Report of

International Workshop on Conservation and Wise Use of Wetlands along the Coast of the Bay of Bengal

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Faculty of Environment and Resource Studies, Mahidol University,
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This was a kickoff meeting of the three years' project "Building an international cooperation network across the countries sharing the coast of Bay of Bengal – Capacity building of local people for climate change adaptation, disaster risk reduction, and biodiversity conservation", which is supported by Keidanren Nature Conservation Fund (KNCF).
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The editors

Acronyms

BOB = Bay of Bengal.
BOBLME = Bay of Bengal Large Marine Ecosystem
CWBMP = Coastal & Wetland Biodiversity Management Project
DOE = Department of Environment
ECA = Ecological Critical Areas
ICZM = Integrated Coastal Zone Management
IUCN = International Union for Conservation of Nature
JFGE = Japan Fund for Global Environment
KNCF = Keidanren Nature Conservation Fund
MOEF = Ministry of Environment & Forestry
NGO = Non Governmental Organization
RAMCEA = Ramsar Centre for Eastern Africa
RRC-EA = Ramsar Regioval Center – East Asia
RCJ = Ramsar Center Japan
RRC-CWA = Ramsar Regional Center for Central and Western Asia
USM = Universiti Sains Malaysia

The Jewels of the Bay of Bengal

Bishnu B. Bhandari

***Abstract**: The Bay of Bengal is the largest basin in the world surrounded by seven countries in South Asia. The Bay is rich in marine fauna and is the house of the world's highest emigration and home to the sea-based tribes; the Sentinelese, Jarawa, Onge and Moken. The Sentinelese people are aggressive to visitors. They do not want any contact with outsiders and attack them with the volley of arrows and spears. The Bay is plagued with four major environmental problems; water pollution, decline in critical habitat, ship breaking industry and global warming. Bringing together the stakeholders of seven countries under a common platform for the sustainable development of the area is a Herculean task, a formidable challenge and serious issue.*

Introduction

The Bay of Bengal is the largest basin and one of the 64 large marine ecosystems in the world. Its current name has been in use since the 10th century. The entire area became under the influence of the European colonists since 15th century. And after World War II, especially in the 1960-s, the Bay was almost a "forgotten Sea".

1. Diversity of physical features

The Bay is surrounded by 7 countries; (1) Bangladesh, (2) India, (3) Indonesia (4) Malaysia, (5) Myanmar, (6) Thailand, and (7) Sri Lanka. The total area of the Bay is about 2.3 million km^2.

Its maximum depth is 4.7 km and the average depth is 2.6 km. Major rivers pouring into the Bay are from India (1) Kaveri, (2) Krishna, (3) Godawari, (4) Ganga and (5) Brahmaputra, and from Myanmar (6) Ayeyarwady.

The Bay manifests a number of features such as gulf (Gulf of Mottama in Myanmar and Gulf of Manar between India and Sri Lanka, straits (Strait of Malaca between Malaysia and Indonesia and Strait of Palk between India and Sri Lanka), Penang island, Andaman Island, Nicobar island), archipelagos (Myeik archipelago in Myanmar, Andaman & Nicobar Archipelago in India), isthmus (Kra Isthmus, Thailand), sea (Andaman Sea, India) and 7 major river mouths.

Today, the Bay of Bengal area houses, along its rim, about 13 Ramsar sites from 5 countries. Bangladesh and Myanmar have one site each, which are (1) Sundarbans Reserve Forest in Bangladesh and Moeyungyi Wetland Wildlife Sanctuary in Myanmar. India and Thailand have 5 sites each. The five sites from India are (1) Point Calimere Wildlife and Bird Sanctuary, (2) Kolleru Lake, (3) Chilika Lake, (4) Bhitarkanika Mangroves, and (5) East Calcutta Wetlands. The five Ramsar sites of Thailand are (1) Kaper Estuary-Laemson Marine National Park -Kraburi Estuary, (2) Ko Ra-ko Phra Thong Archipelago, (3) Pang Nga Bay Marine National Park, (4) Krabi Estuary, and (5) Had Chao Mai Marine National Park-Ta Libong Island Non-hunting Area–Trang River Estuary. The Ramsar sites from Sri Lanka is Kumana-Kudimbigal Wetland Cluster.

2. Home of the World's biggest emigration

The tracing of the history of the Bay shows that Asia fell in the control of European colonists at the end of the 15th century and became the arena for the competition with themselves and Asian powers. In the 17th century, the Portuguese advance was reversed by the joint forces of the Dutch and the English. In the 18th century, the English, the Dutch and the French East India Company had put a foothold here through the establishment of the "factory". The British started sending their troops, garrison, legal code and officials and thus dominated the entire Bay area.

In the second half of the 19th century, the British Empire envisioned a grand design of developing rubber plantation in Malaysia, rice in Burma and coffee and tea in Ceylon. This plan was supported by imperial capital and Asian labor, especially of India. In the implementation of the plan, the British authority mobilized the emigration of almost 30 million (some say 28 million) workers between 1840 and 1940 that crossed the Bay of Bengal from India to Malaysia, Burma, and Ceylon. Only about 2 million of them travelled back and forth.

There was always a circular migration around the Bay. Historically also it is important to note that about 140,000 refuges embarked on the long march from Rangoon to India in the late 1930's. On the way, many died of exposure, exhaustion, starvation, heart failure and amputation. Indeed, the Bay was the home of the world's biggest emigration. The Bay was the highway for emigration from India to Malaysia, Myanmar and Sri Lanka (Amrith, 2013).

This vast political and economic connection fell apart when World War II took place in the early 1940's. World War II was the turning point for political, economic and cultural connection in Asia. The British Empire collapsed and new nation states emerged, where the issue of citizenship and belongingness was prominent. These nation-states began to exploit internal resources and internal labor. The sea was of no concern for them. Thus the Bay was simply a "forgotten sea" in the 1960's.

3. Rich in faunal diversity

The most important fauna that are reported to have occurred in the Bay of Bengal are listed below.

1. Irrawaddy Dolphin, *Orcaella brevirostris,* rare & endangered species found in Ayeyarwady River in Myanmar, the Mahakam River in Indonesia and the Mekong River.
2. Tropical Dolphin, *Delphinus capensis* and *D. dephis*: endangered species.
3. Dugong (also called sea cow), *Dugong dugong*: vulnerable (threatened), as an appendix in CITIES, an extinct herbivorous marine mammal swims in sea-grass.
4. Olive Ridley Sea Turtle, *Lepidochelys olivacea* (heart-shaped shell, olive color when added, vulnerable in IUCN Red List and as an appendix in the CITIES.
5. Shark (endangered species)
6. Hilsa, *Tunualosa illisha*; an endangered species, national fish of Bangladesh and popular in South Asia.
7. Flying fish *Exocoetus* sp.: The flying fish take to air to avoid predators. They can attain the speed of up to 70 km an hour and reach a height of 6 meter above the ocean surface. They would take off from under and around the boat, fly over the sea and re-enter the water. It is an amazing sight to watch a school of these fish in action. The flying fish live in all of the oceans, particularly in tropical and sub-tropical waters. There are about 64 species of them in the world.
8. White-bellied sea gull, *Haliaeetus leucogaster*; an endangered species and a bird of prey feeds on aquatic species from fish and sea snakes to turtles and waterbirds.
9. Horse shoe crab, *Carcinoscorpius rotundicauda* is an endangered species. This is the mangrove horseshoe crab found in southeast Asia.

4. Home to sea-based tribes

A quick search of the Internet from the Google shows that the area houses four distinct tribal groups in the area. These tribes are follows.

1. Sentinelese Tribe
2. Jarawa Tribe
3. Onge Tribe
4. Moken Tribe

(1) The Sentinelese Tribe

The Sentinelese are the indigenous people of the Andaman Islands. North Sentinel Island, which lies westward of the Southern tip of the Great Andaman archipelago, is the most isolated island on the Earth and is the home to this sixty thousand years old community. Their population is estimated in between 40-500 in a 72 square kilometer island. The Sentinelese have maintained an essentially hunter-gatherer society obtaining their subsisting through hunting, fishing and collecting wild plants. They survive off jungle pig, honey and fruits. There is no evidence of either agricultural practices or method of producing fire. The language remains unclassified and is not mutually intelligible with the Jarawa language of their nearest neighbors.

They have zero contact with and are untouched by modernization. They have rejected the modern world. In reality, they are hostile towards outsiders. They are violent and kill outsiders. This is the reason why outsiders can’t visit the area. Two evidences are enough to prove this fact.

- In the 2004 Indian Ocean Tsunami, they managed to reach a high ground. Three days later, a navy helicopter was sent to check their status and drop the food on the beach. But it was warned away by a Sentinelese warrior who emerged from the jungle and brandished a bow and arrow. Generally, a Sentinel archers fire a volley of arrows.
- The incidence of 2006 is another proof that they are most dangerous people. Two fishermen happen to be near their north Sentinel Island when they were in sleep. These fishermen were killed and buried in a shallow place. The helicopter went there to retrieve the bodies but it was chased by a rain of arrows and javelins.
- They are rarely photographed or recorded on video. According to the Indian law, it is a criminal offence to try and contact with the Sentinelese. They are classified as the scheduled tribe. The tribe is vulnerable to new breed of intruder called sea cucumber poachers. (Source: https://en.wikipedia.org/wiki/Sentinelese_people).
- Generally, they toss rocks at low flying planes or helicopters. They shoot with the rain of flying arrows and javelins. Such is the hostility they show towards outsiders. They are the most dangerous tribe on the world. When outsiders approach the island, they swarm the shoreline and rain down arrows.
- About their hostile attacks, there are number of incidences, some selected ones are presented below.

  ***Land of Lost Tribe*:** Two persons were killed when they entered the area while fishing. It is reported that it is dangerous to visit the area as they try to kill the visitors.

  --- *Mail Online dated Sunday 22 May 2016*

  ***A Human Zoo on the World's Most Dangerous Island*:** The Sentinelese have no contact with outsiders. In 2006, the tribe murdered two fishermen, who illegally entered the islands. Ecotourism may attract new disease and confrontation may lead to retaliation and extinction of the entire tribe. -- *Margin FORBES* (28 Sept. 2015)

  ***Sentinel Island:The World's Hardest Place to Visit*:** Those who dare to visit the island are met by men and women wielding a shower of spears and arrows. People that live on the island kill anyone who tries to come ashore. Some government mission went there a number of times, but the native people turned their back to the visitors. This was meant to insult the outsiders as we were not welcome there.

(2) The Jarawa Tribe

The Andaman Island is the home to the last Afro-Asian people in the world. The Jarawas are the oldest ethnic tribe living in the Andaman Islands. At low tide at the end of each day, they go in small group to catch fish. They are the darkest of the dark people.

The Jarawas are hunter-gatherer. Of the four tribes in the region, the Great Andamanese have already disappeared. The Onge is almost extinct. Only the Jarawas and the Sentinelese have managed to resist and preserve their way of life.

The Jarawas, whose population is estimated to be at 420, live in southern and central part of the Andaman Islands. Their territory is 115 km long and 10-20 km wide. Access to the area by land and by sea is completely forbidden. Forest ranger regularly patrol the territory, aircraft fly over and police vehicle cruise the shores of the beach. Any intruder is punishable.

Source: The Amazing You Tube

(3) The Onge Tribe

The Onge people are one of the Andamanese indigenous peoples of the Andaman Island. They have their own language called Onge. They are confined to the Little Andaman Dugong Creek in the northeast and South Bay. These tribes are semi-nomadic and used to be fully dependent on hunting and gathering for food.

The total population of the Onge tribe is about 100 and they are the least fertile and the most sterile people in the world. About 40% married couple are sterile. They survived the Tsunami of 2004. They believe that their population was destroyed by the ground shaking and great wall of water.

Presently, alcohol addiction is the major problem among themselves.

(4) The Moken Tribe

The Moken people have made the Sea their home. They forage food from oceans and forests and trade fish and shell for other necessities, travelling by boat across southern Burma and Thailand. They have maintained a self-sufficient nomadic way of life along the Andaman Coast for hundreds of years

The Mokens are nomadic people with their sea-based culture and speak their own language. They are known by "Sea-nomad". They are distributed around the Andaman sea, west coast of Thailand and several provinces of Myanmar. The Burmese call these people Salung, Salone or Chalome. In Thailand, they are called Chao Ley (People of the Sea) and Chao Nam (People of Water). They are also called the "Sea Gypsies".

The Moken has knowledge about their sea and thus live off its flora and fauna by using nets and speck to forage food. The unused one is hung on the pole and is bartered for other necessities at the local market.

Then Burmese Moken are still nomadic people who roam the sea most of their lives in small-crafted wooden boat called *Kabang* or mother boat. The boat is about 10-meter long. Their hunter-gather's lifestyle relies on men, women and children each playing roles in community subsistence, taking only the resources they require for survival and making minimal impact on the natural environment.

