



Developing a functional zoning system for Sonadia Island ECA



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© Cover page and report photos are taken during the field survey in Sonadia Island in April 2008, credit to Mohamed Shaker Hebara

1. Introduction

This report provides a proposal for a zoning system that address the management challenges of Sonadia Island ECA. Despite the intention was to review and update the zoning system which was developed in August 2006 as a part of Conservation Management Plan, it was found that the earlier zoning system requires drastic changes based upon the situation in the field and the management needs.

This proposal was developed as a collective work of all NPPPs and with direct engagement of BCVD, local people and other concerned stakeholders. The development of the report depended on internal discussions with NPPPs and several meetings with governmental officers such as Forest Department Office in Cox's Bazar and local government officers. In addition, intense field survey was conducted to cover each spot and corner of Sonadia Island ECA.

The most characteristic feature of this proposal is providing effective balance between conservation and sustainable development; for instance, the proposed zoning system provides Core Zones, Buffer Zones, Sustainable Development Zones and Managed Resource Zones. In other words, it accommodates all forms of land uses arranged in a matrix according to management objectives and field realities.

This proposed system is focusing on protecting the most valuable and vulnerable ecological features, upon which the ECA was declared, and in the same time it is delivered in pragmatic approach, considering the current land use on the ground and the need of the local communities. In brief, the proposed system can be described as a functional and practical zoning scheme.

The developed zoning system, in this report, tried as possible to follow the existing zoning systems; internationally (i.e IUCN system), nationally (i.e the zoning scheme of protected areas in Bangladesh) and regionally when appropriate. This is an attempt to link the proposed system to other relevant schemes and to harmonize the conservation works of ECA in Bangladesh in all levels.

The report gives the details of each zone and describes clearly its location - supported by a map, rationale for selection, management strategy and management objectives, and conclude with general rules and regulations for each zone.

If this system is approved by PMU and other authorities, it should be implemented as soon as possible, and publicized through a meeting or workshop and then demarcated on the ground in preparation to practice the rules and regulations of each zone. The system can be fine-tuned in the first year of implementation provided that the concept and overall objectives remain the same.

2. The concept of zoning

2.1. Definition

The term "Zoning" means dividing the Protected Area (PA) or Ecologically Critical Areas (ECA) into logical units or belts mainly for management purposes. ECA and PA usually suggest a zoning system in order to achieve their management objectives, realize specific conservation goals, determine the level of management, and set measures for accepted development in each zone.

In brief, the idea of developing zoning system for conservation is to create balance between biodiversity protection and economic development. So, the designing of zoning system must reflect the natural and cultural values of the protected areas and must also respect the current pattern of land use on the ground and the essential needs of local communities.

Zoning is a tool for planning and management of Protected Areas and ECAs. It helps ECA staff and NPPPs to see the whole picture of ECA and consequently develop their perception about their ECA as a whole, not only their area of interest. So, the staff can recognize easily the wider context of conservation strategy of their ECA.

In other words, zoning puts conservation activities in its right position, according to priorities and actual needs. For instance; fishery officers who work in protected area naturally tends to focus on water bodies, and ecotourism officers focus on tourism development, yet they need to see the ECA from above and meet their terms of references within the overall objective of ECA. Zoning solves this situation and helps creating a consensus among staff, and other concerned stakeholders about areas that need strict protection and areas that could be open for sustainable development.

Thus, functional zoning system, with clear strategy and with regulations and rules, will definitely help ECA staff to design their activities and interventions within the vision of the ECA and that will lead to the effective conservation of core values of the ECA.

The zoning options vary between strictly reserved zone, which is the highest level of protection and down to multiple use zone or general use zone, which is the most flexible management belt. Between these two zones, there is usually a buffer zone which is established to soften the line between preserving biodiversity and general use areas that include some forms of development. Zoning, in this sense will separate incompatible land uses within ECA, for instance mining and ecotourism.

2.2. Zoning for Conservation Management Plans

Zoning is an integral part of Conservation Management Plans, as it is a tool by which conservation plan is realized. Zones, in this regard, are used to describe management actions and to guide and control the human and development activities. Additionally, It is difficult to describe, or even consider, the management of large or complicated sites unless they are divided into a series of zones.

In order to develop functional and meaningful zones, an analysis based on the ecological information derived from relevant sources is required. This analysis must be supported by field-based information and good understanding of current land use and development pattern on the ground.

Zones in management plans must be delineated and described as clear as possible, and the basis or justification for their selection should be clearly presented. That is why in many cases, conservation management plans are developed with a provisional zone map until a clearer idea is crystallized regarding zoning and objectives of the site.

There are few basic rules that should be applied when establishing zoning system, these rules are;

- A full and detailed rationale is required to explain the basis for establishing the zones.
- A concise description of the functions and/or restrictions applied within each zone must be prepared and included.
- A map showing the zones must be prepared and included in the management plan.
- Zone boundaries must be easily recognizable and clearly identifiable on the ground, physical features such as rivers, walls or roads form the best boundaries.
- Boundaries of zones which are based on habitats must be identified with permanent markers since communities are often dynamic and liable to change in area.
- Uniform sites, or areas of homogeneous habitat, fixed markers are needed for demarcation.

- Zones should be identified with a unique and, if possible, meaningful code, in most cases, a simple numerical code will be quite adequate.

3. Improving CMP zoning system

This part describes and analyzes the zoning system which was developed in August 2006 as a section of Conservation Management Plan for Sonadia Island ECA. It also explains why the system should be reviewed and improved.

Conservation Management Plan for Sonadia is a significant achievement of CWBMP. Considering the circumstances within which the plan was developed including the time limitation, it becomes quite obvious that a lot of efforts and knowledge have been invested in developing the plan.

According to CMP, zoning system of Sonadia consists of six core zones and one general use zone in addition to an undetermined zone. These zones are provided in a tabular format that describes delineation, justification, function and restrictions of most of the zones.

