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## **Wildlife *in - situ* conservation strategies in Jharkhand**

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**Abstract-** The state of Jharkhand has a unique relation with forest since time immemorial. The word Jharkhand connotes area of land covered with forests. Therefore, literally as well as symbolically, Jharkhand is associated with forests. The total recorded forest area of the state is 23,605 km<sup>2</sup> which is 29.61 % of the geographical area of the state. Of the total recorded forest area, Reserved Forests constitute 18.58%, Protected Forests 81.28% and Unclassified Forests 0.14%. Jharkhand Forest Department is entrusted with all matters pertaining to forests and forestry including protecting and conserving forests and wildlife resources of the state through scientific forest management practices within the ambit of policies, acts and rules in vogue. One of its main objectives is to bewilder sustainable conservation and management of biodiversity - rich ecosystems through *in-situ* & *ex-situ* conservation such as Biosphere Reserves, National Parks, Wildlife Sanctuaries, Biological Parks, Breeding Centres and Zoos. Presently besides several Biological Parks and Zoos, Jharkhand has only one National Park, altogether ten Wildlife Sanctuaries but devoid of any of Biosphere Reserves.

**Keywords :** Jharkhand, Reserved Forests, Protected Forests, Unclassified Forests, *in-situ* & *ex-situ* conservation

### **INTRODUCTION**

In-situ conservation is the on-site conservation of genetic resources in natural populations of plant or animal species, such as forest genetic resources in natural populations of tree species.<sup>1</sup> For *in-situ* conservation of forest and wildlife resources, the state of Jharkhand has one National Park and ten Wildlife Sanctuaries (refer Table 1). The state has no Biosphere Reserve. The Ministry concerned has implemented several schemes and policy instruments on various cross-sectoral issues for conservation and sustainable uses of natural resources including forestry and wildlife.

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### **METHODS**

1. Procuring the available data of floral and faunal species of the state of Jharkhand from various sources.
2. Compilation of action plans of the state Government for protection and conservation of wildlife and sustainable development of forest resources.
3. Occasional visits to National Parks and Sanctuaries.

### **RESULTS & DISCUSSION**

#### **Protected Flora & Fauna Species of Jharkhand Betla National Park**

Betla National Park - Betla National Park is a national park located in the Chota Nagpur Plateau of the Latehar

district of the Indian state of Jharkhand, in India. The park boasts a wide variety of wild life.

Initially comprising the 1,026 km<sup>2</sup> of the Palamau Tiger Reserve, an additional 226 km<sup>2</sup> was added to the park in 1989 and 63 km<sup>2</sup> of the Mahuadanr Wolf Sanctuary. Betla was one of the first national parks in India to become a tiger reserve under Project Tiger.

The forests of the park have a vast range of vegetation consisting of sal and bamboo as the major components along with a number of medical plants. There are grasslands in the flowing area of the Koel River.

#### **Fauna**

Elephants in large numbers are seen mostly after the monsoons up to the time when water holes begin to dry up in March.

Permanent residents include as predators sloth bear, panther and wolf. Jackal and Hyena are common scavengers. Large herds of gaur and chital are commonly seen. Large families of langurs are an ever present attraction, as are rhesus monkeys. Other animals to be found in the NP are mouse deer, sambhar, four-horned Antelopes, Nilgai, Kakar, Small Indian civets, Ant eating pangolin, Porcupine and Mongoose. At last decades white tigers were found rarely.

The park's rich bird life features the Hornbill, Peafowl, Red Jungle Fowl, Black Partridge, White-Necked Stork, Blackibis, Swamp Grey, Quail, The Pied Hornbill, Wagtails, Doves, Drongo, The Crested Serpent-Eagle, Forest Owlets, the Papeeha and other birds usually found in dry deciduous forests. The famous Kamaldah lake attracts several varieties of water birds including the common whistling and cotton teal, the knob-boiled duck, snipe and geese.

#### **DALMA WILDLIFE SANCTUARY**

Dalma Wildlife Sanctuary is located 10 km from the city of Jamshedpur in the Indian state of Jharkhand. It was inaugurated by Sanjay Gandhi in 1975.

Dalma Wildlife Sanctuary is situated around the Dalma Hills. Dalma Sanctuary is spread over 193 sq km.