The Moken of Burma and Thailand are stateless at sea. One research study showed that the "Sea Gypsies" children of Southeast Asia have an incredible ability to see clearly underwater at depths of up to 75 ft. Like Dolphins, they appear to be able to spot small items, such as clams, beneath the wave. Hla Dal, a Moken in his early 20's explains;

> "He and his family abandoned their nomadic life two years ago. Before we used to catch a lot of squid and filled a basket of 20 kg in a day. Now we can hardly manage 3 kg in a day … We can't afford to maintain our mother boat. It is easier to fish from the village".
>
> - *AnthroScape, Human Biodiverstiy Forum*
> -

The Moken people face deepening poverty, marginalization and discrimination. Most are stateless, making them vulnerable to human rights, abuse and depriving them of access to other rights (medical care), education, employment opportunities that other enjoy.

Due to tight immigration and maritime conservation, laws restrict their freedom of movement threatening their traditional lifestyles.

Nomadism, lack of registration, lack of citizenship (or statelessness) can't move outside their district. Nor, can they work legally. They can work only in the informal sector.

Major environmental issues

Environmental issues are the outcome of the constant interaction between the massive exploitation of natural resources, growing population, intensive land clearance and greenhouse gas emission. Its direct effect is on the sea, i.e. the rise of sea level, which has been the frontier for immediate action. This is the reason why the region is again at the heart of international community (Bhandari, 2016) and faces the following issues.

(1) Water pollution

The Bay receives about the $4/5^{th}$ of total pollutants that spill into the area coming from 7 rivers, and important cities that ring the littoral area. The area is the sink of organic and inorganic wastes of the area as it received pollutants from numerous rivers and cities. The notorious cocktail of refuse, trash, garbage, organic matter, nutrients (including nitrogen, agricultural pesticides), metabolized drugs, medical waste, cytotoxic, antibiotic, hormone-mimicking materials, bacteria, virus, worms, chemicals (detergents, fertilizer runoff) are of serious concerns.

(2) Decline of critical habitats

The critical habitat such as mangroves, coral reef and estuaries are declining and deteriorating in the Bay area due to overfishing, shift of coastal lines, shrinking of deltas, human intervention, destruction of the critical link between channels and their floodplains and weakening of the filtration system to both coastal areas and mangroves.

(3) Shipbreaking industry[1]

[1] This industry began in Chittagong due to climate-related hazards. In the 1960's, one of the notorious cyclones blew a 20,000 ton tanker off course and onto the beach in Chittangong. This opened the door for generating income for the local communities. They used their ingenuity to recycle the ship's components.

The Bay receives the discarded hulks of the world's unwanted ships. The industry has both beauty and horror. Chittagong alone of Bangladesh houses one of the world's unwanted ships. Some 30 thousand people are employed in this trade. This is the beauty of the industry. The other side is that the shipbreaking industry is one of the most dangerous occupations in the world. People have to work and wade into toxic and oily sludge to take the parts of the ships. Every day the workers inhale dangerous chemicals including lead and asbestos.

(4) Global warming

The world's oceans are likely to rise due to global warming. The accumulation of greenhouse gases since the industrial revolution heats up the Earth. The ice and the snow become the first victim. Thus ice-melt pours into the ocean, causing the sea level rise globally. Climate extremes have already occurred, making the coastal region highly vulnerable to draught, flood and the Tsunami.

Major Challenges

The BOB as such is a huge area, covering some 2.3 million km^2 that belongs to 7 countries of different size, system and social structures. A multitude of actors are in connectivity and all of them need to be taken into consideration. Some are familiar with the concept and implementation of wise use of wetlands, while others do not know anything about it. Some are interested in conservation whereas others are not at all. In facts there are many actors, factors and sectors that are directly responsible for the degradation of the Bay area. The key questions are; how to develop a common vision? What would be the incentives to bring them together under an umbrella? How to keep them intact? What would be the mechanism of keeping them together? How social equity can be maintained among so many actors? Bringing them to a consensus for a commonality is in fact a big Herculean task.

Secondly it requires a huge resources, long time and commitment. How to generate resources? Who would be responsible? What would be the mechanism? In the absence of a responsible organization, it would not be so feasible as well as possible to move ahead for the cause of the Bay of Bengal in the region.

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Coastal Wetlands in Myanmar and significant intertidal mudflat Gulf of Mottama

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Abstract: Myanmar has 99 wetlands site according the recorded by "Wetlands inventory in Myanmar" published in 2004. Within over a decade, some very important wetlands in coastal areas were identified by INGOs and NGOs. The Gulf of Mottama is one of the famous intertidal mudflat ecosystems in the world. The Gulf is bell-shaped and has dynamic estuary ecosystems. The Gulf is one of the world's most important wintering areas for the critically endangered Spoon-billed Sandpiper, hosting probably more than half of the remaining global population. The local communities use the site for fishing, grazing, duck-rearing and paddy farming. However, the Gulf of Mottama is a vulnerable and changing environment where communities have lived by adapting to change over time. Different types of wetlands play critical role in sequestering and storing carbon, which leads to addressing climate change.

Keywords: Spoon-billed Sandpiper, Gulf of Mottama, CEPA, Ramsar, EAAFP

Myanmar is the largest country in main land south-east Asia comprising the land area of 676,577 square kilometers and geographically located between 9˚ 32' and 28˚ 31' latitude and 92˚ 10' and 101˚ 11' longitude stretching over 2800 kilometers coast line. It shares common maritime boundaries with Bangladesh in the north-east of Bay of Bengal with Thailand and India in the Andaman Sea which is a part of Bay of Bengal.The coastal zone of Myanmar can be subdivided into three main areas, namely Rakhine, Delta and Thanintharyi coasts. Many rivers flow into the coastal zones such as "Mayyu" and "Kalandan" rivers in Rakhine coastal area, "Irrawaddy", "Sittaung" and "Thanlwin" rivers in Delta coastal area and "Ye", "Dawei","Thanintharyi" and "Lenya" rivers in Thanintharyi coastal area.

Myanmar has 99 wetlands site according the recorded by "Wetlands inventory in Myanmar" published in 2004. But almost all wetlands sites were identified inland areas and doesn't include Thanintharyi coastal area. Only four wetland sites, Gadongalay Island, Gayetgyi Island, Letkokkon wetland and Meinmahla Kyun Wildlife Sanctuary are located in Delta coastal area and only three wetland sites which are Byaing Kyun Island,Kyeintali chaung and Satthawa chaung located in Rakhine coastal area.

Within over a decade, some very important wetlands in coastal areas were identified by INGOs and NGOs. For Rakhine coastal area, important wetlands are Nanthar Island, Kyauk phyu Mangrove area, Man Aung and south Island should be conserved as high priority because of the habitat of mangrove diversity, migratory bird species, sea grass, marine mammal and sea turtles . At the Delta coastal area, Kaing Thaung island, Thameehla Island(Dimond Island) beach, Nga Youk Kaung beach, Phone Taw Pyae beach and Gulf of Mottama, Bilu island, Kyeikhamei sea shore which are critical habitat for mangrove diversity, globally important migratory birds, sea

grass and sea turtles areas and should be conserved as high priority.In the Thanintharyi coastal area, Myeik Archipelago, Lampi Marine National Park, Hein Ze bay mudflats and Dawei river estuary which have marine biodiversity need to be conserved as high priority.

Bay of Bengal (BOB), large but relatively shallow embayment of the northeastern Indian Ocean, occupying an area of about 839,000 square miles (2,173,000 square km) and world's largest basin. It lies roughly between latitudes 5° and 22° N and longitudes 80° and 90° E. It is bordered by Sri Lanka and India to the west, Bangladesh to the north, and Myanmar (Burma) and the northern part of the Malay Peninsula to the east. Weather conditions are often brutal in the Bay of Bengal as the area is ravished by heavy monsoon rains, both summer and winter. Destructive cyclones are common in the spring and fall months, bringing intense winds and severe flooding. Because of its low-lying land, southern Bangladesh is especially susceptible to these storms.

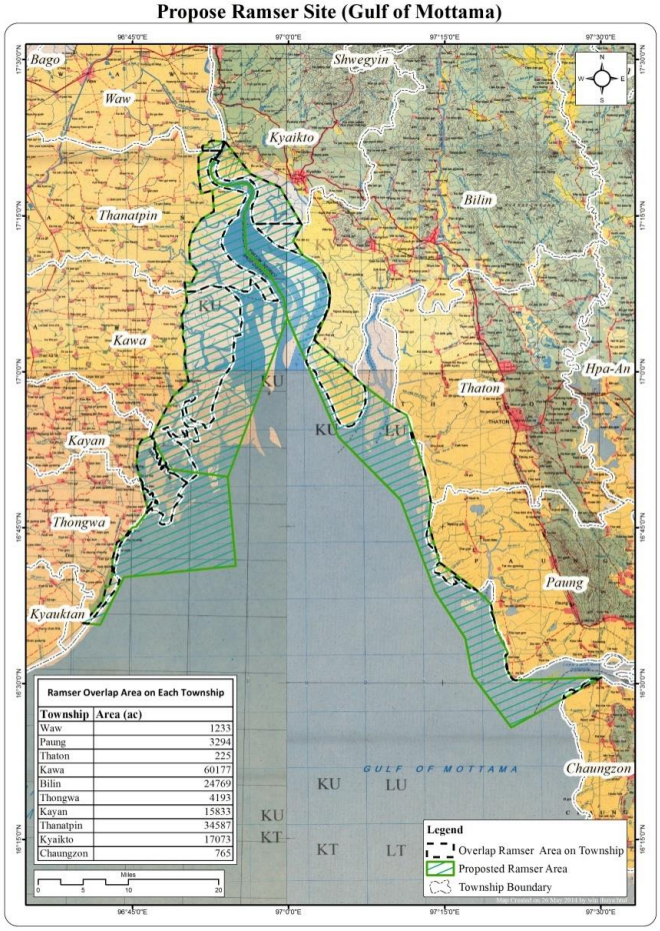
The Gulf of Mottam(Martaban) is located in Yangon Region, Bago Region and Mon State. The Gulf of Mottoma is a large and generally undisturbed funnel-shaped estuary with extensive tidal flats. Its tidal cycle is extremely pronounced in speed and amplitude, causing a powerful bore phenomenon which is highly unusual in the region and which makes this one of the most dynamic estuaries in the world, with constant sediment redistribution, channel-shifts, erosion and accretion on a large scale. The high productivity of the system supports a rich biota including abundant invertebrates, important nursery areas for marine fish and up to 150,000 migratory water birds in the non-breeding season. These include three globally threatened species and internationally important numbers of 19 bird species, and the stage is set the Gulf as one of the world's most important wintering areas for the critically endangered Spoon-billed Sandpiper (CR), hosting probably more than half of the remaining global population. The Gulf exhibits a tidal cycle which is extremely pronounced in speed and volume, gathering from a width of around 100km and concentrating in a funnel-shaped bay to produce a powerful bore phenomenon, which can reach heights of over 1m on spring tides in the upper estuary and is highly unusual in the region. The tide drops by over 6 m and can reach in places up to 7m, exposing areas of tidal flats whose extent, sediment composition and undisturbed character are increasingly rare and important in the region. The tides and currents constantly redistribute sediments on a large scale, producing shifting channels and a mix of erosion and accretion, and making this one of the most dynamic estuaries in the world. The biological productivity of this system supports a rich biota that exemplifies the importance of large estuaries on an international scale as source areas for fish and invertebrates and as non-breeding refuges for thousands of migratory water birds. A characteristic feature of the Gulf of Mottama is that it has a tide-dominated coastline. Tides ranges between 4–7 m high. During spring tide, when the tidal range is around 6.6 m, the turbid zone covers an area of more than 45,000 sq km making it one of the largest perennially turbid zones of the world's oceans. During neap tide the tidal range of 2.98 m high. The main habitats are estuarine waters, intertidal mudflats, sandbars, muddy and sandy shorelines and salt marsh. The local communities use the site for fishing, grazing, duck-rearing and paddy farming. However, the Gulf of Mottama is a vulnerable and changing environment where communities have lived by adapting to change over time. Different types of wetlands play a critical role in sequestering and

storing carbon, which leads to addressing climate change. Since the Gulf of Mottama is also an important wetland area in Myanmar, restoring wetlands and maintaining the environmental status is of ultimate importance in response for addressing climate change, flood mitigation, water supply, food provision and biodiversity conservation (Wise Use of Wetlands). However, in the Gulf of Mottama, action is needed to maintain the advantages provided by wetlands for economic development and the livelihoods of locals.

For Spoon-billed Sandpiper its population is declining by 26% per year, with a global population estimate of approximately 200 pairs. If the current rate of decline continues then the species will be extinct within a decade. The major cause of juvenile mortality is believed to be trapping and hunting, primarily on the wintering grounds, and notably in Myanmar and Bangladesh. Another problem is illegal fishing in the Gulf of Mottama, which is very important issue for livelihood of the local community. Hunting of shorebirds on the wintering grounds was immediately recognized as the major threat to SBS. The individual hunters identified and BANCA began a public awareness campaign. With BANCA's encouragement, all identified hunters signed agreements to cease hunting and those hunters most dependent upon netting birds were given support to develop alternative livelihoods.

The main threats to the Spoon-billed Sandpiper take place on the non-breeding grounds. In Myanmar, the following are four main threats; (1) hunting (the most severe and urgent threat), (2) weakness of formal protection of coastal sites, (3) loss of habitat through unsustainable coastal development and mangrove forest restoration, and (4) inadvertent catching while fishing.

