SACON Technical Reports No.105

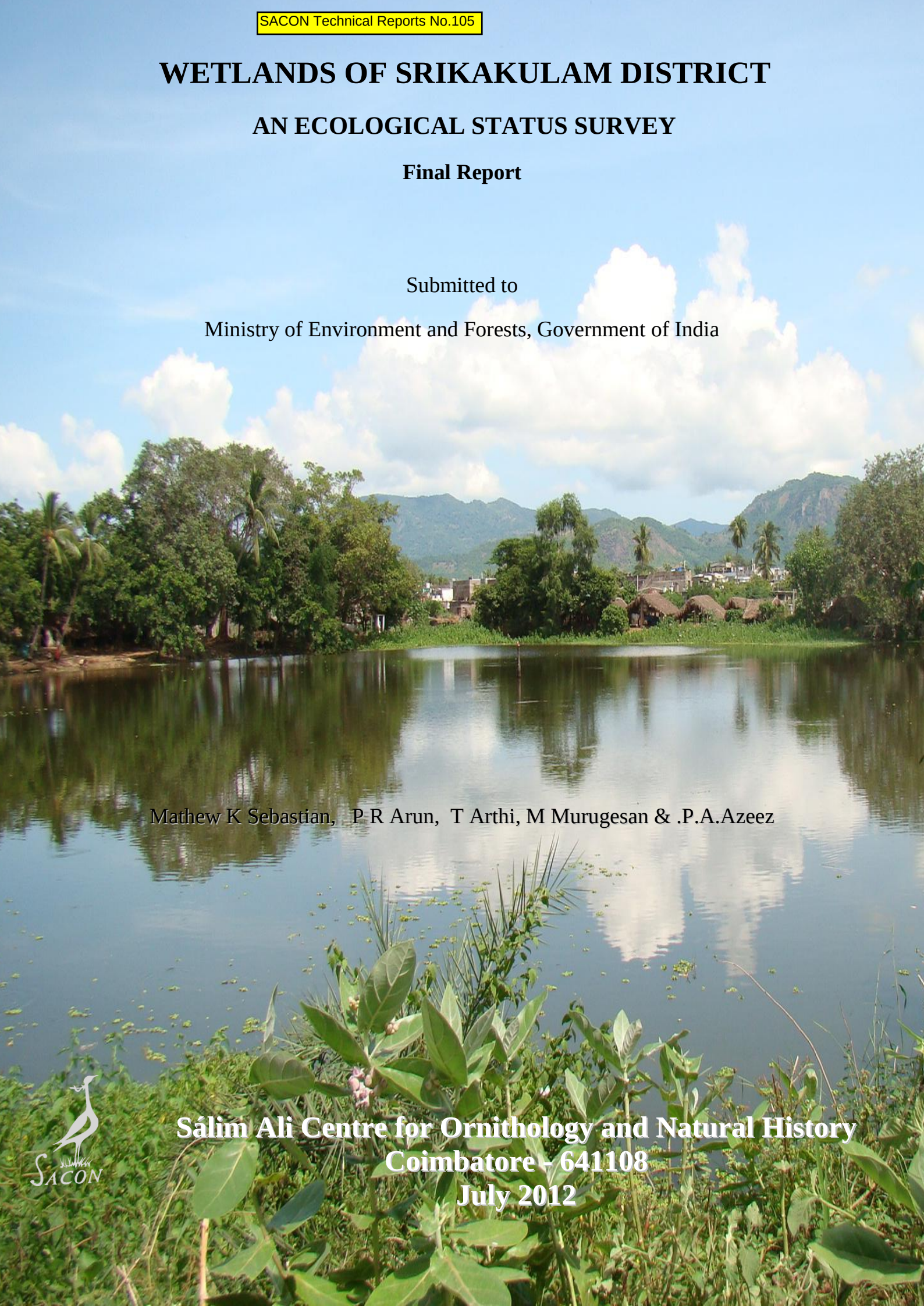
# WETLANDS OF SRIKAKULAM DISTRICT

## AN ECOLOGICAL STATUS SURVEY

**Final Report**

Submitted to

Ministry of Environment and Forests, Government of India



Mathew K Sebastian, P R Arun, T Arthi, M Murugesan & .P.A.Azeez

Sálim Ali Centre for Ornithology and Natural History
Coimbatore - 641108
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**By**

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# Glossary, symbols and abbreviations

| | | |
|---|---|---|
| **AP** | = | Andhra Pradesh |
| **CADA** | = | Catchment Area Development Authority |
| **FGD** | = | Focussed Group Discussions |
| **ft** | = | feet |
| **GoAP** | = | Government of Andhra Pradesh |
| **GoI** | = | Government of India |
| **Ha** | = | hectare |
| **IMC** | = | Indian Major Carps |
| **m** | = | meters |
| **MoEF** | = | Ministry of Environment & Forests, Government of India |
| **PRA** | = | Participatory Rural Appraisal |

# Acknowledgements

The present study entitled 'Ecological Status Survey of the Wetlands of Srikakulam District, Andhra Pradesh' was carried out by Salim Ali Centre for Ornithology and Natural History with the support of Ministry of Environment and Forests, Government of India. We are grateful to the Ministry for entrusting the study to SACON and extending financial assistance for the same.

During the course of our field work, we have received support from various organizations and individuals. We are thankful to Mr. Mohammad Thayyab, District Forest Officer, Srikakulam district for providing valuable information about the flora and fauna.

Departments of Fisheries and Irrigation play a vital role in maintaining and using the wetland resources for the benefit of the rural community. We acknowledge the valuable assistance rendered by P Koteswara Rao, Deputy Director of Fisheries, Srikakulam district; Mr. P Sudhakara Rao, Deputy Superintending Engineer, Vamsadhara project, Srikakulam, and Mr. Suganakara Rao Sambagi, Executive Engineer, Department of Irrigation. Mr. Sreedhar, Deputy Director, District Industries Centre, Srikakulam was a valuable source of information regarding the industries and related aspects of Srikakulam district.

The officials of various Non Governmental Organizations such as Paryavaran Samrakshana Samiti, Sompeta and Sanjeevani Paryavarana Samrakshana Sangam, Srikakulam, assisted us in reaching the far corners of Sompeta and Naupada wetlands. The officials and members of Fishermen Cooperative Societies have also rendered valuable assistance in carrying out the survey. We express our deep sense of gratitude to all of them.

We are indebted to the members of the rural community in different parts of the Srikakulam district in sparing their valuable time participating in the discussions and answering our questions. We are thankful to the people of Gollakandi village for actively participating in the Participatory Rural Appraisal exercise.

We are grateful to Mr K A Nishad, Research Scholar, SACON for preparing the satellite images of the wetlands.

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# Executive Summary

The district Srikakulam ($18^0$ 20' to $19^{0'}$-$10^{1'}$N latitudes and $83^0$ 05' to $84^0$ 90', E longitudes) is the most north-eastern and second smallest district in Andhra Pradesh. Spreading over 5837 $Km^2$ of area, it shares boarders with Odisha state in the north, Vizhinagaram district of A P in the west and south. On its east lies the Bay of Bengal. It is divided into 38 Mandals under three Revenue Divisions viz. Srikakulam, Palakonda and Tekkali.

In view of the large number of wetlands in the district, of which many are under serious threat, the Union Ministry of Environment and Forests (MoEF) entrusted SACON with the present study on the 'ecological status of the wetlands of Srikakulam district'. Although initially envisaged as a short-term, three months, project, considering the number and diversity of wetlands, the study was extended to six months.

The district can be distinctively divided into three zones namely i) the hills, ii) the midland plains, and iii) the coastal plains. Most of the wetlands are seen in the coastal plains, followed by the midland plains.

The rivers, Vamsadhara, Nagavalli, Mahendratanaya and Bahuda flow through the district. The river Vamsadhara, originating in the Eastern Ghats of Odisha state, enters the Srikakulam district in Bhamini Mandal and flows into the Bay of Bengal near Kalingapatanam. The river Nagavalli and its tributary Suvarnamukhi originate in the Eastern Ghats and joins the Bay of Bengal at Kallepalli near the Srikakulam town. The smaller rivers Mahendratanaya and Bahuda drain the northern parts, a narrow stretch of land between the Eastern Ghats and the sea, in the district.

The district is industrially backward. The people in the district depend largely on agriculture for a living. Though the main crop is paddy, millets, horse grams and red grams are also raised. Vegetable/fruits such as Cabbage, Cauliflower, Tomato,

Papaya, Jack Fruit, Cashew, Lemon, and Guava are also cultivated. Jute is also widely cultivated to serve the local industries.

Pisciculture is practiced in most of the wetlands. Traditional inland fishermen depend upon these wetlands for their livelihood. Wetlands in the district provide a number of ecosystem services such as water for irrigation and fish culture, habitat for wildlife, grazing field for livestock, and as a source for fodder, materials for making traditional gadgets for people's day to day uses, edible and medicinal plants. The role of these wetlands in recycling nutrients and arresting of sedimentation and controlling floods remains undervalued.

The coastal plains are blessed with numerous wetlands of different sizes and characteristics, of which 'Beelas' are of ecologically and economically important (Beelas, in the vernacular, are back waters, a wetland system fed by flood waters or a network of streams/channels and connected to the sea through a creek/channel). Four major large wetland complexes, namely Naupada, Sompeta, Ichapuram and Poondi are situated in the coastal plains in the district. In addition there are hundreds of small and medium, seasonal and perennial wetlands of diverse nature.

Sompeta Beela, a complex of three separate but connected water bodies of which two are brackish and the other fresh water, with its surrounding flood plains is a wetland complex with an approximate area of 800 hectares. It is an important habitat of 121 bird species and 493 plant species. Many bird species seen here fall under IUCN Red List. Around 100,000 people belonging to 30 villages around the wetland depend upon the wetland complex for various purposes, deriving ecosystem goods and services. During the dry season drained out portions of the wetland is used for grazing by thousands of cattle and wild boars. Around thousand families belonging to the traditional fisher communities fully depend upon the wetland for their sustenance. Around 2000 hectares of paddy (two crops) and 300 hectares of vegetable and horticultural crops are irrigated directly drawing water from the beela.

Naupada swamps is another large wetland complex which falls in the Tekkali division of the district. The Naupada swamps consists of vast stretches of perennially and seasonally water logged areas, salt pans, and the Tekkali creek through which it connects to the sea. As per the revenue records the total wetland area, excluding the creek, is approximately 2800 hectares. During monsoon, fed by numerous water channels, vast stretches of this wetland is inundated. Thus, Naupada swamps perform invaluable ecosystem services of flood and siltation control, and enhancing the recharge of ground water in hundreds of villages in its environs.

It is an important foraging ground for Pelicans and Painted Storks from the Telineelapuram Important Bird Area (IBA), just 4 Km away. Our rapid survey found 145 bird species here, out of which 13 species belong to the IUCN Red List. Two thirty six plant species were also listed from the swamp area. One thousand fishers depend upon the wetland on a regular basis eking out a living. This wetland also provides numerous wetland services to lakhs of people in the surrounding villages.

Poondi wetland, a backwater one, has a water-spread of about 200 ha and vast stretches of salt pans and aquaculture farms in the adjoining areas. Ichapuram wetland spreads across the Srikakulam and the Ganjam district of Odisha state. Apart from providing habitats for several species, this wetland and adjacent hundreds of acres of salt pans and aquaculture farms provide livelihood for thousands of households.

All the above mentioned wetlands are extensively used for fishing, traditional fisher communities (viz. Kaviti, Behra and Kandra) holding the rights. These communities use tralatitious gears and techniques for fishing in a sustainable way. Adept only in these traditional skills their survival is inextricably linked to the survival of the wetlands. Same is the case of several invaluable and wild species living in / on the wetlands.

In addition to the abovementioned major coastal wetland complexes hundreds of wetlands of different sizes and characteristics are seen in the coastal plains of the district. Most of the wetlands, despite pressures from intentional and unintentional anthropogenic and other pressures, harbour valuable floral and faunal biodiversity. These wetlands provide several known crucial ecosystem services such as water for irrigation, fishing, grazing land for thousands of cattle during lean period, fodder, edible and medicinal plants, roofing and thatching materials, and several unaccounted services such as moderating local climate and offering haven for several known and unknown species. Regulating services such as flood control, sediment retention, ground water replenishment, and water purification contribute to the very maintenance and survival of the ecology of the entire region, which however remains largely unrecognised, neither studied nor documented.

Both the Important Bird Areas (IBA) in the district, Telineelapuram and Telkunchi are in the coastal areas of Srikakulam. While Telineelapuram harbours more than 150 Spot billed Pelicans and 200 Painted Storks, Telkunchi sustains thousands of Open Bills and many other birds.

The coast of Srikakulam district is the second largest breeding site after Odisha coast for the endangered Olive Ridley Turtles. Their preferred breeding grounds are the river mouths and adjoining areas. Olive Ridley Turtles travel from the sea south of Sri Lanka to the coasts of Odisha, passing through Tamil Nadu and Andhra coastal waters during the breeding season. Therefore to ensure the survival of Olive Ridleys , it is imperative that the coasts and coastal waters are kept devoid of constructions that will change the coastal setting and ambience.

The midland plains in the district are also rich in wetlands of varying sizes harbouring valuable biodiversity and providing various ecosystem services. Many of these wetlands are connected to rivers Mahendratanaya, Vamsadhara or Nagavalli. A number of these perennial wetlands are foraging grounds for several

conservationally important bird species such as Spot billed Pelican and Painted Storks.

Madduvalasa reservoir created by a dam in the Swarnamukhi river, which is a tributary of Nagavalli, is important for people of the district. It also supports very important biodiversity; both floral and faunal. Apart from many other birds, species such as Darter, large flocks of Tufted Duck showing some morphological variance, was observed here.

The integrity of most of the wetlands is under threat due to various pressures, some of which are universal and some particular to the district. Due to the well developed transportation links such as the Chennai-Calcutta National Highway and the broad-gauge railway line passing through the coastal areas, and easy access to the sea for building Jetties, transportation of construction materials and raw materials for industries is cost effective. Proposals for setting up two Super Thermal Power Plants (STPPs), one at Sompeta and another one at Bhavanapadu, a part of the Naupada swamps, are in advanced stage. Despite intense opposition from the local communities, NGOs, Environmentalists and Scientists, permission was granted for both the proposals. However, both places have seen 3 human casualties each while protesting against the projects, forcing the authorities to suspend permission for the projects till further studies are taken up on the ecological status of all the wetlands of Srikakulam district (order dated 14 July 2010 by National Environment Appellate Authority).

The changes in the natural landscape settings, alteration in natural flow regimes, construction of roads, transportation of construction and raw materials and release of thousands of tons of pollutants to the environment during the operation of the STPPs will cause irreparable damage to the coastal ecosystem imperilling not only the rich biodiversity but also the wellbeing of lakhs of inhabitants of the coastal area who depend upon the wetlands directly and indirectly and would effectively marginalise them. The impact of the jetties proposed to be built for bringing in fuel /

coal for the STPPs and the release of thousands of gallons of water to the sea during the STPP operation on the breeding migration of the Olive Ridley Turtles as of now is little known.

Bhavanapadu wetland is an important foraging ground for the Spot billed Pelicans and Painted Storks of the Telineelapuram Heronry. Any qualitative / quantitative changes in the Bhavanapadu wetland will adversely affect the survival of these 'Near-threatened' birds.

Our exploratory surveys employing participatory tools among the adjoining villages indicate a strong possibility of the existence of the critically endangered Pink Headed Duck during November to January in the core area of Sompeta wetland. Any changes in the wetland complex will deny an opportunity to take up further enquiries in this regard and perchance if this 'critically endangered' species is confirmed as present there it will lead to an irremediable loss.

It is disheartening to note that water from none of the wetlands is used for drinking indicating the deterioration of the water quality. The major threats generally faced by the wetlands of the district are pollution caused by agricultural runoff, wide usage of wetlands for curing the jute bark, dumping of solid wastes especially in urban and semi urban wetlands, sewage discharge, encroachment, open defecation on the banks of wetlands which leads to increased microbial and organic load. Poaching of birds is widespread in the wetlands. Cleaning and modification of wetlands, without appropriate supervision, under the MNREGA programme is also wiping out plant biodiversity from many of the wetlands and possibly associated animal species.

As of now consequences of Industrial pollution is explicitly seen only in the Pyedibhimavaram area, bordering the Visakhapatnam district, hardly five kilometers away from the coast. Most of the effluents here flow to the sea through a wetland near the industrial area. Effluents from M/s Nagarjuna Agrichem Ltd manufacturing agrochemicals including fungicides and pesticides apparently play havoc with the

ecology of the nearby wetlands and ecosystems and deprives the local inhabitants' of safe drinking water and water for irrigation.

The wetlands and its environs of Srikakulam district provide habitats for 236 bird species and 662 plant species. Information on other taxa is scanty. As noted above several birds falling under 'Near threatened', 'Vulnerable' and 'Endangered' IUCN categories and Schedule- I of IWPA-1972 are seen in the wetlands and its environs.

The 'Beelas' as made out are not inconsequential water bodies in the coastal plains and should be protected from any violations of their integrity as they are ecologically sensitive and important, habitats for diverse biodiversity including several species under various categories of threat, and to ensure environmental, food and water security for lakhs of people. The plans for setting up the Super Thermal Power Plants in those wetlands should be re-examined.

Lakhs of people depend upon the various ecosystem goods and services provided by the coastal wetlands for their survival. There are 83 marine fisher's habitations apart from the hundreds of settlements of local farmers, traditional pisci-culturists, workers in the numerous salt pans and inland fishers in the coastal area. The water and food security of the coastal plains depend upon the wetlands to a great extent. Therefore, no activity that will threaten the integrity of the wetlands should be allowed.

Srikakulam coast is the second largest endangered Olive Ridley nesting site in India. This species prefer river mouths for breeding. Therefore, special protective measures have to be devised and executed in the coastal belt. The coastal waters of Andhra Pradesh being an important pathway for migrating Olive Ridley turtles in search of their nesting sites, construction of Jetties near the Srikakulam coast and also the release of effluents to the sea should not be allowed.

To conserve the breeding sites of the Olive Ridley Turtles, 'Interest Groups' involving the stakeholders have to be formed and awareness campaigns and other steps needed for achieving the objective should be taken up.

Since, our survey using PRA tools surmises the presence of the endangered Pink Headed Duck, which has not been sighted in the country for more than half a century, in the core area of the Sompeta wetland, pending its confirmation, immediate steps should be taken up to protect the habitat from any disturbance and investigations should be taken up right away to ascertain the presence of the bird.