The forests of Dalma come under the category "Dry peninsular Sal" and "Northern Dry Mixed Deciduous forest".

#### **Fauna**

The wildlife sanctuary has Elephants, Barking Deer, Sloth Bear and Porcupines as the main inhabitants. Dalma

is known as paradise for Elephant. The deer enclosures at Makula kocha have spotted Deers and Sambhars. Other faunal species include Indian Giant Squirrel, Wild Boar, Mouse Deer, Pangolin and Mongooses in the sanctuary.

Commonly seen birds in the sanctuary are the falcons, Golden Oriole, Indian Tree Pie, Paradise Fly Catchers, Grey Hornbills, Indian Peafowl, different varieties of Kingfishers, Herons, Egrets, Mynas, Pigeons, Racket Tailed Drongo, Magpie Robins etc.<sup>2</sup>

#### **GAUTAM BUDHA WILDLIFE SANCTUARY**

Gautam Budha Wildlife Sanctuary is located in Gaya district of Bihar state and Koderma district of Jharkhand state in state in east-central India. The sanctuary was established in 1976, and covers an area of 259 km<sup>2</sup>.

The refuge covers portions of the Lower Gangetic Plains moist deciduous forests and Chota Nagpur dry deciduous forests ecoregions. Plant communities include dry and moist sal (*Shorea robusta*) forests, ravine thorn forest, and tropical dry riverine forest.

#### **Fauna**

Important mammals of the sanctuary are Leopard, Indian Elephant, A Common Langur, Wild Dog, Giant Squirrel, Barking Deer, Hyaena Nilgai, Sambhar, wild pig, Jackal, Fox, Pangolin, Porcupine.

Important Birds are Vulture, Eagle, Peafowl, Red A Jungle Fowl, Pheasant Indian Roller, Golden Oriole, Red Vented Bulbul, Indian Tree Pie, Brahminy Myna.

Important Reptiles are Chameleon & Python

#### **HAZARIBAGH NATIONAL PARK**

Hazaribagh National Park, located 19 km from Hazaribagh, Jharkhand, India is a national park and also a wildlife sanctuary. The sanctuary stretches over 186 square km of undulating country and steep hills with dense tropical forests and grassy meadows.

#### **Fauna**

The park has tigers, panthers, sambhars, spotted deer, bisons and a number of mammalian faunas. The Cheetal, Kakar, Nilgai, Sambar and Wild Boar are among the most easily and often spotted animals particularly near the waterholes at the time of the dusk. The population of the tigers is very low – according to a 1991 Census, there were 14 tigers in the park.

#### **KODERMA SANCTUARY**

The sanctuary is situated in Koderma District. The total area covered by the sanctuary is 177.35 sq.km.

### **Fauna**

Important Mammals are Sloth Bear, Sambhar, Cheetal, Barking Deer, Nilgai, Leopard, Hyaena, Jackal, Wild Boar, Porcupine etc.

Important Birds are Crested Serpent Eagle, Bulbul, Indian Grey Hornbill, Rose Ringed Parakeet, Golden Oriole, Small Green Bee-eater, Grey Tit, Magpie Robin.

Important Reptiles are Cobra, Karait, Python etc.

### **LAWALONG WILDLIFE SANCTUARY**

It is located in Chatra District. The total area is 211.03 sq. km.

### **Fauna**

Important Mammals of the sanctuary are Leopard, Hyaena, Spotted Deer, Wild Boar, Sambhar, Barking Deer, Porcupine, Indian Pangolin, Rhesus Monkey, Mongoose, Jackal, Fox, Common Otter etc.

Important Birds are Hoopoe, Bee-eater, Jungle Myna, F vented Bulbul, Black headed Oriole, Barbet, Pied Kingfisher etc.

Important Reptiles are Chameleon, Python, Cobra, Common Turtle.

### **MAHUADANR WOLF SANCTUARY**

Mahuadanr Wolf Sanctuary is a part of Latehar District. The sanctuary covers an area of 63.25 sq. km.

Mahuadanr sanctuary is situated in the picturesque Chechari Valley (Mahuadanr) Distt. Latehar. It is under administration control of Field Director, Palamau Tiger Reserve. The area of the sanctuary is 63.256 sq km.