Propose Ramser Site (Gulf of Mottama)



In 2008, with the support of Arcona Consulting (UK) and BirdLife International, BANCA was able to participate as a pioneer in initiating the globally threatened species, Spoon-billed Sandpiper population survey in the Gulf of Mottama. Accordingly, baseline survey results the Gulf of Motttama plays a vital role for the conservation of Spoon-billed Sandpiper. In 2011 BANCA carried out the socioeconomic surveys and provided support for local communities to develop alternative livelihood for ex-poachers in several areas of the Gulf of Mottama. That is a very successful programme and the ex-poachers are actively involved in community conservation programme for the long-term sustainability of the Gulf of Mottama.

BANCA initiated an effort to designate the Gulf of Mottama as a Ramsar site in collaboration with the Forest Department in 2012. BANCA carried out several programs such as education awareness, CBNRM, CEPA, patrolling training,

provision of safe water facilities, cooperation with other development agencies in the Gulf of Mottama. Two international designations (Ramsar Site under the ***Convention on Wetlands*** and Flyway Network Site under the ***East Asian-Australasian Flyway Partnership (EAAFP)*** can raise the conservation profile of the Gulf of Mottama

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Community-based Conservation Initiative on Coastal Zone Management in Myanmar

Htun Paw Oo, Myanmar

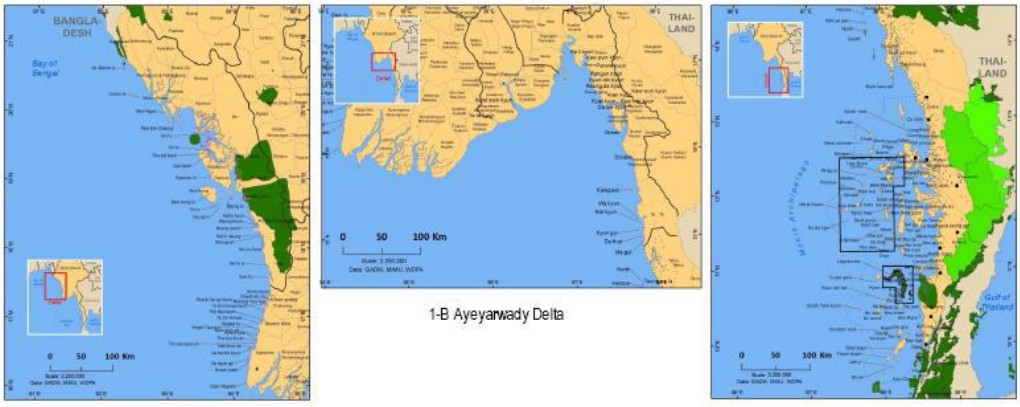
Abstract: With a coastline of over 2,400 km, Myanmar possesses complex and diverse ecological and socio-economic systems. Coral reefs, sea grass beds and mangroves consist of Rakhine Coast, Ayeyarwady Delta and Tanintharyi Coast. Mangrove ecosystems contribute a wide range of goods and services to the coastal population, however over the past three decades more than half of mangroves have been undergoing over-exploitation, illegal felling, agricultural expansion and conversion to fishponds and shrimp ponds. Coral reefs remain largely unexplored and the species diversity but coral reefs have been declined. Myanmar with the support of relevant development partners Mangroves for the Future Programme has been initiated in 2014 to initiate rehabilitation of Myanmar Coastal area.

Key words: coastal zone management, poverty and lack of viable livelihood, community-based conservation

1. Background Information

Coastal zone of Myanmar is in the Bay of Bengal with Bangladesh, India and Thailand. The three coastal zones of Myanmar consist of Rakhine Coast, Ayeyarwady Delta and Tanintharyi Coast. The Rakhine Coast, 740 km, deltaic coastal zone, 460 km and is outlets of the three major rivers including Ayeyarwady, Sittaung and Thanlwin. Tanintharyi Coastal area has the longest coastline stretching over 1,200 km from the Gulf of Mottama to Pakchan River which is bordered with Thailand. It is fringed in southern part by the Myeik Archipelago and is also home to more than 1,700 inshore and offshore islands.

Myanmar has a tropical to subtropical monsoon climate. The mean annual rainfall is around 2,350 mm. Annual rainfall can be as high as 4,000-6,000 mm along the coastal reaches and in the mountains of Rakhine and Tanintharyi, and ranges between 2,000-3,000 mm in Ayeyarwady Delta. There has been no separate policy or legislation pertaining to management of the coastal resources.



1-A Rakhine Coast

1-B Ayeyarwady Delta

1-C Tanintharyi Coast

2. Key Coastal Habitats

With a coastline of over 2,400 km, Myanmar possesses complex and diverse ecological and socio-economic systems. Coral reefs, sea grass beds and mangroves flourish mainly in the Myeik Archipelago. Estuaries and mud flats are common in the Ayeyarwady delta. Mangroves cover an estimated area of 467,330 ha making Myanmar the fourth largest mangrove coverage in Asia, after Malaysia, Bangladesh and Papua New Guinea. The majority is located on Ayeyarwady flood plains, with the remainder in Tanintharyi and a lesser portion in the Rakhine Coast. Species distributions and compositions of mangroves differ amongst the three coastal regions.

(a) Mangroves

Mangrove ecosystems contribute a wide range of goods and services to the coastal population, particularly as charcoal and firewood for cooking, timber for construction, nurseries and artisanal fisheries. The role of mangroves in protecting coastal lands, settlements and infrastructure against the effects of cyclones and tidal surges is also well-recognized. However, over the past three decades more than half of mangroves have been undergoing over-exploitation, illegal felling, agricultural expansion and conversion to fishponds and shrimp ponds.

(b) Coral reefs

Coral reefs in Myanmar remain largely unexplored and the species diversity and health of this ecosystem is poorly known. Rakhine and Tanintharyi coastal areas, in particular offshore island of Myeik Archipelago, are the most favorable grounds for both hard and soft corals. Research studies including master and doctoral degrees theses identify a wide range of coral species, from 51 in 1972 to 512 species in 2014. However, Myanmar coral reefs have been declined due to contiguous with prolonged exposure to blast fishing, and illegally small-meshed fishing nets) and unregulated marine product resource extraction.

(c) Fisheries

Fishery resources in Myanmar waters are approximately 470 species of marine fishes including 67 commercially important pelagic species, and13 crustacean species. Three species are listed as Endangered in the IUCN Red List of Threatened Species including Hilsa shad (*Tenualosailisha*), Indian threadfin (*Polynemusindicus*), and four-finger threadfin (*Eleutheronematetradactylum*). Each of these species is greatly harvested for food along the coasts of Myanmar, and the regional stock of hilsa is overfished throughout its range.

Production of marine fish through aquaculture is relatively small compared with production of shrimp from aquaculture or production of wild caught marine fish. Aquaculture is practiced largely in freshwater and brackish water along the coastal area but on a limited scale in sea water. Considering the continuing deterioration of fish habitat and inland fish stocks together with high foreign demand for food fish of high-value species such as shrimps, sea bass (*Latescalcarifer*) and groupers (*epinephilusserranidae*), the government has encouraged the industry to increase total fishery production through culture-based fishery. As a result, there is a need to develop environmental-friendly aquaculture, sustainable aquaculture as well as conservation measures for mangrove resources.

(d) Marine and Coastal Tourism

Tourism is one of the fastest-growing industries in Myanmar, especially since 1996. The number of tourists visit Myanmar has demonstrated a growing trend. It is expected that the country will experience a rapid coastal tourism development as a result of overall economic development. There has been a substantial growth in tourist visitation to the southern islands of Myeik Archipelago through the Kawthoung border point.

3. Challenges

Information for the livelihoods and living standards of the coastal population is very limited. The majority of the coastal communities depend upon fisheries and agriculture, with minority live on tourism and industrial development. Other economic activities include logging, hunting, snails collecting, aquaculture and fishery industry. A number of coastal communities suffer from poverty and a lack of viable livelihood options.

Population growth accompanied by increased resource utilization as well as the ever-increasing demand for resources from neighboring countries have put biodiversity in Myanmar under severe pressure. The country remains one of the ten countries in the world with the largest annual net loss of forest area and among the five countries (Brazil, Indonesia, Myanmar, Nigeria and United Republic of Tanzania) (FAO, 2015). Mangroves were degraded and decreased due to over exploitation of forest products and conversion to agricultural land. When paddy yield declined, land was converted for shrimp farming. When shrimp farming was affected by increased acidification and water pollution, people encroached into another mangrove area for repeating the process of mangrove exploitation. In Tanintharyi Region, palm oil concessions have been granted in large forest areas and rubber plantations have almost doubled in coastal areas from 1990 to 2010.

(a) Overexploitation of Mangroves for Fuel-wood and Charcoal Production

Mangroves, in Ayeyarwady Region in particular, have been degraded because of overexploitation of fuelwood for Yangon and cities and towns in adjacent areas. In Rakhine State and Tanintharyi Region, mangroves are in better condition although there are increasing needs of fuel-wood from Yangon city to meet an annual demand of 700,000 tons. In addition to household consumption, fuel-wood and charcoal are supplied to cottage industries, restaurants and tea shops.

(b) Overfishing

The introduction of trawling in the 1970s and use of advanced fishing gears are likely to increase pressure on fish resources in Myanmar waters. Overfishing has been persistent due to several reasons involving an increasing demand of fish for local consumption, high dependency of artisanal fisherfolk upon coastal waters for their livelihood, and a large number of fishing boats from neighboring countries.

(c) Climate Change and Natural Disaster

The 2008 Cyclone Nargis caused over 140,000 casualties and catastrophic destruction of vast mangrove areas in Ayeyarwady Region, impacting food security of coastal communities. In the coastal and marine regimes, frequent and intense storm as well as strong wind and wave can have direct effect in fisheries both inshore and offshore. Coastal zones especially areas interspersed with tidal waterways like the Ayeyarwady Delta may face permanent inundation due to sea level rise. The highly productive deltaic and low-lying coastal rice/local crop cultivation areas will also be exposed to increased salinity and coastal erosion. As climate change impacts could severely undermine economic growth in Myanmar, the formulation and implementation of policies on climate change adaptation is vital for sustainable development.

(d) Constraints to Coastal Management

There has been no separate policy or legislation pertaining to management of the coastal resources. Agricultural production in coastal zones is carried out by farmers through agriculture supervision committee and Department of Agriculture, while fisheries management through Department of Fisheries and mangrove forest management through Forest Department. Key challenges in this context involve no appropriate integrated planning; no collaboration and coordination mechanism in policy making level.

The causes of biodiversity loss and unsustainable use of coastal and marine resources in Myanmar are correlated with a number of aspects involving: limited knowledge and understanding; capacity constraints;

lack of environmental safeguards; undervaluation of resources; lack of comprehensive land-use policies and plans; gaps in legislations and weak enforcement; poverty and subsistence needs; lack of grassroots support for conservation; and global climate change.

4. Proposed Projects in Myanmar Coastal Area

The Government of Myanmar with the support of relevant development partners Mangroves for the Future Programme has been initiated in 2014 to initiate rehabilitation of Myanmar Coastal ar. The National Coordination Body has been formed consist of governmental departments, IUCN, academia, professionals and NGOs. There are a number of small scale projects will be implemented in Myanmar coastal area as follows.

I. Project Title: Sustainability of Pyinbugyi Village Tract's Ecosystem through Community Based Mangroves Conservation and Coastal Bank Protection

a. **Project Site:** Pyinbubyi Village Tract, Palaw Township, Myeik District, Tanintharyi Region, Myanmar
b. **Implementation agency:** Myanmar Forest Association (MFA), Forest Compound, Bayintnaung Road, West Gyoegone, Insein Township, Yangon, 0925023143947, Email: mmforestassociation@gmail.com
c. **Implementing Partners**: Green Island Group (GIG), Pyinbugyi Village,
d. Authorized representatives from Implementing Agency: U Tin Aye, Secretary, Myanmar Forest Association
e. **Project Objective:** "To increase resilience of Ecosystem-Dependent Pyinbugyi Village Tract coastal Communities through establishing Community Based Mangroves Conservation and Coastal Bank Protection Models"
f. **Project start date:** 1 July 2016
g. **Project duration:** 12 months
h. **Project budget:** Mangroves For the Future (MFF) will provide USD 25,000
i. **Brief Project description:** Myanmar Forest Association will implement a project funded by Mangroves for the Future (MFF) for Pyinbugyi Village Tract of Palaw Township, Tanintharyi Region, Myanmar Forest Association. MFA has conceived this project to carry out community based mangroves conservation and coastal bank protection activities in the 3 villages of Pyinbugyi Village Tract and some of the following main outputs will be delivered through this project and they are: 1. targeted communities has increased knowledge on the importance of ecosystem in building human resilience; 2. initial stage on environmental governance is set up in the targeted villages; 3. a pool of villagers are trained on mangrove nursery practices; 4. One mangroves nursery is established, 4. mangroves conservation areas are demarcated and established; 5. Two acres of mangrove plantation for coastal bank erosion protection are undertaken etc.