Both Naupada swamps and Sompeta wetland are rich and distinctive ecosystems. However, scientific documentation on these wetlands is grossly inadequate and therefore it is imperative that a multidisciplinary research programme is taken up on these wetlands and a comprehensive management plan prepared. Considering their apparent ecological values steps should be initiated to declare both the wetlands as Ramsar sites.

Jute cultivation and processing is an important economic activity in the district. Appropriate methods that will not spoil the wetlands may be devised and executed for curing jute. Construction of special cement water tanks may be considered for the purpose.

The present survey indicates that many fishermen indulge in poaching birds and other wild life, maybe being unaware of the importance of such species. Awareness programmes have to be initiated to address this issue. Programmes with stakeholder participation should also be formulated that would help in this and protect such wetlands.

Under the Mahatma Gandhi National Employment Guarantee Programme cleaning and expansion work has been taken up in many wetlands which lead to the removal of plant biodiversity which in turn impact the bird and other animal biodiversity.

Measures to sustain the biodiversity of the wetland have to be devised and implemented while carrying out such works using MNREGP funds.

Wetlands should not be used as dump yards for wastes of any kind, municipal, industrial, commercial or domestic. Industrial effluents should not be allowed to be discharged into the wetlands even after treatment. Rules and regulations pertaining to Solid Waste Management and wetland management should be strictly enforced.

In brief, it is suggested that all the wetlands (including interconnected wetland complexes such as coastal wetlands of Sompeta) in the district with more than 500 ha should be identified and protected alongwith wetlands that are ecologically sensitive,though they are less than 500 ha, and important which are major wildlife habitats, areas of outstanding natural beauty or historical or heritage areas and the areas rich in genetic diversity as stipulated in the National Wetland (Conservation & Management) Rules-2010. They should not be allowed to be converted for any other purpose. It is also suggested that firm attempts should be made, especially for the four major wetland complexes in the coastal plains, to document their ecological and conservational values, the ecological goods and services form these and to conserve them. A strategy to use them wisely in sustainable manner should be formulated and executed, perhaps by a system such as ecodevelopment committees.

# 1 INTRODUCTION

## 1.1 BACKGROUND

The Union Ministry of Environment and Forests (MoEF) entrusted SACON with the present short-term study on the wetlands of Srikakulam district of Andhra Pradesh (AP). Srikakulam is the second smallest district of the state with an area of 5837 $Km^2$, having more than 8,000 wetlands of different sizes and characteristics. Although initially envisaged as a short-term, three months project, considering the large number and diversity of wetlands of the district, the study was extended to six months to do justice to the task of representative sample data collection.

## 1.2 STUDY AREA

The district Srikakulam, situated between $18^0$ 20' and $19^0$, 10'N latitudes and $83^0$ 05' and $84^0$ 50' E longitudes, is the north eastern most one in AP state. The district is divided into 38 Mandals under three Revenue Divisions viz. Srikakulam, Palakonda and Tekkali. The district shares boarders with Odisha state in the north, Vizhinagaram district of AP in the south while Bay of Bengal lies along the east. In the district the altitude varies from sea level to to above 1100 m above msl in the hills.

The district receives an annual average rainfall of 1162.5 mm.

The district can be distinctively divided, based on the terrain and geomorphology, into three zones namely i) the Hills, ii) the Midland plains and iii) the Coastal plains. Most of the wetlands are seen in the coastal plains followed by the midland plains. The coastal plains harbour major four large wetlands namely, Naupada, Sompeta, Ichapuram and Poondi.

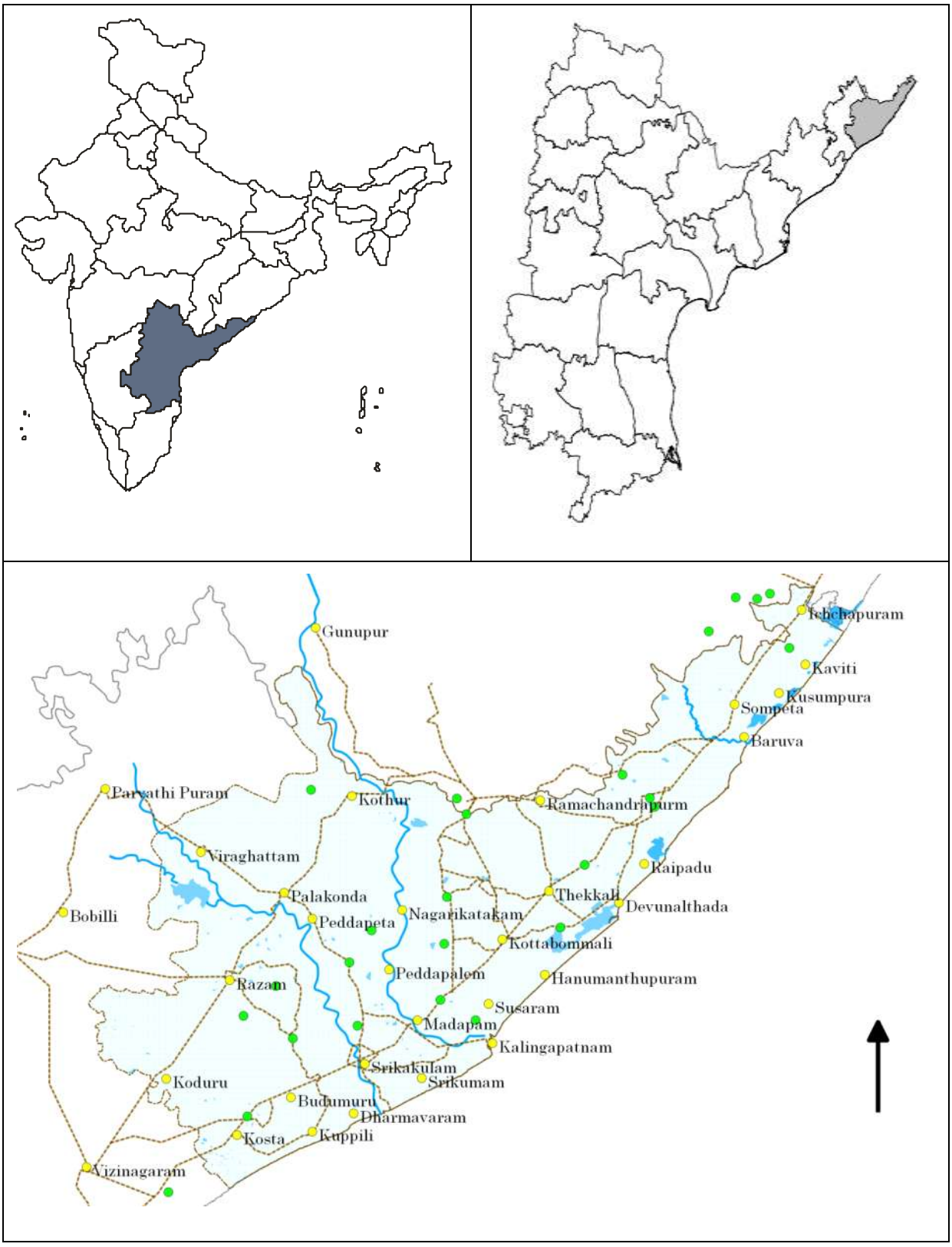



Figure 1 Location map

Apart from these major wetland complexes, there are hundreds of small and medium, seasonal and perennial wetlands in the coastal area. The major rivers of the district, Nagavalli, Mahendratanaya and Vamsadhara drain into Bay of Bengal. The river Vamsadhara originating in the Eastern Ghats of Odisha state enters Srikakulam district in Bhamini Mandal and finally flows into the Bay of Bengal near Kalingapatanam. The river Nagavalli and its tributary, Swarnamukhi originate in the Eastern Ghats and joins the Bay of Bengal at Kallepalli near Srikakulam town. Other smaller rivers such as Mahendratanaya and Bahuda drain into the northern parts, a narrow stretch of land between the Eastern Ghats and the sea.

Table 1 Mandals under the three divisions in Srikakulam District

| Palakonda Division | Tekkali Division | Srikakulam Division |
|---|---|---|
| 1. Veeraghattam | 1. Palasa | 1. Sarubujjili |
| 2. Seethampetta | 2. Mandasa | 2. Ganguvarisigadam |
| 3. Bhamini | 3. Kanchili | 3. Amadalvalasa |
| 4. Kothuru | 4. Ichapuram | 4. Narasannapeta |
| 5. Pathapatnam | 5. Kaviti | 5. Polaki |
| 6. Meliaputti | 6. Sompeta | 6. Gara |
| 7. Palakonda | 7. Vajarapukothuru | 7. Srikakulam |
| 8. Heeramandalam | 8. Nandigam | 8. Ponduru |
| 9. Vangara | 9. Tekkali | 9. Laveru |
| 10. Regidiamadalavalasa | 10. Santhabommali | 10. Ranastalam |
| 11. Lakshminarsupeta | 11. Kotabommali | 11. Etcheria |
| 12. Sarvakota | 12. Jalumuru | |
| 13. Burja | | |
| 14. Santhakaviti | | |
| 15. Rajam | | |

**The Coastal Plains:** Coastal plains are highly productive fertile area harbouring different types of ecosystems. Extensive sand bars / mounds are seen near Kallepalli, Srikakulam, Kalingapatnam, Bhavanapadu, Vajrapukotturu, and Baruva; along the estuaries of the river Nagavalli near Kallepalli, river Vamsadhara near Kalingapatnam and the river Mahendratanaya near Baruva. Under the agro-forestry programme of the state forest department, private entrepreneurs have converted vast coastal stretches into cashew plantations providing green cover to the entire coast.

**The Plains**: The midland plains lie within the network of semi-perennial rivers like Vamsadhara, Nagavalli, Bahuda, Mahendratanaya, and their tributaries. In the plains there is little forest. The areas being highly fertile are under permanent agriculture or horticultural crops.

**The Hills:** The hilly region, lying in the north and west of the district, forming part of the Eastern Ghats, is characterised with highly undulating terrain. This terrain covers parts of Palakonda, Pathapatnam and areas of Mandasa, Sompeta in the north-west and northern part of the district. About 1/3$^{rd}$ of the total area of the district is hilly.

The Eastern Ghats run, roughly parallel to the sea from the north-east to the south-west. Some prominent hills in this range in the district are given below. These hill ranges with their isolated hills show a distinct north – west, south east trend.

Table 2 Prominent hills in the district

| S.No. | Name | Altitude (m) |
|---|---|---|
| 1 | Himagiri | 1120 |
| 2 | Darabanda | 950 |
| 3 | Rangavalasa | 950 |
| 4 | Chintaleguda | 900 |
| 5 | Burnakonda | 812 |
| 6 | Anitkonda | 684 |
| 7 | Palakonda | 650 |

*Source: Draft Working plan 2011, DFO Srikakulam*

### 1.2.1 GEOLOGY, ROCKS AND SOIL

The Srikakulam district geomorphologically is characterised by rocks of Archaean ages comprising of Granites and Charnockites, which have intruded into the highly folded and metamorphosed sedimentary rocks, represented by Khondalite series. The district forms a part of the stable peninsula, where these are overlaid with recent age laterite and alluvial soils.

### 1.2.2 DEMOGRAPHY

As per 2001 census, the population of Srikakulam district is 25,37,593; females 50.3% and males 49.7%. For the district the decennial growth rate for 1991 to 2001 is

9.33%, as against 14.44% for the whole state of AP. The district population density is 435 persons per $km^2$ as against the state average 277. Scheduled caste and scheduled tribe population in the district is 2,29,609 (9.05%) and 1,51,249 (5.96%) respectively. The literacy rate is 67.19% for males and 43.68% among females. The urban population is 2,78,659 (10.98%) as against the 27.35% for the whole state.

### 1.2.3 LAND UTILIZATION

During the year 2009-10 the cultivable land was 3,56,654 ha, 61.10% of the total geographical area of the district. Net area sown represents 2,84,644 ha accounting for 48.76% of the total. Forest area in the district during 2009-10 is 68641 ha; 11.76% of the total geographical area.

### 1.2.4 AGRICULTURE

The role of agriculture, which is mostly rain fed, in the district economy is very significant. The agricultural practices in the plains and hills vary. Tribals following primitive method of agriculture are predominant in the hilly terrains. They practice '*Konda-podu'*, a mode of traditional hill cultivation. Though main crop is paddy; millets, horse grams and red grams are also raised. Vegetable/fruits such as Cabbage, Cauliflower, Tomato, Papaya, Jack Fruit, Cashew, Lemon, Guava etc, are also cultivated by the tribals near their dwellings. The yield from the agri-horticultural activities is just sufficient to meet their domestic consumption only. The tribals collect Non Timber Forest Produce (NTFP) such as Tamarind and Adda leaves (*Bauhinia sp*) and sell them to Girijan Co-operative society which provides them additional income.

Agriculture in the plains is practiced on the modern lines using improved seeds, fertilizers, pesticides etc. The main Kharif crop is Meshta Jute (*Hibiscus cannabinus)* which is cultivated extensively in Palakonda, Amadalavalasa, and Rajam Mandals. The product is largely utilised by the Jute mills at Amadalavalasa and Singupuram in the district, while the surplus is sent to Calcutta.

The most important wet crop is paddy, intensively cultivated in the plains. Cultivation of coconut and cashew in coastal areas and, mango in the plains is very profitable. Casuarina (*Casuarina equisetifolia*) is also raised in small plots chiefly to meet their domestic fuel requirement and also as a source of income.

### 1.2.5 IRRIGATION

Thre are several major (Table 3) and minor (Appendix 9) irrigation projects in the district, catering to the agriculture needs of the area. There are several ongoing irrigation projects in the district with vast expanses of water storage and channel systems. These irrigation / channels augment the number of wetlands in and around.

Table 3 Major irrigation schemes and area irrigated (2009-10)

| Sl.No. | Project | Registered Ayacut (Ha) |
|---|---|---|
| 1. | Vamsadhara Stage-1 | 60012 |
| 2. | Vamsadhara Stage-II | 18212 |
| 3. | Thottapppally Barrage | 30485 |
| 4. | Narayanapuram Project | 15001 |
| 5. | Paidigam Project | 2021 |
| 6. | Thottappally Regulator | 12837 |
| 7. | Madduvalalsa | 9996 |
| 8. | Bahuda Barrage | 2096 |
| 9. | Vonigadda Reservoir | 80 |
| | **Total** | **150740** |

*Source: Report of Executive Engineer, I & CAD, Irrigation, Srikakulam (2011)*

### 1.2.6 FISHERIES

Inland fishing based on '*Beela's* and tanks are a major source of income for the fishing communities. The traditional fishers, mostly migrants from Odisha, belonging to Scheduled Castes/Scheduled Tribes hold the fishing rights in these water bodies. The ownership of the tanks is vested with Gram Panchayats or Fisheries Department and these tanks are leased to the Fishermen Cooperative Societies.

Table 4 Inland Fish Production (2009-10)

| Sl. No. | Fish species | Quantity (M.T.) | Value (lakhs) |
|---|---|---|---|
| 1 | Barbus | 540 | 135 |
| 2 | Indian Major Carps | 4958 | 3222 |

| Sl. No. | Fish species | Quantity (M.T.) | Value (lakhs) |
|---|---|---|---|
| 3 | Cat Fishes | 145 | 43 |
| 4 | Common Carps | - | - |
| 5 | Murrel | 344 | 275 |
| 6 | Mullets | 128 | 51 |
| 7 | Prawn | 514 | 514 |
| 8 | Miscellaneous | 978 | 293 |
| | Total | 7607 | 4533 |

*Source: RC No. Mapping/2012, Report by Dy Director of Fisheries, Srikakulam*

### 1.2.7 INDUSTRIES

Jute is the major Kharif crop and Jute Mills are the industrial backbone of the district. As per the District Industries Centre statistics, in 2009-10 there are 24 large and medium scale industries in the district.

| | Industrial unit | Product | Capacity | Investment Rs. in lakhs | Employment |
|---|---|---|---|---|---|
| 1 | M/s Amadalavalasa Coop. Sugars, Amadalavalasa | Sugar | 1000 TPD | 300.00 | 709 |
| 2 | M/s Mahadeo Jute mills Ltd., Rajam | Jute twine Yarn | 5500 TPA | 300.00 | 358 |
| 3 | M/s Vamsadhara Paper Mills Ltd., Madapam | Kraft paper | 16500 TPA | 1109.46 | 397 |
| 4 | M/s Dr. Reddy Laboratories Ltd. IDA, Pydibheemavaram (Ranasthalam) | Bulk drugs | 2250 TPA | 1287.34 | 91 |
| 5 | M/s Smart Chem Industries Ltd., Ponnada village, (Etcherla Mandal) | Ammonium, Nitrate & Nitric acid | 16500 TPA | 5315.00 | 262 |
| 6 | M/s Midwest Iron & Steel Co. Ltd., Dusi RS Amadalavalasa | Pig Iron | 1,50,000 TPA | 4000.00 | 252 |
| 7 | M/s Samkrg Pistons Ltd., Varisam village Ranasthalam (M) | Piston rings | 150 lakh nos | 4000.00 | 180 |
| 8 | M/s Varalaxmi Jute Twine Jute Twine Mills Ltd., Rajam | Yarn | 7250 TPA | 816.00 | 235 |
| 9 | M/s Stilbene Chemicals, Ltd., IDA, Pydibheemavaram Ranasthalam | Dye intermediates | 500 TPA | 4218.00 | 278 |
| 10 | M/s Chem. Agro Inds. Ltd., Arinam Akkivalasa vill. Etcherla Mandal. | Monochrotophos | 500 TPA | 4218.00 | 108 |
| 11 | M/s GMR Technologies &Inds. Ltd. Ravivalasa vill Tekkali Mandal | Ferro Chrome | 500 TPA | 3000.00 | 245 |
| 12 | M/s Saritha Synthetics Ltd., Rajam | Texturised yarn | 1257 TPA | 1692.00 | 190 |
| 13 | Sri Laxmi Srinivasa Jute Jutetwine mills | Twine Yarn | 4300 TPA | 300.00 | 270 |

| | | | | | |
|---|---|---|---|---|---|
| | Ltd., Rajam | | | | |
| 14 | Emergy Pharma Ltd., Ravivalasa (V) Ranasthalam , | Folic acid | 5500 TPA | 700.00 | 240 |
| 15 | Sri Vasavi Steel Mills Ltd., Rajam | MSCTD bars and rounds | 5760 TPA | 420.00 | 224 |
| 16 | M/s Samkrg Pistons Ltd., Arinam akkivalasa Etcherla Mandal | Pistons | 10 lakh | 655.00 | 321 |
| 17 | Mid-West Iron & Steel Portland & Co. Ltd. Dusi RS. Amadalavalasa Mandal | Slag Cement | 51,000 MTS | | 13 |
| 18 | M/s Saritha Synthetics Polyester Grey Ltd., (Looms division) Challavanipeta vill Gara Mandal | cloth Metres | 22,51,300 | 300.00 | 300,0026 |
| 19 | M/s GMR Technologies (Sugar division Sankili vill, Regidi(M)) | Sugar and 16 MW power | 2500 TPD | 8903.82 | 650 |
| 20 | M/s Shiva Sagar Chemicals Ltd., Akkurada vill | Paper & Kraft Paper | 75,000 TPA | 900.00 | 148 |
| 21 | M/s GMR Vasavi Inds, Ltd., Bantupalli vill, Ranasthalam Mandal | BEER | 5000 K. Litres | 2300.00 | 150 |
| 22 | M/s Sri Shiridi Sai Laxmi Venkateswara Jute mills (P) Ltd, Fine yearn Gunabhadra vill, Kotturu(M) | Jute twine | 1500 TPA | 223.00 | 141 |
| 23 | M/s Varam Power Projects(P) Ltd., Chilakapalem vill Etcherla (M) | Power generation | 6 MW | 2400.00 | 75 |
| 24 | M/s Andhra Organics IDA, Pydibheemavaram | Bulk Drugs | | 2007.00 | 100 |

*Source: District Industries Centre, Srikakulam*

### 1.2.8 FLORA AND FAUNA

Currently the forests in the district are largely mixed dry deciduous forests which are secondary in origin. Constant adverse biotic factors particularly, recurring annual forest fires, grazing and *'podu'* cultivation are some of the factors which led to the present degraded condition of the forests. Based on the Champion & Seth's revised classification of forests of India (1968) the following types of forests existed in the district.