There are some concerns regarding the current zoning system that compel us to review and improve the draft in order to make it more functional and realistic. These concerns are summarized below;

- The current system categorizes almost all (>85%) Sonadia Island as “Core Protection Zone” in six units, out of seven identified units. This, unjustified, highest level of protection imposes on local communities strong restrictions and leave them with no chances for sustainable development or traditional uses. In other words, it is not realistic to declare the whole area as core zone preventing local communities from practicing their traditional activities and generating sources of income for local and national economy.
- This system provides no buffer zone or transitional areas between Core and General Use zones. From technical point of view, Core zones should be buffered by transitional zones, to avoid direct contact between two incompatible zones, unless there is a strong reason for that.
- The current land use pattern on the ground does not support the proposed system, for instance many zones which are drafted to be core zones have been under heavy development for long time, and the natural ecosystems have been significantly altered in these zones. It is almost impossible to declare these areas as core zones and impose strong restrictions, while developments in all forms are taking place in the area. This could put the ECA into “paper park” condition, meaning that the zoning will be only on paper not in reality. Additionally, many core protection zones, in the CMP of Sonadia do not qualify to be so and declaring them as Core Protection Zones will bring no ecological or socio-economic benefits to the area.
- The tabular format of zoning, (Table 1, CMP which represent the zoning section of the plan) has some gaps and is incomplete. There are also some parts of the ECA are not covered by the zoning scheme and/or it is unclear within which zone they are classified. Apparently, the delineation does not clearly cover the whole ECA, as there are gaps between some zones.
- There are no zones dedicated for sustainable development and alternative sources of income, except a very margin area surrounding the two villages in Sonadia. That is why, it is perceived that the proposed system will increase hardship for local and will neither be sustainable nor practical.

- As the system was developed in an early stage of CWBMP and witness very limited field work, it was not crystallized enough. Thus, the proposed zoning system does not gain the attention of the most concerned people and was vague to everybody including BCVD before the outsiders. In addition, a strong recommendation was done by the Wildlife Conservation Officer in Cox's Bazar to review the system and provide a more realistic and practical zoning system for Sonadia.

4. Methodology

In order to develop this updated zoning system for Sonadia ECA, the following methodological steps have been taken.

- **Proposal Prepared:** A proposal of the activity was prepared and sent to NPD and ECAMO via email. The proposal was discussed in internal meeting chaired by NPD and attended by ECAMO and NPPPs during NPD visit to Cox's Bazar in 13th March 2008. The proposal was approved by NPD, ECAMO and NPPPs.
- **Literature Review:** Relevant literature were reviewed particularly CMP, CWBMP documents and other relevant technical papers.
- **Meeting with Forest Department:** A meeting with Forest Officers in Cox's Bazar was organized and held in 3rd April 2008 to explore the zoning and categorization system that is adopted by Forest Department. That was an important step for CWBMP in order to develop more uniformed zoning system on the national level as an attempt to strengthen institutional links. This meeting helped CWBMP team to understand the zoning system which is adopted by Forest Department in the Protected Areas, and consequently embodying it, when appropriate, to the newly proposed zoning system.
- **Coastal Land Zoning Project:** A coordination meeting was held with Environmental Consultant of the newly introduced governmental project of Coastal Land Zoning. The Consultant shared the team during the field visits and other preparations and meeting activities. Exchanging of ideas and concepts was a good sign of future cooperation. The environmental consultant asked IUNV to give a presentation on the Zoning of Sonadia ECA, if internally approved, so as to consider it with the governmental system.
- **Field survey:** A plan was prepared to survey the entire ECA, by dividing Sonadia Island into plots, each plot can be covered in a day time. The field work lasted for four days; three of them were in row and required spending two nights in Mohashkali. The intense field work enabled the team to visit each and every corner of the island in order to develop good understanding platform of the situation on the ground. During this survey, GPS points were marked for different zones and for current development activities. Almost all NPPPs shared in this field work.
- **Compilation of report:** the above activities helped to gather the needed information and to develop a good vision for the proposed practical zoning system. This report represents the findings of the mission and proposes a detailed improved zoning system for Sonadia ECA.

5. Itinerary and team

The table below shows the itinerary of the mission and the team participated in each events, the work lasted for 6 weeks including 2 weeks for field work.

Date	Activity	Team	Location	remarks
9/3/2008	Proposal preparation	IUNV in consultation with NPPPS	Cox's Bazar Office	
13/3/2008	Discussion of the proposal in a meeting chaired by NPD and attended by ECAMO and NPPPS	IUNV and NPPPs in Cox's Bazar	Cox's Bazar Office	Proposal approved by NPD and meeting members
3/4/ 2008	Meeting with Forest Officers in Cox's Bazar to explore thier zoning system	IUNV, FBO, EDO	Forest Office in Cox's Bazar	This is an attempt to harmonize the zoning system nationwide
7/4/2008	Field work in Sonadia; North – East	IUNV, FBO, HEO, CDO, EDO, BCVD staff and community guards, Environmental Consultant*	Sonadia; Taziakata-Kutubzome	FBO undertaken coordination responsibility of the mission during field visits
8/4/2008	Field work in Sonadia; North – West	IUNV, FBO, AEO, HEO, CDO, BCVD staff and community guards	Sonadia: Ghotivanga-Boradia-Vanga khal	
9/4/2008	Field work in Sonadia: South – East	IUNV, FBO, AEO, HEO, CDO, BCVD staff and community guards	Sonadia: Mogchar-Kaperkhal - Dofordia	Mission concluded earlier due to boat problem
15/4/2008	Field work in Sonadia: South - West	IUNV, FBO, AEO, BCVD staff and community guards	Sonadia West: Belekdia - Mogchar	
30/4/2008	Final Report prepared	IUNV and FBO	Cox's Bazar	

* Mr. Ekramullah, Environmental Consultant for Coastal Land Zoning Project has joined the entire field work and participated in some discussions and meetings.

6. Proposed zoning system

This section describes in details the proposed zoning system, which comprises of 5 zones. Each zone is clearly demarcated on the map and its rationale is outlined together with its management strategy and objectives. General rules and regulations are also provided for each zone.