II. Project Title: Community Development through Renewable Energy and Livelihoods Support in Tanintharyi

a. **Project Site:** Khanti Island, Pyinbubyi Village Tract, Palaw Township, Myeik District, Tanintharyi Region, Myanmar
b. **Implementation agency:** Myanmar Forest Association (MFA), Forest Compound, Bayintnaung Road, West Gyoegone, Insein Township, Yangon, 0925023143947,
Email: mmforestassociation@gmail.com
c. **Implementing Partners:** Green Island Group (GIG), Pyinbugyi Village,
d. **Authorized representatives from Implementing Agency:** Tin Aye, Secretary, Myanmar Forest Association
e. **Project Objective:** To enhance community development through renewable energy and livelihood support in Tanintharyi
f. **Project start date:** 1 July 2016
g. **Project duration:** 12 months

h. **Project budget:** Blue Moon Fund and Global Environmental Initiative will provide USD 50,000

i. **Brief Project description:**Khanti Island are located in Palaw Township, Tanintharyi Region in the south coast of Myanmar. There are two villages with 195 households and 1094populations in these two islands. These villages do not access the electricity supply because of geographical limitation and situated in isolated islands. In addition these villages are facing the degradation of mangrove forests due to over exploitation of fuel wood and charcoal. The socio-economic, livelihoods and environmental conditions of the community are lagged behind from other villages in that township. In order to overcome this limitation factors, alternative energy equipment, fuel-efficient stoves, awareness on mangrove conservation and community development activities such as alternative income opportunities, e.g., craft fattening and livestock.

III. Project Title: Sustainability of Ecosystem through Community Based Mangrove Conservation and Livelihood support in Rakhine Coastal Area, Myanmar

a. **Project Site:** U To Village, Pathein Township, Ayeyarwady Region

b. **Implementation agency:** Myanmar Forest Association (MFA), Forest Compound, Bayintnaung Road, West Gyoegone, Insein Township, Yangon, 0925023143947,
Email: mmforestassociation@gmail.com, uhtunpawoo51@gmail.com

c. **Implementing Partners:** Youth Group in U To Village, Pathein Township, Ayeyarwady Region

d. **Authorized representatives from Implementing Agency:** Htun Paw Oo, Chairperson, Myanmar Forest Association

e. **Project Objective:** To enhance sustainability of ecosystem through community-based mangrove conservation and livelihood support

f. **Project start date:** January 2017 to December 2018

g. **Project duration:** 24 months

h. **Project budget:** TOYOTA Environment Project will provide JPY 3,500,000

i. **Brief Project description:** Rakhine coast is situated in the Bay of Bengal with 740 km length, endowed with mangrove forests, sea grasses and unspoiled beaches and surrounded with tropical evergreen forests. Southern tip of Rakhine coast line is administratively under Ayeyarwady Region. The mangrove have been seriously affected by the large-scale cutting of mangrove trees for timber, fuel wood, charcoal and to clear land for agriculture and coastal development. At present biodiversity of the said areas is declining due to overexploitation of mangrove resources both for forest products and fisheries, and unsustainable fishing practices. Nevertheless, there are some dedicated communities who really want their mangroves back in their area and it is an encouraging signal that promoting community based mangrove conservation would lead towards restoration of mangrove ecosystem in Myanmar.

5. Recommendations

For long term coastal zone management in it needs to establish a national level committee for coastal resource management prepare guideline and undertake following actions.

- A guideline needs to develop national coastal resources policy, legal and institutional frameworks.
- Promote the implementation of ecologically sustainable development activities in coastal areas. Recognize and solve problems and conflicts of coastal resources competition among multiple users.
- Promote coordination with all relevant national and international institutions for the conservation, management and research of coastal resources such as mangrove, coral reefs and sea grasses and so on. Review and accept scientific advice and integrate this knowledge into the preparation of natural resource management plans.

Degraded mangroves in Pyingyi Island, Palaw Township, Tanintharyi Region

Reference

San, P. P., 2015, Report on Resilience Assessment for MFF Program Pyinbugyi, MFF Programme
Zöckler, C., et al, 2013, Sustainable Coastal Zone Management in Myanmar, Flora and Fauna International

An overview on the Participatory Wetland Conservation intervention made by PALLISHREE along the coast of Bay of Bengal in Odisha, India

D.P.Dash

Secretary, PALLISHREE

PALLISHREE has been working as an implementing NGO in the field of environmental awareness/ education in the community with its key focus on wetland conservation and eco system management in the coastal districts of Odisha, India. There are 26 Ramsar sites in India and out of which two Ramsar Sites are in the State of Odisha, namely Chilika lagoon and another is Bhitarkanika. The geographical situation of these two Ramsar sites is along the Bay of Bengal (BoB). The eco system of Bhitarkanika Ramsar site is basically mangroves forest with natural crocodile habitat and the largest nesting ground of Olive Ridley Sea Turtle in world at Gahiramatha along BoB. Chilika Ramsar site is having lagoon ecosystem with largest Irrawaddy Dolphin population in world. Due to anthropogenic pressures both the Ramsar sites are under threat from different aspects. In the present Climate Change scenario, the entire coast is vulnerable on rapid erosion as such a number of villages have been swallowed by BoB during last 15 years. The long coast of 480 Kms long over Odisha, Gopalpur, Rushikulya estuary, Chilika, Puri, Petha & Satabhaya in Bhitarkanika are the most vulnerable and as such PALLISHREE has already intervened its activities in Gopalpur, Rushikulya estuary, Chilika, Petha & Satabhaya in Bhitarkanika with the financial support of JFGE, KNCF, TOYOTA, NALAPO, Wetland International and the most important technical support from RCJ, Japan.

Chilika is a brackish water coastal lagoon in India and the second largest lagoon in the world situated between $19^0 28'$ and $19^0 54'$ north latitude and $85^0 05'$ 85o38' East longitudes, spread over Puri, Khurda and Ganjam districts of Odisha state on the east coast of India along Bay of Bengal covering an area of over 1,100 km^2. This Ramsar site is the largest wintering ground for migratory birds on the Indian sub-continent. The lagoon is home to a number of threatened species of plants, animals and an ecosystem with large fishery resources. It sustains more than 150,000 fisher-folk living in 132 villages on the shore and islands although there are about 273 villages surrounding to the lagoon. About 30% of the fishing village population are active fishermen, although many others depend indirectly on the fisheries. Shrimp culture has been largely practiced by illegal encroachment inside the lagoon by the villages. It is causing in decreasing of the fishing ground and fish production. In addition to upper catchment, the people generally depend upon agriculture for their livelihood. Every year the lagoon is silting up slowly as 405403 million cum of sediment draining into the lagoon every year, because of deforestation, mining and other development activities in the catchments. Hence the lagoon is under threat from increased fishing activities, detrimental practices and many other anthropogenic pressures.

Bhitarkanika Ramsar site is the second largest mangrove eco-system after Sunderbans with unique high species diversity of International importance. This Ramsar site is a geographical area of 672Sq. Kilometers having 381 villages. It is situated between 20^0. 30' to 20^0. 50' north latitude and 86^0. 30' to 87^0. 06' East longitude, in the Raj Nagar Block of Kendrapara District, State Odisha along Bay of Bengal coast. It is the habitat of largest estuarine crocodile population in India. Gahira Matha marine sanctuary is under this Ramsar

site which is the largest mass nesting rookery for Olive Ridley sea turtle in world having unique ecosystem of International importance. It is also one of the ideal habitats for other endangered reptiles like largest Indian water monitor, King cobra, python, etc. other endangered species like leopard cat, fishing cat, jungle cat, hyena, wild boar, spotted deer, sambar, porcupine, dolphins, terrapins etc. are sighted here. Kingfishers, hornbills, bar-headed geese, brahmini ducks, pintails, white-bellied sea eagles and many other endangered resident and migratory birds have created bio-spear in this wetland. Bhitarkanika Ramsar site covers 672 Sq. Km., out of which the mangrove forests cover only 150Sq. kms. and the core area of 145 Sq. km. is declared as National park. The entire area other than the core area is thickly populated with 1.96 lakh population in 381 villages. The mangrove forest is diminishing due to lack of fresh water supply in the mangrove areas and anthropogenic pressures like illegal encroachment for shrimp culture, agricultural activity. Another issue of concern is the continuous decrease in the population of migratory birds.

Rushikulya Estuary

The Rushikulya Estuary, located along the Bay of Bengal in Ganjam, Orissa, is the second largest mass nesting beach of Olive Ridley Sea Turtles in the world. Amazingly, this rookery only came to the attention of marine scientists in 1994. Over one hundred fifty thousand of the endangered Olive Ridley Sea Turtles (*Lepidochelys olivacea*) arrive each February to nest on this beach. Unfortunately, Olive Ridley juveniles are threatened by fishing-related activities as well as predators such as dogs, jackals, crows, eagles etc. In fact, the survival rate is thought to be as few as one in a thousand. A report shows that, more than 100,000 adult Olive Ridley Sea Turtles have perished during last 8 years due to unsustainable fishing practices. Unfortunately, the project area is coming under storm, cyclone prone zone and also vulnerable to Tsunami.

Climate Change

According to the Third Assessment report of IPCC (McCarthy et al., 2001) in the World, South Asia region is most vulnerable to climate change. The land mass is shrinking as such number of villages are swollen due to the rise of sea water level, change in sea behavior and erosion both in sea and river. Some of the current issues in this unique wetland are declining of fish species, saline water intrusion into coastal aquifers which results to reduction of good quality of drinking water. The vulnerability is acute by the combined effects of climate change, sea level rise, subsidence, and changes of upstream river discharge, high flood, cyclones, tornado, tidal surges and coastal embankments. Frequency and occurrence of disaster-surges is projected to increase as a consequence of climate change mostly in the coastal cluster villages. It is ultimately affecting the agriculture as the livelihood, natural and socio-economic infrastructures, health and energy and consequently on people lives in terms of reduced employment, lowering of income and scarce consumption including food in-security. High morbidity causing lessening the workdays of the wage earners and fishers. The most vulnerable sites in case of climate change are most affected in Satabhaya, Pentha, Puri, Dhalabali near Chilika mouth, Podampeta near Rushikulya river mouth & Gopalpur region.

Interventions

I) Environmental awareness/ education programme

Environmental awareness & education programme is very important to build and enhance the capacity of the stakeholders. The stakeholders play important role in conservation and wise use of the wetlands and Ramsar

Sites. PALLISHREE has taken up 66 nos. of villages in Bhitarakanika Ramsar site, 55 nos. villages in Chilika Ramsar Site, 11 nos. of villages in Rushikulya estuary for awareness and education programme. Under this programme 67 nos. of centers has been established in the local schools involving the students and teachers. The Centers have been playing important role among the community as the focal point through organizing of different activities like wall painting and street play to make understand regarding the degradation of environment among the stakeholders. Teachers workshop, different training programmes, survey using PRA tools and micro-planning, formation of women SHG and capacity building training are some of the principal activities which make involve of the stakeholders from the inception of the programme. Nature camp, exposure visits, demonstrations and ToT in different areas of interventions have brought practical knowledge in implementation of conservation measures in the project area by the community. Observation of World Environment Day, World Wetlands Day, Wolrd Wetland Week are some of the events which are very important in bringing ownership in the programme. Release of news letter, poster and booklets in the local language has also play important role among the stakeholders on public opinion and sharing of their views on conservation of their wetlands. The students monitor the water quality of the wetlands and collect the samples of different species of fish and weed of the wetlands, indigenous seeds, different type of soil, feathers of different birds, medicinal plants etc. and kept in the centers for the common understanding of the community. The students also bring awareness over the detrimental practices of the community. Essay & painting competition among the students and organizing rally in the community by the local schools raise the level of awareness among the students. As such PALLISHREE has able to make success of building unit among local volunteers 640 nos. in Bhitarkanika, 930 in Chilika and 410 in Rushikulya estuary region who are now able to capacitate in taking conservation measures and sound environment issues. This programme is most important in building resilient in the community to address all the environmental issues including conservation measures.

II) Plantation programme

In the present climate change scenario, tree has great role to mitigate the adverse effects at the community level. Hence PALLISHREE has taken up plantation programme in school campus, temple campus, community land for both mangroves and other general plants. The plant species have been selected by the community before making nursery such as mangoves species like *Rhizophora apiculate, Avicennia alba, Avicennia officinalis, Ceriops decandra, Excoecaria agallocha, Bruguiera parviflora,* grass species like *Myriostachya wigstiana* . The general plants such as *Acacia aurielu formis, Acacia mamgium, Cariea papaya, Psibium guava, Emblica officiralis, Pangamia pimmata, Moringa ptrygosperma, Anacadium Occidentale, Cusuarina equisitifolia, Tectona grandis, Pongamia pinnata, Delonixregia* etc.

