder's Group and Fishermen's Community Group.
6. The number of cows and buffalos ranges from 40 to 300 heads per village in the studied villages. In some village they adopt the trap-and-hold method of aquaculture meaning fingerlings and juveniles are trapped, raised and sold once they attain the right size.
7. Most villages have primary schools, while a few schools have been promoted to post primary schools. Many students drop out of primary school due to transportation difficulties and inability to pay their monthly fees. None of the village has health center excepting auxiliary midwife.
8. Health problems are water-related particularly diarrhea, gastric, bacteria, mosquito fever and birth & delivery cases.

9. The livelihood calendar of the coastal villages is as follows.
    - Most villagers depend on the mix of activities of fisheries, farming and wage earning.
    - Rain-fed farming is the main occupation and is done from April to November. The second crop of vegetables, green pulses and beans are grown from December to March.
    - No irrigation structures exist in these villages.
    - Boats are used for fishing on sea, whereas some people fish in the creek without boats. Crabs are also collected using various fishing gears and nets. Fishing with large boat occurs all the year round. Season is no problem for these boats. People use small mesh gear, which is considered illegal.
    - Fish and fish processing (fish, crab collection & shrimp cultivation) take place mainly in dry season (December to March).
    - Factories process fish & shrimps as dry products, paste or animal feed.
    - Three cold plants are currently engaged in the export of Rosey Jew Fish (*Nga Poke Thin*) to China. The most frequently traded fish species are given in **Annex III** along with their local names, trade names, scientific names and types of fishes traded.
    - Fuelwood collection is only for local use. They are collected mostly from the mangrove forest and in some villages people collect the drift woods that come floating on the river.
    - Livestock rearing includes only of small scale raising like pigs, chicks, ducks, buffalos and cows. Besides wealthy villagers run small shops as well.
    - Villagers are unemployed during wet season, especially between transplantation of rice and its harvest. This slack season is the push factor for the migration of the people to other areas including Thailand.
    - The local money lenders charge 7-8% interests without collateral and 4-5% with collateral.
10. There is a great shortage of land due to coastal erosion, sedimentation, unequal distribution of land, illegal occupation of newly formed land for fish/pawn ponds and then conversion into farmland and expensive registration system.
11. There is a great shortage of water and variation of weather patterns contributes to common occurrence of flooding, storm, draught and cyclone.
12. Poor drainage and sea water intrusion has caused the salinity of soil, which is a major challenge.
13. Traders and money lenders lend money to fishers to purchase their harvest and make profit by selling them in the local as well regional markets.

Source: *Livelihoods & Fisheries Management in the Gulf of Mottama, Myanmar (HELVETAS, Network Activity Group & IUCN with support from SDC: July 2014)*

One Night at the Sandflat

1. After our fruitful meeting with Prof. Dr. San Tha Htun of the Department of Marine Sciences of Mawlamyine University on the 30th January we drove back to the Environmental Education and Sustainability Center (EESC) at Theingu Village of Bilin Township and picked up our stuff for the night stay on the boat in the Sittaung River estuary. The van took us to the village of Koe Tan Su Village.
2. Our guide was U Thaw Phyoe Shwe, Program Officer of BANCA. Driving through the highway and then rural roads with sand and mud. The van could not cross the stream at Kyarsi Aung Village. Therefore, we left the van and rode the buffalo-driven cart to cross a small stream and reached Koe Tan Su at 6:30 pm. By then tides have already arrived at the village. And three boats were ready to carry us to the estuary.
3. The informant told us that every 12 hours, tides come to the village. Today at 6:30 am, 6:30 pm. In the lunar days, tides come every day about half an hour behind. And this cycle remains in action for 15 days.