The Forest Composition varies on hill tops and valleys. The hill tops have xerophytes vegetation, where as there are crop of sal and associates in the valleys. The trees of Bel, Dhaura, Khair, Salai, Piar, Kend, Karounda, Ziziphus, Sal, Chilb dominant in the sanctuary.

### **Fauna**

Predominant is Wolf and other species are Hares, Mongoose, Rats, Squirrels, Small Deer.

### **PALAMAU TIGER RESERVE**

The Palamau Tiger Reserve is one of the nine original tiger reserves in India and the only one in the state of Jharkhand, India. It forms part of Betla National Park and Palamau Wildlife Sanctuary. It was set up in 1974. The tiger reserve has a total area of 1,129.93 square kilometers.

### **Fauna**

The census in 2007 found only 17 tigers in the reserve. The 2009 tiger census based on DNA analysis

indicated that there were just six tigers in the reserve. As of 1989, 65 elephants were believed to reside in the reserve.<sup>6</sup> Apart from tigers and elephants, leopards, gaurs, sambars and wild dogs live in the reserve.

Over 140 species of birds (including peafowl) have been sighted in the reserve. Two white vultures were spotted by the officials of Palamau Tiger Reserve in Chainpur in 2013.

### **PALKOT WILDLIFE SANCTUARY**

The palkot wildlife sanctuary falls within the district of Gumla and Simdega. The total area of the sanctuary is 182.83 sq.km.

Forest land is scattered in patches and the density of forest is also very poor. The sanctuary comprises Dry Deciduous Forests (Dry Peninsular Sal) bearing rich flora consisting of Sal and its assoc. like Asan, Gamhar, Salai, Piar, Amla, Mahua, Kusum, Mango etc.

### **Fauna**

The mammal fauna consists mainly of Leopard, Sloth Bear, Jackal, Monkey, Porcupine, Hare etc. Frequently seen here are Jungle Fowl, Partridges, Koel, Parakeet, Owl and Pheasants.

Some of the endangered species like Sloth Bear, Rattle, Python, Pangolin, Black necked crane are represented in the area.

### **PARASNATH WILDLIFE SANCTUARY**

Parasnath Sanctuary is situated in Giridih District of the state. Its total area is 39.33 sq.km.

### **Fauna**

Important mammal inhabitants are Leopard, Barking Deer, Spotted Deer, Langur, Monkey, Wild Bear, Jackal, Hyaena, Hare, Porcupine, Jungle Cat.

Important Birds are Peafowl, Parakeet, Cuckoo.

Important Reptiles are Chameleon, Python, Cobra

### **TOPCHANCHI WILDLIFE SANCTUARY**

Topchanchi Wildlife sanctuary is positioned in Dhanbad district of Jharkhand, India. This sanctuary covers an area of 8.75 square kilometres.

The type of the prevailing forest of this sanctuary is a dry mixed deciduous with Dry Peninsular Sal. The Flora that dominated this sanctuary consists tree species of this forest are Asan, Bijasal, Dhow, Semal, Kendu, Piar, Karam, Siris, Sidha etc.<sup>3</sup>

### **Fauna**

The state of Jharkhand has a rich biodiversity. The inhabitants present in this sanctuary are Leopard, Jungle

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**Table: 1. National Park and Wildlife Sanctuaries of Jharkhand**