6.1. Managed Resource Zone (code MRZ01)

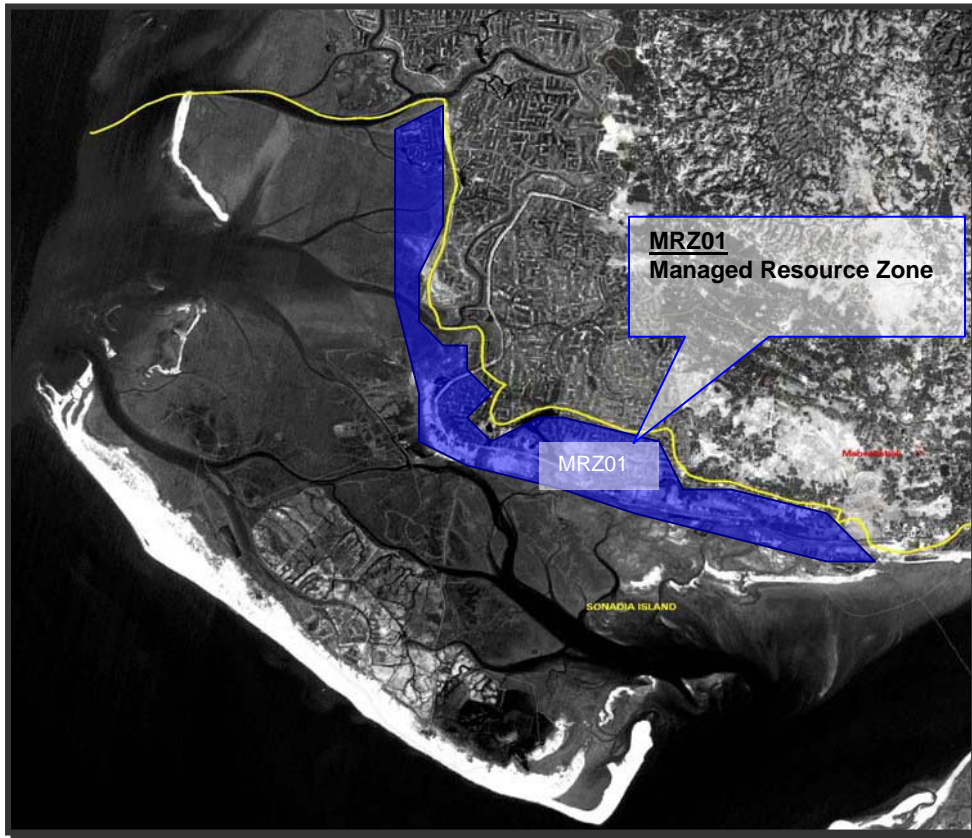
This zone covers the Northern (East to West) border of ECA and stretches to the southern range of Mohashkali and passing through Gohtibanga, Kutubdia, and Bangakhal. It represents a belt of about 12 Square Kilometer (12 Km length X 1 KM width). See map below.

6.1.1. Current situation

This zone is very close to the highly populated northern villages of Sonadia and that is clearly reflected on the current land use. The area is under high pressure of development in forms



of salt production, shrimp farms, buffalo grazing, boat harbor, and associated activities.



The area includes settlements in Borodia, Ghotivanga, Dembunipara, and Taziakata.

The habitats of this zone contain stretch of mud flats, sandy beach and dunes. However, the ecological features of the area are totally altered to the extent that restoration could not be feasible or successful (See photo).

6.1.2. Rationale

This zone contains modified natural systems and does not have exceptional ecological features. The ecosystems in this area are significantly altered due to heavy development practices. As mentioned earlier, the zone is under intense production of salt and shrimp, in addition to agriculture and fishing, and these activities represent the main source of income for locals in area.

Considering the ecological situation of this zone and the need of the local communities, the zone was designed as a Managed Resource Zone in order not to disrupt the main source of living of those poor communities, especially because there is no significant ecological return is expected. This will allow local communities to continue their commercial activities, and improve their local economy, provided that they will follow the rules and regulations of this zone and adapt their activities to be more sustainable and in harmony with the overall objectives and rules and regulations of ECA.

If this zone moves towards sustainability, this will maintain flow of natural products and services to meet community needs. This zone will represent the contribution of ECA to local people to support sustainable development. In turn, ECA will be able to protect the core areas and areas of ecological significance in strict mode as a compromising agreement.

6.1.3. Management strategy and objectives

The strategy of this zone is to serve the local community in sustainable manner and without impinging upon the overall objective of ECA. So, the management objective will focus on allowing sustainable development in order to ensure sustainable flow of natural products and services for local community in harmony with overall objective of ECA and its rules and regulations. Specific objectives are;

- Promote sound management practices for sustainable production systems of agriculture, salt production, crab culture/fattening, and fish-shrimp poly-culture exclusive for local communities and local consumption.
- Contribute to local development and improve local economy in line with the national and regional policies.
- Function as a managed layer to protect the core and buffer zones of ECA, so as not to jeopardize the natural and cultural values of ECA.
- Serve as a model for sustainable development within ECA and hence improve the profile and the role of ECA in local development.
- Create a bridge of trust between ECA authority and local communities.

6.1.4. General rules and regulations

- Zone is open for sustainable development activities with particular emphasis on organic farming, traditional uses, ecotourism, cultural activities and art-crafts production.
- Agricultural production and plantation of native species i.e coconuts should replace exotic species such as *Eucalyptus* and *Acacia*.
- Environmental clearance certificate based upon Environmental Impacts Assessment is required for any development project in the area, and approval of ECA authorities is mandatory for any environmental clearance certificate.
- Any activity which could result in deterioration of the natural conditions of this zone or more importantly the other zones of ECA is strictly forbidden.
- The following activities are not allowed in this zone or in any other zone of the ECA;
 - Any activity that may change the natural characteristics of the area
 - Establishment of any industry that may pollute the soil, water and air.
 - Cutting of natural forest or killing or hunting wildlife.
 - Commercial use of chemicals or pollutants of negative impacts on environment.
 - Disposal of boats oil waste into water or land.
 - Disposal of solid wastes into water or land.