**Southern tropical moist mixed deciduous forests:** These are high forests, generally 20 m and above, with relatively negligible number of evergreen elements in the upper canopy. Evergreen habit is more pronounced in the lower storey. Bamboo under growth is generally absent, but when present constitutes the second storey.

Epiphytes and climbers are plenty. Altitude is 610 m and above and average rainfall is 1020 mm and above. The trees in the top storey are leafless for a short period either in winter or early summer. Most of these trees flower during summer.

This type occurs in localized small patches in valleys and near perennial streams at a fairly high altitude where the conditions are favourable. They are found in parts of Burnakonda and Antikonda block of Palakonda range. This type of forest extends over 2600 ha.

**Northern Tropical Dry Deciduous Forests-Sal Typ**e: The distribution of Sal (*Shorea robusta)* is restricted owing to the relatively narrow limits of locally conducive factors suitable for it. The soils in this type of forests, which is absent or thin on the ridges, vary from deep ferruginous sandy loams to clay and lime, leading to stunted growth of sal. The tree height here is 20 to 25 m, density 0.6 to 0.8, canopy fairly closed, and with under growth. Altitude is between 350 to 600 m, and rainfall above 1,000 mm.

Sal is found in the northern most part of the district bordering Odisha state, in areas lying between the rivers Vamsadhara and Nagavalli and their tributaries as they enter AP. Confined to the Palakonda Range, Sal forests are spread over about 20 ha.

**Southern Tropical Dry Mixed Deciduous Forests**: The upper canopy in this forest types is rather open, uneven and not very dense, formed by a mixture of deciduous trees. Most of these trees also occur in moist deciduous forests, attaining a satisfactory growth there. The height of dry deciduous forests in this division is generally 10 to 15 m. The species is much less in number than other types of forests and a few tend to predominate in any selected area for the soil peculiarities or human interference. The lower canopies also consist of deciduous species here and there. Semi-ever green scrubs when present are confined to moist sheltered pockets. Bamboos are present. Due to open canopy enough light gets down

permitting grass growth. Annual fire and other biotic factors eventually result in the development of dry scrub and eventually leading to savannah type.

Rainfall is between 600 m and 1000 mm. Soils are impoverished, organic matter and topsoil being practically absent and the area, of these forests spread over 26,000 ha.

**Dry Deciduous scrub**: This is a degradation stage of dry deciduous mixed forest conditioned by heavy grazing, fires and removals. The adverse biotic factors overrule the favourable climate and keep these forests in a degraded stage preventing improvement /progression of the vegetation. Canopy height never exceeds 6 m and is open with the presence of Bamboo. Many of the shrubs here are unpalatable (*Holarrhena antidysenterica, Dodonaea viscose* etc) to cattle or thorny (*Randia, Carissa*). These forests are characterized by the presence of relatively high percentage of thorny species, and thin grass occurring throughout. The soils here are impoverished, eroded, gullied, bouldery and rocky, and rainfall below 1,000 mm.

**Dry Evergreen Forests**: These forests are mostly open, irregular with an average height of 6 m and less. Preponderance of thorny species is conspicuous. This type of forest occurs in the eroded slopes, surface being gravelly with almost no soil subject to heavy biotic interference. This forest occurs in Bejji and Asokam blocks of Pathapatnam range spreading over 16,800 ha.

**Beach Forests**: This type of forests is distributed all along the coast wherever a fair width of sandy beach occurs. The soil is sea-sand often blown and accumulating low-dunes with adequate lime from shell-fragments but poor in other mineral nutrients. These forests extend over 5820 ha. Species seen here are very few; *Casuarina equisetifolia, Ipomea biloba, Spinifex squarrosus, Pandanus odoratissimum*a and climbers like *Chinopodum* near the estuaries.

### 1.2.9 FOREST FAUNA

The forests shelter fairly good wildlife, including Leopard, Sambar, Spotted Deer, Wild Boar, Sloth Bear, and several other species. Local migratory birds such as Open

Bill Stork, Painted Stork, and Pelican are regular in the district. In recent years wildlife is improving because of the protection of forests under participatory management.

### 1.2.10 WETLANDS

Wetlands are the ecotones or transitional zones between permanently aquatic and terrestrial ecosystems. Ramsar Convention has defined wetlands as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters".

Wetlands are increasingly coming under pressure due to the fast growing human population, its needs and its associatory changes such as rapid urbanization, industrial and urban pollution, solid and liquid waste dumping, changing land use patterns, diverting and manipulating hydrological regimes and their wanton destruction for setting up various other structures and industries. Wetlands are important feeding and breeding grounds for wild life and the destruction/decline of the same leads to loss of biodiversity. Wetlands are also valuable repositories of plant / animal genetic pools.

A substantial chunk of rural population, in India and elsewhere, depend upon wetlands for various means of their livelihoods such as agriculture, irrigation, fisheries, medicinal and edible wild plants, fodder, and materials for thatch and for preparation of various key utility items. The decline in the wetlands, while directly impacting the very existence of the ecosystem, make ecological refugees of the ecosystem people depending on the wetlands for their life needs.

### 1.2.11 RAMSAR CLASSIFICATION OF WETLAND TYPES

As per the Ramsar Convention the Wetlands are classified into 42 subtypes under three major categories, namely marine/ coastal wetlands, inland wetlands and human made wetlands (Appendix 1).

### 1.2.12 ECOSYSTEM SERVICES FROM WETLANDS

The values of the wetlands are increasingly being acknowledged all over the world as a result of the ever increasing awareness about the role they have been playing in the development of civilisations and over all welfare of the humanity by ensuring water security and food security and several other services being derived from them. As earlier, wetlands no more are considered as wastelands. It has been estimated that wetlands provide US $4.88 trillion $yr^{-1}$ as ecosystem services. These ecosystem services include flood regulation, water supply, water quality maintenance, facilitating pollination, biological control, food production, and others. According to Costanza et al., (1997) wetlands are 75% more valuable in terms of ecosystem services than lakes and rivers, 15 times more valuable than forests, and 64 times more valuable than grassland or rangelands (Bruland, 2008).

As noted above the wetlands offer a variety of services to human kind, numerous other species and to the environment. Some of the well known such services, grouped into different types, are briefed below.

| Basic categories of Ecosystem Services (Millennium Ecosystem Assessment, 2005) |
|---|
| **Provisioning Services:** supply a large variety of ecosystem goods and other services for human consumption, ranging from food and raw materials to energy resources and genetic material. |
| **Regulating Services:** regulate essential ecological processes and life support systems through bio-geochemical cycles and other biospheric processes. These include things like climate regulation, disturbance moderation and waste treatment. |
| **Cultural Services:** provide an essential 'reference function' and contribute to the maintenance of human health and well being by providing spiritual fulfilment, historic integrity, recreation and aesthetics. |
| **Supporting Services:** provide a range of services that are necessary for the production of the other three service categories. These include nutrient cycling, soil formation and soil retention. |

### 1.2.13 THREATS TO THE WETLANDS

**Urbanisation**: Ever increasing demand for space for residential, infrastructure, commercial and recreation activities are adding pressure on wetlands. Already the wetlands are fast disappearing for various such reasons.

**Pollution:** Dumping solid wastes and discharge of liquid waste and industrial effluents, toxic chemicals from industries and households are destroying the wetlands.

**Industrialisation:** More and more wetlands are being diverted for setting up industries flouting wetland conservation rules and guidelines.

**Agriculture:** Booming requirement for new areas for cultivation makes wetlands very prone for diversion.

**Deforestation:** Extensive land use changes in the catchment and deforestation is leading to heavy siltation of wetlands and changes in the water regime.

**Climate change:** Coastal wetlands are under threat from sea level rise as a consequence of global warming. Erratic changes in the pattern of precipitation increase in ambient temperature, frequent floods and droughts pose serious threats to the hydrological regime and biodiversity of wetlands.

**Weeds**: Exotic species like Salvinia and Water Hyacinth invade wetlands, dominate the macrophytes and choke them and curtail the growth of the planktonic forms eventually leading to the death of the wetlands.

**Salinisation:** Depletion in the water table due to overexploitation of ground water leads to reduction of wetland size as well as increase in salinity.

### 1.2.14 WETLANDS IN INDIA

According to Ministry of Environment and Forests (1990) there are 67,429 wetlands in India above 100 ha in size covering a total area of 4.1 million ha.These wetlands

are distributed in varied eco-geo-climatic zones from the Himalayas to the Peninsular India. Wetlands, of which 70% is rice-paddies, occupy 18.4% of India's geographical area. The diversity of Indian wetlands is fascinating. It ranges from the high altitude wetlands of the Himalayas, saline and temporary wetlands of the arid and semi arid regions, coastal wetlands such as mangroves, low tide areas, swamps, lagoons, backwaters, estuaries, and coral reefs. In addition to the natural wetlands there are thousands of manmade wetlands constructed for various purposes such as irrigation, drinking water, electricity generation and flood control. Out of the 4.1 million ha of wetlands in our country (excluding irrigated agricultural lands, rivers and streams) 1.5 million ha are natural and 2.6 million ha are manmade. India has 6750 $Km^2$ of coastal wetlands (National Wetlands conservation programme-guidelines for conservation and management of wetlands, MoEF, 2009). Twenty percent of national biodiversity is supported by wetlands (Prasad et al*.,* 2002).

### 1.2.15 INITIATIVES FOR WETLAND CONSERVATION

Until the wetland rules-2010 came into force (Annexure- 4) there was no exclusive laws to protect wetlands. Earlier, wetland protection fell into the ambit of many other Acts enacted from time to time and policies adopted for environmental protection and biodiversity conservation. Thus, wetlands, except those select ones, were not under much legal protection in the country, and practically wetlands were considered as wastelands, meant for reclamation.

Wetlands conservation in India is indirectly influenced by an array of policy and legislative measures (Parikh & Parikh 1999). Some of the key legislations are given in the table below

Table 5 Relevant legislations pertaining to wetland conservation

| Name of the Legislation | Year |
|---|---|
| The Indian Fisheries Act | 1897 |
| The Indian Forest Act | 1927 |
| Wildlife (Protection) Act | 1972 |

| | |
|---|---|
| Water (Prevention and Control of Pollution) Act | 1974 |
| Territorial Water, Continental Shelf, Exclusive Economic Zone and other Marine Zones Act | 1976 |
| Water (Prevention and Control of Pollution) Act | 1977 |
| Maritime Zone of India (Regulation and fishing by foreign vessels) Act | 1980 |
| Forest (Conservation act) | 1980 |
| Environmental (Protection) Act | 1986 |
| Coastal Zone Regulation Notification | 1991 & 2011 |
| Wildlife (Protection) Amendment Act | 1991 |
| National Conservation Strategy and Policy Statement on Environment and Development | 1992 |
| National Policy and Macro level Action Strategy on Biodiversity | 1999 |
| EIA Notification | 2006 |
| Wetland (Conservation and Management) rules | 2010 |

#### *1.2.15.1 National Wetlands Conservation Programme*

The Government of India has been implementing the National Wetlands Conservation Programme (NWCP) in close collaboration with the State/UT Governments since the year 1985-86. Under the programme, 115 wetlands have been identified till now by the ministry which require urgent conservation and management interventions. The aim of the programme is the conservation of wetlands so as to prevent their further degradation, ensuring their wise use for the benefit of local communities and overall conservation of biodiversity.

India is one of the early signatories to the Ramsar Convention on Wetlands and the Convention of Biological Diversity.

### 1.2.16 WETLANDS OF ANDHRA PRADESH

AP is bestowed with thousands of wetlands which fall under different categories. The available data indicates that 1.33% of the land area in AP is covered by wetlands of the size 56.25 ha and above (SAC, 1998) and the number of such wetlands is estimated to be 1493. However, the number of wetlands below 56.25 ha occupies the lion's share of wetlands in the state. The wetlands of the size of 2 ha and above in nine out of the 23 districts are in areas that are ecologically sensitive and

important, such as, national parks, marine parks, sanctuaries, reserved forests, wildlife habitats, mangroves, corals, coral reefs, areas of outstanding natural beauty or historical or heritage areas and the areas rich in genetic diversity.

Low rainfall districts have maximum number of wetlands because of the new water harvesting structures built for irrigation and fisheries (SACON, 2004). The number of tanks used for fisheries alone comes to 74000 in the state (Draft Report, CADA, Irrigation Department, Government of AP (Undated)). There has been a steady increase in the number of wetlands in the coastal districts due to the expansion of aquaculture.

### 1.2.17 WETLANDS IN THE DISTRICT

The Srikakulam district abounds in wetlands both natural and manmade. The number of wetlands, small to large ones, is more than 8000. Though the wetlands are distributed more or less evenly in the district, the coastal wetlands are ecologically and economically more sensitive and came into focus for various reasons.

#### *1.2.17.1 Coastal wetlands of Srikakulam district*

The coastal plains consist of a strip of land, 10 to 15 Km in width, all along the 193 Km sea coast from Ichapuram of KandivalasaGedda. The Coastal plains are characterized by Beelas (Back waters, a typical wetland system which is fed by flood waters through a vast network of small streams/channels and connected to the sea through a creek/channel) and sandy dunes. The two major Beelas in the district are Sompeta and Bhavanapadu swamps. While Sompeta swamp is situated near to the Sompeta town in the northern part of the district, Bhavanapadu lies near Tekkali town in the central part of the district. Major Corporates were eyeing the coastal areas of Srikakulam district for setting up Thermal Power Plants due to various reasons such as the availability of water, and transportation facilities in the form of NH-5 from Chennai to Calcutta and the broad-gauge railway line from Chennai to

Calcutta. Proximity to the sea facilitates building jetties for transportation of coal and other materials and also for drawing sea water as coolant or for other uses and for discharge of effluents.

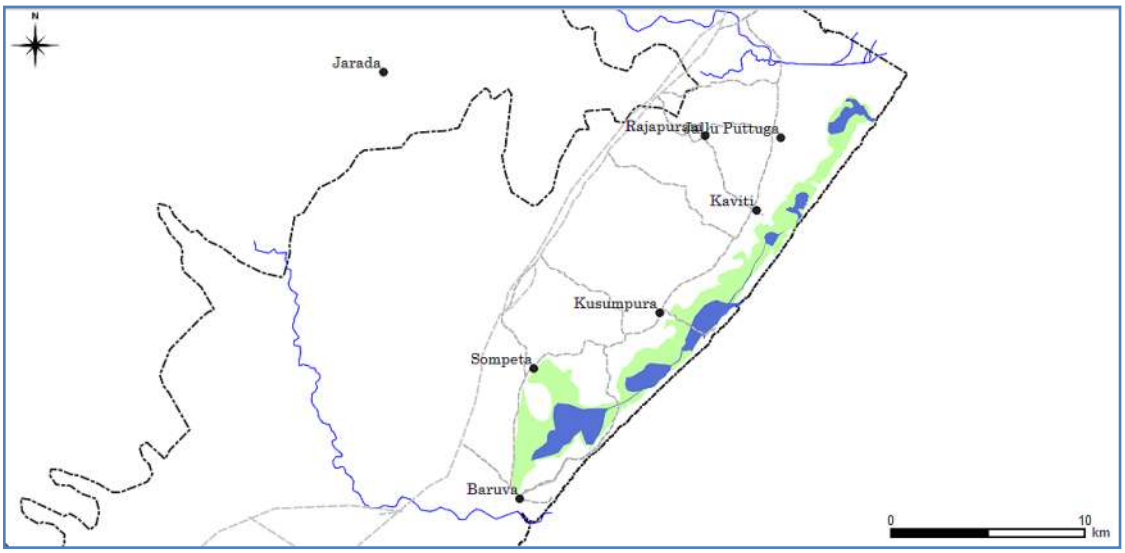



Figure 2 Coastal wetlands- Sompeta

### *1.2.17.2 Proposal for Thermal Power Plant at Sompeta*

Nagarjuna Construction Company Ltd (NCC) has proposed to construct a coal based 2640 MW (4x660 MW) Thermal Power Plant (TPP) at Gollakandi and Baruva villages of the Sompeta mandal and procured 2423.599 acres of land from government and private parties.

The TPP is proposed in the Sompeta Beela, a low lying swamp with several microhabitats and several taxa of animals and plants. Three adjacent Beelas form the Sompeta wetland complex. The 'Pedda Beela' is connected to the two other Beelas; the second one known as the 'Chinna Beela' and the third 'Tampara'. The third one eventually joins the sea. The wetland complex is nearly 4000 acres and 20 Km long covering parts of Baruva in Sompeta mandal and Kapaasguddi in Kaviti mandal. It is a wetland which is to be conserved under various State and Central government policies and international treatises such as Ramsar Convention and the Wetland Rules-2010 notified by the Ministry of Environment and Forests, GoI.