Apart from the awareness and education programme in community, plantation programme has been implemented successfully with community participation. In Bhitarkanika, 75, 000 nos. of mangroves plants have been planted covering 28 ha. in community land. In Chilika PALLISHREE is facilitating a community led mangroves plantation programme with State Govt. (ICZMP) in a land of 93 ha. In Rushikulya region 20,000 plants have been raised and the plantation programme is about 8 ha. of mangrove plantation. This plantation is taken up in the muddy and tidal influence area. But in case of general plants, the school campus, temple campus and also community open land has been selected by the community for take up plantation programme. In Bhitarkanika, 62 schools campus,14 temple campus and 5 community land has been selected for plantation by the stakeholders and planted 90,000 plants covering 40 ha. of land. In Chilika 38 school campus, 17 youth club campus has been selected for plantation covering 52 ha. of land having 1,20,000 plants of different species. Now jackal and hire are found in some of the old plantations. The community is very happy to observe it.

In Rushikulya estuary area 10 school campus and 3 community land has been planted with 42,000 plants of different species covering 19 ha. of land.

III) Solid waste management

In Bhitakanika 10 schools, in Chilika 25 schools and Rushikulya estuary 10 nos. of schools have been established with waste bins both degradable and non-degradable. The students have been well trained on proper management of the wastes generated in their school campus. The students are also learnt the sanitation and management of their household wastes in their own home. So ultimately this programme could also make the village clean successfully.

IV) Stress tolerant rice and other crop cultivation

In the present climate change scenario farmers are also most sufferers with drought, flood and high salinity. In this context, different stress tolerant cultivation methods and inputs have been prepared by the scientist community. PALLISHREE facilitated the successful adaptation of the stress tolerant varieties of paddy in 6 coastal districts. The farmers have been trained and at the same time the variety of seeds are also provided with adequate demonstrations.

V) Olive Ridley Sea Turtle conservation

In Rushikulya estuary, there are 5 villages where the coast is coming under mass nesting of Olive Ridley Sea Turtle. Since the area is vast, it is too difficult to manage such a large population both during nesting and also safe release of hatchlings to BoB. In this regard, community participation for support in management has been organized successfully. The community has been made aware to stop fishing during meting season in BoB. Safe nesting and safe guard of eggs from jackles, dogs, kites and crows was managed by the local community by deploying volunteers with proper training. Most important to release the hatchlings in night time. Due to lights from opposite directions of BoB, the hatchlings do not go to BoB and face problem and at last meet the last or prey by predators. In this case more volunteers are necessary to support in releasing of millions of hatchlings to BoB. The community is supporting in this connection as the awareness level raised in the project. Sea beach cleaning is most important aspect which the local volunteers do regularly. The garbage collect by the volunteers are kept in the waste bins installed by PALLISHREE over the beach and manage successfully. Necessary training has been provided to boatmen, fishermen, women SHG members and volunteers to enhance their capacity for better management with community participation. Apart from this, PALLISHREE has formed Eco-guide group and trained them to conduct eco-tourism in the project villages. The educated youths have been selected by the community as eco-guide. The women SHGs have been trained to prepare sea-cell handicrafts product which is another skill development training for creation of livelihood opportunity. The handicrafts are sold in different exhibition, local fairs and also to tourists.

VI) Disaster Risk Reduction

Odisha coast is highly vulnerable to disasters every year. The stakeholders are facing with different disasters such as cyclones, flood and also drought regularly. So PALLISHREE has taken lead role in forming a NGO network namely NETCOAST with 10 nos. of grass root level NGO members in 6 districts of coastal Odisha. In this programme the objective is to reduce the risk of disaster through capacity building of the community to be managed by them. The four frameworks for adaptation to disaster is – prevention, mitigation, community readiness and individual survivability. The necessary trainings like mock drill, early warning, preparedness, first-aid, search and rescue, snake bite management, evacuation, preparation of dry food and management have been provided. Shelter, light, food, water, sanitation, medicine and important documents for

preservation have been given priority during disasters. Under this programme the following activities have been implemented by the community for prevention and mitigation with people's participation successfully. As such there is no casualty has been occurred during the severe cyclones in the project area.

In Satabhaya the sea water was entering into the village in many times during high tide. So PALLISHREE has planned very cost effective indigenous technology with the community people to prepare natural bond across the sea and village. It could successfully build the sand bond of 8 feet high with a length of one Km. The sea water could be prevented to enter into the village by this programme.

- Mangrove plantation and Nalia grass (*Myriostachya wigstiana*) plantation has been taken up under this programme on river side of 5 Km. as a pilot programme in Bhitarkanika Ramsar site to prevent soil erosion and also natural conservation with livelihood enhancement.
- The women are the most vulnerable during disasters for collecting drinking water and sanitation. So the platforms of 150 nos. existing tube wells have been raised to the high flood level in order to avail the drinking water facility during flood. For better sanitation management during the time of flood, 850 nos. of high raised plinth toilets have been installed in coastal flood affected villages.
- To manage the ecosystem in water logged area, proper drainage facility has been created. The creeks of 8 kms. have been renovated as a pilot programme to release the flood water fast from the project villages.
- The role of pond is significant in the community in the environment as well as livelihood aspects. So 36 nos. ponds have been rejuvenated.
- Under livelihood promotion programme, hygienic dry fish production, vegetable cultivation, poultry, pisciculture, mushroom cultivation, leaf-plate making, tailoring, cold chain maintaining in fish marketing has been provided.
- Bringing participation in implementation of Govt. programmes, the community has been capacitated by providing training as well as facilitating the action in the field. The Govt. programmes like sanitation, insurance, MGNREGS, horticulture, agriculture, fishery, forest, child welfare etc. has been included in the project villages through convergence.

Coastal Wetland Biodiversity Conservation by Involving the Community: A NGO initiative

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Abstract: The Southernmost part of Bangladesh is bordered by about 710 km long coast line of the Bay of Bengal, which has the continental shelf of up to 50 m depth with an area of about 37,000 km2. Coastal ecosystem of Bangladesh is very rich in biodiversity. Bangladesh POUSH has been working in the east coast of the country since 1992. The purpose of Bangladesh POUSH is to facilitate and promote sustainable livelihoods through Participatory Conservation & Management of Ecosystem & Natural Resources and Socio-economic Empowerment. Bangladesh POUSH follows participatory approaches in implementation of the biodiversity conservation project activities; organizing the community, facilitate the community identifying the action plan and community based monitoring are the main course of action making community conserving own habitat.

Introduction

Bangladesh comprises a land area of 144.054 km2, which is bounded by India on the west, north and northeast by Myanmar on the East and Southeast and the Bay of Bengal on the South. The Southern most part of Bangladesh is bordered by about 710 km long coast line of the Bay of Bengal, which has the continental shelf of up to 50 m depth with an area of about 37,000 km2. It is the Exclusive Economic Zone of Bangladesh lies .The coastal fauna of Bangladesh are a total 453 species of birds, 42 species of mammals, 35 reptiles and 8 amphibian species. A total of 301 species of mollusks and over 50 species of commercially important crustaceans and 76 species fish from estuarine have been recorded so far in the coastal zone. Among the endangered species are five mammals, 25 birds, 14 reptiles and two amphibians (frogs). The marine waters of Bangladesh are also having 442 species of fish36 species of marine shrimps. About 336 species of mollusks, covering 151 genera have been identified. In addition, 3 lobsters and 7 species of turtles and tortoises, 168 species of seaweeds, 3 sponges, 16 crabs, 3 lobsters, 10 frogs, 3 crocodiles, 24 snakes, 3 otters, 1 porcupine, 9 dolphins and 3 species of whale found in Bangladesh territorial water. Among the marine and migratory species of animals, 4 fishes, 5 reptiles, 6 birds, and 3 mammals are threatened.

In Bangladesh people and the nature has long co-existence history. A great number of populations live in the coastal areas, which are primarily dependent on the natural resources available in the wetland for their livelihoods. NGO in Bangladesh has a long history of co-management of the natural resources in Bangladesh. NGO has organized the community to work for the protection and conservation of the natural resources. Where to note the NGO contribution in the wetland ecosystem conservation of the Bay of Bengal Coast the intervention by Bangladesh POUSH is noted. Bangladesh POUSH has been working for the wellbeing of coastal biodiversity since 1992.

Bangladesh POUSH

Bangladesh POUSH is a non-profit, non-political, non-governmental, environmental voluntary development organization, established in 1990, registered with NGO Affairs Bureau, Govt. of Bangladesh and also registered under Societies Registration Act. 1860. The purpose of Bangladesh POUSH is to facilitate and promote sustainable livelihoods through Participatory Conservation & Management of Ecosystem & Natural Resources

and Socio-economic Empowerment. Objectives of the organization are to promote community based wise use of Natural Resources, to organize and capacitate poor communities to facilitate income generation for securing their livelihoods, to assist to build-up community based organization, to rehabilitate the degraded ecosystem, to increase environmental awareness & capacity towards sustainable development.

Approach

POUSH`s approach of community based project implementation:

The approach of Bangladesh POUSH is to implement the project focusing on forming various community groups by directly involving them to achieve the goal, and also works in closed collaboration with different government and private organizations.

Initiative of POUSH in conservation of coastal Biodiversity

Initiative of Bangladesh POUSH in Conservation of Coastal Biodiversity in the following coastal areas of Bangladesh; Chakaria, Cox's Bazar, Ramu, Teknaf, Ukhia, Mohesh khali,, Sonafdia, St. Martin Island To achieve the aim & objectives.

POUSH undertakes interventions in the following major areas: sustainable livelihood through participatory natural resource management, bio-diversity conservation, participatory afforestation & nursery development, environmental education, human resource development, partnership & gender development, conservation of cultural heritage, research & publication.

Being an environmental NGO, BP has been implementing different project on protection of forest & wildlife, management & conservation of coastal wetlands, afforestation and nursery development, environmental education by involving community people. It was jointly funded by WFP/GoB, Ramsar Center Japan (RCJ), JFGE, KNCF, TOYOTA Environmental grant programme, Climate Change Trust fund and RICOH Company Ltd. Tokyo, Japan. Over the period of 25 years a total 35 project and over 5000 (Five thousand) poor families were mobilized and organized for conservation of coastal biodiversity.

Bangladesh POUSH has been implementing the different projects and program in the coast since 1992. Following are the significant on-going projects of Bangladesh POUSH working for the coast:

1. Community based conservation of globally significant biodiversity of Dhalghata Island, Moheshkhali, Cox's Bazar: The project work aims to improve the ecosystem through the participation of the community. Community learnt sustainable use of natural resources in the island of Moheskhali. With TOYOTA Environmental Grant Program, Tokyo, Japan since January 2013 in collaboration with RCJ, Japan. A Total of 100 families direct benefited from this project through different capacity building training and knowledge transfer and indirectly more than 2000 people were motivated and aware about sustainable use of local natural resource for their livelihood support.

2. Biodiversity Conservation through Ecosystem based Adaptation Involving the Local community at Gorakghata, Maheshkhali of Cox's Bazar, Bangladesh: This Japan Fund for Global Environment (JFGE), Japan in association with RCJ, Japan, project aims capacity building of the community on adaptation to climate change. 200 families have been directly benefited through different capacity building training and awareness building activities.

3. Homestead Planting in Coastal Villages Mitigate the Climate Change Impact: Climate change trust fund supported project has been implemented since 2013. The project is being implemented in the coast households of Moheshkhali. A total of 200,000 sampling planted at 20,000 households with different tree species in an around homestead.

Previous projects that were successfully completed in the coast

1. Implementation of Biodiversity Conservation Management Plan of St. Martin's Island ECA: Bangladesh POUSH had conducted a survey in St. Martin's Island to identify the alternative livelihood option of the community people. Based on the survey finding POUSH has identified the alternative livelihood option for the community. POUSH has developed training materials for alternative income generation of the target community people and conducted several trainning for target community people to skill them to under the alternative income generation activities and ultimately as alternative livelihood for the betterment of the local target households. All households are now of the Village Conservation Group (VCG) member. A total of 300 households got training five village conservation group (VCG) formed. Each VCG consists of 20 members.

2. Conservation and protection of marine turtle, coral and other marine resources: Organize community meetings on importance of Mangrove Screw pine & sand dune vegetation ecosystem and other threatened biodiversity. Under this project more than 10000 Mangrove screw pine planted and are 100 hectors sand dune vegetation protected. A turtle breeding ground protected.

3. Community Mobilzation for Biodiversity Conservation in three Ecological Critical Areas (ECA)of Cox's Bazar district under Coastal & Wetland Biodiversity Management Project (CWBMP) of Department of Environment (DOE)/ Ministry of Environment and Forest (MOEF)/ UNDP: Bangladesh POUSH implemented community Mobilization for Biodiversity Conservation in three ECAS of Cox's Bazar district a Component of Coastal & Wetland Biodiversity Management Project of Department of Environment, Government of Bangladesh with financial support from GEF/UNDP. 5000 household are mobilized and formed 35 Village Conservation Group (VCG) towards conservation of the local biodiversity.

4. Non formal Primary Education: Eleven non- formal primary education centers were operating with the financial assist from RICOH Co. Ltd. Japan for the children of the poorest family in the remote coastal area in Cox's Bazar coastal district. In each centre is for 30 children. Student belongs to 6 to 12 years old. In addition with the normal elementary education visual educational materials like poster on different environmental message was used for better understanding of the environment. 330 children got 3 years' elementary education.

