

# Study of Phyto Diversity And Conservation Aspects on Private Nursery At Coastal Purba Medinipur

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**Abstract-** Coastal area of Medinipur is unique for its nature with diverse floral and faunal composition. It is a treasure of many wild and valuable plants in different small pockets. The use and value based plant diversity focuses the empirical value that broadcasts economic importance in addition to its ecological value. Not only has the local and natural vegetation, the area harboured many valuable exotic as well as semi exotic plants. Owing to its landmass with natural flora alien species act directly on natural vegetation and shows negative impact on the local environment. Local nursery and private conservatory play a crucial role to conserve the species and develop immense economic growth of the area. In this communication authors have been documented some value based plant stocks in private nurseries which need attention to know the present situation of exotic phyto-diversity in addition to the natural phyto-diversity. It attains a good view to manage the ecosystem as well as to use the resource of local kind in addition to the foreign elements to manage the ecosystem. It will draw an opaque idea to the researchers to manage and protect phyto-diversity as a whole. Hope that coastal people, migratory people, authority and Government departments would take proper steps to restore the environment soon. Society people would be benefitted immediately to earn money through the manipulation of nursery stock which has immense value on nature and environment.

**Keywords-** Purba Medinipur; Private nursery, Phyto-diversity; Conservation.

## I. INTRODUCTION

Purba Medinipur is an administrative unit of West Bengal state in India. The district is situated in the southern part of the Medinipur division. The head quarter of this district is Tamluk famous as Tamralipta. It is adjacent to Balasore district of Odisha state in the southwest; Bay of Bengal in the south; Hooghly river and 24 Parganas (S) district to the east. The geographical location of the district is 21°36' 35" N to 22° 57' 10" N latitude and 86° 33' E to 88° 12' 40" E longitude. The elevation of the district is nearly 10 mt above mean sea

level. It has 65.5 km long coastal line along its southern and south-eastern boundary. The same district has its six coastal blocks, namely Nandigram-I, Khejuri-II, Contai-I, Contai-II, Ramnagar-I and Ramnagar-II. The soil of coastal area is alluvial, sandy and saline. Strong wind erosion, high evaporation, salinity and scarcity of soil nutrients are the characteristic features of the coastal area of Purba Medinipur. This area is occasionally affected by cyclones and high tide. Tidal floods are regular phenomenon of these areas. Therefore, the area is under threat to cultivation. Coastal areas of this district are full of different flora and fauna. Majority of plant species are wild and natural type. Different cultivable mesophytes and halophytic species are also present here. Due to different natural and anthropogenic cause, the natural habitat of the area is destroying day by day. Remembering these as a whole it is very important to restore the ecosystem to save the habitat of these flora as well as fauna people create nursery on high land. Local people engage in nursery and develop nursery stocks to earn money as the stocks are highly demandable. Therefore, present paper has been made based on some nurseries, their status, uses and the conservation strategies. It will help to survive habitat of the plants of different categories as well as medicinal kinds including ornamentals to save eco-degradation process.

## II. AREA UNDER STUDY

Purba Medinipur district has Contai sub-division which consists of Contai-I and Contai-II community development blocks. Contai II or Deshapran community development block consists of Aurai, Amtolia, Dhobaberia, Sarda, Basantia, Chalti, Dariapur and Bamunia with the head quarter of Basantia. Conati I community development block has 8 gram panchayets namely Haripur, Badalpur, Raipur, Paschimbar, Dulalpur, Mahisagote, Nayaput, Sabajput, Majilapur and Contai municipality. Study area included in Contai-II Community development block as case study under some special conditions.

Geographically Contai-II (Desapran) is 170.30 sq. km with an elevation 3 m above mean sea level. The area of

coastal Medinipur is plain but affect under regular tidal influence. There are numerous wet or dried salt pans. Various types of micro habitats of the area, and water bodies make a diverse phyto-diversity of the area under varied physiognomic situations. Long dike have been made to prevent the entrance of saline water into the land. Villages, canal sides, dike side, open grazing land, waste land, pond side, wet land, shrubberies, agricultural land and local gardens of coastal area are taken into consideration for the vegetation study along with their ecological status. But for the study of nursery only 3 specific private gardens were selected and demarcated for regular study at Contai of Purba Medinipur.