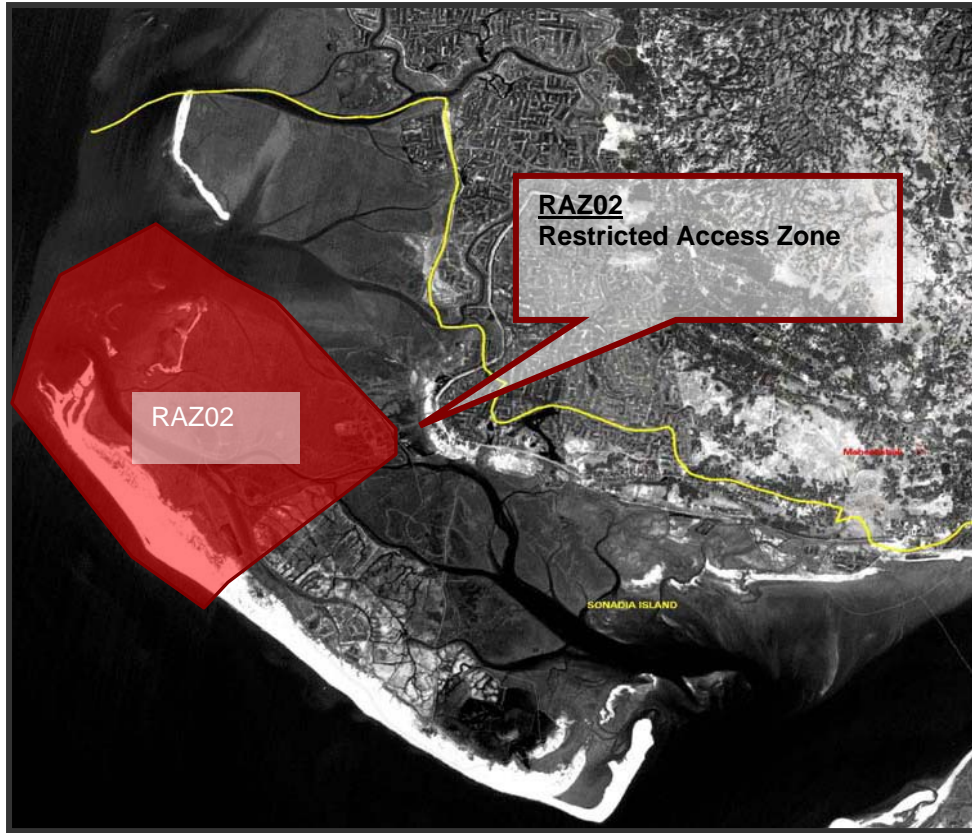
6.2. Restricted Access Zone (code RAZ02)

This square shape zone covers the West part of Sonadia ECA. It starts from the West-southern boundary of the Western village from the beach side and move along the main sandy beach towards North-West, Belekerdia, including marine belt of about 500 meter width.

The Sandy beach of this zone is 3.7 Km length. At the tip of the sandy beach from North-West the zone turns right toward North-East to Kalardia including Dofardia, then 5 km long Southern side of Kalardia to Moch Khal in order to include the most pristine mangrove forest in Sonadia Island.

The zone moves toward South- East across Moch Khal Canal until it meets Baddar Khal at a point parallel to the beginning point of the zone at the Western Village from the Northern- Eastern side.

The average length of this zone is 3.7 Km and the average width is 3 km and the approximate total area is 11 square kilometer. That represents less than 10% of the total area of ECA.



6.2.1. Current situation

This zone represents the ecological critical features upon which the ECA was declared. It has the most intact mangrove forest, which is still in good and natural conditions but in the same time very vulnerable considering the development pressure surrounding it. The area also includes undisturbed mudflats, canals; a stretch of sandy beach and sand dunes these are favorable conditions for migratory and local birds. The sandy beach is famous for turtle nesting and can be considered as a good sanctuary for sea turtles being relatively remote.

There are no permanent human settlements in the area and no existence of infrastructure or any other similar human developments. The area can be dedicated for in situ conservation and can be easily managed according to this objective. This zone is designed for this very reason, which is feasible, practical and realistic from both technical and administrative point of view.

6.2.2. Rationale

This zone enjoys the existence of last remaining area of natural mangroves in South-eastern Bangladesh. It also includes an undisturbed mudflat areas and canals that are important habitat

for migratory and resident birds, such as Bar-headed Goose, Shoveler, Grey Heron, and Eurasian Curlew, and other waders and shore birds,

Additionally, it provides habitat for red crab, mud crab, horseshoe crab and other crabs, mollusks and echinoderms such as sea stars and sea anemones. Moreover, the zone is considered spawning and nursery grounds for juvenile marine fishes and shrimps. Sandy beach of this area is very important as a nesting ground for marine turtle.

This zone represents the core value of ECA, and hence should enjoy the highest level of protection in order to serve as refugia for wildlife, mangrove forest and associated natural features and processes. The area should be significantly free of direct human intervention and should remain so. In the meantime, the conservation of the area's biodiversity is achievable through protection and does not require substantial active management or habitat manipulation.

6.2.3. Management strategy and Objectives

The management strategy for this zone is to protect biologically significant species and habitats in pristine conditions to serve as refugia for wildlife and for natural processes to interact largely for scientific research and environmental monitoring.

Conservation of natural values and natural processes takes precedence over other forms of uses in this zone. The management objectives of the zone are;

- Maintain genetic resources in a dynamic and evolutionary state to maintain established ecological processes.
- Preserve habitats, ecosystems and species in an undisturbed state as possible.
- Safeguard structural landscape features and geological formations.
- Secure examples of the natural environment for scientific studies, environmental monitoring and education.
- Minimize disturbance by careful planning and execution of research and other approved activities.
- Limit public access and associated disturbance to wildlife.
- Practice minimal management intervention so natural processes occur unimpeded.
- Maintain the essential natural attributes and qualities of the environment over the long term.