4. The team was ushered us with the help of torch lights to ride the boat and our journey started at about 7:15 pm. It was pitch dark and only lights would be seen far away. After having cruised about 4-5 km off the village, our boat could not float any more as the tides were receding back. So, we had to stop and anchor our boats each other.
5. Our guide U Thaw Phyoe Shwe and boatmen jointly prepared dinner for us. Outside, it was pitch dark and full of tranquility. So we had nothing to do excepting going into our sleeping bag.
6. At about 5 am in the morning, the gentle roaring of the tides was heard, followed by the splashing of tides against our boats. These splashes caused our boats to shake. The boatmen were already in the position to row them forward. At about 6 am the boatmen began to row the boats and travelled for another 5 km by then the tides were low and disappearing slowly and made our boat stop at 8 am. So boats were anchored in the middle of sandflat. We were grounded there until the next tides came at about 5 pm. Breakfast was prepared. We ate our breakfast of coffee, bread and noodles. Then we walked bare-foot around to feel, see and observe the sandflat. Very many small crabs were seen on our walk. We also met 2 medium-sized boats which arrived there only in this morning and anchored on the mudflat. After a short observation of these boats we returned to our boat to eat lunch and then rested for whole afternoon.
7. In the course of conversation with our guide U Thaw, we were able to know the 7 types of crabs found in the area. They are (1) Brown Big Crab (eaten by humans), (2) Small Sand Crab (eaten by birds, Spoon-billed Sandpiper and shorebirds), (3) Medium Red Crab (eaten by some people), (4) Small Red Crab (or Horse Crab which runs very fast), (5) Small Brown Crab (eaten by ducks), (6) Small Black and White Crab (rare but found in salty water only) and (7) Horseshoe Crab. He also informed us that there are plenty of frogs (small and big), snakes about 3-4 species, like the water snake, flat-tailed snake, brown & white snake and the black & yellow snake (this species is found only in salty water).
8. On our question on turtle, U Thaw told us that he has never seen turtle in the area. It was later confirmed by the boatmen as well.
9. In the mean time we were able to interview one of the boatman U Bo Bo. See the interview in Box B below.
10. In a scorching heat under the tent on the boat, we were eagerly waiting for the arrival of tides. At about 4 pm we heard the sound of the mildly roaring tides. The boatmen began to take bath with the freshwater that they carried in the plastic containers. And we were watching the coming of the roaring and glaring tides one after another to reach their destination. The first tide crossed our camp at about 5:10 pm. With the gentle roaring of foam of water, which transformed like a seasonal stream, water began to splash against the boat and shaked it with big push. Within minutes water filled the area and water was everywhere making us feel as if we were in the middle of a big sea. At about 5:20 the area was full of water enough for us to row the boat. Then we headed back to the village of KoeTan Su.

Box B: Daily Routine of a Fisherman

1. I am U Bo Bo from Koe Tan Su Village. I am 26 years old. I am married and we have one boy. Previously I was a farmer. I quit farming a few years ago as I was all the-time busy with hard work. So I changed my livelihood activities. I borrowed money from a local money-lender to buy a boat for 1 million Kyats and spent another 50,000 Kyats for its accessories and decoration. I am paying 10% interests annually to the lender. (In case one can't pay the loan on time, the debtor has to pay the interest of 15% annually in the second year and 20 % interest rate in the third year. Generally the borrower is able to pay back the loan in a year). After having purchased the boat, my life is governed by sea tides. If managed well, then the boat has a life of 10 years. The boat is made up of hard wood called Kohaung Mu, *Anisoptera scaphula*.

2. I got a license from the government @ 6000 Kyat. The fee depends on the size of the boat and the quality of fish net.
3. I generally get up at 7 am and carry water for the families. I go to the kitchen garden and paddy field. Generally at 8 am, I eat my breakfast and visit the neighbors to play billiards or to see the cock fight, a popular game played for the bet generally of 50,000 Kyats. (A good male cock costs about 30,000 Kyats. Generally, banana, rice & beans are fed to cocks so that they become stronger and aggressive in fighting.)
4. After lunch I take short rest and then I get ready to go to sea as I have to spend at least a night on the sea. I clean my boat and engine, repair ropes and roofs and check my boat. I also make sure that enough food, water and logistics are there. I eat my super and get ready to go for fishing. As soon as the tides come, I start my boat for two to several days fishing.
5. I use long net and hires one laborer for which I have to pay 50,000 Kyats a month including his food while in the sea. Since I do not have time at home, my wife sells the fish in the local market.
6. I go to the sea for a period of 15 days at low tides. The length of the stay depends on the size of the tides; long time at low tides and short time at high tides.
7. I earns like 10,000 to 20,000 Kyats a day. The minimum of 10,000 Kyats is necessary for my survival. I need to earn about 4-4.5 lakh (one lakh equals to 100,000) Kyat in a month.
8. This is my daily routine when I am at home. There is a change in my routine when I am fishing in the sea. In the sea my movement is determined by tides.
9. I feel that sea fishing is a dangerous work due to high tide, high wind and threats coming from the illegal fishers who always use the net of small mesh to scoop everything including fingerlings & juveniles.