Sl. No.	Name	District	Legal Status	Year of Notification	Area (Sq.km.)	Principle Wildlife	Nearest Rly Station	Nearest Airport
01	Palamau Tiger Reserve, Betla	Latehar	NP	1976	1026.00	Tiger, Leopard, Elephant, Gaur, Cheetal, Sambhar, Barking Deer, sloth Bear, Nilgai, Wild Dog, Wolf Hyaena	Chhipadoh ar 12 km	Ranchi 170 km
02	Hazaribag Wildlife Sanctuary	Hazaribag	WLS	1976	186.25	Tiger, Leopard, Elephant, Cheetal, sloth Bear, Nilgai, Wild Bear, Nilgai, Wild Boar, Hyena	Ranchi Road 65 km	Ranchi 110 km
03	Mahuadanr Wolf Sanctuary	Latehar	WLS	1976	63.25	Wolf Spotted Deer, Wild Boar, Hares, Mongoose, Rats, Squirrels, Ground Birds	Chhipadoh ar 60 km	Ranchi 240 km
04	Dalma Wildlife Sanctuary	Singhbhum (East)	WLS	1976	193.22	Elephant Leopard, Mouse Deer, Barking Deer, Wild Boar	Tata Nagar 12 km	Ranchi 110 km
05	Topchanchi Wildlife Sanctuary	Dhanbad	WLS	1978	8.75	Leopard, Jungle Cat, Cheetal, Barking Deer, Langur, Wild Boar, Mongoose, Jackal, Fox, Wild Dog	Dhanbad 25 km	Ranchi 140 km
06	Lawalong Wildlife Sanctuary	Chatra	WLS	1978	207.00	Tiger, Leopard, Cheetal, Barking Deer, Nilgai, Wild Boar, Hyaena, Langur	Chandwa(T ori)76km	Ranchi 100 km
07	Koderma Wildlife Sanctuary	Koderma	WLS	1985	150.62	Tiger, Leopard, Sloth Bear, Sambhar, Cheetal, Barking Deer, Nilgai, Wild Boar, Gaint Squirrel, Jackal, Fox, Hyaena, Langur, Porcupine	koderma 10km	Ranchi 170 km
08	Parasnath Wildlife Sanctuary	Giridih	WLS	1981	49.33	Leopard, Sloth bear, Sambhar, Cheetal, Barking Deer, Wild Boar, Gaint Squirrel, Hyaena, Langur, Porcupine, Mongoose, Jungle Cat, Monkey	Parasnath 16 km	Ranchi 160 km
09	Palkot Wildlife Sanctuary	Gumla	WLS	1990	183.18	Leopard, Sloth Bear, Jackal, Monkey, Procupine, Hare, Jungle Fowl, Patridge, Koel, Parakeet, Owl, Pheasants	Ranchi 115 km Bano 55 km	Ranchi 115 km
10	Udhwa Lake Birds Sanctuary	Sahebganj	WLS	1991	5.65	Gull, Jacana, Test, Cormorant, Dabchick, Darter, lapwing, Plover, Wagtail, Egrent, Heron, Ibis, Stork, Blue Rock Pigeon, Lark, Bee-eater, Sparrow, Myna (six spp.) Pipit, Bulbul etc. Birds of prey like term, Brahminy kite, Fishing Eagle, Hawak and vulture. Others like swift, Swallow, kingfisher, Drongo, Indian Foller, Parakeet etc.	Sahebganj 42 km	Ranchi/ Patna
11	Gautam Budha Wildlife Sanctuary	Koderma	WLS	1976	121.142	Sloth Beer, Sambhar, Cheetal, Barking Deer Nilgai, Wild Boar, giant squirrel	Koderma 60 km	Ranchi

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**Table: 2. Schemes for Forests & Wildlives Conservation**

Sl.	Name of Schemes	Proposed Financial Allocation (in Lakh)	Desired Physical Result for 2017-18 to 2019-20	Targeted Physical Result for FY 2017-18
01	Green India Mission	500.000	1500ha/25.0 lakh plants Qualitative improvement of forest cover/ ecosystem in the existing forests; Creating new forest through eco restoration/afforestation; Improvement of livelihood, agroforestry, promoting alternate fuel, etc.	500 ha/8.33 lakh plant Qualitative improvement of forest cover/ ecosystem in the existing forests; Creating new forest through eco restoration/ afforestation; Improvement of livelihood, agroforestry, promoting alternate fuel, etc.
02	Intensification of Forest Management	550.000	-Construction of Boundary Pillars -Infrastructure improvement -Conservation sacred groves	-Construction of Boundary Pillars -Infrastructure improvement -Conservation sacred groves
03	Palamau Tiger Reserve	400.000	Improvement and management of Tiger habitat in Palamau Tiger Reserve	Improvement and management of Tiger habitat in Palamau Tiger Reserve
04	Palamau Tiger Reserve	400.000	Improvement and management of Tiger habitat in Palamau Tiger Reserve	Improvement and management of Tiger habitat in Palamau Tiger Reserve
05	Project Elephant	225.000	Ecological restoration of existing natural habitats, migratory routes -Managing Man-Elephant conflicts, etc	Ecological restoration of existing natural habitats, migratory routes -Managing Man-Elephant conflicts, etc
06	Integrated Development of Wildlife Habitat	250.000	Improvement and Management habitats of all the wildlife Sanctuaries of the state.	Improvement and Management habitats of all the wildlife Sanctuaries of the state.
07	National Plan for Conservation of Aquatic Eco systems (NPCA)	20.000	Conservation and management of lakes and wetlands especially Udhwa Lake Sanctuary.	Conservation and management of lakes and wetlands especially Udhwa Lake Sanctuary.
08	National Afforestation Programme (NAP)	700.000	2100ha/35.0 lakh plants afforestation activities will be taken up. -strengthening JFMCs -Developing community assets under entry point activities.	700/11.66 lakh plants afforestation activities will be taken up. -strengthening JFMCs -Developing community assets under entry point activities.
09	Wildlife Conservation & Crime Control	2125.000	(i)Improvement and management of Wildlife habitat of the various Wildlife Sanctuaries of the state. (ii)Develop Wildlife crime database management system for effective control of wild life related crime	(i)Improvement and management of Wildlife habitat of the various Wildlife Sanctuaries of the state. (ii)Develop Wildlife crime database management system for effective control of wild life related crime
10	Jharkhand State Climate Change Action Unit	300.000	Establishment and Strengthening of 'Jharkhand State Climate Change Action Unit' - to implement the schemes to mitigate climate change effect.	Establishment and Strengthening of 'Jharkhand State Climate Change Action Unit' - to implement the schemes to mitigate climate change effects

