



A MANUAL

Community-led
mangrove replenishment-
a way to coastal resiliency



Astaranga, Odisha 2023 - 24





Community on mangrove Nursery seed collection, plantation



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Community-led mangrove
replenishment—a way to coastal resiliency

Nagara, Astaranga, Odisha 2023 - 24



Preface



Mangrove forest ecosystem is one of the major ecosystems in coastal India, addresses the adverse climate change impacts and enhances the resiliency of coastal community. India has lost 40% of its mangrove area in the last century. The relevant departments undertaken several mangrove replenishment initiatives at their level. But this initiative can be amplified if the coastal community take leadership and play a pro-active role with the departments and other stakeholders.

Indo-Global Social Service Society (IGSSS) in collaboration with DIAGEO, undertaken a commitment to incentivize coastal biodiversity with 30,000 native mangrove seedlings in 25 Hectare river shore within three years under community leadership. This manual conveys the sound process and the strategies to bring the coastal community in leadership role for mangrove replenishment. It also articulate our vast experiences practicing with mangroves in coastal Odisha.

The coastal mangroves are being adversely impacted due to some human made and nature made challenges. These can be addressed by building pro-mangrove consensus and leadership in the coastal community. This manual has been publishing as a coffee table book, expecting with an outreach to peer organizations, knowledge institutions, relevant line department & duty bearers, experts, influential persons etc.

I am highly grateful to the coastal community of Astaranga, Puri, Odisha for giving us opportunity in experiencing mangrove with them which are being articulated here. I am also thankful to my team members without their effort this documentation was not possible. I trust that this document will help the readers in understanding community led pro-mangrove initiatives and consensus building to stimulate mangrove replenishment efforts.

Proshin Ghosh
Mangrove Practitioner
Thematic Lead Climate Change, IGSSS

WHY MANGROVE PLANTATION



Mangrove incentivizes nature in different ways

1

It absorbs 4 times more carbon-di-oxide in comparison to other trees.

2

Mangrove checks soil erosion with strong root buttresses, the prop root, pneumatophores, knee roots etc.

3

It has outstanding salt filtration and water purification capacity.

4

This plant acts as a strong wind barrier and addresses cyclone risks in coastal region.

5

Mangrove supports native biodiversity by creating a habitat for many plants & animals.

6

Survival of Mangrove in brackish water, making it resilient to raising sea levels.



CHALLENGES OF COASTAL MANGROVES

Human made

- Rampant parking of fishing boats, fishing nets and unplanned coastal shrimp culture along the river shore intervene natural mangrove growth.
- Pulling of fishing nets often uproots young mangrove seedlings at their early stages.
- Uncontrolled collection of fuel wood, has thinned dense mangrove patches.
- Over grazing by animals reduces regeneration, as mangrove seedlings are often eaten as fodder.

Nature made:

- Erratic rainfall, extreme dry weather affect seedling survival.
- Loss of clay loams due to poor siltation hampers root establishment.
- Fluctuations in tidal pattern (high tide & low tide) disrupt mangrove growth.



OUR DREAM



Strong community leadership in restoring mangroves.



Rich native mangrove species and biodiversity.