### III. MATERIALS AND METHODS

Contai and nearby areas were selected randomly to study vegetation as a whole and similarly some private nursery and commercial gardens were selected for study of plants raised for conservation purposes. These were mainly at Chalti and in Basantia under conati II community development block. In total 3 case studies were done to record the overall importance of private nursery at Contai-sub divisional areas of Purba Medinipur. Nearby nursery at distal place were taken in to consideration to know the management strategies in various community development blocks.

Knowledge also gathered from local people about different techniques adopted during seedling or stock development. Management regimes and economic background also studied on such plants along with medicinal and ornamental kinds.

Specimens were collected and collected specimens were studied and preserved for further study. Photographs and soils were collected for field to know the nutrient status as well as different salinity conditions of the sites. Plant materials, herbarium specimens and museum specimens were treated with 4% formaldehyde solution. 4-5% copper sulphate solution was used to keep material free from insect and fungi attack. Similarly, Naphthalene balls were used to preserve dry plant parts and herbarium specimens. During survey, field notes were also recorded. Identification of specimens were done with the help of standard literature (Duthie, 1960; Hooker 1892-1897, Haines, 1921-1925; Prain, 1963; Das 2007, Anonymous, 1997, 2005, 2010, 2012, 2017) The names of plants were crossed checked following Bennet, 1987. Publications consulted for last few years were Chakraborty *et al.* 2012; Das and Das, 2014; Das, 2013; Das, 2015; Das and Ghosh, 2018; and Das and Das, 2019. Wetland plant species were indentified with the help of fresh water vegetation of Rimer, 1984. The specimens of medicinal plants were indentified with the help of museum specimens and herbarium

specimens of CAL. Herbarium specimens were prepared as per the methodology of Jain and Rao, 1977. To study use pattern of medicinal plants, different books of Government sections have been consulted. But for general consideration the common book used for medicinal plants was Kirtikar and Basu, 1918. Herbarium specimens were collected as per the manual published by Rao and Sharma, 1990. Halophytic species have been identified with the help of manual on mangroves in India (Banerjee *et al.* 1986). Other literature used were Blasco (1975), Banerjee (1987), Dwivedi *et al.* (1974), Mukherjee (1978), Naskar *et al.* (1978), Rao *et al.* (1972), Sanyal *et al.* (1984), Sidhu (1960), Thothatri (1981), Wahead Khan (1959), Walson (1928), Gul and Khan (1995), Subhanian *et al.* (2010), Jha *et al.* (2011), Ahmed *et al.* (2011), and Das and Ghosh (2017, 2018). Salty marsh species were identified with the help of museum specimen and Herbarium specimen of CAL. To study the botany of plants medicinal plants, different books of Government sections have been used. Book used to know the propagation and management techniques of some ornamental plants in nursery (Roychowdhury and Mishra, 2001). All references are tagged <sup>1-42</sup> as record references.

### IV. RESULTS AND DISCUSSION

Purba Medinipur of West Bengal is very proximal to the Bay of Bengal. It has a long coast line that filled with many canals and rivers flooded by seasonal high tides. Margin of the nullah and rivers have many pockets of vegetation that shows many valuable plants round the year. Most of the plants found here are medicinal. People use these plants but the frequency of the collection and use of these plants are so high that makes the vegetation fragile and some of the species become threatened locally. Remembering the theme in mind people use nursery in their own premises and grow plants of various kind. Not only the local plants, due to high demand of exotic plants and ornamentals, they culture plant propagules round the year and sale them in local as well as in national market. Some nursery men use the plants in global international market. Ornamentals, plams, medicinal plants and spices are highly demandable plants. The uses of stocks of more than 5 years are highly valuable because these plants establish quickly on ground in compare to the other age old plants. Remembering the theme in mind people ser up nursery and develop almost all plants. Forest department, local gram panchayat, private sectors, local people are the feeder group of these plants. So, it is unique that local nursery and private nursery act a key role to conserve the species. Not only have that, the nursery served better placement of people and acts as a source of income generation.