Of the 1882 acres handed over to NCC, 1200 acres is in the Beela. The area is highly fertile. Thirty two villages with a population of around 3 lakhs depend upon the Beela for various purposes, for water for irrigation, fisheries, fodder, thatching materials, medicinal plants and several edible plants. Apart from the direct ecosystem goods and services provided by the Beela to thousands of people, regulatory ecosystem services such as maintaining the hydrological regime of a large area which is vital for maintaining the ground water table supporting the agriculture, acting as a carbon sink and maintaining air quality, soil nutrient maintenance etc are invaluable. The core area of the Pedda Beela is a major habitat for migratory and other birds, giving shelter to 122 bird species several of them falling under IUCN categories that require conservation actions.

#### *1.2.17.3 Social issues at Sompeta*

Local people have resented the establishment of the proposed project from the very beginning though the company could purchase few hundreds of acres of land directly from the local farmers. Environmental NGOs under the leadership Environmental Paryavaran Samrakshana Samiti spearheaded the agitation by the locals against the setting up of the power project in the area. On the 14 July 2010, NCC attempted levelling the land allocated to them although they were yet to receive the mandatory 'Consent for Establishment' from the AP Pollution Control Board (E A S Sarma, 2010). The action provoked the local public leading to violence in which three people were shot dead and many others including scribes and police personnel got injured.

After hearing the project proponent and the opposing parties on 13 May 2010 and on the request of M/s NCC and the appellants, the Environment Appellate Authority and Dr. S. Kaul, an expert on wetlands, visited the Sompeta wetlands during 28$^{th}$ to 30$^{th}$ May 2010 and heard the views of various stake holders. The authority again heard the views of the opposing parties on 6$^{th,}$ 13th and 14$^{th}$ July 2010. Based on these exercises, the Appellate Authority concluded inter alia that:

*"-This is a typical land of great ecological importance and a source of water for nearby villagers upon which three lift irrigation projects of the Government depend. The report of various committees including the EAC is misleading. The EAC was also carried away by these reports and reversed its decision of 32$^{st}$ meeting held on 13$^{th}$ and 14$^{th}$ of October 2008.*

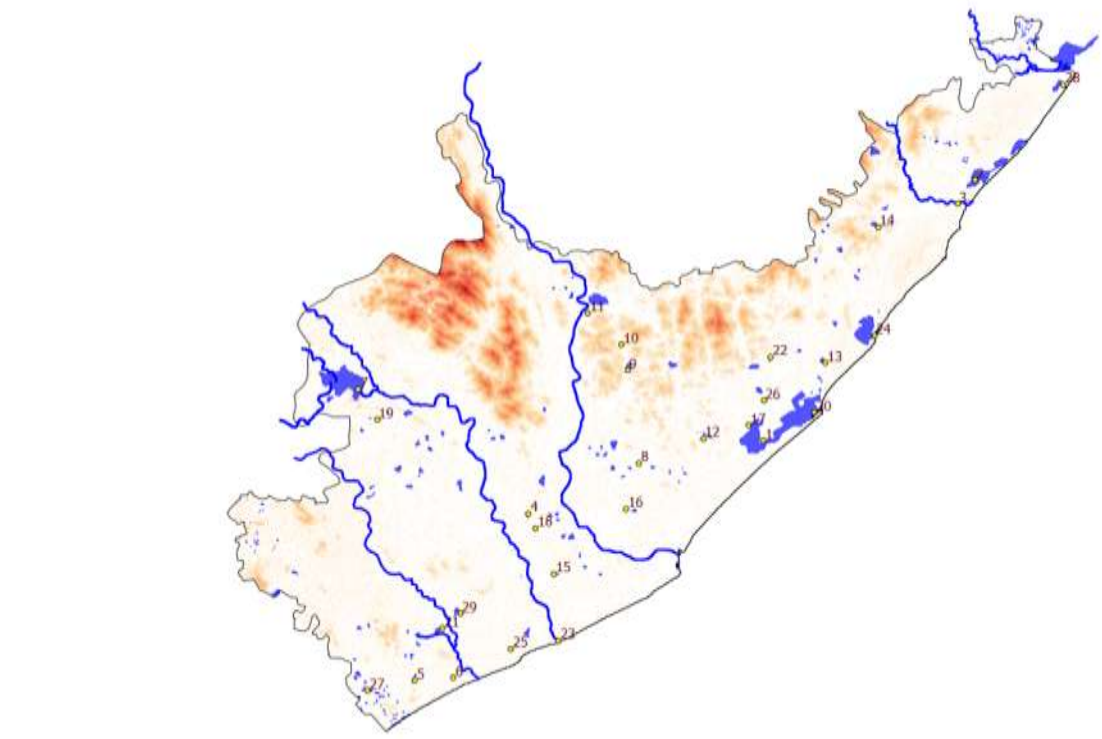
*- There was overwhelming opposition from the people of the area against this project which is valid.*

*-It is relevant here to mention that the four corners of the project site were shown to the authority and the expert by the Revenue Divisional Authority accompanied by his surveyor and the authority has no doubt that the area is a typical wetland of great ecological significance and despite no law prohibiting its use for Power plant, does not permit its use for the proposed power plant."*

Accordingly the Environmental Clearance for setting up the power plant was quashed. The authority also gave a directive to the MoEF, to undertake a survey of all wetlands of Srikakulam district for their ecological sensitiveness as soon as possible pending which no project should be cleared in such locations (National Environment Appellate Authority order dated 14 July 2010).

## 1.3 OBJECTIVES OF THE PRESENT STUDY

- assess the biodiversity of the wetlands in the Srikakulam district
- assess the ecosystem services provided by the wetlands of Srikakulam district and its implications on the livelihood of the people depending on the wetlands, and
- assess the ecological status and the major threats of the wetlands in the district




| | | | |
|---|---|---|---|
| 1 | Naupada Swamps | 16 | Rajalu Cheruvu |
| 2 | Sompeta | 17 | Vaddidhandra Kaaricheruvu |
| 3 | Mahendratanaya swamps | 18 | Chintada Cheruvu |
| 4 | Kuddiram sagaram | 19 | Arisadu wetlands |
| 5 | Lanka Cheruvu | 20 | Bhavanapadu Creek area |
| 6 | Cheri Cheruvu | 21 | Dhyal Cheruvu (Dhevunivalu) |
| 7 | Madduvalasa Reservoir | 22 | Narasapuram Peddha Cheruvu |
| 8 | Narayanavalasa | 23 | Nagavalli River Mouth |
| 9 | Mettucheruvu | 24 | Poondi Back waters |
| 10 | Thamarai Cheruvu | 25 | Marandupada Cheruvu |
| 11 | Rajakaru Cheruvu | 26 | Telineelapuram Wetland |
| 12 | Kottabommali Cheruvu | 27 | Pydibhimavaram Cheruvu |
| 13 | Pathatekkali | 28 | Dunkuru wetlands |
| 14 | Damodar Sagaram | 29 | Narayana sagaram |
| 15 | Peddhapadu Cheruvu | | |

Figure 3 Wetlands visited during the present study

## 1.4 METHODOLOGY

Wetlands of the district were located using Survey of India Topo Sheets and Google Earth Maps, and field surveys were planned and executed accordingly. Care was

taken to visit all the mandals of the district and important wetlands in each mandal to collect as much primary data as possible, within our time and logistic constraints.

Before embarking upon the field trips extensive survey of literature was conducted collecting maximum information available. Government departments such as Irrigation, Forest, Fisheries and District Industries Centre were valuable sources of information. NGO's, industrialists, public and other knowledgeable people were also helpful in this regard.

Since the coastal wetlands such as Sompeta and Bhavanapadu were found to be the major wetland complexes supporting large human population and are apparently rich in biodiversity, special attention was given to these wetlands in terms of time and effort (Figure 2).

Stratified random sampling strategy was adopted for sampling the wetlands ensuring representation from diverse geographical areas as well as the wetlands under varying disturbance regimes. All the large wetlands of the districts, especially the ones with more than 500 acres of ayacut area, were surveyed. Wetlands of lesser size classes were also visited on a rapid survey mode and sample data collected. As per the original schedules the study period was only three months. However, while proceeding with the preliminary investigations it was found the duration need to be extended at least to six months.

### 1.4.1 BIODIVERSITY ASSESSMENT

Biodiversity surveys were carried out in the Srikakulam district during October 2011 to March 2012. At first, a pilot survey was carried out in the entire district, followed by more detailed surveys to document birds, plants and butterflies. Socio-economic sample surveys was also conducted among the local public residing around the wetlands to find out their dependency on the wetlands, their knowledge about the locally available species of birds and other animals using a custom made

questionnaire. Secondary information was also collected from the concerned departments, organizations and from published research articles and reports.

#### *1.4.1.1 Documentation of flora*

The plants occurring in the study area were enumerated by random walk. Reports from previous floral studies were also used for the purpose. Taxonomic identification of the species was done referring to the flora of Hooker (1872-97), Gamble (1957) and Mathew (1996, 1999). Unidentified plant specimens were collected and preserved in 10% formaldehyde for identification by experts at the Botanical Survey of India, Southern Circle (MH), Coimbatore. Nomenclature used in this report is based on the Flora of Tamil Nadu Series 1: Analysis vols. 1-3 (1983-1989).

#### *1.4.1.2 Documentation of fauna*

Various groups of animals found in the study area were recorded by both direct and indirect methods. Different sampling techniques were applied to record different faunal groups in the study area. Animals recorded include butterflies, fishes, amphibians, reptiles, birds and mammals. The following sampling techniques were used for the study of various fauna during the present study period as given in the Table

Table 6. Sampling techniques used for the faunal study

| Taxa | Sampling techniques |
|---|---|
| Butterflies | Random walk, opportunistic observations |
| Amphibians | Visual encounter survey (search) |
| Reptiles | Visual encounter survey (search) |
| Birds | Random walk, opportunistic observations |
| Mammals | Tracks and signs, and visual encounter survey |

##### 1.4.1.2.1 Avifauna

The survey covered major wetlands in the area, extending to their adjacent / immediate catchments. The birdlife in the study area were documented by direct observations, random walks and opportunistic encounters following Bibby et al., (1992). Observations were made over a period of 6 months, from October, 2011 to

March, 2012 with three intensive surveys. Bird survey was conducted, when birds are most active during day, from (07.00 to 11.00 hrs) and from (16.00 to 19.00) hrs. However, opportunistic observations were also made during other timings, and species recorded during these observations are included in the checklist. Based on the visibility, the observations on both the sides of the viewer on a field path were recorded with the help of 7 x 35 and 10 x 50 m field binoculars (Nikon). Indirect observations, signs and vocalisations, were also recorded. Birds seen were recorded with habitat type, season and frequency of occurrence. Identification manuals and filed guides by Ali & Ripley (1989), Kazmierczak (2000) and Grimmett et al., (2001) were used during the survey. Standardized common and scientific names of the birds following Grimmett et al., (1998 & 2001); Manakadan and Pittie (2001) were adopted. The birds were categorized as Resident (R), Migratory (M), Aquatic (A) and Terrestrial (T) as per Grimmett et al., (2001). All the bird species recorded during the present study were tabulated giving their recent scientific name, family, IUCN status & legal status if any. Abundances of the recorded species were documented based on the total sightings during the study period as common (more than 10 sightings); fairly common (6-10 sightings), uncommon (3-5 sightings), and rare (1-2 sightings).

#### 1.4.1.2.2 Butterflies

The butterflies in and around the wetlands were documented by direct observations, random walk and opportunistic observations, during morning (07:00 to 11:00 hrs) and evenings (16:00 to 19:00 hrs), as our earlier surveys have shown this timing as ideal in the area to see maximum butterfly activity. Butterflies were looked for 5m distance on either side of the path. Gunathilagaraj et al., (1998), Kunte (2000) and Kehimkar (2008) were referred to identify the Butterflies and Larson (1987a, b, c; 1988) was referred for scientific nomenclature. Abundance of each butterfly species was graded, based on the total sightings during the study period, as common (more than 10 sightings during the study period), fairly common (6-10 sightings), uncommon (3-5 sightings), and rare (1-2 sightings).

#### 1.4.1.2.3 Herpetofauna

Visual Encounter Survey (VES, search) was followed for the survey of the herpetofauna (amphibians and reptiles) in the wetland and its environs were conducted following during the survey for amphibians and reptiles. VES is a method one in which field personnel walk through an area or habitat for a prescribed time period systematically searching for animals. This is an appropriate technique for inventory and monitoring studies. During the search leaf litter, fallen logs, trees (bark, buttress, root and holes), shrubs, boulders, rocks and rock crevices were examined. The identification of herpetofauna was done with the help of Boulenger (1890), Daniel and Sekar (1989), Daniel (1963 & 1975), Daniel (1992), Daniels (1997 a, b & c), Daniels (2005), Das (2002), Whitaker and Captain (2004).

#### 1.4.1.2.4 Mammals

Both direct and indirect methods were applied to get an overall view on mammals present in the area. For survey of mammals, tracks and signs, and visual encounter survey were used during the present survey period. Species were also identified by indirect evidences such as pug marks, calls, signs and scats (Bang et al., 1972; Burnham et al., 1980 and Heyer et al., 1994). Mammals were identified following Menon (2003).

### 1.4.2 QUESTIONNAIRE SURVEY AND FOCUSSED GROUP DISCUSSIONS

A customized questionnaire was prepared to obtain information about the socio-economic state of the villagers around major wetlands and their dependency, awareness and suggestions for improving the status of wetland. The questionnaire survey among the stakeholders helped in collecting information on the ecological history, people's understanding about the ecosystem services provided by the wetland, their dependence on the wetland and their perceptions about the wetlands in their neighbourhoods. Data on several socio-economic parameters were collected

at village level and household level wherever possible (mainly in inland fisher's colonies), by using open and close-ended questionnaires.

Focus Group Discussions (FGD) were conducted with members of the stakeholder communities participating to collect information on the history of the wetland, recent changes in utilization of the wetlands and their general understanding about various other aspects related to wetlands and local environment.

### 1.4.3 PARTICIPATORY RURAL APPRAISALS

Participatory Rural Appraisal (PRA) tools were employed on a limited scale to collect data on various ecological aspects in a participatory way. A preliminary resource map of Sompeta wetland was also worked out through this exercise.

In order to ascertain the presence and absence of the migratory bird species, a novel methodology namely Participatory Biodiversity Appraisal (PBA) tool was tried which generated very interesting information. As part of the methodology, the stake holders for whom the wetlands are integral parts of their day to day life and survival were shown pictures of 10 species of birds which are common and not so common to that particular area. If the person could identify all the birds correctly by their local names it was concluded that he is qualified enough to recognize other migratory /rare birds which is likely to be found in that area.

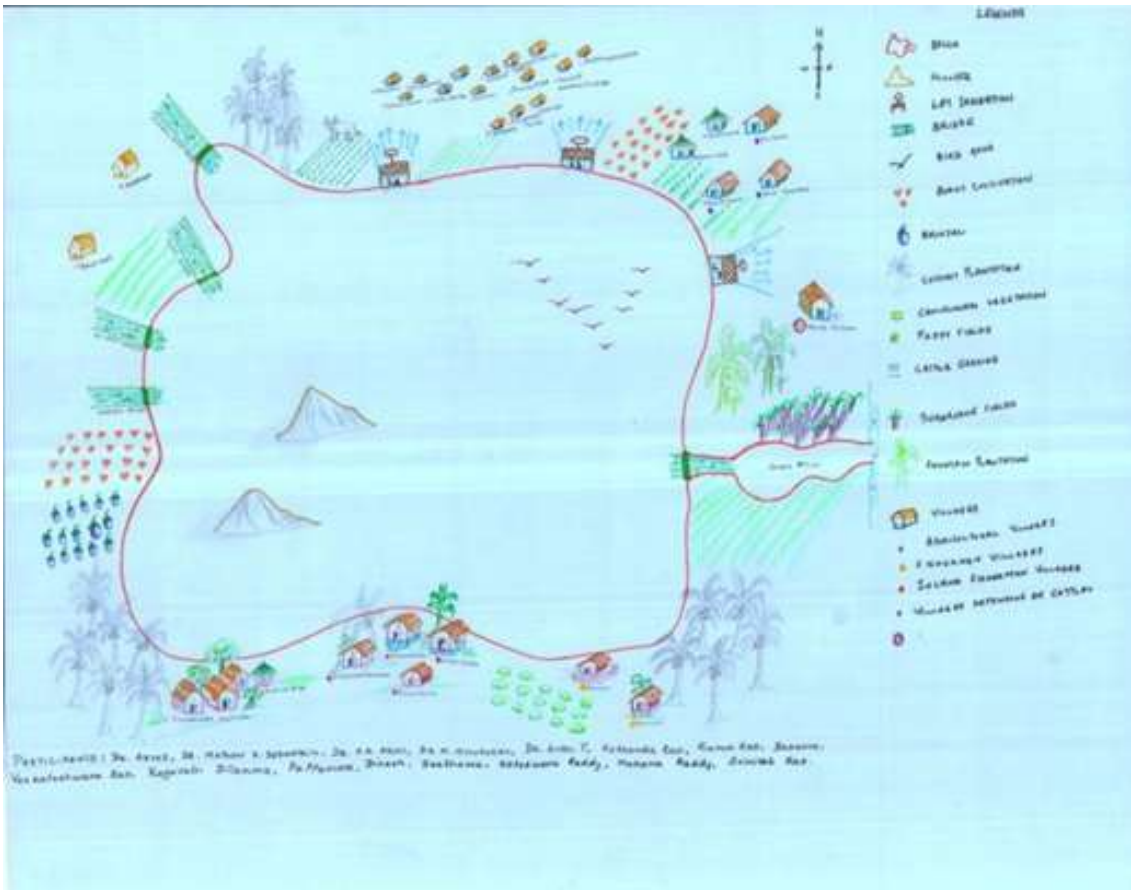


Figure 4 Resource map of Sompeta

# 2 OBSERVATIONS

## 2.1 FLORA

### 2.1.1 FLORAL ANALYSIS

In total 662 plant species belonging to 406 genera spreading over 111 families were documented (Appendix 2) Among them, herbaceous plants were dominant (245 species, 37%) followed by trees (182 species, 28%), shrubs/under-shrubs (77 species, 12%), grasses (74 species, 11%) excluding *Bambusa arundinacea*, which is included under trees due to its arborescent nature), stragglers (47 species, 7%) and climbers (36 species, 6%, Figure 5).