- Interview taken on the boat while waiting for the tide to come on the afternoon of the 1st January 2017 .

Major Threats

The major threats to biodiversity in the GOM are bird trapping, hunting and poisoning. These activities are illegal and are believed to be the most acute cause of the dramatic global decline of the critically endangered Spoon-billed Sandpiper. Besides, illegal fishing is another cause of decline of fish population as people use tiny small mesh sized net during low tide to collect fingerlings as well juveniles.

Whatever, hunting is the major issue in the Gulf area. The hunters employ mist net, chemicals (such as potassium cyanide, pesticides) and snares. The BANCA staff conducted the survey of the area and identified some 63 hunters that fall into the categories of professional, seasonal and occasional hunters. With the help of the community leaders and social mobilizers, these hunters were persuaded to take part in conservation activities and were given training on fisheries, livestock & pig farming, chicken & duck rearing and other agricultural activities. Following the training, each was given a package of Kyat 500,000 to purchase the boat, fishing nets and other accessories. Now these hunters have turn into fishermen and duck raisers. Plus they also help move forward conservation activities in the area.

In this way, many hunters turn into fishermen. One of the examples is that of U Win Maung, who was a life-long hunter, turn into a successful fisherman. How he became a fisherman is given in Box C.

Box C: I am now a bird hunter-turn-fisherman

- U Win Maung
Zoke Ka Li, Bilin Township

1. My name is Win Maung, a resident of Zoke Ka Li Village. I spent almost 3/4th of my life on bird hunting for my livelihood as well as that of the family. I was engaged in this occupation from the very beginning as I did not have any knowledge, resources, experience and even will-power to adopt new economic activities. During the bird-hunting period, I killed so many birds that it is impossible for me to put them in numbers.

2. On one day I happened to attend a meeting with the community peoples which was organized by the BANCA. They explained to us the importance of birds, drinking water, forests, sanitation and other natural resources so as to keep our natural surrounding healthy and productive. But I did not take it seriously as my livelihood was bird-hunting. For me and my family, bird hunting means food and other basic needs. In other words, bird-hunting was the main source of our survival and sustenance. No bird hunting means no income and thereby no bread and butter for that day. So I did not pay any attention to their advice and ideas. However, I continued attending such kinds of community meetings.
3. After having attended a series of meetings, I came to know that alternate means of livelihoods would be offered to those who would quit bird hunting in the area. Then I explored the situation with the BANCA. Then they persuaded me and I was convinced to change my occupation to adopt fisheries. I needed some basic knowledge, technology and support of the family and communities. And I was given a boat and gears needed to adopt fisheries. So I decided to change the occupation. I, not only quit bird-hunting but also decided to get involved whole-heartedly in conservation. This inspired me to be an active member of the BANCA.
4. Many thanks to the BANCA and its staff members for giving me practical knowledge, skills and essential resources such as boats,, nets and other accessories to

enter into this fish catching endeavor. I am now happy of what I am doing and have come the member of the BANCA and support them in their efforts towards the sustainability and resilience of livelihood, community life and village system as a whole.

In the area there are now conservation groups, each group of 12 persons. They are the ones who monitor bird hunting and give counseling to the hunter-cum-fishermen in the area.

Visit to Kyaikhtiyo

Mon State has a sacred pilgrimage site, popularly known as Kyaikhtiyo (in Enlglish the Holy Rock). Thousands of people, particularly the Buddhists from all over the country throng there on a pilgrimage. We were told that on the full moon night, so many visitors and tourists throng there that the entire place is occupied by people doing meditation or invoking the *Mantra*. There is hardly any space left around for the visitors.