In case study 1, we see many plants like akashmoni, adenium, Chinese evergreen, giant taro, anthurium, Burmese bamboo, rattle snake plant, papaya, ornamental croton, song of India, rudrakshya/rudraksha, magnolia and prayer plant (Table 1). These are used for various purposes starting from wood to ornamental purpose through edible form also. As a whole the point is income generation as well as conservation of species abroad.

#### Case study 1:

Name of the Nursery: K G N Raj Nursery

Owner's Name: Akhtar Hossain

Place: Durgapur-Chalti

Area: 1.5 acre

**Table 1. Plants available at K G N Raj Nursery, Chalti, Purba Medinipur, W.B.**

Sl No.	Name	Family	Common Name	Mode of Propagation
1.	<i>Acacia auriculiformis</i> A. Cun. ex Benth.	Mimosaceae	Akashmoni	Seeds.
2.	<i>Adenium multiflorum</i> Klotasch	Apocynaceae	Adenium	Propagated through seeds.
3.	<i>Aglaonema</i> sp.	Araceae	Chinese evergreen	Propagated through cuttings and by dividing the basal shoots.
4.	<i>Alocasia</i> sp.	Araceae	Giant taro	Propagation through division of rhizome.
5.	<i>Anthurium</i> sp.	Araceae	Anthurium	Young rooted shoot cuttings.
6.	<i>Bambusa polymorpha</i> Munro	Poaceae	Burmese bamboo	Culm split into one node cuttings
7.	<i>Calathea lancifolia</i> Boon. (40 varieties)	Marantaceae	Rattle snake plant	Propagated through bulb, side brachings.
8.	<i>Carica papaya</i> L.	Caricaceae	Papaya	Through seeds
9.	<i>Croton</i> sp.	Euphorbiaceae	Ornamental croton	Propagated through stem cuttings.
10.	<i>Dracaena</i> sp. (25-30 varieties)	Asparagaceae	Song of India	Stem cuttings
11.	<i>Elaeocarpus ganitrus</i> Roxb.	Elaeocarpaceae	Rudrakshya	Through seeds and air layering.
12.	<i>Euphorbia milii</i> Des Moul.	Euphorbiaceae	Crown of thorn	Stem cuttings
13.	<i>Magnolia champaca</i> (L.) Baill ex Pierre	Magnoliaceae	Magnolia	Propagated through seeds, stem cuttings
14.	<i>Maranta leuconeura</i> E. Morren	Marantaceae	Prayer plant	Propagated by side branch/bulb

N.B.: All plants are transported to contain market and markets all over India. Market demand is high. Locally plants are available directly from the nursery.

#### Case study 2:

In case study 2, we see plants of various kinds i.e. from medicinal to ornamental. The demand is high in international market. Local people use these plants. The high tide ruins the species and create high demand to re-vegetate the land mass after flood. These are bael, edible amaranth, betel tree, satvari, patilebu, areca palm/butterfly palm/golden cane palm, chin rose, water spinach, Indian Jasmine, Small

knot weed, guava, wax apple, pointed gourd and coconut tree (Table 2).