5. Sustainable Conservation of Mangrove Forest & Marine Turtles through Community Participation in Sonadia Island, Cox's Bazar of Bangladesh: Bangladesh POUSH has successfully implemented project. The purpose of the project was to conserve the rich ecosystem and biodiversity hotspot by mangrove afforestation, protection of globally significant marine turtle through community participation and capacity building of the target community people through different training. Under this project more than 50 households of land brought under mangrove plantation and more than 6 thousand Turtles hatchling produce in the turtle hatchery and released to sea.

6. Community Based Coastal Wetland Management Building Capacity and organizing Communities at Badarkhali, Chakaria, Cox's Bazar: Bangladesh POUSH has successfully implemented in collaboration with RCJ. This initiative was for demonstrating enhancement of capacity through knowledge sharing and application in managing wetland resources & livelihoods. Under this project a mangrove nursery with capacity of 5000 sapling established and planted 300 trees in the area and 2000 households were capable through knowledge shearing and training.

7. Mobilizing Communities in Protection, Conservation and management of Coastal Fisheries Resources: Bangladesh POUSH, in coalition with Bangladesh Environmental Lawyers Association (BELA) and Bangladesh Centre for Advanced Studies (BCAS) has successfully implemented a component of the project, Empowerment of Coastal Fishing Communities (BGD/97/017) in Cox's Bazar, Moheshkhali, Ramu and Ukhiya Upazilas. The project implemented by Department of Fisheries with support from the Food and Agriculture Organization (FAO). The project engages a number of service providers from the NGOs to assist the project in achieving its objectives within the given framework of project concept, strategy and institutional arrangement. The development objective of the project is to

promote livelihood security of the poor coastal fishing communities and protection, conservation and management of coastal fisheries resources. Through this project more than 1000 fisherman were capable through training and knowledge shearing.

8. Social Afforestation and Nursery Development: POUSH has completed three-year project on Afforestation and Nursery Development with the assistance of RICOH CO.LTD., Tokyo, Japan. About 80000 seedlings of different tree species were raised and planted on 60 acres of denuded land in 3 Upazila of Ramu & Chakoria.100 community people benefited during the period of 2000 to 2004.

9. Coastal Green Belt Project at Chakaria Upazila of Cox's Bazar District (Period of implementation: 2000-2003): Under this project a total of 240 local community people were trained on protection and management of planted trees of coastal belt. Now 240 local people are engaged in protecting and managing about 15 km. of plantation raised (2000-2001) with Assistance of Asian Development Bank and Department of Forest, GOB.

10. Biological Protection of Embankments in Coastal Area of Cox's Bazar (Two Polders) (Period of implementation: 1992-1993): Bangladesh POUSH was one of the three NGOs which participated in the implementation of Biological Protection of Coastal Embankment by involving local people sponsored by Bangladesh Water Development Board. POUSH implemented this Biological Protection of Coastal Embankment pilot project at Polder No. 66/1 under Cox's Bazar Upazilas and at Polder No.69 under Moheshkhali Upazilas of Cox's Bazar district during the year of 1992-1993.

Why engaging the community

(A) Partnership with the local entireties: Bangladesh POUSH has long association and good working relationship with local communities and local government institutions and departments. POUSH implement the project activities in close partnership and association with local biodiversity conservation group, different stakeholders including local government institutions like Union Parishad, Upazila, District, forest department, department of environment, department of fisheries, department of cooperative, and other community based organizations and different local occupational or livelihood groups.

(B) Concentration in an geolocation: Bangladesh POUSH has been working in the south east coast specifically the Moheshkhali Coast since long. A concentrated work with in an area for long has given the community the trust of co-working among the community.

Output-out come analysis

Engaging community in management of their own natural resources requires the capacity and the understanding of the crisis as well as the capacity of intervention: Following is the output-out come analysis of a current project. The project work aims to improve the ecosystem through the participation of the community. Community learnt sustainable use of natural resources in the island of Moheskhali.

Output:

- 30 community group formation with the objective of community based conservation;
- 3 Mangrove nurseries establish with capacity 2000 each sapling.
- Mangrove plantation in 200 hectors;
- Published of 5000 copies of a leaflet
- Conducted 20 capacity building trainings.
- Organized 30 community consultations
- Two marine turtle hatchery operated in Moheshkhali and Dhalghata.

Outcome:

- 400 individuals are capable to initiate conservation measures themselves;

- Habitat of 150 hectors are protected;
- 2000 saplings are in the new plantation area of Dhalghata;
- Sand dune of 50 hector is now notified by community as protected area
- 6000 turtle hatchlings produce & release from the hatchery in the sea.

Bangladesh POUSH has implemented a total of twenty participatory bio-diversity management projects at different times.

Has mobilized community people in conserving the coastal bio-diversity, BP has published 4 booklets on community based conservation methods & practices, and several posters, leaflets, monographs etc.

BP has organized 300 different Training, 100 Workshops, at grass root level to build capacity & environmental awareness for different stakeholders in its programme areas, as well as 50 regional & 10 national workshops on different environmental issues & published proceedings.

Climate Change, an additional consideration of planning coastal biodiversity conservation

Bangladesh is the most vulnerable country to climate change. With in the country the coast is the most vulnerable because of its location and livelihood pattern. The coast is in topography very plain and is of sea level and the livelihood is musty agrarian and costal fisheries based.

1. Cyclone intensity and frequency have been increased: The intensity of the cyclone has increased; it is reported that cyclone frequency in the coastal Bangladesh has increased three times. The strength and number of major cyclones may be increasing because of higher sea surface temperatures associated with global warming. Cyclone Sidr (November 2007) and Cyclone Aila (May 2009) provide recent examples of devastating storm-surge in Bangladesh. In 2007, Cyclone Sidr, a 10-year return period cyclone with an average wind speed of 223 km per hour resulted in 4,234 casualties and 55,282 injuries. Livelihoods of 8.9 million people were affected and damages and losses from Cyclone Sidr totalled US$1.67 billion. 11 In 2009, Cyclone Aila, a 1.2 year return period cyclone with an average wind speed of 95 lm per hour caused 190 deaths, 7,103 injuries and affected 3.9 million people. The estimated damage of assets from Aila is US$270 million.

2. Salinity intuition: Salinity is penetrating far inland through Meghna estuarine river system. An environmental terrible circumstance caused by salinity intrusion is a major problem in southwest coast. Huge lands are not cultivable now. The shallow coastal aquifers have high salinity.

4. Changes in seasonal calendar: The characteristics of the typical months and season have already been changed. Three seasons exist instead of 6; summer and rainy season becoming longer and the winter is significantly short.

5. Rainfall erratic: Though no significant changes in total rainfall reported but short duration heavy rain has increased. There is also no-rain situation.

6. Migration happening: Climate change is resulting huge migration; it was reported that after the Aila around 36,000 people has migrated to other urban areas including capital Dhaka from a a coastal sub-distinct Shyamnager Upazila.The scenario is same in every locality of coast.

Key lesson learnt

Though 'Participation of community in natural resource management' and 'natural resource management by the community'mean a similar process in intervention but there is a significant difference between the two. Bangladesh POUSH believes to make community managing own natural resource very specifically the coastal resources planning and designing needs to be done by the community. The geo-context particularly the state of disaster risk is a vital for the project success and sustainability. Regarding community lead coastal biodiversity conservation major learning of Bangladesh POUSH are as follows:

- Project design needs to be a community participatory process allowing in-built flexibility and enable community based resource management institutions to respond to local situations. Government and donors need to give an enabling framework.

- More consideration should be given to post project sustainability at the design stage of project.

- Building capacity of communities, by means of organizing them in groups (any form) and imparting trainings by applying participatory rapid appraisal (PRA) tools towards enhancing understanding and ability to anticipate impacts of climate change and risks of disasters so that they may safeguard their assets, diversify their economic activities towards climate-/disaster-safe activities and they may access goods and services to withstand shock and/or to bounce back following shocks.

Conservation of the Ramsar Sites along the coast of the Bay of Bengal

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ABSTRACT: Along the coast of 8 basin countries of the Bay of Bengal, there is a very high diversity of wetland ecosystems of various unique types, different sizes, and multiple functional importance. Ecosystem services, functions, and benefits of wetlands along the Bay of Bengal are significantly important at local, national, regional and international levels. This paper focuses on wetlands of international importance (Ramsar Sites). Conservation-related issues, especially good examples, successful practices, and lessons learned, are reviewed, drawn and highlighted. Information to be added or updated on the Ramsar Information Sheets, is suggested. Inputs on issues and aspects which should be considered for further wetland inventory, not limited to only Ramsar Sites, and conservation networking along the coast of the Bay of Bengal are provided.

Keywords: *Bay of Bengal, Ramsar Sites, wetlands, conservation networking*

Introduction

International networks for wetlands conservation collaboration among countries bordering the Bay of Bengal are important and needed for sustaining the existence, healthy status, and wise use of wetland ecosystems. The objectives of this paper are: (a) to present key findings and highlights from the review of the conservation and wise use of Ramsar Sites along the coast of the Bay of Bengal; and (b) to provide inputs for a 'simple wetland inventory' to be implemented by the Project '*Building an International Wetland Cooperation Network across the Countries Sharing the Coast of the Bay of Bengal*', initiated and led by the Ramsar Center Japan.

Methods

Desk study and review of available information was carried out, focusing on 12 wetlands of international importance (Ramsar Sites) situated along the coast of the Bay of Bengal in 4 countries. Reviewed Ramsar Sites include : 1 site of Bangladesh (Sundarbans Reserved Forest); 4 sites of India (East Calcutta Wetlands; Chilika Lake; Bhitarkanika Mangroves; and Point Calimere Wildlife and Bird Sanctuary); 2 sites of Sri Lanka (Kumana Wetland Cluster; and Bundala); and 5 sites of Thailand (Kaper Estuary – Laem Son Marine National Park – Kraburi Estuary; Phang Nga Bay Marine National Park; Ko Ra – Ko Prathong Archipelago; Krabi Estuary; and Had Chao Mai Marine National Park – Ta Li Bong Island Non-Hunting Area – Trang River Estuary).

Conservation-related issues, especially successful practices and good examples, are compiled and highlighted.

Major source of information is Ramsar Information Sheets (RISs) available from http://ramsar.org. Other sources of information include scientific journals, research reports, websites especially of related government agencies of each country and of international organizations.

Key findings and highlights

Wetlands along the coast of the Bay of Bengal have very high ecosystem diversity. Each and every Ramsar Site possesses many different diverse types of ecosystems and habitats which are unique to and/or representative of the Region. For examples, **Sundarbans Reserved Forest** is one of the world's largest

contiguous mangrove forest. **Chilika Lake** is the largest brackish lagoon of India. The **East Calcutta Wetlands** is the world's largest multifunctional natural and manmade infrastructure integrated wastewater and solid waste treatment facilities with local traditional fishery and agricultural practices. **Kaper Estuary – Laem Son Marine National Park – Kraburi Estuary** has one of the oldest (> 300 years) best mangroves and isthmus ecosystem unique to the Region. It should be noted that **Cox's Bazar**, which is not yet a Ramsar Site, is known as the world's longest beach.

Wetlands along the coast of the Bay of Bengal have very high species and genetic diversity. They are important habitats supporting life cycle and critical stages of life of flora and fauna, including a large number of the world's rare and endangered species, as well as many important species endemic to all basin countries of the Bay. Important species include Sundri Tree *Heritiera fomes* (EN) dominant species of the **Sundarbans**; Palu Tree *Manilkara hexandra* on sand dunes of **Bundala**, a unique forest type of Sri Lanka; Bengal Tiger *Panthera tigris* (EN) of the **Sundarbans**; River Terrapin *Batagur baska* (CR) of **Sundarbans Reserved Forest**; Saltwater Crocodile *Crocodylis porosus* (EN) of **Bhitarkanika Mangroves** (India's highest density of this species) and of **Sundarbans Reserved Forest**; Olive Ridley Sea Turtle *Lepidochelys olivacea* (EN) of **Bhitarkanika Wildlife Sanctuary** (the world's largest known nesting beach) and **Point Calimere Wildlife and Bird Sanctuary**; Grey Pelican *Pelecanus philippensis* (EN), Asian Dowitcher *Limnodromus semipalmatus* (EN), Indian Blackbuck *Antilope cervicapra* (EN and endemic) of **Point Calimere Wildlife and Bird Sanctuary**. Other important species recorded in wetlands of the Bay of Bengal include Dugong *Dugong dugon*, Greater Flamingo *Phoenicopterus roseus*, Lesser Flamingo *Phoenicopterus minor*, and Hilsa *Tenualosa ilisha* the national fish of Bangladesh.

Wetlands along the coast of the Bay of Bengal have very highly diverse ecosystem services (provisioning, regulating, supporting, and cultural services). Economic values are explicitly derived from a wide range of wetland resource uses at all wetland sites. Ecosystem functions are clearly demonstrated in times of disasters and extremes such as protection from cyclones, tsunamis and tidal surges. Ecological values are obtained from conservation of biodiversity and the crucial roles in water purification, groundwater recharge, and flood control. Social and cultural values are exceptionally high, including those associated with livelihoods, food and health security, nature education, history, archaeology, religious rituals, festivals, novels, epics, folklores, folk arts, sons, dances.

