Project name:

Developing a GPS based monitoring system for Boat/Mechanized Boat of Sundarban Reserved Forest for the protection from pirates and natural calamities

Background:

The Sundarban is a unique and largest contiguous natural mangrove forest in the world located in the southern part of Satkhira, Khulna and Bagerhat districts of Bangladesh with an area about 6017 square kilometer. The Sundarban forms southern most of the Ganges and Brahamaputra river deltas and is shaped by the complex drainage structure. Topographic variation within this delta is very low. The forest floor lies between 0.9 m to 2.1 m above sea level. The SRF drainage system has three sub systems to the east, centre and west, which formed the estuaries of Bangra, Kunga and Raimangal. The whole area is dissected by large tidal river, notably the Baleswar, Passur, Kobadak-Sibsha, Arpangasia and Raimangal with innumerable small channels and creeks. The proportion of salinity and the distribution of tree species composition define the zonation of SRF. These are the freshwater zone, moderately saltwater zone and saltwater zone. Sundri (*Heritiera fomes*) is the characteristic species of the freshwater zone. The zone provides good conditions for the abundance of sundri. The forest of the moderately saltwater zone is mixture of gewa (*Excoecaria agallocha*) and sundri with varying amounts of goran (*Ceriops decandra*) and other species. The forest in the saltwater zone is dominated by goran with an over storey of gewa, passur (*Xylocarpus mekongensis*) and dhandal (*Xylocarpus granatum*).

SRF has a great significance from the economic and ecological context of Bangladesh. This forest is rich in biodiversity along with a great variety of wild life. Sundarban Forest contains a considerably high floral diversity. Sundarban harbours 334 species of trees, shrubs and epiphytes and 269 species of wild animals. World renowned Royal Bengal Tiger is the magnificent animal of the Sundarban. There are three wildlife sanctuaries in the SRF. They are Sundarban East WS, Sundarban South WS and Sundarban West WS and comprise areas altogether 139,700 hectares declared as World Heritage Site in 1997. This forest has been an important source of timber, fuelwood, pulpwood and many non-timber forest products like, thatching materials, honey, wax and fish. Revilla (1998) mentioned in the inventory report, some 1.2 million or more depend upon the SRF resources for their livelihood directly or indirectly. This forest is protecting and stabilizing the coastal areas and as well as serving as safeguard to the local peoples from cyclones, tidal surges as experienced during SIDR in 2007. Furthermore, it sequesters carbon 105.6 Megaton as estimated in 2010.

There are 9 blocks and 55 compartments under four ranges of SRF. They are Khulna, Chandpai, Sarankhola and Satkhira and separated by the natural features such as rivers, canals and creeks. The management prescriptions were formulated on block or compartment basis under these ranges for the forest. Chandpai & Sarankhola range are managed under the Sundarban East Forest Division and Khulna & Satkhira range are managed under Sundarban West Forest Division. There are 54 patrol posts under two divisions to protect the forest and resources.

Problem statement:

Sundarban is under pressure due to natural hazards and anthropogenic causes. Around 10 thousand boats/machanised boat enter into the Sundarban to collect fish, honey, golpata and/or other non-timber forest product with proper document in each year. Till now it was not possible to monitor the movement of boats/mechanised boat inside the Sundarban. The movement of the boats needs to be monitored using Geographical Positioning System (GPS) technology to track their movement inside the forest to reduce the illegal activities. Sometime the boats/mechanised boats are attacked and hijacked by pirates inside the forest. This can be tracked through this technology. It is also be possible to track the boats during natural calamities. These locations are necessary to be identified for immediate action.

Beneficiary:

Both the Forest Department/monitoring agency and fisher man/baoalies/ maoalies will be benefited as they can be easily located inside the Sundarban. Hijacing of boats/mechanised boats can be tracked as well as the benedict's/dacoits can be encountered. Once the position and movement of the boats can be understood by the management authority afterwards they can take immediate action against any illegal activities inside the Sundarban. Hence through this technology both the local resource user of Sundarban and the country will be benefited and the forest will be protected.