#### Case Study 2:

Name of the Nursery: Bera Nursery

Owner's Name: Haripada Bera

Place: Basantia

Area: 0.5 acre

**Table 2. Plants available at Bera Nursery, Basantia, Purba Medinipur, W.B.**

Sl No.	Name	Family	Common Name	Mode of Propagation
1.	<i>Aegle marmelos</i> L.	Rutaceae	Bael	Through seeds
2.	<i>Amaranthus tricolor</i> L.	Amaranthaceae	Edible amaranth	Propagated through seeds
3.	<i>Areca catechu</i> L.	Araceae	Betel tree	Propagated through seeds
4.	<i>Asparagus</i> sp.	Asparagaceae	Satvari	Stem cuttings, seeds
5.	<i>Citrus x aurantifolia</i> (Christm.) Swingle	Rutaceae	Patilebu	Through air layering
6.	<i>Dyopsis lutescens</i> (H. Wendl.) Benje & J. Dransf.	Araceae	Areca palm, butterfly palm, golden cane palm.	Cuttings of rooted stems, it is a near threatened plant.
7.	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	China rose	Stem cuttings
8.	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	Kalmisak, water spinach	Seeds
9.	<i>Jasminum multiflorum</i> (Burm. f.) Andrews	Oleaceae	Star/Indian Jasmine	Propagated through stem
10.	<i>Polygonum plebeium</i> R. Br.	Polygonaceae	Chiknisak/Small knot weed	Seeds, it is a least concern species as per IUCN.
11.	<i>Psidium guajava</i> L.	Myrtaceae	Guava	Through air layering
12.	<i>Syzygium samarangense</i> (Blume) Merr. & L.M. Perry	Myrtaceae	Wax apple	Through air layering
13.	<i>Tricosanthes dioica</i> Roxb.	Cucurbitaceae	Pointed gourd	Through seeds

N.B.: Marketed in Contai, transported to Odisha and in different parts of India.

In a case study 3, we see many plants. Here the site it is essential to record the species in wild condition, but the plants nearby nursery and in nursery study is more essential because they can interact with others and make hostile conditions. Remembering these in mind, case study 3 has been included and recorded many valuable plants. These are wood apple, chatin, cashew nut, jack fruit, margosa, snowy orchid tree, bay leaf, Ceylon cinnamon, patilebu, coconut, temple plant, pilkhan, Chinese banyan, litchi, mango, champak, Spanish cherry, curry leaf plant, native mock orange, rose, debdaru, guava, bayur, lliipe, wild mango, American Mahogany, Black Jam and Chinese date palm (Table 3).

#### Case study 3:

Name of the Nursery: Adhikary Nursery

Owner's Name: Debkumar Adhikary

Place: Basantia thakurbari, Basantia.