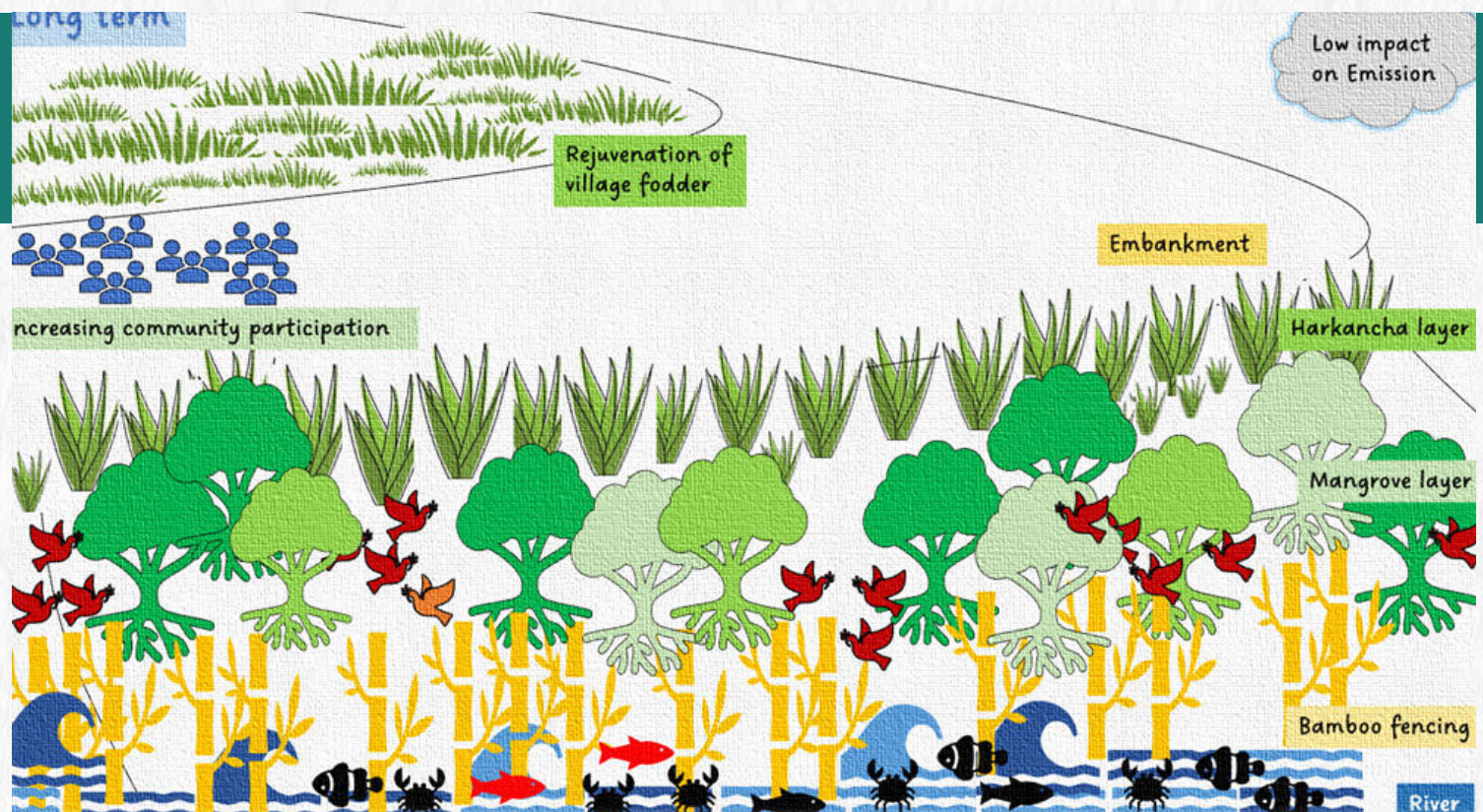
Cleaner environment & healthier atmosphere.



Multiple stable income sources for the villagers.



Communities leading preparedness and mitigation measures.



OUR TARGET

25 Hectare river shore plantation



30,000 Survival seedlings



5 Nurseries



1000 Village family's participation



1.3 Million quintal carbon sequestration
in long run



5 Villages



PROCESS

STEP I - FORMATION AND STRENGTHENING MANGROVE MANAGEMENT COMMITTEE



The committee includes active participation of villagers.

It focuses on building the capacity and leadership skills of villagers to lead mangrove restoration efforts.



The committee follows a highly inclusive approach to decision-making.

Its sole commitment is to protect and safeguard the mangroves.



Latitude: 19.995853
Longitude: 86.304462
Elevation: 47.38±16 m
Accuracy: 19.4 m
Time: 09-19-2023 13:36
Note: naliapata nursery

Powered by NoteCam

PROCESS

STEP II- QUADRANT STUDY



Quadrant study conducted to identify dominant and native mangrove species.

Each sample plot measured 10 meters by 10 meters.



Quadrants were selected from both barren river shores and nearby forest patches for comparison.

Village youth collected the data, which was then used to calculate species frequency and density.



Latitude: 19.958155
Longitude: 86.319679
Elevation: 6.6718 m
Accuracy: 6.0 m
Time: 11-19-2023 14:28
Note: Feasibility Study Training



Latitude: 19.95507
Longitude: 86.321399
Elevation: 6.9344 m
Accuracy: 4.2 m
Time: 04-16-2025 08:30
Note: quadrant survey



PROCESS

STEP III - SEED COLLECTION



The process follows a 'Do No Harm' approach, ensuring no damage to the local ecology and biodiversity.

Seeds of native mangrove species collected from nearby forest patches.

Collection was done during June–July (monsoon onset) and February–March (dry season).

So far, 30,000 seeds collected.

Villagers collect mature seeds that naturally fall due to rain and float in the river.

Seeds are immediately processed for germination in nurseries after collection.

PROCESS

STEP IV - NURSERY RAISING



PROCESS

STEP V - PLANTATION

Plantation is undertaken in the river shore in three parts based on the strength of root systems.