Objectives:

The objectives of the pilot project in order to

- Dovelop a GPS based monitoring system to identify the boat/mechanised boat in Sundarban,
- Integrate the information in forest management of Sundarban,
- Capacity building of forest personal to handle the monitoring system.

Project area:

It is preferred to conduct a pilot study to test the methodology as well as check the feasibility for using the instruments within a range in the sundarban. This will help to identify the difficulties for using the GPS based technologies as well as find out the solutions to replicate the monitoring effort in other ranges of sundarban. Chandpai Range is considered as a pilot study area.

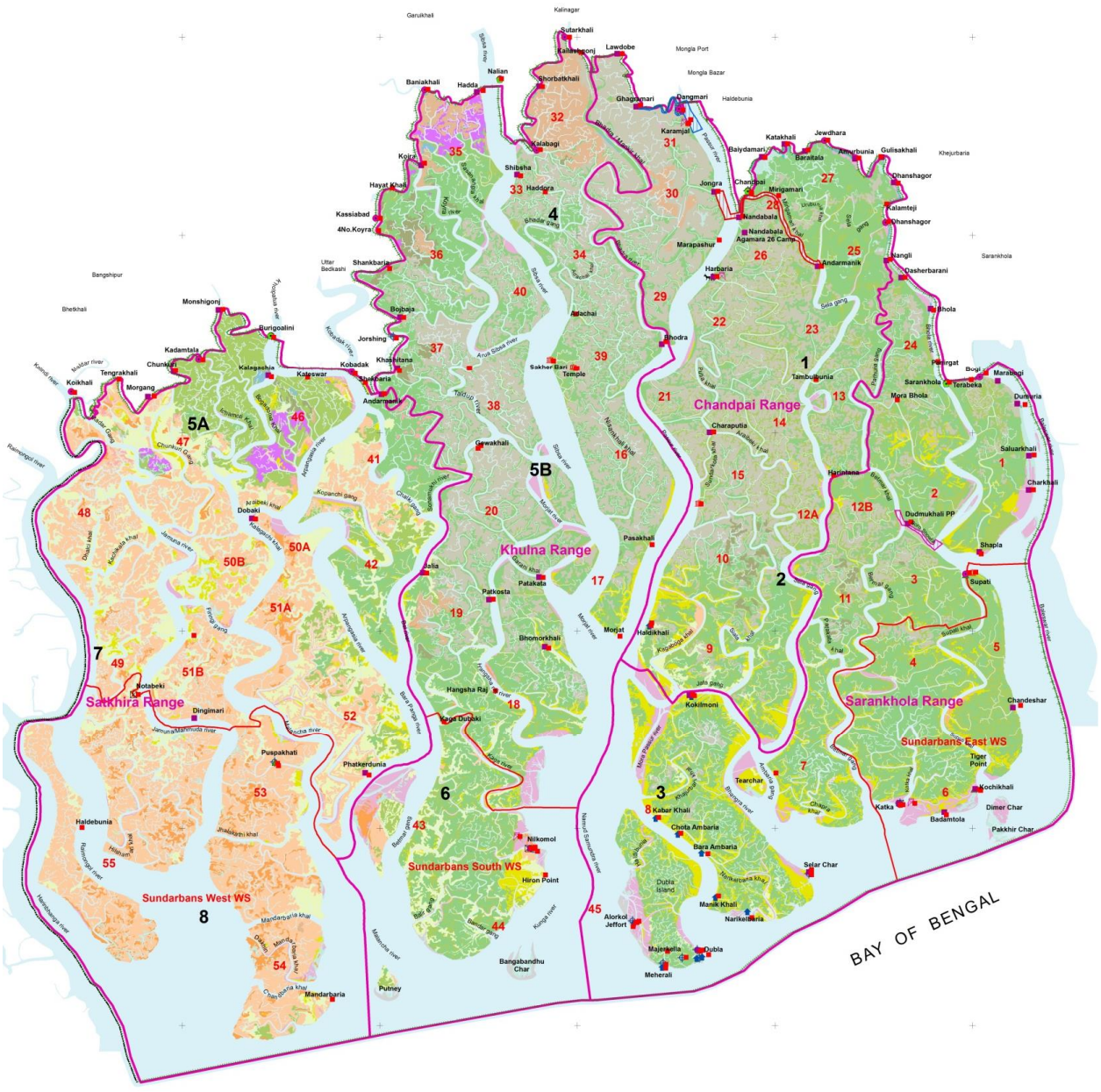

Figure: Forest area of Sundarban showing the ranges and Chandpai Range-the pilot project area

Solution statement:

Improvement of the forest management is required with GPS based real time monitoring system on the boat/mechanised boat movement of the resource user inside the forest. There is a Management Information System Technology (MIST) for Sundarban developed under a SEALs Project by Forest Department. GPS along with the web based MIST software is using by the Sundarban Forest Divisions for monitoring the patrols of forest guards, wildlife sighting etc. for the Sundarban. Resource Information Management System (RIMS) of Forest Department is using satellite imageries to monitor the forest areas also. The project will explore the possibility of a suitable technology to track the boat/mechanised boats movements in the forest.

GPS monitoring system for the boats/mechanised boats can reduce the causalities happening inside Sundarban due to pirates and natural calamities as well as to protect the forest and biodiversity.

Materials and methods:

1. Baseline survey
2. Meeting and discussion with the target groups
3. Around 25 boats/mechanised boat selection and tracking device installation
4. Software development and installation