Area: 2.5 acre

**Table 3. Plants available at Adhikary Nursery, Basantia, Purba Medinipur, W.B.**

Sl. No.	Name	Family	Common Name	Mode of Propagation
1.	<i>Aegle marmelos</i> L.	Rutaceae	Wood apple, bael	Seeds
2.	<i>Alstonia scholaris</i> (L.) R.Br.	Apocynaceae	Chatin	Through seeds
3.	<i>Anacardium occidentale</i> L.	Anacardiaceae	Cashew tree	Seeds
4.	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	Jackfruit	Propagated through seeds
5.	<i>Anadirachia indica</i> A. Juss.	Meliaceae	Margosa	Seeds
6.	<i>Bauhinia acuminata</i> L.	Fabaceae	Snowy orchid tree	Seeds
7.	<i>Cinnamomum tamala</i> (Buch-Ham) T. Nees & C.H. Eberm	Lauraceae	Bay leaf	Cuttings, air layering
8.	<i>Cinnamomum verum</i> J. Presl	Lauraceae	Ceylon cinnamon	Stem cuttings
9.	<i>Citrus x aurantiifolia</i> (Christm.) Swingle	Rutaceae	Panlebu	Air layering
10.	<i>Cocos nucifera</i> L.	Arecaceae	Coconut	Fruits
11.	<i>Crataeva religiosa</i> G. Forst	Capparidaceae	Temple plant	Grafting
12.	<i>Ficus infectoria</i> (Miq.) Miq.	Moraceae	Pikhan	Seeds
13.	<i>Ficus religiosa</i> L.	Moraceae	Chinese banyan	Seeds
14.	<i>Litchi chinensis</i> Sonn.	Sapindaceae	Lichi	Seed, air layering
15.	<i>Mangifera indica</i> L.	Anacardiaceae	Mango	Grafting, air layering
16.	<i>Michelia champaca</i> (L.) Baill. Ex Pierre	Magnoliaceae	Champak	Seeds, cuttings
17.	<i>Mimusops elengi</i> L.	Sapotaceae	Spanish cherry	Seeds
18.	<i>Murraya koenigii</i> (L.) Spreng	Rutaceae	Curry leaf plant	Seeds
19.	<i>Murraya paniculata</i> (L.) Jack	Rutaceae	Native mock orange	Air-layering
20.	<i>Polyalthia longifolia</i> (Sonn.) Tawantes	Annonaceae	Debdaru	Seeds
21.	<i>Psidium guajava</i> L.	Myrtaceae	Guava	Through grafting
22.	<i>Pteranpermum acarifolium</i> (L.) Willd.	Malvaceae	Bayur/Karnikara	Grafting
23.	<i>Shorea bonaniensis</i> Pierre	Dipterocarpaceae	Lilipe	Seeds
24.	<i>Spondias pinnata</i> (L.f.) Kurz	Anacardiaceae	Wild mango	Seeds
25.	<i>Suaeda mahagoni</i> (L.) Jacq.	Meliaceae	American Mahogany	Seeds
26.	<i>Syzygium cumani</i> (L.) Skeels	Myrtaceae	Black jam, Java plum	Seeds
27.	<i>Ziziphus jujuba</i> Mill.	Rhamnaceae	Chinese date	1-bud grafting

Not only the plants mentioned above, other ornamentals have been found in Case study 3. These are golden trumpet, red ginger, herbal aralia, cook pine, fish tail palm, Kerala coconut, garden croton, cycas, red palm, song of India, golden cane palm, outdoor plant, silky oak, china rose and flame of the wood (Table 4). Red palm and golden cane palm is highly priced and now old stock available in the market with price amounting rupees 1500 to 1700. These are exported quality plants sale outside the state.

Other plants available here are latina, Malabar Melastoma, yellow oleander, phoenix palm, pine, pagoda tree, red frangipani, Christmas flower, lady palm, hybrid garden rose, crepe Jasmine, Madagascar almond, yellow oleander, fox tail palm etc.