In terms of conservation management and wise use of wetlands, many and various good examples, practices, and lessons in a wide range of aspects are available and can be drawn from wetlands along the coast of the Bay of Bengal for knowledge transfer and experience sharing. **Sundarbans Reserved Forest** has various scientific studies and research related to flagship species conservation. The **East Calcutta Wetlands** is the best demonstrating how wetlands can be cheap, efficient, and eco-friendly infrastructure for urban wastewater and solid waste treatment, while integrated with traditional practices of fisheries and agriculture, also providing 3 basic needs to the locals : food, sanitation-health, and livelihood securities. This Ramsar Site also provides a very good example of efforts and ability of the Calcutta Metropolitan Development Authority in management of multiple wise use of wetlands. **Chilika Lake** provides an excellent example of wetland management structure and efforts, having Chilika Development Authority established by the Government of Orissa State, chaired by the Chief Minister, and administered by the Chief Executive Officer, allocating investment in scientific research, assessment and monitoring, carrying out science-based management decisions and actions, promoting participatory integrated watershed management, and most importantly – one of the best example of wetland restoration. **Bhitarkanika Mangroves** has good examples of protected area management, mangrove conservation, and species conservation programs/projects e.g. saltwater crocodile, sea turtle. **Point Calimere Wildlife and Bird Sanctuary** may provide an example of how to manage the invasive alien species. **Kumana Wetland Cluster** can provide a good example of how to preserve cultural values of wetlands, especially the ancient irrigation civilization and traditional settlements. **Bundala** can share good experience in biodiversity conservation. **Kaper Estuary – Laem Son Marine National Park – Kraburi Estuary** has a very good Ranong Mangrove Forest Research Center and can provide capacity building program. **Phang Nga Bay Marine National Park** and **Ko Ra – Ko Phra Thong Archipelago** can share experience in how to minimize impacts of mass-tourism and how to manage eco-tourism. **Krabi Estuary** can share experience in collaborative activities related to nature education in wetlands among schools, teachers, and students. **Had Chao Mai Marine National Park – Talibong Island Non-Hunting Area – Trang River Estuary** has a good example of involvement and roles of local stakeholders working together with the site manager in wetland conservation activities.

Some inputs for 'a simple inventory' of wetlands along the coast of the Bay of Bengal

The mandate of all countries bordering the Bay of Bengal is not only limited to conservation and wise use management of Ramsar Sites. Other wetlands deserve well-managed conservation. A simple wetland inventory is a useful tool for initiating and enhancing the networking at the local or site level.

For networking, name(s) and contacts of key persons or groups at local or site level, should be identified, especially of site manager(s), site expert(s), community leader(s), local network(s), CBOs, NGOs, IOs, groups of local schools, teachers, and students.

To make the most use out of good examples from different wetland sites, there is a high potential for establishing a 'Network of Site Managers', a 'Network of Wetland Schools', and probably other networks, in which valuable lessons, knowledge and experience can be shared and transferred.

Information of noteworthy flora and fauna needs to be updated and regularly monitored. This includes, not only number of species and list of important species, but also the trend and details of disappearance and introduction of new species. More importantly, 'Flagship Species of wetlands of the Bay of Bengal' should be identified for conservation targets (both species and their habitats).

Quantified economic values of ecosystem services (provisioning, regulating, supporting, cultural) and benefits to wetland inhabitants should be recorded. Mechanism for monitoring of ecological characteristics and ecosystem services should be identified and promoted.

Topics, areas, aspects of action research needed for each site should be identified in order to support successful management.

Capacity building programs should be well designed based on the need assessment and delivered to site managers and other groups of stakeholders.

Local wisdom, traditional knowledge and practices related to wise use of wetlands, as well as roles of local stakeholders and their limitations to participate in wise use and conservation management should be clearly understood.

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Climate Change Adaptation and Wetland Wise Use

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Keywrods: UNFCC, Mitigation, Adaptation, NDC, INDC

Paris Agreement and NDC

On 12th December, 2015, the 21st Conference of Party (CoP21) of United Nations Framework Conventions on Climate Change (UNFCCC) adopted Paris Agreement. It shall enter into force on the 30th day after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55 % of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary. As of 1st June, 2016, 17 Parties have ratified and the total amount of GHGs emissions of the parties accounted for 0.04% of the global emissions. It might seem far until it becomes effective, but most countries including the USA are seriously considering its ratification. Many hope that it will be effective before 2020.

The Paris Agreement requires all Parties to submit Nationally Determined Contributions (NDC) every five years, and report its implementations, which will be subject to review.

INDC

Before the CoP21, the Parties submitted their Intended Nationally Determined Contributions (INDCs) to the UN. The NDC will be expected to be prepared by the Parties according to the INDC. The format and the contents of the INDCs are different among the Parties. While the INCDs mainly focuses on mitigation, adaptation is still important subject particularly among those of developing countries.

In May 2016, the UN released a synthesis report on the aggregate effect of the INDCs (United Nations 2016). It reported that many Parties identify ecosystem as a priority area for adaptation as follows:

> *303. Another priority area identified by many Parties was ecosystems, including in the context of biodiversity conservation. Many defined enhancing the resilience of or rehabilitating ecosystems as one of their objectives and they highlighted their national and/or regional biodiversity strategies and/or action plans. In terms of biodiversity, Parties identified some specific objectives and actions, including establishing biodiversity corridors, protecting moorlands and other ecosystems, increasing the conservation of species and recovering forest, coastal and marine ecosystems (in particular mangroves and corals) and tracking, monitoring and assessing impacts on biodiversity. Specific measures mentioned by Parties include preparing a biodiversity index and atlas or biodiversity centres, protecting wildlife species, establishing watering points for wildlife and stopping coastal mining.*

It also refers that wetlands restoration offers mitigation and adaptation synergy.

Wetland management in INDCs

All submitted INDCs are able to be downloaded from UNFCCC's websites. While Japanese INDC neither refer to adaptation nor wetland, other Asian INDCs identify wetland or mangrove as important factors for mitigation and adaptation:

Bangladesh

Bangladesh identifies continuation of coastal mangrove plantation as a possible conditional action-based contributions for mitigation. It also recognizes “Community based conservation of wetlands and coastal areas” as one of the Key Areas to address adverse impacts of climate change, and estimated its necessary investment cost for 2015-2030 as one billion USD.

India

India identifies herself as one of the countries which are most vulnerable to the impact of accelerated sea level rise due to global warming. It initiated “Mangroves for the Future (MFF)” project coordinated by International Union for Conservation of Nature (IUCN) to protect coastal livelihood.

Myanmar

Myanmar aims in increasing “the resilience of mangroves and coastal communities which are at risk of flooding” by “developing a coastal zone management plan to effectively conserve terrestrial and under water resources including mangrove forests”, “cooperating with international organizations providing technology, and funding to reduce the risk of climate related disaster risk for local communities”.

Thailand

Thailand’s prioritized adaptation efforts include: “Increasing national forest cover to 40% through local community participation, including in particular headwater and mangrove forests to enhance adaptive capacities of related ecosystem,” and “Develop participatory, integrated marine conservation and coastal rehabilitation plan to protect marine ecosystem and enhance climate proofing infrastructure to strengthen coastal protection against erosion.”

Conclusion

Notional governments of countries along the Bengal Bay has already recognized the function of coastal wetlands, particularly mangroves, and identified the proper management of the coastal wetland as important factor for both adaptation and mitigation. Sharing the experience and knowledge of wetland wide use, in particular of coastal wetland, in the region will significantly contribute adaptation efforts both internationally and domestically.

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Integrated Coastal Zone Management Project, Odisha; promoting sustainable management of the coastal resources & livelihood.

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Abstract: Coastal waters around the globe suffer from stress due to wide range of human activities. The situation calls for a holistic approach, combining expertise from nature science and social science, to reach a balanced and sustainable development of the coastal zone. Integrated coastal zone management (ICZM) is a frame work for sustainable management of coastal zone perpetually. ICZM can be defined as a continuous and dynamic process by which decisions are taken for the sustainable use, development, and protection of coastal and marine areas and resources. ICZM acknowledges the interrelationships that exist among coastal and ocean uses and the environments they potentially affect, and is designed to overcome the fragmentation inherent in the sectoral management approach. ICZM is multi-purpose oriented, it analyzes and addresses implications of development, conflicting uses, and interrelationships between physical processes and human activities, and it promotes linkages and harmonization among sectoral coastal and ocean activities. The Bay of Bengal, the largest bay in the world, forms the northeastern part of the Indian Ocean. The province Odisha is situated along the Bay of Bengal. On a pilot basis ICZM project is implemented for the first time in India in three States i.e. Odisha, West Bengal & Gujarat. The ICZM frame work is a paradigm shift from the traditional approach of sectoral management of the coastal resources to a comprehensive, integrated approach for better governance and management. The ICZM (O) project has been conceived with an objective to facilitate the development and implementation of an integrated management strategy for the coastal zone, by adopting a broad perspective and a multi-sectoral approach, to ensure wise use of coastal resources, perpetual maintenance of high level of biodiversity , conservation of critical habitats and to maintain their ecological integrity including sustainable coastal fishery, protection from extreme weather events, nature based tourism, and infrastructure development. The major thrust of the project being coordination of various coastal economic sectors towards long term optimal socio-economic outcomes, ICZM compliant coastal infrastructures including resolution of sectoral conflicts and mediating beneficial trade-offs.

The coast and marine environment plays a critical role in the social, economic and environmental fabric of any country. The coastal zone, from time immemorial has been a major hub for a variety of activities including industry, agriculture, fisheries, recreation and Port. The coastal and marine ecosystems being highly productive attract human settlement and economic activities. Coastal zone ecosystem is important for biological and economic productivity, storm protection, erosion control and most importantly it provides a host of ecosystem services which are crucial for human wellbeing. Despite their ecological richness and the contribution to national economy, the coastal and marine areas have not received adequate protection, and are under stress. Rapid urban-industrialization, maritime transport, marine fishing, tourism, coastal and sea bed mining, offshore oil and natural gas production and aquaculture have led to a significant increase in demand for infrastructure, resulting in the over-exploitation of natural resources. Such rapid depletion and degradation, unless arrested, will impact the livelihood, health and wellbeing of the coastal population; affecting in turn prospects for a country's sustained economic growth. Since most development activities are sectoral and highly competitive, there is often conflict for space and resources. However, since settlement we have seen our coast and marine environment change substantially, we have built over the coastal sand dunes, we have deposited untreated and treated effluent into the marine environment. We have seen tones of sediments washed into the seas from our creeks and rivers as a result of erosion caused by increased storm water flows resulting in sea grass loss and impacting on our reefs and fisheries.

Sustainable management of coastal and marine resources is essential for long term economic growth and to ensure the equilibrium between economic development and the protection of the environment. In this context Ministry of Forest & Environment, Government of India, the World Bank have come forward with ICZM approach to coordinate activities of various sectors and resource users for the sustainable management and wise use of coastal resources maintaining the integrity of coastal ecosystem.

Integrated coastal zone management (ICZM) is a process for the management of the coast using an integrated approach to achieve sustainability, regarding all aspects of the coastal zone, including geographical and political boundaries. The project on long-term aim tod balance environmental, economic, social, cultural and recreational objectives, all within the limits set by natural dynamics and facilitate integration of the terrestrial and marine components of the target territory, in both time and space through a comprehensive ICZM Plan. The ICZM plan when completed will be extremely useful for management of natural resources as well as development of the infrastructure in coastal zone.

The ICZM project for Odisha is formulated based on multidisciplinary and interactive framework to promote sustainable management of coastal zones through a wide consultative process to make it as inclusive as possible. Considering the dynamic nature of coastal ecosystem an adaptive approach for formulation of the project is followed. A series of grass root level consultation workshops were organized to get the inputs from the stakeholders as participation of all stakeholders in achieving the goals of the project. The project would benefit the coastal population of the state. About 0.4 million people from 235 coastal villages of Kendrapara, Jagatsinghpur, Puri, Khurda and Ganjam would be directly benefitted from the project activities. Direct employment opportunity for the coastal fisher folks would be created through eco-tourism activities. Capacity building and empowerment of 600 Self Help Groups from 80 villages would be carried out through the project. Pilot activities under the project are implemented by 10 Department & Agencies. The pilot activities are implemented with best possible technology, adequate capacity building of the stake holders good instructional support and governance for sustainability. Many PEAs have replicated and scaled up the pilots.