Cat, Cheetal, Barking Deer, Wild Boar, Mongoose, Langur, Jackal, Fox, and Wild Dog etc. The Topchanchi Lake enhances the richness of the habitat and is visited by migratory winter birds too.

#### **UDHWA LAKE BIRD SANCTUARY**

Udhwa Lake Bird Sanctuary is one of the most attractive tourist attraction spots in Jharkhand. The bird Sanctuary is extended with a coverage area of around 5.65 square kilometer. Udhwa Lake Bird Sanctuary is located close to the Udhwa Lake. This lake is situated in Sahibganj District.

#### **Fauna**

Udhwa Lake Bird Sanctuary is one of the natural abodes for a number of different types of birds who reside or migrate here. Some of the rare species of birds that spend majority of the time in mud to satisfy they are Pratincole, Stork, Ibis, Heron, Egret, Wagtail, Plover, Lapwing, Waders, and many more.

The most common birds are the Bulbul, Pipit, Hill Myna, Sparrow, Bee eaters, Lark, Blue Rock Pigeon, and other species of birds. The six different species of Myna are Brahminy, Jungle Myna, Bank Myna, Indian Myna, Pied Myna, and the rarest one is the Grey headed Myna. Apart from the pretty birds, there are also some of the other wild avian creatures who reside here; they are Parakeet, Indian Roller, Drongo, kingfisher, Swallow, House and Palm Swift, Vulture and Hawk, Fishing Eagle, Brahminy Kite, Tern, and many other birds.

The bird species migrate from other region just love to spend quality time in this Lake Bird Sanctuary. These migratory birds include Western Swallow, Blue-throat, Yellow and White Wagtail, Temmink's Stint, Common Sandpiper, Spotted Green Shanks, Red and Green Shanks, Little-ringed Plover, Grey-headed Lapwing, Brown-headed Gull, Black-headed, and lot more.

#### **ECO TOURISM IN JHARKHAND**

Under the Scheme of Eco Tourism, an attempt is being made to create awareness among the common masses regarding the state's forest resources and the environment specially their protection and conservation using environmental friendly sustainable techniques. For this "Jharkhand Tourism Authority" has been formed.<sup>4</sup>

Eco Tourism Scheme 2015 has been notified in the month of October, 2015. It has planned for the villagers staying in far flung forest areas to be provided with the

livelihood resources and also there financial income would be increased.