The meaning of the place goes this way; *Kyaik* means Pagoda, *Yo* means carry on the head and *Ithi* means hermit, thus the Pagoda in the hermit's head. The rock pagoda is situated at 1100 meter above the sea level on the top of the Kyikhtiyo hill. The Pagoda can be reached either driving or trekking an 11 km long trail. Private vehicles are not allowed to go there. Therefore, special vehicles are available for the tourists and pilgrims at the fare of 2000 Kyats per person from the village of Kipun that is situated at the base of Mt. Kyaikhtiyo. Kipun is the place from where foot trail starts for the Holy Rock.

Pilgrims and tourists have to walk bare foot on the Holy Rock area. The sacred site is on the top of the hill. Only males are allowed to paste gold leaf on the rock as a sign of devotion. Each foreign tourist and visitors are charged an entrance fee of 6000 Kyat to enter the Kyaikhtiyo Archeological Zone. This is a special archeological zone protected by the State Government and is managed by the Mon State Development Affairs.

WWD Celebration at Moeyungyi

Early morning of the 2nd February the team left for Moeyungyi Wetland Wildlife Sanctuary in Bago Region to participate in the celebration of the World Wetlands Day (WWD). The event was organized by the Nature & Wildlife Conservation Division (NWCD) of the Ministry of Natural Resources and Environmental Conservation (MoNREC). The opening remark was made by the Union Minister of the MONREC with remarks from the Chief Minister of the Bago Region, the Norwegian Ambassador to Myanmar, Her Excellency M. Tone Tinnes and Senior Advisor of the Ramsar Conservation Secretariat, Dr. Lew Young.

In the ceremony, the certificate of inclusion of the Meinmahla Kyun Park in the Ramsar List was given to the Government of the Union of Myanmar. The certificate was handed to Dr. Nyi Nyi Kyaw, Director-General of Forest Department by Dr. Lew Young, Senior Advisor of the Ramsar Convention Secretariat.

In the afternoon, the short presentations of the three Ramsar sites; Moeyungyi Wetland Wildlife Sanctuary, Indawgyi Wetland Wildlife Sanctuary and Meinmahla Kyun Park by their respective park wardens.

At the end, "*An Action Plan for the Delivery of Improved Management and Wise Use of Valuable Wetlands in Myanmar*" was presented by Ramsar Wetland Experts; Dr. Bob McInnes and Prof. Dr. Nick Davidson. The 12 priority areas included in the Action Plan are as follows.

1. National Wetland Committee
2. National Wetland Policy
3. Strategy for Ramsar Site Designation
4. Guidelines for Wetland Site Management
5. Indawgyi Demonstration Site
6. Moeyungyi Demonstration Site
7. Gold Mining Mitigation Measures
8. Immediate Site Management Needs
9. National Wetland Inventory
10. Network of Wetland Site Managers
11. Meinmahla Management Planning & Ramsar Site Designation
12. Indo-Burman Ramsar Regional Initiative (IBRRI)

After the celebration the team returned back to Yangon to take the flights back to their respective countries.

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Annex I: Important Waterbird Species

Species	Scientific Name
Black-headed Ibis	*Threskiornis melanocephalus*
Black-tailed Godwit	*Limosa limosa*
Broad-billed Sandpiper	*Limicola falcinellus*
Common Greenshank	*Tringa nebularia*
Common Redshank	*Tringa totanus*
Curlew Sandpiper	*Calidris ferruginea*
Eurasian Curlew	*Numenius arquata*
Great Knot	*Calidris tenuirostris*
Kentish Plover	*Charadrius alexandrinus*
Lesser Adjutant	*Leptoptilos javanicus*
Lesser Sand Plover	*Charadrius mongolus*
Pacific Golden Plover	*Pluvialis fulva*
Painted Stork	*Mycteria leucocephala*
Red-necked Stint	*Calidris ruficollis*
Spoon-billed Sandpiper	*Calidris pygmaea*
Spotted Greenshank	*Tringa guttifer*
Spotted Redshank	*Tringa guttifer*