The first part is towards riverside. Here *Rhizophora* sp. are planted. These trees have prop roots, considered as strongest and most structurally complex root. These root provides significant stability and support, allowing the trees to withstand strong winds and wave, hence minimize cyclone risk.

The second part is planted just behind the first, closer to village embankment. This part includes *Avicennia* sp., *Kandelia* sp. etc which have Knee roots, *Pneumatophores* etc, considered as stronger root. This root creates a buffer against storm surges and powerful winds. It can also reduce wave energy and helping to attenuate wind energy.

The third part is planted just behind the second, even closer to the village embankment. Here, *Acanthus ilicifolius*, local mangrove shrub with fibrous roots, is planted. These roots minimize embankment erosion efficiently.



PROCESS

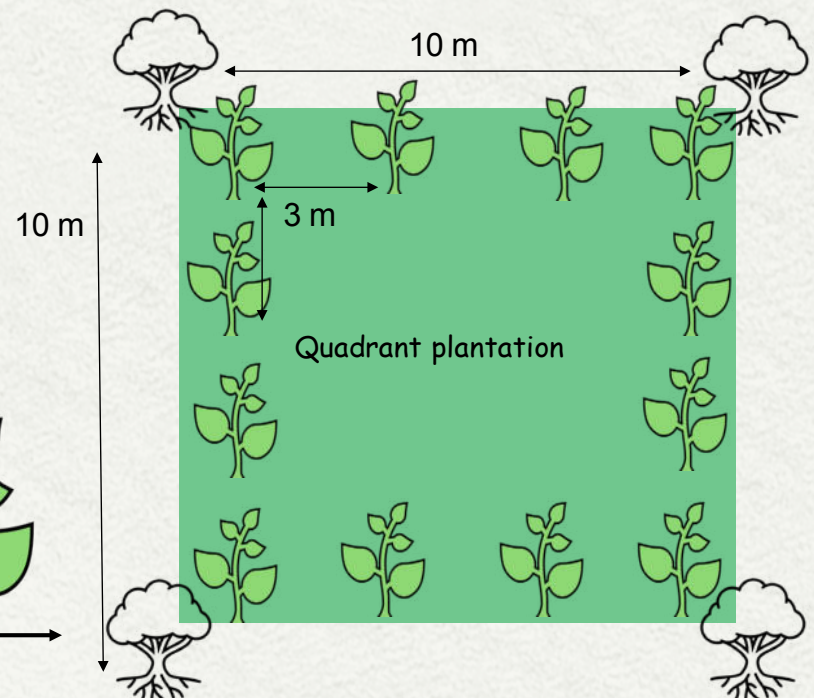
PLANTATION PATTERN

The river shore which is inundated by high tide daily, are considered for suitable plantation site.

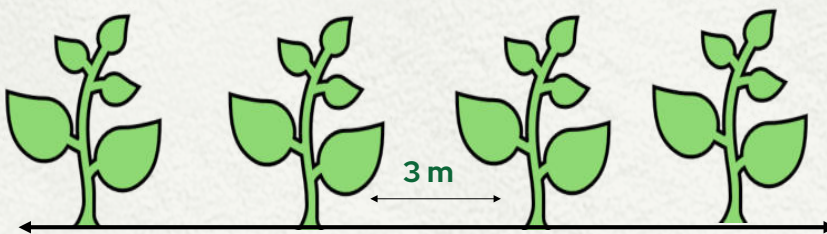
Two type of plantation pattern followed, row plantation and quadrant plantation. 10 meter x 10 meter quadrant is undertaken. An interval of 3 meter between each plant maintained.

Plantation time: Post high tide in post monsoon season.