One of the major output of the project would be the ICZM Plan. The major impediment for adoption of ICZM is the knowledge gaps and the lack of adequate data. ICZM planning is an integrated governance process in which all stakeholders associated and affected with natural and coastal resources work together to fully ensemble the societal objectives for both present and future generations. Initially, a workshop was organised on 6th-9th December,2010 at SPMU, Odisha involving the key stakeholders to disseminate the concept of ICZM and deliberate on the process involved in ICZM Planning. The major outcome of the workshop was methodology for delineation of sediment cell and the TOR for Regional Coastal Process Study. A national workshop on ICZM Planning was organised from 16th 17th March,2012 in collaboration with NCSCM involving all coastal states and 3 SPMUs focusing on the need for defining objective and frame work for ICZM Planning and Shoreline Management Planning. Based on the output of the Workshop, the NCSCM is developing the ICZM Planning framework and the guidelines. As per the TOR and suggestion of different national & international Experts, a credible Primary data on coastal process for entire coast of Odisha for the period of 12 months based on Sediment Cells were generated for the first time in India. An eminent panel of nation-wide experts was constituted for the interim review and improvement of the Regional Coastal Process Study (RCPS). These Primary data will be subjected to studies of numerical modelling and the Secondary data will be used for the development of conceptual modelling which would be the inputs for Shoreline Management Plan & ICZM Plan. As a follow up the March,2012 Workshop, the training workshop on ICZM & Shoreline management planning was facilitated in April, 2013 by the experts. The experts have deliberated the rich experience in Modelling Studies, the shoreline and ICZM planning and the case studies from different parts of the globe including Asia. The useful inputs and valuable information emerged from the workshop by the experts & stakeholders were very much helpful for the preparation of Road maps of ICZM and SMP plan for Odisha coast. ICZM Planning is an evolving process. The entire Planning process would involve multi stakeholder consultation, conflict resolution, capacity building of the stakeholders to make it inclusive. The TOR for preparation of ICZM Plan and Shoreline Management guidelines of Odisha is finalised and a high level monitoring committee has been constituted to review the progress of ICZM Planning under the Chairmanship of Chief Secretary of the State.

For ICZM to succeed, a broad context of government and interest group involvement is essential. Fishing, mining, shipping, defense, public health, and recreation are complex activities requiring cooperative management and inter-sectoral coordination. To accomplish the coordination requires the full involvement of all the various stakeholders through a comprehensive and integrated programme. Keeping the present level of key issues such as conservation of turtle and mangrove, addressing the issue of coastal erosion, loss of tourism beaches, siltation of mouth of Chilika Lake, salt water ingress in paddy fields, alternate livelihood, fisheries development, optimum use of coastal space for developmental activities. During the course of implementation of the project ICZM frame work is put to test to maintain equilibrium between, conservation, livelihood & development .

Past, present and future of the Ramsar Regional Center – East Asia

SUH, SEUNG OH

Ramsar Regional Center – East Asia

Abstract: The Ramsar Regional Center – East Asia (hereafter the RRC-EA) was established in July 2009 with the official endorsement of the 40th Standing Committee of the Ramsar Convention. It works with 17 countries in East and Southeast Asia[2] for further implementation of the Ramsar Convention through activities of capacity building, information sharing, grant program and networking for various wetland stakeholders in the region.

From July 2009 to December 2015, the period can be considered as the RRC-EA's 1st phase. The center was belonging to another organization as a small team with limited resources. However, during the time, the RRC-EA built up its foundation for future activities. Now the RRC-EA is on the 2nd phase. It moved to Suncheon City with its own identity (independence) by signing a new hosting agreement with MOE Korea and Suncheon city. The center decided to put its priority on the networking of the wetland visitor centers considering their importance in delivering messages of the Ramsar Convention. The RRC-EA signed an MOU with Wetlands Link International (hereafter WLI), which is a global network of wetland visitor centers to create synergy in vitalizing the network in our region. The RRC-EA is confident to create positive impacts through the network. It will be a stepping stone to lead the RRC-EA to the bright future.

Introduction

The Ramsar Regional Center – East Asia (hereafter the RRC-EA) was established in July 2009 with the official endorsement of the 40th Standing Committee of the Ramsar Convention. There are four Ramsar Regional Centers globally, which are CREHO, RRC-CWA, RRC-EA and RAMCEA. These Ramsar Regional Centers mainly work with Ramsar Contracting Parties in different geographical region. (CREHO – America, RRC-CWA – Central and Western Asia, RRC-EA – East and Southeast Asia and RAMCEA – Eastern Africa) The RRC-EA mainly works with 17 Ramsar Contracting Parties[3] and also cooperatively works with International organizations, Intergovernmental organizations, regional NGOs and national NGOs in the region. The objective of the RRC-EA is providing 1) education and capacity building opportunities, 2) networking and information sharing opportunities, and 3) financial support through its grant program.

For the education and capacity building, the RRC-EA has organized annual regional/national level training workshops for wetland managers since 2009. Regional level training workshops normally invite 2 wetland managers from each member country, deliver important messages of Ramsar Convention, provide scientific and technical lectures on wetland management and restoration and provide time to share their information and experiences and to discuss solutions for their common and specific problems. National level training workshops were invented to overcome language barrier in our region. Different from other regions, the countries in East and Southeast Asia do not have a common language to communicate and the number of wetland managers who can attend the Regional level workshop was limited. To overcome the language barrier, the RRC-EA began to organize the National level training workshops in each country by using the local language of the country. More than 400 wetland managers attended the training workshops and every workshop marked 80 to 90% satisfaction from the evaluation after workshops. These two training workshops are now considered as annual training workshops for our region by the countries.

[2] Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Japan, Republic of Korea, Lao PDR, Malaysia, Mongolia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, and Vietnam

[3] Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Japan, Republic of Korea, Lao PDR, Malaysia, Mongolia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, and Vietnam


For the networking, the RRC-EA organized the Changwon Declaration Network meeting from 2009 to 2015 to promote the implementation of the Ramsar Resolution X.10 and workshops for CEPA NFPs and STRP NFPs with Ramsar Secretariat to vitalize the network of Ramsar CEPA and STRP Network.


For the financial support to wetland conservation and CEPA activities in the region, the RRC-EA supported 25 projects from 2009 to 2015 through its grant program called “The RRC-EA Wetland Fund”. It normally selects 4 projects per year and supports 10,000 USD per project. Although the amount is not enough to make big differences, it is meaningful for applicants to begin their project and to approach bigger funding opportunities.


1st Phase - Past

From July 2009 to December 2015, the period can be considered as the RRC-EA’s 1st phase. The center was inexperienced, and belonging to another organization as a small team with limited resources. However, during the time, the RRC-EA could successfully build up its foundation for future activities with enormous support of partners. I deeply appreciate all the support of partners, especially RCJ and Dr. Bishnu B. Bhandari.

The biggest concern for the RRC-EA during the time was the conflict with the host organization. The organization was established for local level activities for wetland conservation and authorized to make all the decisions related to the RRC-EA. All the CEOs did not understand the role and activities of the Center in the region and reduced human resources and budget originally allocated to the RRC-EA. The only way to overcome the problem was to be independent from the host organization. The RRC-EA continuously appealed the

problem through all possible opportunities. Finaly the MOE Korea made great decision on the status of the RRC-EA in early 2015 and signed new hosting agreement with new host city of Suncheon and MOE Korea in December 2015.

As mentioned, it could be done only with the support of all partners.

2nd Phase - Present

The RRC-EA is on the 2nd phase. It moved to Suncheon City with its own identity (independence) in January 2016. MOE Korea and Suncheon City respect the independence of the RRC-EA and support the RRC-EA administratively and financially enough to work efficiently.

With its new beginning, the RRC-EA set up a new plan for network of the wetland visitor centers. During all the activities in the past, the RRC-EA found out the important role of wetland visitor centers in delivering messages of wetland conservation and also the difficulties they faced.

Recently more and more countries establishing new wetland visitor centers and the number of them increased sharply. But the newly established centers faced lack of experience and information. Not enough opportunities to build their capacities and to share information and experience were given.

Therefore the RRC-EA decided to put its higher priorities on the networking of the wetland visitor centers. The RRC-EA signed an MOU with Wetlands Link International (hereafter WLI), which is a global network of wetland visitor centers to create synergy in vitalizing the network in our region. The RRC-EA will act as a secretariat of the WLI-Asia and provide benefits to all wetland visitor centers in our region.

As its first task on the network, the RRC-EA is now developing an inventory of wetland visitor centers in our region and it will be a great resource for wetland visitor centers to know each other and to begin their communication for cooperation. And it will also be a stepping stone to the next task of the RRC-EA on the networking.

3rd phase - Future

As its next task on the network, the RRC-EA considers cooperative fund-raising with network members. Targeted number of wetland visitor centers for the WLI-Asia is more than 100 and the targeted number of visitors that we expect is more than 20 million per year. Private companies spend huge amount of money for promotional activities to improve their brand images and to publicize their products. Visible visitor centers and huge number of visitors in all around the region will be a great attraction to the companies.

All WLI-Asia members will put the sponsor company's logo in the center for a certain period, and the sponsor will contribute a certain amount of fund to the WLI-Asia. It can be utilized as Asia Wetland Fund to support various wetland conservation activities in our region.

The RRC-EA is ready to do its best to realize the dreamlike plan and hope to have all partners' continuous support.

Annex I: List of participants

Name	Position	Organization
Ajit K.Pattnaik	The Principal Chief Conservator of Forests	Government of Odisha, India
Bishnu Bhandari	President	Nepal Wetland Society, Nepal
Durga P.Dash	Secretary	Pallishree, India
Htun Paw Oo	Environmental Consultant	Myanmar Forest Association, Myanmar
Mashhor Mansor	Professor	Universiti Sains Malaysia, Malaysia
MishraA. Chinmaya	Staff	Pallishree, India
Pyae Phyo Aung	Program manager	BANCA, Myanmar
Sanowar Hossain	President	Bangladesh POUSH, Bangladesh
Sansanee Choowaew	Professor	Mahidol University, Thailand
Seung Oh Suh	Executive director	Ramsar Regional Center for East Asia, Korea
Atsushi Tanabe	Graduate Student	Kumamoto University, Japan
Emiko Nagakura	Communication Officer	Wetlands International Japan, japan
Hiroji Isozaki	Professor	Sophia University, Japan
Takayuki Musha	Vice President	RCJ, Japan
Tamotsu Kameyama	Vice President	RCJ, Japan
Toru Iwama	Vice President	RCJ, Japan
Yoshihiro Natori	President	Wetlands International Japan, Japan
Yukihiro Shimatani	Professor	Kyushu University, Japan Wetland Society, Japan
Reiko Nakamura	Secretary-General	RCJ, Japan
Ryo Fujikura	Professor	Hosei University, Japan
Manabu Echigo	Researcher	Intem Consulting

Annex II: Programme of the workshop

International Workshop on Conservation and
Wise Use of Wetlands along the Coast of the Bay of Bengal
6-7 June 2016
Venue: Faculty of Environment and Resource Studies,
Mahidol University (Salaya Campus), Nakhon Pathom, Thailand
Organizers: Ramsar Center Japan (RCJ)
In collaboration with
Faculty of Environment and Resource Studies, Mahidol University
Supported by Keidanren Nature Conservation Fund (KNCF)

6 June 2016

Session 1: Current Situation of the Coastal Wetlands over the Bay of Bengal and Conservation Efforts for Sustainable Development

Chairman: Hiroji Isozaki

9:30-10:00
The Jewels of the Bay of Bengal Dr. Bishnu Bhandari, Nepal Wetland Society

10:00-10:30
Coastal Wetlands in Myanmar and significant intertidal mudflat Gulf of Mottama
Mr. Pyae Phyo Aung, Program Manager, BANCA

10:30-11:00
Community-based Conservation Initiative on Coastal Zone Management in Myanmar
Mr. Htun Paw Oo, Myanmar Forest Association

11:00-11:20 Tea Break

11:20-11:50
Overview on the Participatory Wetland Conservation intervention made by PALLISHREE along the coast of Bay of Bengal in Odisha, India Mr. D.P.Dash, Pallishree

11:50-12:20
Coastal Wetland Biodiversity Conservation by Involving the Community: A NGO initiative
Mr. Sanowar Hossain, Bangladesh POUSH

12:20:12:50
Conservation of the Ramsar Sites along the coast of the Bay of Bengal
Dr.Sansanee Choowaew, Mahidol University

12:50-14:00 Lunch

Session 2: Wise Use of the Wetlands in the Bay of Bengal and Global Environment

Chairman: Toru Iwama

14:00-14:30
Ramsar Convention A tool for the sustainable Development/Use Prof. Hiroshi Isozaki

14:30-15:00
Climate Change Adaptation and Wetland Wise Use

Prof. Ryo Fujikura, Hosei University

15:00-15:30

Traditional Disaster Risk Reduction in Japan

Prof. Yukihiro Shimatani, Kyushu University

15:30-16:00

Integrated Coastal Zone Management Project, Odisha; promoting sustainable management of the coastal resources & livelihood

Dr. Ajit K. Pattnaik, Government of Odisha, India

16:00-16:30

Roles and Works of Ramsar Regional Center – East Asia

Mr.Seung Oh Suh, RRC-EA

16:30-16:50 Tea Break

Session 3: Discussion Session

16:50-18:00 Discussion

Chairman: Ryo Fujikura Co-Chair: Bishnu Bhandari

How we can go further to promote the wise use of the wetlands in the Bay of Bengal

7 June 2016

Session 4: Discussion Session ((Wrap Up)

8:00-9:30 Discussion about the Future work plan

Chairman: Ryo Fujikura Co-Chair: Bishnu Bhandari

SATELLITE MEETING

Preliminary Meeting for Asian Wetland Symposium 2017

9:30-11:00, 7 June 2016

Venue: Faculty of Environment and Resource Studies, Mahidol University

Organizers: Wetlands International Japan (WIJ), Ramsar Center Japan (RCJ)


RCJ