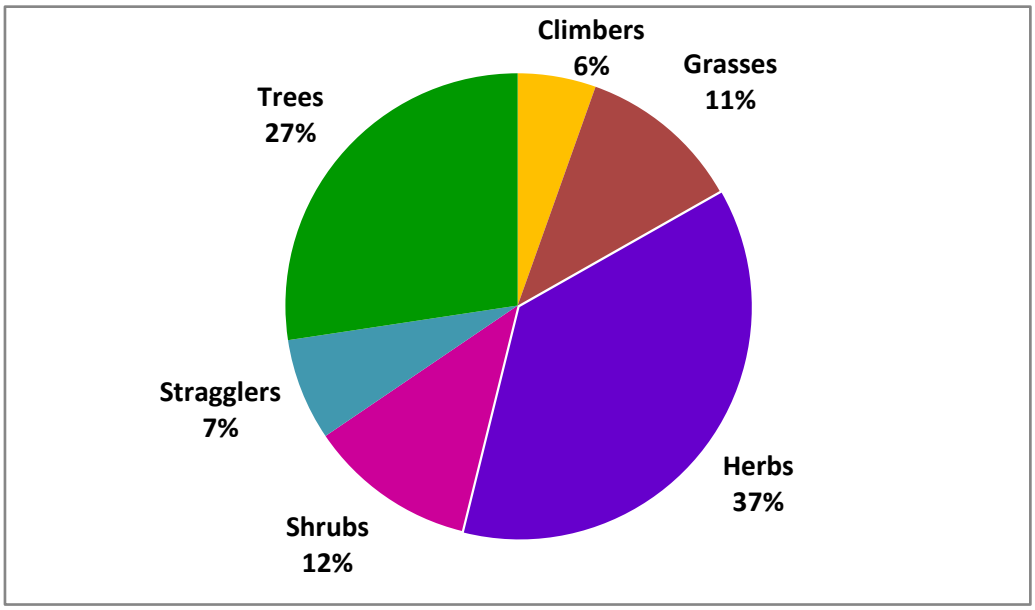



Figure 5 Habit-wise representation of plant species in the present study area

### 2.1.2 DOMINANT FAMILIES

Of the 111 families of plants recorded in the study area, Poaceae represented by 75 species, was the most dominant one. Other notable families are Fabaceae (44 species), Euphorbiaceae (34 species), Asteraceae (32 species) and Malvaceae (23 species, Figure-6).

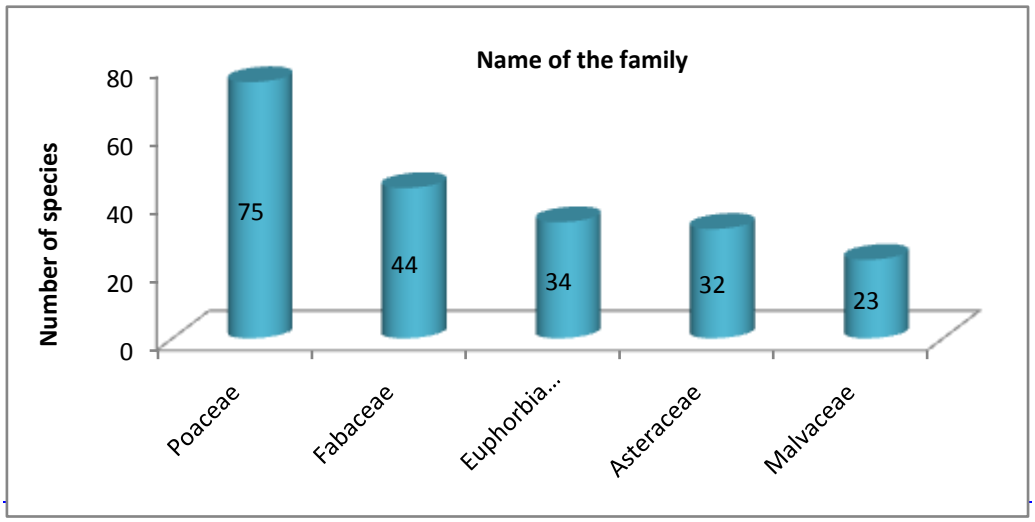



Figure 6 Major plant families

### 2.1.3 DOMINANT GENERA

Among the 406 genera recorded from the study area, the genus Acacia is the dominant with 10 species, next was Ficus and Fimbristylis with 9 species each, Eragrostis with 8 species, Cyperus, Euphorbia, Ipomoea and Phyllanthus each with 7 species and Hibiscus, Indigofera, Panicum, Senna and Sida with 6 species each (Figure-7).

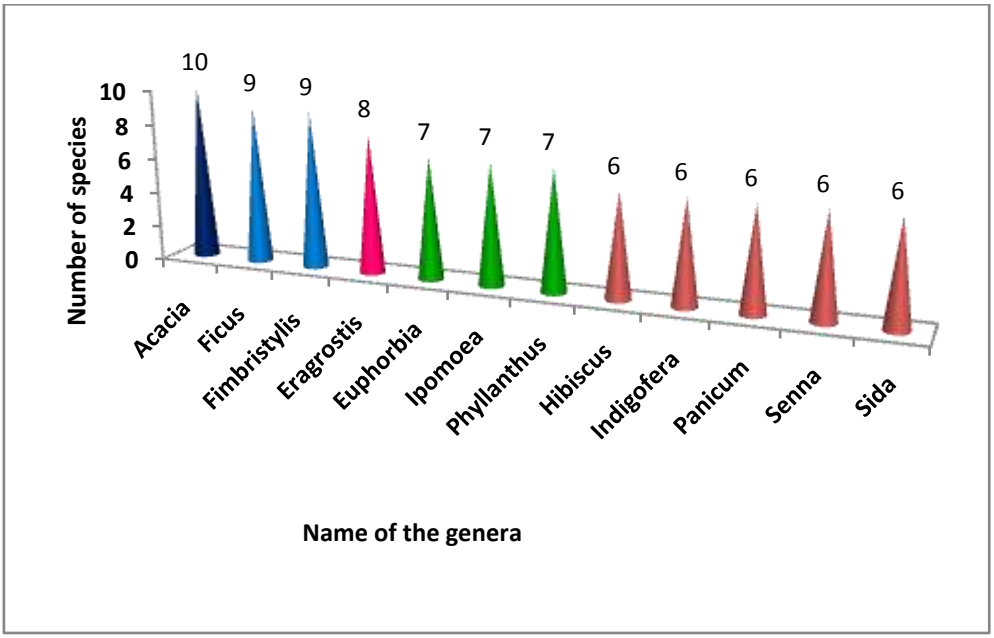



Figure 7 Dominant genera in the study area

## 2.2 FAUNA

### 2.2.1 AVIFAUNA

In total 236 bird species belonging to 147 genera, over 56 families and 17 orders were recorded (Appendix-2). This included 179 species that were directly observed and rest 57 species were based on various secondary information. Of the 236 bird species, 107 species were aquatic, 129 species terrestrial, 177 species resident, and 59 species migratory (both winter and summer visitors, ).

Species *Aythya baeri* (Bear's Pochard) reported from the district fall under "Endangered" category, while *Amandava formosa* (Green Avadavat) and *Haliaeetus leucoryphus* (Palla's Fish Eagle), *Grus antigone* (Sarus Crane) and *Leptoptilos javanicus* (Lesser Adjutant) fall under "Vulnerable" category (IUCN, 2010). The species *Anhinga melanogaster* (Darter), *Numenius arquata* (Eurasian Curlew), *Pelecanus philippensis* (Spot-billed Pelican), *Threskiornis melanocephalus* (Black-headed Ibis), *Mycteria leucocephala* (Painted Stork), *Platalea leucorodia* (Eurasian Spoonbill), *Sterna acuticauda* (Black-bellied Tern), *Limnodromus semipalmatus* (Asian Dowitcher), *Ichthyophagia ichthyaetus* (Greater Grey-headed Fish Eagle), *Ephippiorhynchus asiaticus* (Black-necked Stork), *Aythya nyroca* (White Eye Pochard) and *Circus macrourus* (Pallid Harrier), coming under Near Threatened category (IUCN, 2007) were also recorded.

Birds such as *Pavo cristatus* (Indian Peafowl), *Pandion haliaetus* (Osprey), *Platalea leucorodia* (Eurasian Spoonbill), *Haliaeetus leucogaster* (White-bellied Sea Eagle) and *Circus macrourus* (Pallid Harrier) recorded in the study fall under Schedule-I of the Indian Wildlife Protection Act (IWPA, 1972).Among the wetland birds, Asian Openbill (*Anastomus oscitans*), Black-winged Stilt (*Himantopus himantopus*), Bronze-winged Jacana (*Metopidius indicus*), Common Poachard (*Aythya ferina*), Cattle Egret (*Bubulcus ibis*), Lesser Whistling Duck (*Dendrocygna javanica*), Little Cormorant (*Phalacrocorax niger*), Little Egret (*Egretta garzetta*), Cotton Pygmy Goose (*Nettapus*

*coromandelianus*), Indian Pond Heron (*Ardeola grayii*), Northern Shovelor (*Anas clypeata*), Northern Pintail (*Anas acuta*), Painted Stork (*Mycteria leucocephala*), Spot-billed Pelican (*Pelecanus philippensis*) and Eurasian Wigeon (*Anas penelope*), Tufted Duck (*Aythya fuligula*) were common and abundant Amongst the terrestrial birds, Asian Pied Starling (*Sturnus contra*), Asian Palm Swift (*Cypsiurus balasiensis*), Eurasian Collared Dove (*Streptopelia decaocta*), White-headed Babbler (*Turdoides affinis*), Common Myna (*Acridotheres tristis*), Jungle Crow (*Corvus macrorhynchos*), Black Drongo (*Dicrurus macrocercus*), House Crow (*Corvus splendens*), Red-vented Bulbul (*Pycnonotus cafer*), Spotted Dove (*Streptopelia chinensis*), White-browed bulbul (*Pycnonotus luteolus*) and Blue-tailed Bee-eater (*Merops philippinus*) were very commonly seen in the study area.

Bird species such as Barn Swallow (*Hirundo rustica*), Black-crowned Sparrow Lark (*Eremopterix nigriceps*), Crested Treeswift (*Hemiprocne coronata*), Eurasian Golden Oriole (*Oriolus oriolus*), Jack Snipe (*Lymnocryptes minimus*), Indian Pitta (*Pitta brachyura*), Yellow Bittern (*Ixobrychus sinensis*), Grey-headed Lapwing (*Vanellus cinereus*), Small Minivet (*Pericrocotus cinnamomeus*), Pied Harrier (*Circus melanoleucos*), Long-tailed Shrike (*Lanius schach*), Large Cuckooshrike (*Coracina macei*) and Lesser-crested Tern (*Sterna bengalensis*) were spotted, but rarely.

Great Crested Grebe (*Podiceps cristatus*), Eurasian Sparrowhawk, (*Accipiter nisus*), Eurasian Spoonbill (*Platalea leucorodia*), Osprey (*Pandion haliaetus*), Besra (*Accipiter virgatus*), Green Avadavat (*Amandava formosa*), Orange-headed Thrush (*Zoothera citrina*), Plum-headed Parakeet (*Psittacula cyanocephala*), Red-crested Pochard (*Rhodonessa rufina*) and Palla's Fish Eagle (*Haliaeetus leucoryphus*) were sighted only twice or thrice during the entire study period.

Among the 17 orders of birds recorded, Passeriformes is the dominant 69 species (29.2%) of the total followed by Charadriiformes (44 species, 18.6%), Ciconiiformes (23 species, 9.7%), Anseriformes (19 species, 8.1%) and Falconiformes (18 species, 7.6%). The order Caprimulgiformes is the least represented by single species (Table-

6). Of the 56 families the family Scolopacidae is the dominant represented with 28 species (11.86%). The other notable avian families include Anatidae (19 species, 8.05%), Accipitridae (15 species, 6.36%), Ardeidae (12 species, 5.08%) and Cuculidae and Rallidae represented with 8 species each (3.39%, Table-7).

Table 7 Order-wise representation of birds recorded during the study

| Sl. No. | Avain order | Species | % representation |
|---|---|---|---|
| 1. | Anseriformes | 19 | 8.1 |
| 2. | Apodiformes | 4 | 1.7 |
| 3. | Caprimulgiformes | 1 | 0.4 |
| 4. | Charadriiformes | 44 | 18.6 |
| 5. | Ciconiiformes | 23 | 9.7 |
| 6. | Columbiformes | 6 | 2.5 |
| 7. | Coraciiformes | 12 | 5.1 |
| 8. | Cuculiformes | 8 | 3.4 |
| 9. | Falconiformes | 18 | 7.6 |
| 10. | Galliformes | 4 | 1.7 |
| 11. | Gruiformes | 10 | 4.2 |
| 12. | Passeriformes | 69 | 29.2 |
| 13. | Pelecaniformes | 5 | 2.1 |
| 14. | Piciformes | 4 | 1.7 |
| 15. | Podicipediformes | 2 | 0.8 |
| 16. | Psittaciformes | 3 | 1.3 |
| 17. | Strigiformes | 4 | 1.7 |

Table 8 Family-wise representation of birds recorded during the study

| Sl. No. | Avian family | Species | % representation |
|---|---|---|---|
| 1. | Accipitridae | 15 | 6.36 |
| 2. | Alaudidae | 6 | 2.54 |
| 3. | Alcedinidae | 6 | 2.54 |
| 4. | Anatidae | 19 | 8.05 |
| 5. | Anhingidae | 1 | 0.42 |
| 6. | Apodidae | 3 | 1.27 |
| 7. | Ardeidae | 12 | 5.08 |
| 8. | Bucerotidae | 1 | 0.42 |
| 9. | Campephagidae | 4 | 1.69 |
| 10. | Capitonidae | 2 | 0.85 |
| 11. | Caprimulgidae | 1 | 0.42 |

| Sl. No. | Avian family | Species | % representation |
|---|---|---|---|
| 12. | Charadriidae | 5 | 2.12 |
| 13. | Ciconiidae | 6 | 2.54 |
| 14. | Columbidae | 6 | 2.54 |
| 15. | Coraciidae | 1 | 0.42 |
| 16. | Corvidae | 3 | 1.27 |
| 17. | Cuculidae | 8 | 3.39 |
| 18. | Dicaeidae | 2 | 0.85 |
| 19. | Dicruridae | 4 | 1.69 |
| 20. | Estrildidae | 5 | 2.12 |
| 21. | Falconidae | 2 | 0.85 |
| 22. | Gruidae | 2 | 0.85 |
| 23. | Hemiprocnidae | 1 | 0.42 |
| 24. | Hirundinidae | 3 | 1.27 |
| 25. | Irenidae | 3 | 1.27 |
| 26. | Jacanidae | 2 | 0.85 |
| 27. | Laniidae | 3 | 1.27 |
| 28. | Laridae | 7 | 2.97 |
| 29. | Meropidae | 3 | 1.27 |
| 30. | Motacillidae | 5 | 2.12 |
| 31. | Nectariniidae | 3 | 1.27 |
| 32. | Oriolidae | 2 | 0.85 |
| 33. | Pandionidae | 1 | 0.42 |
| 34. | Passerinae | 1 | 0.42 |
| 35. | Pelecanidae | 1 | 0.42 |
| 36. | Phalacrocoracidae | 3 | 1.27 |
| 37. | Phasianidae | 4 | 1.69 |
| 38. | Phoenicopteridae | 1 | 0.42 |
| 39. | Picidae | 2 | 0.85 |
| 40. | Pittidae | 1 | 0.42 |
| 41. | Ploceinae | 2 | 0.85 |
| 42. | Podicipedidae | 2 | 0.85 |
| 43. | Psittacidae | 3 | 1.27 |
| 44. | Pycnonotidae | 2 | 0.85 |
| 45. | Rallidae | 8 | 3.39 |
| 46. | Recurvirostridae | 1 | 0.42 |
| 47. | Scolopacidae | 28 | 11.86 |
| 48. | Strigidae | 3 | 1.27 |
| 49. | Sturnidae | 5 | 2.12 |
| 50. | Sylviinae | 5 | 2.12 |

| Sl. No. | Avian family | Species | % representation |
|---|---|---|---|
| 51. | Threskiornithidae | 4 | 1.69 |
| 52. | Timaliinae | 3 | 1.27 |
| 53. | Turdinae | 7 | 2.97 |
| 54. | Tytonidae | 1 | 0.42 |
| 55. | Upupidae | 1 | 0.42 |
| 56. | Burhinidae | 1 | 0.42 |

In the study area insectivorous birds represented by 96 species dominated, followed by omnivores (50 species), piscivores (32 species), predators (23 species), granivores (14 species) and frugivores (12 species, Figure-8).

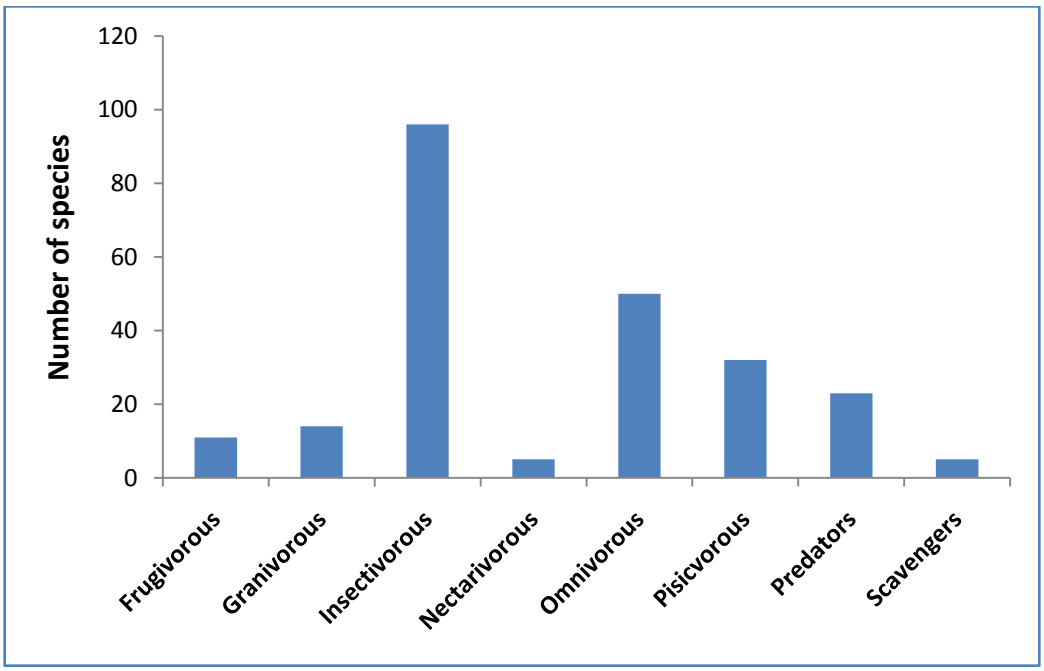



Figure 8 Feeding guild representations of birds in the area

### 2.2.2 BUTTERFLIES

In total 83 butterfly species belonging to 57 genera extending over 5 families were recorded (Table-8). Nymphalidae with 31 species (37%) forms the dominant family. This was followed by Pieridae with 17 species (21%) and Lycaenidae with 13 species (16%), Papilionidae with 12 species (14%). The least number of butterfly species were found to be belonging to the family Hesperiidae with 10 species (12%, Table-8).