Source: http://www.eaaflyway.net/about/the-flyway/flyway-site-network/eaaf117-gulf-of-mottama/

Annex II: Common Waterbird Species

Species	Scientific Name
Asian Openbill	*Anastomus oscitans*
Bar-headed Goose	*Anser indicus*
Bar-tailed Godwit	*Limosa lapponica*
Black-headed Ibis	*Threskiornis melanocephalus*
Black-tailed Godwit	*Limosa limosa*
Common Redshank	*Tringa tetanus*
Common Ringed Plover	*Charadrius hiaticula*
Common Sandpiper	*Tringa (Actitis) hypoleucos*
Common Shelduck	*Tadorna tadorna*
Common Snipe	*Gallinago gallinago*
Eurasian Curlew	*Numenius arquata*
Eurasian Wigeon	*Anas penelope*
Garganey	*Anas querquedula*
Glossy Ibis	*Plegadis falcinellus*
Great Egret	*Casmerodus Albus/Ardea alba*
Great Thick Knee	*Burhinus recurvirostris*
Greater Sandplover	*Charadrius leschenaultii*
Grey Heron	*Ardea cinerea*
Grey Plover	*Pluvialis squatarola*
Grey-headed Lapwing	*Vanellus cinereus*
Indian Pond Heron	*Ardeola grayii*
Intermediate Egret	*Egretta intermedius*
Kentish Plover	*Charadrius alexandrinus*
Lesser Adjutant Stork	*Leptoptilos javanicus*
Lesser Sandplover	*Charadrius mongolus*
Lesser Whistling Duck	*Denrocygna javanica*
Little Cormorant	*Phalacrocorax niger*
Little Egret	*Egretta garzetta*
Little Heron	*Butorides striata*
Little Ringed Plover	*Charadrius dubius*
Long-billed Dowitcher	*Limnodromus scolopaceus*
Marsh Sandpiper	*Tringa stagnatilis*
Night Heron	*Nycticorax nycticorax*
Nordmann's Greenshank	*Tringa guttifer*
Northern Greenshank	*Tringa nebularia*
Northern Pintail	*Anas acuta*
Northern Shoveler	*Anas clypeata*
Pacific Golden Plover	*Pluvia lisfulva*
Painted Stork	*Mycteria leucocephala*
Pied Avocet	*Recurvirostra avosetta*
Pintail Snipe	*Gallinago stenura*
Purple Heron	*Ardea purpurea*
Red-Wattled Lapwing	*Vanellu indicuss*
Ruddy Shelduck	*Tadorna ferruginea*
Sarus Crane	*Grus antigone*
Small Pratincole	*Glareola lactea*
Spoon-billed Sandpiper	*Calidris pygmaea*
Spotted Redshank	*Tringa erythropus*
Terek Sandpiper	*Xenus cinereus*
Tufted Duck	*Aythya fuligula*
Whimbrel	*Numenius phaeopus*

Annex III. Most Frequently Traded Fish Species

S.N.	Local Name	Trade Name	Scientific Name	Types of fishes traded
1	Nga Hnut	Bombay Duck	*Harpadon nehereus*	Processed – dried fish
2	Nga Poke Thin	Rosy Jew Fish	*Otolites ruber*	Iced, Export to China
3	Nga Nyaung	Sea Catfish	*Arius thalassinus*	Processed – dried fish
4	Nga Ponna	Tapasi	*Polynemus paradisus*	Fresh, Local consumption
5	Kakadit	Seabass	*Lates calcarifer*	Iced, Export
6	Kutbelu	Mullet	*Liza parsia*	Fresh, Local consumption
7	Kutkuyan	Threadfin	*Polynemus indicus*	Processed – dried fish
8	Ngathalauk Youkpha	Toli shad	*Tenualosa toli*	Iced
9	Nga Palway	Whiting	*Sillago sp.*	Fresh, Local consumption
10	Prawn	-	-	Processed - dried
11	Crab	-	-	Live

Source: *Livelihoods & Fisheries Management in the Gulf of Mottama, Myanmar (HELVETAS, Network Activity Group & IUCN with support from SDC: July 2014)*


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