5. Provide training to the FD personals to handle the technology
6. Awareness building to the target group to keep the system/device operational
7. Report preparation and take necessary action.

Project period: 7 months.

Budget:

Sl.	Budget Head	Total Cost in BDT	SIF Contribution in BDT	SIF Contribution in %	Applicant's Contribution in BDT	Applicant's Contribution in %
1	Baseline survey	30000	0	0%	0	0
2	Vendor invitation	25000	0	0%	0	0
3	System analysis and design	240000	0	0%	0	0
4	awareness and motivation	98000	0	0%	0	0
5	Procurement	1870000	0	0%	0	0
6	Training and workshop	60000	0	0%	0	0
7	Operations	177000	0	0%	0	0
8	0	0	0	#DIV/0!	0	#DIV/0!
9	0	0	0	#DIV/0!	0	#DIV/0!
10	0	0	0	#DIV/0!	0	#DIV/0!
	Grand Total	**2500000**	**0**	**0%**	**0**	**0**

Work Plan and Time Plan

Sl.	Milestones	Activities	Deliverables	Apr' 15	May' 15	Jun' 15	Jul' 15	Aug' 15	Sep' 15	Oct' 15	Nov' 15	Dec' 15	Jan' 16	Feb' 16	Mar' 16
1	Baseline survey	survey	report												
2	Vendor invitation	Advertisement, evaluation of EOI, selection of vendor,	report												
3	System analysis and design	boat requirements analysis and selection of boat, application design	report												
4	awareness and motivation	meeting, group discussion	report												
5	Procurement	GPS based boat tracking hardware and related accessories procurement,	hardware												
	Procurement	software development	application software												
6	integration	hardware and software installation	report												
7	Testing	hardware and software test, trial field level data and resolve error (if any)	functional monitoring system, maps and reports												

8	Training and workshop (Result demonstrati on)	in-house training and workshop at Bagerhat	skilled man power, training material for keeping the system operational												
9	Operations	water crafts maintenance, stationary	smooth monitoring												

Project Output

- GPS based monitoring system
- Maps and reports
- Motivated target group