6.2.4. General rules and regulations

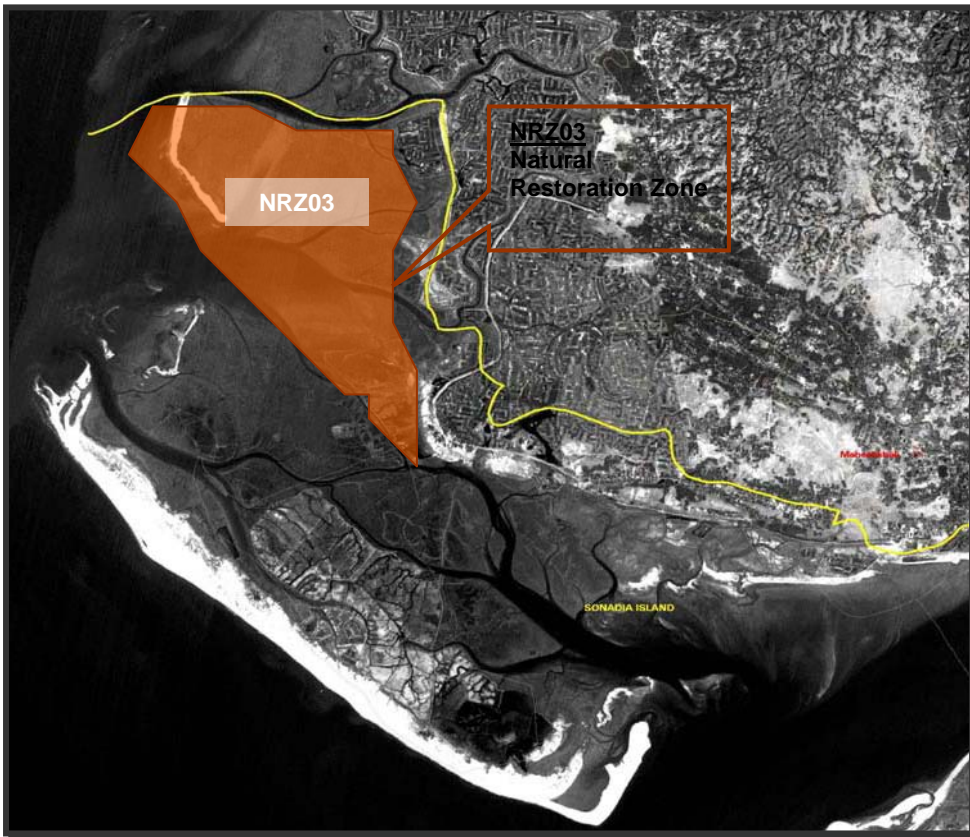
The zone should exercise high level of protection as justified earlier. So, it should be restricted from development and human interventions in all forms. It should be dedicated only to regulated scientific research and ecological monitoring. The following rules and regulations are strongly applicable to this zone;

- Human settlements and associated infrastructure and practices are not allowed.
- Alteration of natural features and landscape is strictly prohibited, i.e. collection of natural components or mining.
- Disposal of solid wastes, oil and/ or any pollutants to land, marine or estuarine water are strictly prohibited.
- Any activity that could change the natural process of terrestrial or marine life is prohibited.
- Hunting or disturbing wildlife in any form is strictly prohibited in this zone.
- No development in this zone, so agriculture, grazing of livestock, fishing, crab trapping and fry collection or any other form of development are strictly forbidden.
- No fishing zone for 1000 meter radius from shore.
- The following activities are not allowed in this zone or any other zone of the ECA;

- Any activity that may change the natural characteristics of the area.
- Establishment of any industry that may pollute the soil, water and air.
- Cutting of natural forest or vegetation, collection of natural components unless for regulated scientific research.
- Commercial use of chemicals or pollutants of negative impacts on environment.

6.3. Natural Restoration Zone (code NRZ03)

This triangular shape zone is located on North-Western Corner of Sonadia ECA; one arm of the triangle starts from Moch Khal point of Ghotivanga and stretches approximately 5.5 km long towards North up to Bhanga Khal Point parallel to Western border of (MRZ01). The other arm is traveling parallel to the border of (RAZ02) for about 6.5 km long Eastern side of the Moch Khal up to Kalardia, including Alordia. The base of the triangle is almost 4 km long Southern side of Bhanga Khal up to Kalardiar and 500 m seaward side. This zone fills the gap between the two zones of RAZ02 and MRZ01 and the cluster of these three zones cover almost half of the total area of the ECA. See map below.



6.3.1. Current situation

This zone is approximately 10-12 sq. km of area, dominated by large expanse of semi-degraded mangrove and slightly disturbed mudflats, and canals. There are sand bars in Kalardia in the Western side; a few shrimp farms in the Eastern side and one just at the Eastern side of Kalardia. See photos below.

It is a part of the last remaining areas of mangrove in South-eastern Bangladesh; it is also a staging area and wintering ground for domestic and migratory waterfowl and shorebirds such as; Bar-headed Goose, Shoveler, Grey Heron, and Eurasian Curlew. It is considered estuarine fish nursery ground; dolphin habitat; and sea turtle nesting ground. The area is also famous for mud crab and horse-shoe crab.



6.3.2. Rationale

This zone is located between the Restricted Access Zone (RAZ02) and the Managed Resource Zone (MRZ01), or in other words, between a core zone and a general use zone. Thus, these two incompatible zones require a buffer as a transitional zone. This zone is *par excellence* a buffer between the core area and general use area.

There are two factors determine function of this zone; the first is its close location to a core area (RAZ02) of significance ecological importance, and the second factor is the environmental conditions of this zone; it includes degraded mangrove forest which could be easily restored to the natural conditions. So the designation of this zone will provide an added and effective layer of protection to the core zone and will function as a buffer and transitional belt between the incompatible adjacent zones.

6.3.3. Management strategy and objectives

The management strategy of this zone is to protect and restore degraded mangrove forest and associated natural features to allow ecological recovery and protect the sensitive natural areas surrounding it. There is no need for interventions through plantation or habitat restoration, as the current conditions would improve naturally, and the mangrove will regenerate if the pressure is removed.