Table 9 List of butterflies recorded in the present study area

| No. | Common name | Scientific name | IWPA status | Abundance |
|---|---|---|---|---|
| | | **Family: Papilionidae** | | |
| 1. | Common Bluebottle | *Graphium sarpedon* | | F |
| 2. | Spot Swordtail | *Graphium nomius* | | F |
| 3. | Common Mime | *Chilasa clytia* | Schd. I | R |
| 4. | Paris Peacock | *Papilio paris* | | R |
| 5. | Blue Mormon | *Papilio polymnestor* | | C |
| 6. | Common Jay | *Graphium doson* | | O |
| 7. | Common Mormon | *Papilio polytes* | | C |
| 8. | Common Rose | *Pachliopta aristolochiae* | | A |
| 9. | Crimson Rose | *Pachliopta hector* | Schd. I | C |
| 10. | Lime Butterfly | *Papilio demoleus* | | A |
| 11. | Southern Birdwing | *Troides minos* | Endemic to PI | R |
| 12. | Tailed Jay | *Graphium agamemnon* | | O |
| | | **Family: Pieridae** | | |
| 13. | Common Emigrant | *Catopsilia pomona* | | A |
| 14. | Common Jezebel | *Delias eucharis* | | C |
| 15. | Common Grass yellow | *Eurema hecabe* | | C |
| 16. | Common Gull | *Cepora nerissa* | Schd. II | F |
| 17. | Common Wanderer | *Pareronia valeria* | | F |
| 18. | Small Salmon Arab | *Colotis amata* | | R |
| 19. | Crimson Tip | *Colotis danae* | | O |
| 20. | Great Orange Tip | *Hebomoea glaucippe* | | C |
| 21. | Mottled Emigrant | *Catopsilia pyranthe* | | C |
| 22. | Psyche | *Leptosia nina* | | R |
| 23. | Small Grass Yellow | *Eurema brigitta* | | A |
| 24. | Spotless Grass Yellow | *Eurema laeta* | | R |
| 25. | Small Orange Tip | *Colotis etrida* | | O |
| 26. | Plain Orange Tip | *Colotis eucharis* | | R |
| 27. | White Orange Tip | *Ixias marianne* | | R |
| 28. | Yellow Orange Tip | *Ixias pyrene* | | A |
| 29. | Pioneer | *Belenois aurota* | | O |
| | | **Family: Nymphalidae** | | |
| 30. | Angled Castor | *Ariadne ariadne* | | O |
| 31. | Baronet | *Euthalia nais* | | O |
| 32. | Blue Tiger | *Tirumala limniace* | | C |
| 33. | Black Rajah | Charaxes solon | | R |
| 34. | Common Nawab | *Polyura athamas* | | O |
| 35. | Chocolate Pansy | *Precis iphita* | | A |

| No. | Common name | Scientific name | IWPA status | Abundance |
|---|---|---|---|---|
| 36. | Common Palmfly | *Elymnias hypermnestra* | | O |
| 37. | Common Bush Brown | *Mycalesis perseus* | | C |
| 38. | Common Castor | *Ariadne merione* | | A |
| 39. | Common Baron | *Euthalia aconthea* | | F |
| 40. | Common Crow | *Euploca core* | Schd. IV | A |
| 41. | Common Evening Brown | *Melanitis leda* | | F |
| 42. | Common Leopard | *Phalanta phalantha* | | C |
| 43. | Common Sailer | *Neptis hylas* | | C |
| 44. | Common Sergeant | *Athyma perius* | | F |
| 45. | Common Lascar | *Pantoporia hordonia* | | O |
| 46. | Danaid Eggfly | *Hypolimnas misippus* | Schd. I | F |
| 47. | Dark Blue Tiger | *Tirumala septentrionis* | | C |
| 48. | Double-branded Crow | *Euploca sylvester* | | R |
| 49. | Glassy Tiger | *Parantica aglea* | | C |
| 50. | Joker | *Byblia ilithyia* | | R |
| 51. | Painted Lady | *Vanessa cardui* | | R |
| 52. | Great Eggfly | *Hypolimnas bolina* | | R |
| 53. | Blue Pansy | *Junonia orithiya* | | R |
| 54. | Grey Pansy | *Junonia atlites* | | A |
| 55. | Lemon Pansy | *Junonia lemonias* | | A |
| 56. | Peacock Pansy | *Junonia almana* | | R |
| 57. | Plain Tiger | *Danaus chrysippus* | | A |
| 58. | Striped Tiger | *Danaus genutia* | | A |
| 59. | Tawny Caster | *Acraea violae* | | R |
| 60. | Yellow Pansy | *Junonia hierta* | | R |
| | | **Family: Lycaenidae** | | |
| 61. | Common Cerulean | *Jamides celeno* | | A |
| 62. | Common Pierrot | *Castalius rosimon* | Schd-I | A |
| 63. | Angled Pierrot | *Caleta caleta* | | F |
| 64. | Banded Blue Pierrot | *Discolampa ethion* | | C |
| 65. | Common Silverline | *Spindasis vulcanus* | | O |
| 66. | Dark Cerulean | *Jamides bochus* | | R |
| 67. | Tiny Grass Blue | *Zizula hylax* | | C |
| 68. | Dark Grass Blue | *Zizeeria karsandra* | | R |
| 69. | Grass Jewel | *Freyeria trochylus* | | O |
| 70. | Red Pierrot | *Talicada nyseus* | | R |
| 71. | Zebra Blue | *Lepotes plinius* | | R |
| 72. | Gram Blue | *Euchrysops cnejus* | | C |
| 73. | Plains Cupid | *Chilades pandava* | | R |
| | | **Family: Hesperiidae** | | |

| No. | Common name | Scientific name | IWPA status | Abundance |
|---|---|---|---|---|
| 74. | Brown Awl | *Badamia exclamationis* | | C |
| 75. | Bush Hopper | *Ampittia dioscorides* | | F |
| 76. | Common Banded Owl | *Hasora chromus* | | F |
| 77. | Common Grass Dart | *Taractrocera maevius* | | A |
| 78. | Pale Palm Dart | *Telicota colon* | | R |
| 79. | Dark Palm Dart | *Telicota ancilla* | | O |
| 80. | Indian Palm Bob | *Suastus gremius* | | R |
| 81. | Indian Skipper | *Spialia galba* | | F |
| 82. | Rice Swift | *Borbo cinnara* | | O |
| 83. | Common Redeye | *Matapa aria* | | O |

**Where:** A-Abundant; C-Common; F-Fairly common; O-Occasional; R-Rare; IWPA-Indian Wildlife Protection Act; Schd-Schedule; PI-Peninsular India

Table 10 Composition butterfly assemblage recorded during the present study

| Family | Number of species with % | Number of genera with % |
|---|---|---|
| Papilionidae | 12 (14%) | 5 (9%) |
| Pieridae | 17 (21%) | 10 (18%) |
| Nymphalidae | 31 (37%) | 21 (37%) |
| Lycaenidae | 13 (16%) | 12 (20%) |
| Hesperiidae | 10 (12%) | 9 (16%) |
| Total | 83 | 57 |

Butterflies such as Plain Tiger, Striped Tiger, Blue Tiger, Chocolate Pansy, Common Rose, Crimson Rose, Grey Pansy, Common Jezebel, Plain Tiger, Common Crow, Lime Butterfly, White Orange Tip, Crimson Tip and Common Grass Yellow, were common in the study area. Blue Mormon, Tailed Jay, Paris Peacock, Peacock Pansy, Common Mime, Small Salmon Arab, Tailed Jay, Black Rajah, Joker and Blue Pansy were found rare. Six species namely Common Baron, Common Silverline, Spot Swordtail, Southern Birdwing, Common Lascar and Common Redeye were seen not more than twice during the entire study period with less than six individuals each.

Four species namely Common Mime, Crimson Rose, Danaid Eggfly and Common Pierrot are protected under Schedule - I of Indian Wildlife Protection Act 1972. Common Gull is included under Schedule – II and Common Crow under Schedule - IV. While Blue Mormon, Double-branded Crow and Crimson Rose are distributed only in

Indian subcontinent and Sri Lanka, Southern Birdwing is endemic to Peninsular India (Kehimkar, 2008). Based on the abundance of butterfly species in the study area 24 species fall under the category 'rare'. 17 species are common, 15 occasional, 10 abundant and 11 fairly common.

### 2.2.3 HERPETOFAUNA

A total of 10 species of Amphibians and 33 species of reptiles were recorded during the survey period (Table 11 & Table 12). Among the 33 species of reptiles 3 were turtles, 13 were lizards and 17 were snakes.

Table 11.Amphibians recorded in and around the wetlands of Srikakulam District.

| # | Family | English Name | Scientific Name | IUCN Status |
|---|---|---|---|---|
| 1 | Bufonidae | Common Indian Toad | *Duttaphrynus melanostictus* | VU |
| 2 | Dicroglossidae | Water Skipper or Skipper Frog | *Euphlyctis cyanophlyctis* | LRnt |
| 3 | Dicroglossidae | Indian Pond or Green Frog | *Euphlyctis hexadactylus* | DD |
| 4 | Dicroglossidae | Cricket Frog | *Fejervarya mudduraja* | - |
| 5 | Dicroglossidae | Indian Bull Frog | *Hoplobatrachus tigerinus* | - |
| 6 | Dicroglossidae | Indian Burrowing Frog | *Sphaerotheca breviceps* | DD |
| 7 | Microhylidae | Ornate Narrow-mouthed Frog | *Microhyla ornata* | LRnt |
| 8 | Microhylidae | Narrow-mouthed Frog | *Ramanella* sp. | - |
| 9 | Microhylidae | Lesser/Marbled Balloon Frog | *Uperodon systoma* | LRnt/N |
| 10 | Rhacophoridae | Common Tree Frog | *Polypedates maculatus* | LRic |

Table 12 Reptiles recorded in and around the wetlands of Srikakulam District

| Sl. No | Common name | Scientific name | Conservation status |
|---|---|---|---|
| **Turtles** | | | |
| 1 | Indian Starred Tortoise | *Geochelone elegans* | VU |
| 2 | Indian Black Turtle | *Melanochelys trijuga* | LR |
| 3 | Indian Flapshell Turtle* | *Lissemys punctata* | LR |
| **Lizards** | | | |
| 1 | Snake Skink | *Lygosoma punctatus* | LR |
| 2 | Common Supple Skink | *Eutropis macularius* | LR |
| 3 | Common Brahminy Skink | *Eutropis carinata* | LR |
| 4 | Termite Hill Gecko | *Hemidactylus triedrus* | LR |
| 5 | Southern House Gecko | *Hemidactylus frenatus* | LR |
| 6 | Bark Gecko | *Hemidactylus leschnaulti* | LR |
| 7 | Fan-throated Lizard | *Sitana ponticeriana* | LR |
| 8 | Common Garden Lizard | *Calotes versicolor* | LR |
| 9 | Forest calotes | *Calotes rouxi* | LR |

| | | | |
|---|---|---|---|
| 10 | Indian Chameleon | *Chamaeleon zeylanicus* | VU |
| 11 | Indian Monitor Lizard | *Varanus bengalensis* | VU |
| 12 | South Indian Rock Agama | *Psammophilus dorsalis* | LR |
| 13 | Common Rat Lizard | *Ptylas mucosus* | LR |
| **Snakes** | | | |
| 1 | Brahminy Worm Snake | *Ramphotyplops braminus* | LR |
| 2 | Common Sand Boa | *Gongylophis conicus* | LR |
| 3 | Red Sand Boa | *Eryx johnii* | LR |
| 4 | Indian Rock Python | *Python molurus molurus* | EN |
| 5 | Indian Bronze Back | *Dendrelaphis tristis* | LR |
| 6 | Common Vine snake | *Ahaetulla nasuta* | LR |
| 7 | Striped-keelback | *Amphiesma stolata* | LR |
| 8 | Checkered Keelback | *Xenochrophis piscator* | LR |
| 9 | Common Cat Snake | *Boiga trigonota* | LR |
| 10 | Indian Wolf Snake | *Lycodon aulicus* | LR |
| 11 | Indian Kukri | *Oligodon arnensis* | LR |
| 12 | Indian Rat Snake | *Ptyas mucosa* | LR |
| 13 | Spectacled Cobra* | *Naja naja* | LR |
| 14 | Common Krait* | *Bungarus caeruleus* | LR |
| 15 | Banded Krait* | *Bungarus fascidiscuputus* | LR |
| 16 | Russell's Viper* | *Daboia russelii* | LR |
| 17 | Saw -scaled Viper* | *Echis carinatus* | LR |
| * Venomous species | | | |

### 2.2.4 MAMMALS

A total of 16 species of mammals were recorded in the study area (Table 13).

Table 13. Mammals recorded from the study area

| Sl. No. | Common Name | Scientific Name | IUCN status | Legal Status |
|---|---|---|---|---|
| 1 | Spotted deer | *Axis axis* | LR\Lc | IV |
| 2 | Jackal | *Canis aureus* | LR\Lc | I |
| 3 | Indian fox | *Vulpes benghalensis* | LR\Lc | II |
| 4 | Jungle cat | *Felis chaus* | Lc | - |
| 5 | Common mongoose | *Herpestes edwardsii* | L R\Lc | - |
| 6 | Black naped hare | *Lepus nigricollis* | LR\Lc | - |
| 7 | Rhesus macaque | *Macaca mullata* | Lc | II |
| 8 | Indian porcupine | *Hystrix indica* | LR\Nt | IV |
| 9 | Bandicoot rat | *Bandicota indica* | LR\Lc | V |
| 10 | Three-striped palm squirrel | *Funambulus palmarum* | LR\Lc | - |
| 11 | Indian pangolin | *Manis crassicaudata* | LR\Lc | - |
| 12 | Asian Palm Civet | *Paradoxurus hermaphroditus* | LR\Lc | II |

| | | | | |
|---|---|---|---|---|
| 13 | Common langur | *Presbytis entellus* | LR\Lc | II |
| 14 | Wild boar | *Sus scrofa* | Lc | III |
| 15 | Short-nosed Fruit Bat | *Cynopterus brachyotis* | Lc | - |
| 16 | Flying fox | *Pteropus giganteus* | Lc | - |

# 3 Major Wetlands

Thirty four major wetlands were surveyed taking care that representative sampling was done covering all the geographical areas of the district. Since the coastal plains have several major wetlands of ecological and economic importance, more wetlands were selected for detailed study from that area.

The area calculated from the satellite image may vary from the actual area depending upon the month of the satellite imagery; i.e. if the satellite imagery is during monsoon the area of the wetland will be more whereas during dry period the area will shrink.

## 3.1 NAUPADA SWAMPS

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Naupada | Tekkali | Santhabommali | $18^0$ 31′ 0.24″ N | $84^0$ 15′ 40.88″ E | Natural |

### 3.1.1 LOCATION AND CHARACTERISTICS

Naupada swamps covers Santhabommali, Kotabommali and Tekkali mandals of Srikakulam district. In the revenue records the extent of wetlands shown as swamps is 7414 acres or approximately 30 $Km^2$. However the Naupada wetlands are larger than that since it is a complex of wetlands consisting of swamps, mud and salt meadows and creek. It is a transitional zone between terrestrial and marine ecosystem and many permanent shallow marine waters on the coastal lines

adjoining the Naupada wetland being integral part of the wetland complex, the area much higher and this wetland is the only remaining wetland of this type on the entire east coast.


| | |
|---|---|
| Geographical extent (in Hectare) | 3842.51 |
| Avian Species Richness | 145 |
| IUCN Red Listed | 13 |
| Floral Richnes | 236 |

Figure 9 Satellite image of Naupada swamps

### 3.1.2 ECOSYSTEM SERVICES PROVIDED BY NAUPADA WETLAND

#### *3.1.2.1 Regulatory Services*

Numerous streams and water channels drains water into the wetland which is discharged into the sea through the Tekkali creek. Most of these water flow-ways are linked to the river Vamsadhara. During monsoon the entire wetland complex receives the flood waters spreading it over thousands of acres. The mixing of the floodwaters with the sea water which intrudes through the Tekkali results in a unique water regime which has implications on the biodiversity and livelihood of thousands of inhabitants in more than 30 villages around the wetland. The floodwaters polluted by industries and agricultural pesticides and fertilisers get more or less purified and released into the Tekkali creek generating an appropriate environment for the survival of biodiversity. The Naupada wetlands play a vital role in erosion control and sediment restoration. It also plays an invaluable role in controlling the salinisation of both water and soil.

### *3.1.2.2 Provisioning Services*

#### Wildlife Habitat

Data collected by a rapid survey and data from literature shows that Naupada wetland is habitat for at least 145 birds and 236 plants. Telineelapuram which is designated as an "Important Bird Area' is part of the Naupada wetland complex.

Naupada wetland harbours large number of migratory birds such as Bar-headed Goose, Shoveller, Spot-billed Pelican, Grey Pelican, Sarus Crane, Common Teal, Cotton teal, Common Pochard etc. Many of these species are observed even during non migratory season in parts of the wetland where there is sufficient water. As per the IUCN categories, there is one 'Endangered' species, ten 'Near Threatened' species and two 'Vulnerable' species present in the wetland. Among the Near Threatened, Pallied Harrier is also a Schedule –I animal according to the Indian Wild Life (Protection Act) 1972. The Monitor Lizard, another Schedule- I animal is also present in the wetland. SACON has reported 7147 birds belonging to just 20 species from the Naupada swamps (Vijayan et al., 2004). The wetland is an important haven and crucial foraging ground for thousands of birds throughout the year. It is the major foraging ground for more than 150 Spot Billed Pelicans and 250 Painted Storks of Telineelapuram. The filling and alterations in the Naupada swamps will seriously curtail food sources for these numerous bird species in the area.