**Table 4. Ornamental plants available at Adhikary Nursery, Basantia, Purba Medinipur, W.B.**

Sl. No.	Name	Family	Common Name	Mode of Propagation
1.	<i>Allamanda cathartica</i>	Apocynaceae	Golden trumpet	Cuttings
2.	<i>Alpinia purpurata</i> K. Schum.	Zingiberaceae	Red ginger	Rhizome
3.	<i>Aralia cordata</i> Thunb.	Araliaceae	Herbal aralia	Cuttings
4.	<i>Aracaria columnaris</i> J.R. Frost Hook.	Aracariaceae	Cook pine	Seeds
5.	<i>Caryota urens</i> L.	Arecaceae	Fish tail palm	Seeds, divisions of clumps and suckers
6.	<i>Cocos nucifera</i> L.	Arecaceae	Kerala coconut	Fruits
7.	<i>Codiaeum variegatum</i> (L.) A. Juss.	Euphorbiaceae	Garden croton	Stem cuttings
8.	<i>Cycas revoluta</i> Thunb.	Cycadaceae	Cycas, sago palm	Seeds, basal offsets
9.	<i>Cyrtostachya randa</i> Blume	Arecaceae	Red palm/Lipstick palm	Separating side shoot, Seeds, dividing sucker
10.	<i>Dryasena</i> sp.	Asparagaceae	Song of India	Stem cuttings
11.	<i>Dyopsis latifolia</i> (H. Wendl.) Beenje & J. Dramf.	Arecaceae	Golden cane palm	Seeds
12.	<i>Forkeria</i> sp.	Agvaceae	Outdoor plant	Rooted plant
13.	<i>Grivellia robusta</i> A. Cunn. Ex R. Br.	Boraceae	Silver oak/Silky oak	Through seeds
14.	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	China rose	Cuttings
15.	<i>Isora coccinea</i> L.	Rubiaceae	Red, yellow, pink flame of the woods	Stem cuttings
16.	<i>Latina rubra</i>	Arecaceae	Latina	Side stock
17.	<i>Melastoma malabatricum</i> L.	Melastomataceae	Malabar melastome	Seeds
18.	<i>Nerium indicum</i> L.	Apocynaceae	White, pink, yellow oleander	Air layering
19.	<i>Phoenix dactylifera</i> L.	Arecaceae	Dise Phoenix palm	Seeds
20.	<i>Pinus</i> sp.	Pinaceae	Pine	Seeds
21.	<i>Plumeria alba</i> L.	Apocynaceae	Pagoda tree	Stem cuttings
22.	<i>Plumeria rubra</i> L.	Apocynaceae	Red frangipani	Stem cutting
23.	<i>Poinsettia pulcherrima</i> (Willd. ex Klotzsch) Graham	Euphorbiaceae	Christmas flower	Stem cuttings
24.	<i>Rhapis excelsa</i> (Thunb.) A. Henry	Arecaceae	Lady palm	Stem cuttings
25.	<i>Rosa</i> sp.	Rosaceae	Garden Rose (Hybrid)	Stem cuttings
26.	<i>Tabernaemontana divaricata</i> (L.) R. Br. ex Roem. & Schult.	Apocynaceae	Crepe Jasmine	Stem cuttings
27.	<i>Ternstroemia montaly</i> H. Perrier	Combretaceae	Madagascar almond	Ornamental though bark and wood are astringent.
28.	<i>Thevetia peruviana</i> (Pers.) K. Schum.	Apocynaceae	Yellow Oleander	Seeds, cuttings.
29.	<i>Wodyetia bifurcata</i> A.K. Irvine	Arecaceae	Fox tail palm	Seeds

N.B.: Transported to different offices in various parts of Odisha state, company like Infosys, IT sectors, Bhusan Steel plant, Sambalpur and other national markets abroad the country.

**Photo Plate 1**

**Photographs**



**Fig. 1 Coastal zone with saline soil hinder plant growth**



**Fig. 2 Coastal canal in Contai Sub-Division filled with casuarinas**



**Fig. 3 Bay leaf plant in nursery**



**Fig. 4 Author taking data in Nursery**



**Fig. 5 Thevetia sp. in bed**



**Fig. 6 Mimusops elengi seedlings**



**Fig. 7** *Pinus* sp. in nursery



**Fig. 10** Papaya seedlings in nursery



**Fig. 8** *Azadirachta indica* in nursery



**Fig. 11** Large scale seedling preparation in nursery



**Fig. 9** Silver oak in nursery



**Fig. 12** *Acacia auriculiformis* in nursery



**Fig. 13 Michelia champaca in garden**



**Fig. 14 Anthurium sp. in nursery (Flamingo flower)**



**Fig. 15 Private nursery (top view)**



**Fig. 16 Rudraksha plant in nursery**

## V. CONCLUSION

Ecosystem damage and soil erosion including flood are general phenomena of Purba Medinipur. The soil loss and vegetation loss need high demand of plants to re-vegetate the land mass in local area as well as other areas. This means there is a high demand of agricultural crops, ornamentals, economic plants, medicinal plants as well as timer yielding plants. Some people are reluctant to grow valuable exotic in their garden or home premises that makes them majestic. The land is acidic to alkaline but most of the places high alkalinity and salinity postpone the growth of the seedlings. Therefore, there is a high demand of seedlings and saplings. Remembering the theme in mind people create nursery which supply the demandable stocks as well as generate income. So, the present study demands a thorough study along the coastline to know the present position of conservation of plants in addition to know the value of biodiversity in such rural coastal Medinipur in West Bengal.

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