The primary objective of the zone is to protect the present significant natural resources, features and processes because of their special character and their potential impacts on core zone (RAZ02). The specific objectives of this zone are:

- Regain and maintain essential natural attributes and qualities of environment over long term.
- Allow gradual restoration of natural habitats by reducing pressure on natural resources and mitigating negative impacts.
- Allow the most environmentally friendly activities in order to support the local people's economy, for instance very low profile of ecotourism such as Wildlife viewing and bird watching.
- Eliminate and thereafter prevent exploitation and occupation that may harm this zone and its adjacent core zone (RAZ02).

- Maintain and promote harmonious interaction between nature and traditional life style.
- Minimize potential impacts on wildlife and fish resources.

6.3.4. General rules and regulation

- Any activity that could cause degradation to mangrove trees and other natural vegetation, wildlife, birds, marine and estuarine life is prohibited.
- No alteration of natural landscape.
- Traditional fishing by local people is allowed provided that it does not generate negative impacts on mangrove and associated natural features, specifically;
 - No use of estuarine set bag net (ESBN), fine-meshed seine nets (Tana Jal/Kukkuru Jal), and Stake nets (Char Jal) especially during winter (Dec-Mar).
 - No fishing by 'Khati' method.
 - Fishing by cast nets, gill nets and catching of mud crabs by crab traps could be allowed with conditions
- Regulated research, educational and public awareness activities are allowed with conditions
- Buffalo grazing is prohibited.
- Ecotourism of very low profile could be allowed with regulations and conditions
- any activity that could cause pollution to air, water, and land is not allowed
- The following activities are not allowed in this zone or any other zone of the ECA;
 - Any activity that may change the natural characteristics of the area.
 - Establishment of any industry that may pollute the soil, water and air.
 - Cutting of natural forest or killing or hunting wildlife.
 - Commercial use of chemicals or pollutants of negative impacts on environment.
 - Disposal of boats oil waste into water or land.
 - Disposal of solid wastes into water or land.

6.4. Habitat Management Zone (code HMZ04)

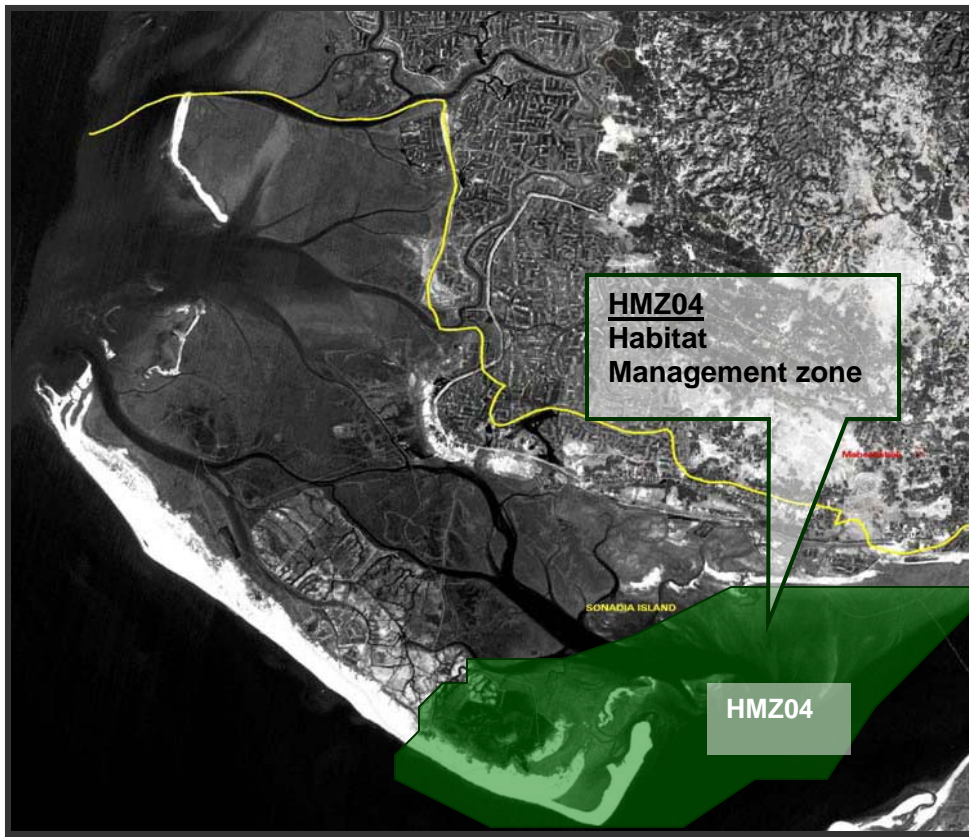
This zone is located in South-eastern part of Sonadia, it starts from East village and extends Northward to the mudflats of Northern side of Baddar Khal and Kutubzome Khal parallel to the border of the Managed Resource Zone (MRZ01).

It includes sand bars of Moghchar, and a radius of 500 meter off-shore from the western beach, including the lagoon, sandy shore and sand dunes. See map below.

6.4.1. Current situation

This zone includes mudflats, lagoon, sandy beach, sand dunes and mangrove shrubs. This combination of habitats, in addition to the water canals, represents fertile ground for local and migratory birds. There are some low scale development activities in the area; for instance, seasonal dry fishing is taking place near Moghchar, and fishing is also common in the area.





6.4.2. Rationale

Flocks of birds have been recorded in this area by CWBMP, some of these birds are rare and of global significance. So, this zone is designed to protect birds' habitats and provide relevant management interventions so as to improve the natural conditions of these habitats.

As mentioned earlier, this zone includes combinations of habitats; namely sandy beach which is important for turtle nesting; undisturbed sandy-mud area which is favourable for domestic and migratory water birds; lagoon and mudflats as roosting and feeding habitat for many birds such as small pratincole, ducks, herons and waders; and canals and mud flats which is considered a feeding and nursing area for fishes, crabs, molluscs and other invertebrates.