As per the Environmental Impact Assessment Report prepared by M/s BS Envi-Tech (P) Ltd, this wetland is also habitat of Common mongoose, hare, Indian Fox, Jackal, Palm Squirrel, Porcupine, Rhesus Macaque, Wild Boar, Banded Krait, Chameleon, Cobra, Common Green Lizard, Common Rat Snake. Forest Calotes, Indian Pond Terrain Tortoise, Krait and Monitor Lizard which is a Schedule-I animal as per IWLP-1972.

## Water supply

During monsoons more than 8000 acres of the wetland is submerged by the flood waters which gradually drains out through the Tekkali Creek further into the sea. However, in winter and summer substantial quanity of water is retained in the wetland. As noted above, Naupada wetland sustains the ground water table of more than 30 nearby villages thus making provision for water for irrigation, drinking, for industries etc.

## Fisheries

Fishing rights here are leased out to M/s Jagannath Inland Fishermen Cooperative Society, Vaddithandra which have 539 members. In fact, the number of families depending upon fishing for their livelihood is around 1000 as a lot of non members in the cooperative society are also engaged in fishing. Females of the fishing families are engaged in marketing fish catches in the nearby areas. Vaddithandra is an exclusive fishers' village. Only members of the '*Kendra*' community do fishing in the Naupada wetlands. Since this indigenous group of Odisha origin is engaged in fishing for generations they lack any other skills for a living. According to the fishermen, Tiger Prawn, White Prawn and Giant Fresh Water Prawn (Scampy) are abundant in the wetland since water quality is ideal for their growth. They also state that around 35 species of fishes are available from the wetland, which indicate the richness of fish diversity.

## Agriculture and animal husbandry

Villages surrounding the wetlands, more than 30 in number, are lush green with paddy crops and coconut groves. Majority of the population depend upon agriculture and allied activities. Most of the farmers raise two crops of paddy. Cattle rearing, pig farming and poultry farming are common practices in these areas.

## Plant biomass resources

The wetland is a source of several medicinal and edible plants collected by the locals. During winter and summer when the water recedes, thousands of cattle graze in the wetlands. The wetland is a source for raw materials for making mats, an important source of income for the locals. Materials for thatching the roofs, building houses, and making tools and crafts are also sourced from these wetlands.

Table 14 Birds recorded in Naupada swamps and its surroundings

| No. | English name | Scientific name | IUCN/IWPA status** |
|---|---|---|---|
| 1. | Ashy Drongo | *Dicrurus leucophaeus* | |
| 2. | Ashy-crowned Sparrow Lark | *Eremopterix griseus* | |
| 3. | Asian Koel | *Eudynamys scolopacea* | |
| 4. | Asian Openbill | *Anastomus oscitans* | |
| 5. | Asian Palm Swift | *Cypsiurus balasiensis* | |
| 6. | Asian Pied Starling | *Sturnus contra* | |
| 7. | Bay-backed Shrike | *Lanius vittatus* | |
| 8. | Black Drongo | *Dicrurus macrocercus* | |
| 9. | Black Kite | *Milvus migrans* | |
| 10. | Black-bellied Tern | *Sterna acuticauda* | NT |
| 11. | Black-crowned Sparrow Lark | *Eremopterix nigriceps* | |
| 12. | Black-headed Ibis | *Threskiornis melanocephalus* | NT |
| 13. | Black-shouldered Kite | *Elanus caeruleus* | |
| 14. | Black-winged Stilt | *Himantopus himantopus* | |
| 15. | Blue-tailed Bee-eater | *Merops philippinus* | |
| 16. | Brahminy Kite | *Haliastur indus* | |
| 17. | Brahminy Starling | *Sturnus pagodarum* | |
| 18. | Bronze-winged Jacana | *Metopidius indicus* | |
| 19. | Common Coot | *Fulica atra* | |
| 20. | Common Greenshank | *Tringa nebularia* | |
| 21. | Common Kingfisher | *Alcedo atthis* | |
| 22. | Common Moorhen | *Gallinula chloropus* | |
| 23. | Common Myna | *Acridotheres tristis* | |
| 24. | Common Poachard | *Aythya farina* | |
| 25. | Common Redshank | *Tringa totanus* | |
| 26. | Common Ringed Plover | *Charadrius hiaticula* | |
| 27. | Common Sandpiper | *Actitis hypoleucos* | |
| 28. | Common Teal | *Anas crecca* | |
| 29. | Cotton Pygmy-Goose | *Nettapus coromandelianus* | |
| 30. | Darter | *Anhinga melanogaster* | NT |

| No. | English name | Scientific name | IUCN/IWPA status** |
|---|---|---|---|
| 31. | Eurasian Curlew | *Numenius arquata* | NT |
| 32. | Eurasian Marsh Harrier | *Circus aeruginosus* | |
| 33. | Eurasian Wigeon | *Anas Penelope* | |
| 34. | Fulvous Whistling Duck | *Dendrocygna bicolor* | |
| 35. | Gargany Teal | *Anas querquedula* | |
| 36. | Great Cormorant | *Phalacrocorax carbo* | |
| 37. | Greater Coucal | *Centropus sinensis* | |
| 38. | Greater Egret | *Casmerodius albus* | |
| 39. | Green Avadavat | *Amandava formosa* | VU |
| 40. | Grey Heron | *Ardea cinerea* | |
| 41. | House Crow | *Corvus splendens* | |
| 42. | House Swift | *Apus affinis* | |
| 43. | Indian Cormorant | *Phalacrocorax fuscicollis* | |
| 44. | Indian Pond Heron | *Ardeola grayii* | |
| 45. | Indian Robin | *Saxicoloides fulicata* | |
| 46. | Indian Roller | *Coracias benghalensis* | |
| 47. | Indian Silverbill | *Lonchura malabarica* | |
| 48. | Intermediate Egret | *Mesophoyx intermedia* | |
| 49. | Jungle Crow | *Corvus macrorhynchos* | |
| 50. | Kentish Plover | *Charadrius alexandrinus* | |
| 51. | Laughing Dove | *Streptopelia senegalensis* | |
| 52. | Lesser Whistling Duck | *Dendrocygna javanica* | |
| 53. | Little Cormorant | *Phalacrocorax niger* | |
| 54. | Little Egret | *Egretta garzetta* | |
| 55. | Little Grebe | *Tachybaptus ruficollis* | |
| 56. | Little Ringed Plover | *Charadrius dubius* | |
| 57. | Marsh Sandpiper | *Tringa stagnatilis* | |
| 58. | Northern Pintail | *Anas acuta* | |
| 59. | Northern Shoveler | *Anas clypeata* | |
| 60. | Painted Stork | *Mycteria leucocephala* | NT |
| 61. | Pallid Harrier | *Circus macrourus* | NT & Sch. I |
| 62. | Pheasant Tailed Jacana | *Hydrophasianus chirurgus* | |
| 63. | Pied Avocet | *Recurvirostra avosetta* | |
| 64. | Pied Harrier | *Circus melanoleucos* | |
| 65. | Pied Kingfisher | *Ceryle rudis* | |
| 66. | Pintail Snipe | *Gallinago stenura* | |
| 67. | Purple Heron | *Ardea purpurea* | |
| 68. | Purple Sunbird | *Nectarinia asiatica* | |
| 69. | Purple Swamphen | *Porphyrio porphyrio* | |
| 70. | Purple-rumped Sunbird | *Nectarinia zeylonica* | |
| 71. | Red Avadavat | *Amandava amandava* | |
| 72. | Red Collared Dove | *Streptopelia tranquebarica* | |

| No. | English name | Scientific name | IUCN/IWPA status** |
|---|---|---|---|
| 73. | Red-wattled Lapwing | *Vanellus indicus* | |
| 74. | River Lapwing | *Vanellus duvaucalii* | |
| 75. | River Tern | *Sterna aurantia* | |
| 76. | Rose-ringed Parakeet | *Psittacula krameri* | |
| 77. | Rosy Starling | *Sturnus roseus* | |
| 78. | Small Green Bee-eater | *Merops orientalis* | |
| 79. | Spot-billed Pelican | *Pelecanus philippensis* | NT |
| 80. | Spotted Dove | *Streptopelia chinensis* | |
| 81. | Spotted Redshank | *Tringa erythropus* | |
| 82. | White-breasted Kingfisher | *Halcyon smyrnensis* | |
| 83. | White-breasted Waterhen | *Amaurornis phoenicurus* | |
| 84. | White-headed Babbler | *Turdoides affinis* | |
| 85. | Yellow-wattled Lapwing | *Vanellus malabaricus* | |
| 86. | *Spotted owlet | *Athene brama* | |
| 87. | *Barn Owl | *Tyto alba* | |
| 88. | *Black-headed Gull | *Larus ridibundus* | |
| 89. | *Ruddy Turnstone | *Arenaria interpres* | |
| 90. | *Black-bellied Plover | *Pluvialis squatarola* | |
| 91. | *Ruddy Shelduck | *Tadorna ferruginea* | |
| 92. | *Grey Plover | *Pluvialis squatarola* | |
| 93. | *Pacific Golden Plover | *Pluvialis fulva* | |
| 94. | *Asian Dowitcher | *Limnodromus semipalmatus* | NT |
| 95. | *Black-tailed Godwit | *Limosa limosa* | |
| 96. | *Bar-tailed Godwit | *Limosa lapponica* | |
| 97. | *Gadwall | *Anas strepera* | |
| 98. | *Bar-headed Goose | *Anser indicus* | |
| 99. | *Comb Duck | *Sarkidiornis melanotos* | |
| 100. | *Greater Flamingo | *Phoenicopterus roses* | |
| 101. | *Sarus Crane | *Grus antigone* | VU |
| 102. | *Woolly-necked Stork | *Ciconia episcopus* | |
| 103. | *White Eye Pochard | *Aythya nyroca* | NT |
| 104. | *Bear's Poachard | *Aythya baeri* | END |
| 105. | *Ferruginous Duck | *Aythya nyroca* | |
| 106. | *Blue-breasted Banded Rail | *Rallus striatus* | |
| 107. | *Ballions Crake | *Porzana pusilla* | |
| 108. | *Brown Crake | *Amaluromis akool* | |
| 109. | *Wood Snipe | *Gallnago nemoricola* | |
| 110. | *Bush lark | *Mirafra assamica* | |
| 111. | *Rufous Tailed Finch Lark | *Ammomanes phoenicurus* | |
| 112. | *Common crested lark | *Galerida cristata* | |
| 113. | *Small Sky Lark | *Alauda gulgula* | |
| 114. | *Peregrine Falcon | *Falco peregrinus* | |

| No. | English name | Scientific name | IUCN/IWPA status** |
|---|---|---|---|
| 115. | *Plaintive Cuckoo | *Cacomantis merulinus* | |
| 116. | *Indian Blue Robin | *Luscinia brunnea* | |
| 117. | *White-rumped Needletail | *Zoonavena sylvatica* | |
| 118. | *Kentish Plover | *Charadrius alexandrinus* | |
| 119. | *Lesser Sand Plover | *Charadrius mongolus* | |
| 120. | *Greater Sand Plover | *Charadrius leschenaultii* | |
| 121. | *Dunlin | *Calidris alpine* | |
| 122. | *Temminck's Stint | *Calidris temminckii* | |
| 123. | *Green Sandpiper | *Tringa ochropus* | |
| 124. | *Wood Sandpiper | *Tringa glariola* | |
| 125. | *Black Crowned Night Heron | *Nycticorax nycticorax* | |
| 126. | *Great Crested Grebe | *Podiceps cristatus* | |
| 127. | *Tufted Duck | *Aythya fuligula* | |
| 128. | *Black-headed Cuckoo-shrike | *Coracina melanoptera* | |
| 129. | *Common Babbler | *Turdoides caudatus* | |
| 130. | *Common Crane | *Grus grus* | |
| 131. | *Blue-winged Leafbird | *Chloropsis cochinchinsis* | |
| 132. | *Golden-fronted Leafbird | *Chloropsis aurifrons* | |
| 133. | *Greater Racket-tailed Drongo | *Dicrurus pardiseus* | |
| 134. | *Indian Cuckoo | *Cuculus micropterus* | |
| 135. | *Jungle Babbler | *Turdoides striatus* | |
| 136. | *Jungle Owlet | *Glaucidium radiatum* | |
| 137. | *Eurasian Thick-knee | *Burhinus oedicnemus* | |
| 138. | *Grey-headed Fish Eagle | *Ichthyophagia ichthyaetus* | NT |
| 139. | *Grey Junglefowl | *Gallus sonneratii* | |
| 140. | *Grey Francolin | *Francolinus pondicerianus* | |
| 141. | *Brown-Caped Pygmy Woodpecker | *Dendrocopos nanus* | |
| 142. | *Egyptian Vulture | *Neophron percnopterus* | |
| 143. | *Short-toed Snake Eagle | *Circaetus gallicus* | |
| 144. | *Streaked Weaver | *Ploceus manyar* | |
| 145. | *Water Cock | *Gallicrex cinerea* | |

***** Secondary information, **NT- Near Threatened; VU-Vulnerable; END-Endangered; IWPA Sch.1- Schedule I as per Indian Wildlife Protection Act, 1972

Table 15 Plants recorded in Naupada swamps and its sorroundings

| No. | Plant species | Family |
|---|---|---|
| 1. | *Acalypha indica* L. | Euphorbiaceae |
| 2. | *Aeluropus lagopoides* (Linn.) Trin. ex Thw. | Poaceae |

| No. | Plant species | Family |
|---|---|---|
| 3. | *Alternanthera paronychioides* A. St.-Hilaire | Amaranthaceae |
| 4. | *Alternanthera pungens* Kunth | Amaranthaceae |
| 5. | *Alternanthera sessilis* (L.) R.Br. ex DC. | Amaranthaceae |
| 6. | *Alternanthera tenella* Colla. | Amaranthaceae |
| 7. | *Amaranthus viridis* L. | Amaranthaceae |
| 8. | *Ammannia baccifera* Linn. | Lythraceae |
| 9. | *Anisomeles indica* (L.) Kuntze | Lamiaceae |
| 10. | *Anisomeles malabarica* (L.) R. Br. ex Sims. | Lamiaceae |
| 11. | *Aponogeton natans* (L.) Engl. & K.Krause | Aponogetonaceae |
| 12. | *Argemone mexicana* L. | Papaveraceae |
| 13. | *Aristida adscensionis* L. | Poaceae |
| 14. | *Aristida funiculata* Trin & Rupr. | Poaceae |
| 15. | *Aristida hystrix* L. | Poaceae |
| 16. | *Aristida setacea* Retz. | Poaceae |
| 17. | *Artemesia vulgaris* L. | Asteraceae |
| 18. | *Arundo donax* L. | Poaceae |
| 19. | *Asclepias curassavica* L. | Asclepiadaceae |
| 20. | *Bacopa monnieri* (L.) Pennell | Scrophulariaceae |
| 21. | *Barleria prionitis* L.\ | Acanthaceae |
| 22. | *Barringtonia racemosa* (L.) Spreng. | Lecythidaceae |
| 23. | *Bergia ammannioides* Roxb. | Elatinaceae |
| 24. | *Bidens pilosa* L. | Asteraceae |
| 25. | *Biophytum reinwardtii* (Zucc.) Klotzsch. | Oxalidaceae |
| 26. | *Blumea lacera* (Burm.f) DC. | Asteraceae |
| 27. | *Blumea mollis* (D.Don) Merr. | Asteraceae |
| 28. | *Bothriochloa bladhii* (Retz.) S. T. Blake | Poaceae |
| 29. | *Bothriochloa pertusa* (L.) A. Camus | Poaceae |
| 30. | *Brachiaria ramosa* (L.) Stapf | Poaceae |
| 31. | *Bulbostylis barbata* (Rottb.) C.B. Clarke | Cyperaceae |
| 32. | *Caesalpinia bonduc* (L.) Roxb. | Caesalpiniaceae |
| 33. | *Cenchrus ciliaris* L. | Poaceae |
| 34. | *Chloris barbata* Sw. | Poaceae |
| 35. | *Cleome monophylla* L. | Capparidaceae |
| 36. | *Clerodendrum inerme* (L.) Gaertn. | Verbenaceae |
| 37. | *Clerodendrum phlomidis* L.f. | Verbenaceae |
| 38. | *Coccinia grandis* (L.) Voigt | Cucurbitaceae |
| 39. | *Coldenia procumbens* Linn. | Boraginaceae |

| No. | Plant species | Family |
|---|---|---|
| 40. | *Colocasia esculenta* (L.) Schott | Araceae |
| 41. | *Commelina benghalensis* L. | Commelinaceae |
| 42. | *Commelina longifolia* Lam. | Commelinaceae |
| 43. | *Corchorus aestuans* L. | Tiliaceae |
| 44. | *Cynodon dactylon* (L.) Pers. | Poaceae |
| 45. | *Cyperus articulatus* L. | Cyperaceae |
| 46. | *Cyperus difformis* L. | Cyperaceae |
| 47. | *Cyperus exaltatus* Retz. | Cyperaceae |
| 48. | *Cyperus halpan* L. | Cyperaceae |
| 49. | *Cyperus iria* L. | Cyperaceae |
| 50. | *Cyperus pangorei* Rottb. | Cyperaceae |
| 51. | *Cyperus rotundus* L. | Cyperaceae |
| 52. | *Dactyloctenium aegyptium* (L.) Willd. | Poaceae |
| 53. | *Dactyloctenium aristatum* Link. | Poaceae |
| 54. | *Datura metal* L. | Solanaceae |
| 55. | *Desmostachya bipinnata* (L.) Stapf | Poaceae |
| 56. | *Dicanthium annulatum* (Forsk.) Stapf. | Poaceae |
| 57. | *Digera muricata* (L.) Mart. | Amaranthaceae |
| 58. | *Digitaria bicornis* (Lam.) Roem. & Schult. | Poaceae |
| 59. | *Dinebra retroflexa* (Vahl) Panzer | Poaceae |
| 60. | *Diospyros buxifolia* (Blume) Hiern | Ebenaceae |
| 61. | *Diospyros melanoxylon* Roxb. | Ebenaceae |
| 62. | *Echinochloa colona* (L.) Link | Poaceae |
| 63. | *Echinops echinatus* Roxb. | Asteraceae |
| 64. | *Eclipta prostrata* (L.) L. | Asteraceae |
| 65. | *Eichhornia crassipes* (Mart.) Solms-Laub. | Pontederiaceae |
| 66. | *Eleusine indica* (L.) Gaertn. | Poaceae |
| 67. | *Emilia sonchifolia* (L.) DC. | Asteraceae |
| 68. | *Enicostema axillare* (Lam.) Raynal | Gentianaceae |
| 69. | *Eragrostis maderaspatana* Bor | Poaceae |
| 70. | *Eragrostis minor* Host | Poaceae |
| 71. | *Eragrostis nigra* Nees ex Steud. | Poaceae |
| 72. | *Eragrostis nutans* (Retz.) Nees ex Steud. | Poaceae |
| 73. | *Eragrostis unioloides* (Retz.) Nees ex Steud. | Poaceae |
| 74. | *Eremopogon foveolatus* (Del.) Stapf. | Poaceae |
| 75. | *Euphorbia rosea* Retz. | Euphorbiaceae |
| 76. | *Euphorbia thymifolia* L. | Euphorbiaceae |