#### **CONCLUSIONS**

The rich biodiversity of India is facing threat as a result of large-scale man made landscape modifications and over-exploitation of resources causing loss of degradation of natural ecosystems/habitats. In Jharkhand 36 animal species and 64 plant species are in endangered category.<sup>4,5</sup>

Endangered animal species: Tiger, Ganges river dolphin, Sloth Bear, Asian Elephant, Indian Giant squirrel, Flying squirrel, Mouse Deer, Marsh Harriers, Darter, White necked stork, Fulvous whistling Duck, Ferruginous pochard, Bengal Florican, Greater Adjutant, Lesser adjutant, Nordmann's Greenshank, Black-bellied Tern, Egyptian Vulture, Red-headed Vulture, Himalayan Vulture, White-rumped Vulture, Indian Vulture, Indian Spotted Eagle, Greater Spotted Eagle, Eastern Imperial Eagle, Pallas's Fish Eagle, Green Avadavat, Bristled Grass Warbler, River Lapwing, Lesser adjutant, River Tern, Oriental white ibis, Black bellied tern, Flap shell turtles, Krait and Russell Viper.

The threatened plant species: Plant Species that belong to the families of Fabaceae, Poaceae, Ranunculaceae, Apiaceae, Gentianaceae, Zingiberaceae, Rosaceae, Berberidaceae, Verbenaceae, Oleaceae, Orchidaceae, Droseraceae, Celastraceae, Commelinaceae, Salicaceae, Taccaceae and Violaceae.

#### **DISCUSSION**

India is one of the 17 mega diverse countries which together possess 60 to 70% of the world's Biodiversity. The state of Jharkhand is a part of biodiversity rich regions of India because of its diverse physiographic and climatic conditions. The species of both plants and animals found represent a wide range of taxa. This can be attributed to a terrain, variety of terrain and landforms. Add to this, various ethnic groups such as Munda, Ho, Oraon, Santhal, Paharia, Chero, Birjea, Asura and other have influenced their eco-systems in varying practices of agriculture and pasture.<sup>6</sup>

The biodiversity of the state is under some threat due to a variety of adverse factors including

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1. Overlapping of mineral map and the forests for the majority of minerals (iron & coal).<sup>7</sup>
2. Human livelihood activities
3. Biopiracy
4. Land occupancy for residential and commercial buildings
5. Overgrazing
6. Exploitation and unsustainable uses of medicinal plants
7. Dams and extraction industry(mining)
8. Tourism
9. Extreme poaching
10. Agricultural intensification and expansion.

The state is committed to protect and conserve its natural resources and wildlife. The conservation efforts are reflected in budgetary and infrastructural support that the state government and its forest department have extended to this cause (refer table 2).

The state of Jharkhand supports the following matrix of large fauna: Tiger - over 35 no.; Leopard- 164; Elephant – 772; Barking Deer-3672; Cheetal- 16384; Sambhar-3052; Chausingha – 62; Common langur- 44920; Common Otter- 98; Hare- 2718; Hyena- 613; Indian Bison – 256; Indian Giant Squirrel-395; Jackal- 559; Jungle Cat- 11; Monkey-64685; Nilgai- 1262; Pangolin-5684; Porcupine-425; Sloth Bear- 1808; Wild Boar- 18550; Wild Dog- 537; Wolf- 874; Peafowl- 5684; Jungle Fowl -325.

A comprehensive floristic study of the state is yet to be done. Vegetation in the forest areas have been under constant threat because of the unsustainable exploitation and more or less in congenial climatic conditions.<sup>8</sup> Unsustainable use of medicinal plants and non-timber forest produces have affected the regeneration capacity of a few species such as *Rauwolfia serpentina* (Sarpagandha) and *Gloriosa superba*, *Adhatoda vasica*, *Achyrenthes aspera* (Chirchiri) species.<sup>9</sup>

The action plans for the biodiversity of the state could be as follow:

1. Inventorization of biodiversity of state.<sup>10</sup>
2. Major control on harvesting of forest produces.
3. Appropriate land use pattern for the state in the light of demands of biodiversity conservation.
4. Protected areas *viz.* national parks, wildlife sanctuaries and biosphere reserves.
5. Identification of biodiversity hotspots.

6. Indexing endemic, endangered and rare species
7. Focus on the recommended species for conservation
8. *Ex-situ conservational* strategies (botanical and zoological garden, arboreta and orchidaria).

Nevertheless it is mandatory to Identify steps to prevent further loss of species-mix, and pass the scientific findings in a convenient state of art technology module to all stake holder agencies of government and non-government agencies before it is too late and the biodiversity becomes victim of methodical material growth and development including urbanization, industrialization and other related sectors.

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