So, this zone is designed for management intervention so as to improve and ensure maintenance of these habitats to accommodate birds of national and global ecological significance and other living organisms. Traditional activities that do not harm these habitats, and do not negatively interfere with the natural processes and services of these habitats, could be allowed provided that the rules and regulation are strictly followed.

6.4.3. Management strategy and objectives

This zone plays an important role in the protection of sensitive natural habitats and the survival of the birds, as it includes breeding areas, wetlands, estuaries, grasslands and mangrove shrubs. In this area, protection of the habitat is essential to the well-being of nationally and globally-important resident and migratory birds. Successful conservation of these habitat and species depends upon active intervention by the management authority of ECAs.

The management strategy of this zone is to serve as a healthy and productive ecosystem that could be self sustained as a Bird Sanctuary Zone and to secure and maintain the habitats conditions necessary to protect significant bird species and associated natural and physical ecological features. Specific objectives are;

- Eliminate and thereafter prevent exploitation or occupation inimical to the purposes of designation as a bird sanctuary
- Conduct habitat restoration program in order to improve habitats conditions and retrieve its functional capacity through for instance; plantation of native species, removal of development pressure and regulating traditional activities.
- Facilitate scientific research and environmental monitoring as primary activities associated with sustainable resource management.
- Develop limited areas for public education and appreciation of the characteristics of the habitat and wildlife management, for example, bird watching posts and visitor centers.

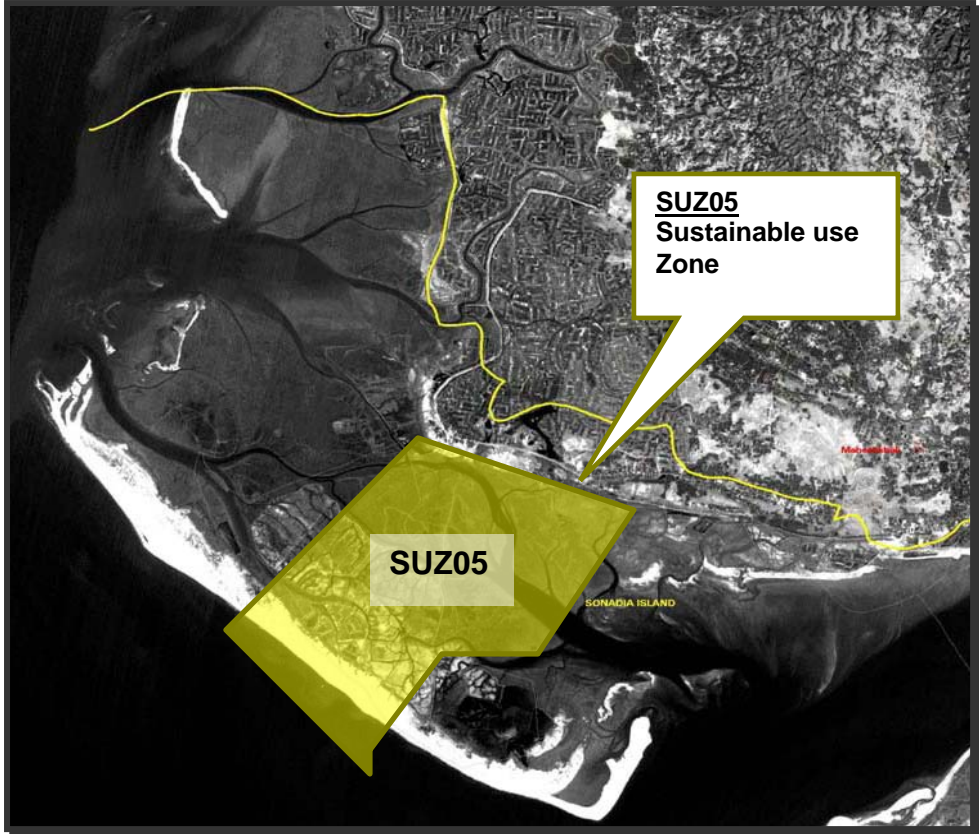
6.4.4. General rules and regulations

- Any activity that could cause alteration of natural landscape is prohibited.
- Low-Profile ecotourism is encouraged in this area, particularly bird watching with conditions.
- Educational and public awareness activities are allowed with conditions; including handcraft production and information centers.
- Agriculture, fishing and other human development activities are prohibited, however traditional fishing by local people is allowed provided that necessary precautions, including approved gear, are taken to mitigate the negative impacts on mangrove and associated natural features.
- Cutting or alteration of mangrove is prohibited.
- The following activities are not allowed in this zone or any other zone of the ECA;
 - Any activity that may change the natural characteristics of the area.
 - Establishment of any industry that may pollute the soil, water and air.
 - Cutting of natural forest or killing or hunting wildlife.
 - Commercial use of chemicals or pollutants of negative impacts on environment.
 - Disposal of boats oil waste into water or land.
 - Disposal of solid wastes into water or land.

6.5. Sustainable Use Zone (code SUZ05)

This zone lies among the other four zones and covers the remaining part of ECA. Its Northern Border is zone (MR01) and (RZ03), Western border is zone (RAZ02) and Eastern Border is zone (HMZ04), and the Southern border is a radius of 500 meter from the sandy beach into the marine water between zones (RAZ02) and (HMZ04), see map below.

The zone is a stretch of sandy beach and sand dunes along the south Western coastline of Sonadia Island, and the area of the degraded mangrove up to southern side of Baddar Khal including the Gura Mannar Khal, Kaper Khal, Majherdhar Khal, and the settlements of the villages of Badarkhalipara, Sonadia Purbapara, Sonadia Pashchimpara.



6.5.1. Current situation

This zone is approximately 25 sq. km area and includes sandy beach and sand dunes, degraded mangroves, mud flats and estuarine waterways and canals. The evicted shrimp farms and salt pans are located in this area. The area has also human settlements, homestead areas and some seasonal agricultural land. There are two villages of total population of approximately 2000, with their infrastructure and amenities such as houses, cyclone shelters and mosques.

Some patches of the zone are planted by Jhau trees by Coastal Forest Department, and there are some plantation of economic values such as coconuts done by CWBMP to support local communities and village conservation groups.