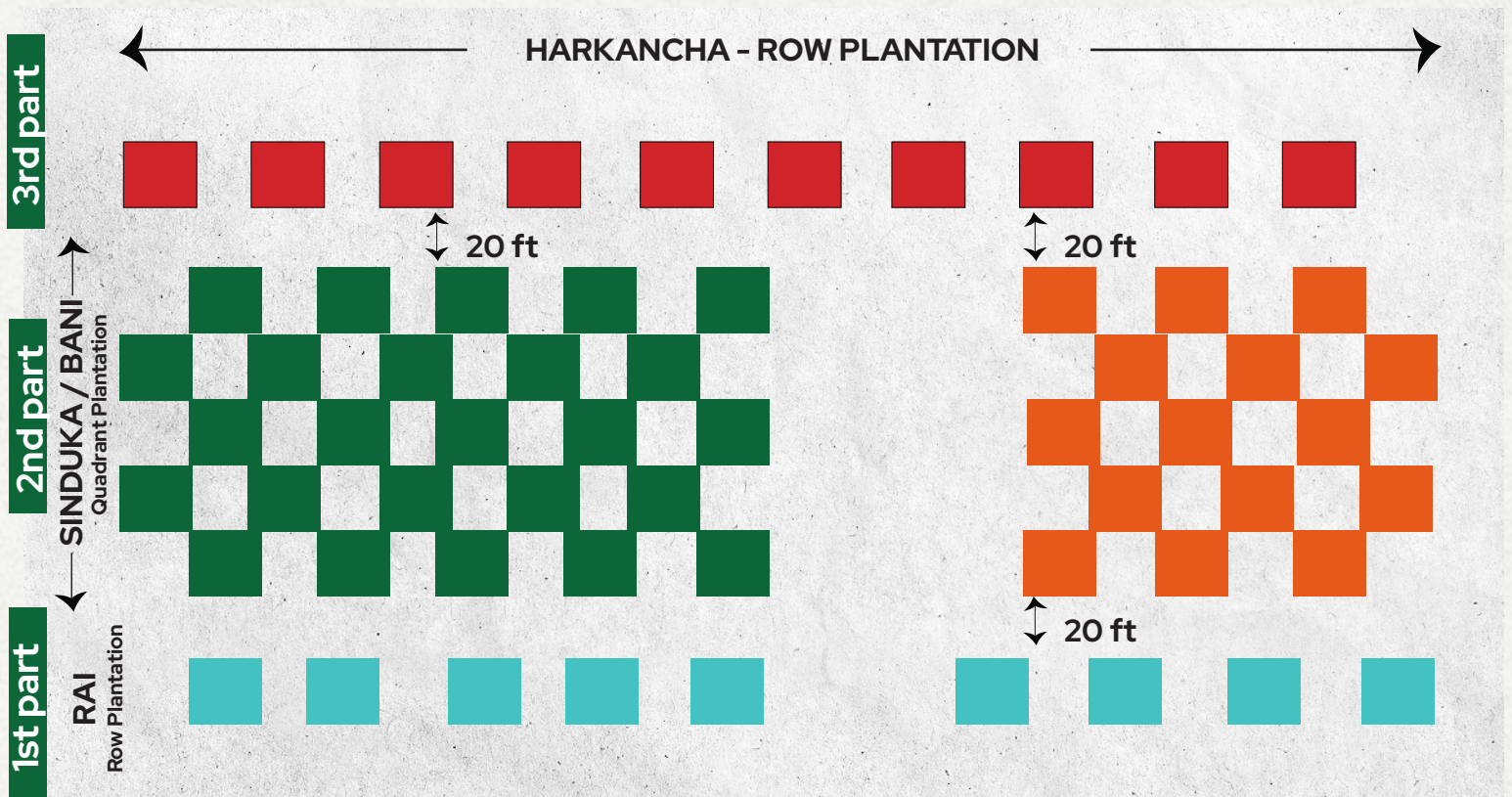
The plantation is required quality caring for one year to get survivability and three years for attain maturity.



Row Plantation



PLANTATION PLAN



1st part
Rhizophora



2nd part
Avicennia

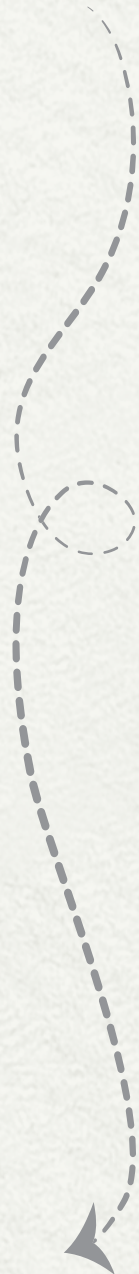


3rd part
Acanthus ilicifolius

PROCESS

STEP VI - MONITORING PLANTATION

1. The health and survival of the plantation are checked every three months.
2. To measure the health of the plants, three indicators are used: height, trunk thickness (girth), and crown cover (spread of branches and leaves).
3. Village youth conduct the monitoring.
4. For this, they use a data sheet, measuring tape, to record the details.
5. Experts then use this data for research and analysis.



IN RETROSPECT



Meeting with Hon'ble Minister Forest & Climate Change Govt of odisha



With Ayushmann Khurrana, Ambassador, Signature



Recognition from Signature



With Padmashri Daitari Naik



Orientation to Signature Team

Exposure visit with Signature Team



Recognition from Brahma Muhurta



Felicitated for Quality work for Mangroove



Strategic meeting with Dr. Debabrata Swain, Former Chairman, Lokayukta, odisha



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