This is a populated zone and currently providing the communities with their basic needs of agriculture and fisheries products along with other business. In the same time, this zone is located very close to sensitive ecological zones such as (RAZ02) and (HMZ04).



6.5.1. Rationale

The area possess a landscape and seascape of high scenic quality, with diverse associated habitats, flora and fauna along with manifestations of traditional land-use patterns and social arrangement as evidenced in human settlements and local customs, livelihoods, and beliefs.

The zone is famous as nesting ground for marine turtles in line between Sonadia East and Sonadia West (Majher vita). In addition, it includes mangroves of highest species diversity in Sonadia ECA, in degraded conditions, and there are also shorebirds, red crabs, mud crabs and mollusks.

In general, the area contains slightly modified natural systems and could be managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.

In this area the interaction of people and nature is a welcome tradition and has over time produced significant aesthetic, ecological and cultural values. Safeguarding the integrity of this traditional interaction is a part of the ECA mandate and is vital to the protection, maintenance and evolution of this zone and the ECA as a whole.

6.5.2. Management strategy and objectives

The strategy of this zone is to function as strong buffer to sensitive core zones around it, as it is located between the Restricted Access Zone (RAZ02) and Habitat Management Zone (HMZ04), and those zones require a layer of buffer. In the meantime, this zone will also serve the community by providing sustainable flow of natural services and products through environmentally friendly projects such as organic farming, handcrafts production and ecotourism. It also provides opportunities for public enjoyment through recreation and tourism within its normal lifestyle and economic activities.

Specific objectives of this zone are:

- Maintain the harmonious interaction of nature and culture through the protection of landscape and seascape and the continuation of traditional land uses and social and cultural manifestations.
- Prevent any activity that could have negative impacts on the surrounding zones particularly zones (RAZ02) and (HMZ04).
- Protect the existing diversity of mangroves and promote the natural recovery to its functional conditions.
- Design a program for mangrove plantation in the evicted shrimp farms.
- Support lifestyles and economic activities which are in harmony with nature and the preservation of the social and cultural fabric of the local communities.
- Maintain the diversity of landscape and habitat, and associated species and ecosystems.
- Eliminate where necessary, and thereafter prevent, land uses and activities which are inappropriate in scale and character with the purpose of this zone and other adjacent zones.
- Provide opportunities for public enjoyment through recreation and sustainable tourism appropriate in type and scale to the essential qualities of the area.
- Encourage scientific and educational activities which will contribute to the long term well-being of resident populations and to the development of public support for the environmental protection of ECA.
- Bring benefits to, and to contribute to the welfare of, the local community through the provision of natural products, i.e. fisheries products and services such as clean water or income derived from sustainable forms of tourism or ecotourism.

- Protect the natural resource base from being alienated for other land-use purposes that would be detrimental to the area's biological diversity.
- Promote ecotourism projects as a win-win strategy for conservation of Natural Resources.

6.5.3. General rules and regulations

- Zone is open for sustainable development activities which are in harmony with nature conservation and generate income for local communities
- Environmental clearance certificate based upon Environmental Impacts Assessment is required for any development project in the area and approval of ECA authorities is mandatory for any environmental clearance certificate.
- No more expansion of human settlement within current boundaries and around sand dune areas.
- Fishing activity should abide to the following rules;
 - No use of ESN, fine-meshed seine nets (Tana Jal/Kukkuru Jal), and Stake nets (Char Jal) in the canals and canal mouths especially during winter (Dec-Mar).
 - No fishing by 'Khati' method
 - Fishing by cast nets, gill nets and catching of mud crabs by crab traps could be allowed with conditions.
- Any activity which could result in deterioration of the natural conditions of this zone or more importantly the adjacent zones of ECA is strictly forbidden.
- The following activities are not allowed in this zone or any other zone;
 - Any activity that may change the natural characteristics of land or water
 - Establishment of any industry that may pollute the soil, water and air
 - Cutting of natural forest or killing or hunting wildlife
 - Commercial use of chemicals or pollutants of negative impacts on environment
 - Disposal of boats oil waste into water or land
 - Disposal of solid wastes into water or land
- No plantations within the dune system, except for carefully planned vegetation that is native to the area and has no negative impacts on turtle nesting and other species.
- Alteration of natural features and landscape due to collection of natural components, such as mining is strictly prohibited
- Any activity that could change the natural process of terrestrial or marine life is prohibited.
- No alteration of natural landscape, human settlements should adopt eco-construction principles using local styles and local materials for building as possible.
- Educational and public awareness activities are allowed with conditions.
- any activity that could cause pollution to air, water, and land is not allowed
- Low-Profile ecotourism is encouraged in this zone.

7. Needed actions

If this system is approved, the following suggested actions are needed in order to put this proposal in practice.

- Organize a meeting in Dhaka to present the system and discuss concerns and comments of PMU, UNDP and DOE.
- Organize a workshop in Cox's Bazar for concerned stakeholders to publicize the system and consider the comments.
- After incorporating the comments of the above two events; the final report should be endorsed and considered an official document for Sonadia Island ECA
- Implementing agency (BCVD) in collaboration with ECAMU should demarcate the zones in the field and set necessary measures to enforce rules and regulations of each zone.

- The system could be reviewed and fine-tuned within one year if needed.
- Proposed system could be replicated in other ECAs building on this report and following the same approach and concept if possible.

8. Conclusion

This report adopted a pragmatic approach to address management challenges of Sonadia Island ECA, by proposing a functional zoning system that meets the requirements of Nature Conservation, local communities and also sustainable development.

The scheme includes general use zone which can accommodate all sorts of sustainable development in order to allow rural development and support local economy. It also includes areas for alternative sources of income for ecotourism and other environmental projects. However, the designed zoning system has strongly considered the ecological uniqueness of the area and dedicated relevant zones for strict protection and habitat restoration. This array of zones, which are designed to be technically and administratively appropriate, see map below, will enable ECA authorities to practice flexible and effective management system with respect to both nature conservation and development.