| No. | Plant species | Family |
|---|---|---|
| 77. | *Evolvulus alsinoides* (L.) L. | Convolvulaceae |
| 78. | *Evolvulus nummularius* (L.) L. | Convolvulaceae |
| 79. | *Fimbristylis aestivalis* (Retz.) Vahl. | Cyperaceae |
| 80. | *Fimbristylis argentea* (Rottb.) Vahl. | Cyperaceae |
| 81. | *Fimbristylis bisumbellata* (Forssk.) Bubani | Cyperaceae |
| 82. | *Fimbristylis complanata* (Retz.) Link. | Cyperaceae |
| 83. | *Fimbristylis dichotoma* (L.) Vahl. | Cyperaceae |
| 84. | *Fimbristylis falcata* (Vahl.) Kunth. | Cyperaceae |
| 85. | *Fimbristylis miliacea* (L.) Vahl. | Cyperaceae |
| 86. | *Fimbristylis ovata* (Burm. F.) Kern. | Cyperaceae |
| 87. | *Fimbristylis tetragona* R.Br. | Cyperaceae |
| 88. | *Giseckia pharnaceoides* L. | Aizoaceae |
| 89. | *Gnaphalium luteo-album* L. | Asteraceae |
| 90. | *Gnaphalium polycaulon* Pers. | Asteraceae |
| 91. | *Gomphrena serrata* L. | Amaranthaceae |
| 92. | *Grangea maderaspatana* (L.) Poir. | Asteraceae |
| 93. | *Hedyotis biflora* (L.) Lam. | Rubiaceae |
| 94. | *Hedyotis corymbosa* (L.) Lam. | Rubiaceae |
| 95. | *Heliotropium curasavicum* L. | Boraginaceae |
| 96. | *Heliotropium indicum* L. | Boraginaceae |
| 97. | *Heteropogon contortus* (L.) P.Beauv | Poaceae |
| 98. | *Hydrilla verticillata* (L. f.) Royle | Hydrocharitaceae |
| 99. | *Hygrophila auriculata* (Schum) Heine | Acanthaceae |
| 100. | *Hyptis suaveolens* (L.) Poit. | Lamiaceae |
| 101. | *Imperata cylindrica* (L.) Beauv. | Poaceae |
| 102. | *Indigofera linifolia* (L.f.) Retz. | Fabaceae |
| 103. | *Indigofera linnaei* Ali | Fabaceae |
| 104. | *Indoneesiella echioides* (L) Nees. | Acanthaceae |
| 105. | *Ipomoea aquatica* Forssk. | Convolvulaceae |
| 106. | *Ipomoea biloba* Forssk. | Convolvulaceae |
| 107. | *Ipomoea carnea* Jacq. | Convolvulaceae |
| 108. | *Ischaemum indicum* (Houtt.) Merr. var. *indicum* | Poaceae |
| 109. | **Iseilema anthephoroides* Hack. | Poaceae |
| 110. | *Iseilema laxum* Hack. | Poaceae |
| 111. | **Jatropha tanjorensis* Ellis & Saroja | Euphorbiaceae |
| 112. | *Kyllingia nemoralis* (J. R. & G. Forst.) Dandy ex Hutchinson & Dalziel | Cyperaceae |

| No. | Plant species | Family |
|---|---|---|
| 113. | *Lagascea mollis* Cav. | Asteraceae |
| 114. | *Lantana wightiana* Wallich ex Gamble | Verbenaceae |
| 115. | *Lemna minor* L. | Lemnaceae |
| 116. | *Lindernia antipoda* (L.) Alston | Scrophulariaceae |
| 117. | *Lindernia crustacea* (L.) F.v.Muell. | Scrophulariaceae |
| 118. | *Lindernia hyssopioides* (L.) Haines | Scrophulariaceae |
| 119. | *Ludwigia adscendens* (L.) H. Hara | Onagraceae |
| 120. | *Ludwigia perennis* L. | Onagraceae |
| 121. | *Ludwigia peruviana* (L.) Hara | Onagraceae |
| 122. | *Manisuris myuros* L. | Poaceae |
| 123. | *Merremia hastata* (Hallier f.) Ooststr. | Convolvulaceae |
| 124. | *Merremia tridentata* (L.) Hall.f. | Convolvulaceae |
| 125. | *Mollugo cerviana* (L.) Ser. | Aizoaceae |
| 126. | *Monochoria hastata* (L.) Solms-Laub. | Pontideriaceae |
| 127. | *Monochoria vaginalis* (Burm. F.) Presl | Pontideriaceae |
| 128. | *Najas minor* All. | Najadaceae |
| 129. | *Nelumbo nucifera* Gaertn. | Nymphaeaceae |
| 130. | *Nothosaerva brachiata* (L.) Wight | Amaranthaceae |
| 131. | *Nymphaea nouchali* Burm. f. | Nymphaeaceae |
| 132. | *Nymphaea pubescens* Willd. | Nymphaeaceae |
| 133. | *Nymphaea rubra* Roxb. ex Salisb. | Nymphaeaceae |
| 134. | *Nymphoides indicum* (L.) Kuntze | Menyanthaceae |
| 135. | *Ophiuros exaltatus* (Linnaeus) Kuntze | Poaceae |
| 136. | *Oropetium thomaeum* (Linn.f.) Trin. | Poaceae |
| 137. | *Ottelia alismoides* (L.) Pers. | Hydrocharitaceae |
| 138. | *Oxalis corniculata* L. | Oxalidaceae |
| 139. | *Oxystelma esculentum* R. Br. | Asclepiadaceae |
| 140. | *Pandanus odoratissimus* L.f. | Pandanaceae |
| 141. | *Panicum miliaceum* L. | Poaceae |
| 142. | *Panicum paludosum* Roxb. | Poaceae |
| 143. | *Panicum repens* L. | Poaceae |
| 144. | *Panicum trypheron* Schult. | Poaceae |
| 145. | *Parthenium hysterophorus* L. | Asteraceae |
| 146. | *Paspalidium flavidum* (Retz.) A. Camus. | Poaceae |
| 147. | *Paspalum scrobiculatum* L. | Poaceae |
| 148. | *Passiflora foetida* L. | Passifloraceae |
| 149. | *Pavonia odorata* Willd. | Malvaceae |

| No. | Plant species | Family |
|---|---|---|
| 150. | *Pavonia procumbens* (Wall ex Wight & Arn.) Walp. | Malvaceae |
| 151. | *Pavonia zeylanica* (L.) Cav. | Malvaceae |
| 152. | *Pedalium murex* L. | Pedaliaceae |
| 153. | *Peristrophe bicalyculata* (Forssk.) Brummitt. | Acanthaceae |
| 154. | *Phoenix loureirii* Kunth. | Arecaceae |
| 155. | *Phragmites karka* Trin. ex Steud. | Poaceae |
| 156. | *Phyla nodiflora* (L.) E. Greene | Verbenaceae |
| 157. | *Phyllanthus amarus* Schum. & Thonn. | Euphorbiaceae |
| 158. | *Phyllanthus maderaspatensis* L. | Euphorbiaceae |
| 159. | **Phyllanthus rotundifolius* Klein ex Willd. | Euphorbiaceae |
| 160. | *Phyllanthus urinaria* L. | Euphorbiaceae |
| 161. | *Physalis minima* Linn. | Solanaceae |
| 162. | *Pistia stratiotes* L. | Araceae |
| 163. | *Plecospermum spinosum* Trec. | Moraceae |
| 164. | *Polycarpaea corymbosa* (L.) Lam. | Caryophyllaceae |
| 165. | *Polygonum barbatum* ( L. ) H.Hara var. *barbatum* | Polygonaceae |
| 166. | *Polygonum glabrum* Willdenow | Polygonaceae |
| 167. | *Polygonum hydropiper* L. | Polygonaceae |
| 168. | *Polygonum plebeium* R. Br. | Polygonaceae |
| 169. | *Polygonum* sp. | Polygonaceae |
| 170. | P*ortulaca oleracea* L. | Portulacaceae |
| 171. | *Portulaca quadrifida* L. | Portulacaceae |
| 172. | *Psilotrichum elliotii* Baker & Clarke | Amaranthaceae |
| 173. | *Pycreus globosus* (All.) Reichenb. | Cyperaceae |
| 174. | *Rhynchosia minima* (L.) DC. | Fabaceae |
| 175. | *Rivea hypocrateriformis* (Desr.) Choisy | Convolvulaceae |
| 176. | *Ruellia patula* Jacq. | Acanthaceae |
| 177. | *Ruellia tuberosa* L. | Acanthaceae |
| 178. | *Saccharum spontaneum* Linn. | Poaceae |
| 179. | *Sacciolepis indica* (L.) Chase | Poaceae |
| 180. | *Salicornia brachiata* Miq. | Chenopodiaceae |
| 181. | *Salvinia molesta* D.Mitch. | Salviniaceae |
| 182. | *Scirpus articulatus* Linn. | Cyperaceae |
| 183. | *Scleria lithosperma* (L.) Sw. | Cyperaceae |
| 184. | *Scoparia dulcis* L. | Scrophulariaceae |
| 185. | *Sebastiania chamaelea* (L.) Muell.-Arg. | Euphorbiaceae |
| 186. | *Sehima nervosum* (Rottl.) Stapf. | Poaceae |

| No. | Plant species | Family |
|---|---|---|
| 187. | *Senna hirsuta* (L.) Irwin & Barneby | Caesalpiniaceae |
| 188. | *Senna italica* Mill. | Caesalpiniaceae |
| 189. | *Senna occidentalis* (L.) Link | Caesalpiniaceae |
| 190. | *Senna tora* (L.) Roxb. | Caesalpiniaceae |
| 191. | *Setaria italica* (L.) P. Beauv | Poaceae |
| 192. | *Sida acuta* Burm.f. | Malvaceae |
| 193. | *Sida cordata* (Burm. f.) Borss. | Malvaceae |
| 194. | *Solanum surattense* Burm. f. | Solanaceae |
| 195. | *Solanum trilobatum* L. | Solanaceae |
| 196. | *Solena amplexicaulis* (Lam.) Gandhi | Cucurbitaceae |
| 197. | *Sonchus oleraceus* L. | Asteraceae |
| 198. | *Spermacoce hispida* L. | Rubiaceae |
| 199. | *Spermacoce ocymoides* Burm.f. | Rubiaceae |
| 200. | *Sphaeranthus indicus* Linn. | Asteraceae |
| 201. | *Spilanthes calva* DC. | Asteraceae |
| 202. | *Spilanthes uliginosa* Sw. | Asteraceae |
| 203. | *Sporobolus coromandelianus* (Retz.) Kunth | Poaceae |
| 204. | *Sporobolus indicus* (L.) R.Br. | Poaceae |
| 205. | *Sporobolus spicatus* (Vahl.) Kunth | Poaceae |
| 206. | *Sporobolus wallichii* Munro ex Trimen | Poaceae |
| 207. | *Stemodia viscosa* Roxb. | Scrophulariaceae |
| 208. | *Striga asiatica* (L.) Kuntze | Scrophulariaceae |
| 209. | *Suaeda fruticosa* Forssk. ex J.F. Gmelin | Chenopodiaceae |
| 210. | *Suaeda nudiflora* (Willd) Moq. | Chenopodiaceae |
| 211. | *Synedrella nodiflora* (L.) Gaertn. | Asteraceae |
| 212. | *Tephrosia purpurea* (L.) Pers. | Fabaceae |
| 213. | *Tephrosia villosa* (L.) Pers. | Fabaceae |
| 214. | *Tinospora cordifolia* (Willd.) Miers ex Hook. f. & Thoms. | Menispermaceae |
| 215. | *Tragia involucrata* L. | Euphorbiaceae |
| 216. | *Tragia plukenetii* R. Smith | Euphorbiaceae |
| 217. | *Trianthema triquetra* Rottl. | Aizoaceae |
| 218. | *Tribulus lanuginosis* L. | Zygophyllaceae |
| 219. | *Trichodesma indicum* (L.) R. Br. | Boraginaceae |
| 220. | *Tridax procumbens* L. | Asteraceae |
| 221. | *Triumfetta pentandra* A. Rich | Tiliaceae |
| 222. | *Triumfetta rotundifolia* Lam. | Tiliaceae |
| 223. | *Turnera subulata* Smith | Turneraceae |

| No. | Plant species | Family |
|---|---|---|
| 224. | *Typha angustifolia* L. | Typhaceae |
| 225. | *Urena lobata* L. subsp. Lobata | Malvaceae |
| 226. | *Vallisneria spiralis* L. | Hydrocharitaceae |
| 227. | *Vernonia cinerea* (L.) Less. | Asteraceae |
| 228. | *Vetiveria zizanioides* (L.) Nash. | Poaceae |
| 229. | *Vigna trilobata* (L.) Verdc. | Fabaceae |
| 230. | *Vitex leucoxylon* L.f. | Verbenaceae |
| 231. | *Waltheria indica* L. | Sterculiaceae |
| 232. | *Wedelia chinensis* (Osbeck) Merr. | Asteraceae |
| 233. | *Xanthium indicum* Koen. | Asteraceae |
| 234. | *Zornia diphylla* (L.) | Fabaceae |
| 235. | *Zornia gibbosa* Span. | Fabaceae |
| 236. | *Zoysia matrella* (L.) Merr. | Poaceae |

*species endmic to Peninsular India

## 3.2 SOMPETA

| Location/Mandal | Division | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|
| Sompeta | Tekkali | 18$^0$ 56′ 14.73″ N | 84$^0$ 35' 24.50" E | Natural |

Sompeta wetland is locally known as '*Beela'*. Beela is a low lying swamp/marsh area with a unique habitat for rich biodiversity with a distinctive hydrological regime. There are three distinct water bodies of varying size and characteristics in the Sompeta wetland complex. The first one is known as '*Pedda Beela*' which is linked to two other Beelas know as the '*Chinna Beela* (Mankkiapuram Beela) and *Tampara* which is eventually connected to sea near Idduvanipalem. An anicut of height 0.843 m distinguishes the Pedda Beela and Chinna Beela. The Anicut has a sluiceway that allows water to flow from the Pedda Beela to the Chinna Beela and not vice versa. This helps to prevent intrusion of salt water to the Pedda Beela enabling it to maintain fresh water characteristics.


| | |
|---|---|
| Geographical extent (in Hectare) | 1108.56 |
| Avian Species Richness | 121 |
| IUCN Red Listed | 9 |
| Floral Richnes | 493 |

Figure 10 Satellite image of Sompeta wetland complex

The Sompeta wetland complex spreads over nearly 1600 ha acres starting from Baruva in Sompeta mandal to Kapaasuguddi in Kaviti mandal, approximately 20 Km, with varying widths. It falls within Rishikudda, Gollagandi, Baruvapeta and Benkili villages. It consists of marshes, mud flats, permanent shallow marine waters, marine sub tidal aquatic beds, coastal brackish/saline lagoons, seasonal/intermittent freshwater marshes/pools, permanent freshwater spreads, fish-culture ponds, irrigated lands etc.

### 3.2.1 CHARACTERISTICS OF THE WETLAND

Sompeta wetland is fed by Mukundasagaram Pydigam reservoir and numerous channels and small streams from the river Mahendaratanaya. Considerable flood waters also reach it during the monsoon. The area gets about 1200 mm rainfall annually, most of it during the south western season of June to September. In summer, the upper reaches of the wetland get dried up whereas its middle portion remains inundated and marshy.

### 3.2.2 ECOSYSTEM SERVICES

#### *3.2.2.1 Regulatory services*

During monsoon the entire Sompeta wetland complex gets inundated by flood waters. This flood waters keep the wetlands replenished with water and nutrients; even in extreme summer all the three beelas never dry up completely. These

wetlands help in controlling flood in the surrounding areas which are rather thickly populated. It also sponges the flood and storm waters gradually releasing it in lean months. Sediments are retained within the wetland and the thick vegetation which persists in the wetland traps sediments and control soil erosion.

#### *3.2.2.2 Provisioning services*

**Wildlife Habitat and rare species**

The wetland is a habitat for 491 plant species and 121 bird species that includes migratory species. In fact, 74% of the plants and 52% birds found in the whole of Srikakulam district are seen in the Sompeta wetland and its environs. The hillock, about 25 acre, in the wetland shelters a wide variety of wild life such as wild boars, several species of snakes and bats.

Pink-headed Duck is a shy and secretive bird, even possibly nocturnal (Eames 2008, http://www.birdlife.org/datazone/speciesfactsheet.php?id=468), inhabiting secluded and overgrown still-water pools, marshes and swamps in lowland forest and tall grasslands, where there are lot of hiding places particularly areas subject to seasonal inundation. Both male and female of the species are 41–43 cm in size, long-billed with long necks and peaked heads. The male has a pink bill, head and neck while the female has a pale pinkish head and neck with a paler bill. The black of the body extends as a narrow strip on the front of the neck.

The Pink-headed Duck is a species not reported from the country for more than half a century. Its known distribution range includes northern Burma, north-eastern India, and central Nepal. Some, and possibly all, populations show local seasonal movements, resulting in scattered historical records as far as from Punjab, Maharashtra and AP in India. The species was relentlessly hunted in the 19$^{th}$ and first half of 20$^{th}$ century for its skin which was prized as curios though its meat was less preferred. Indiscriminate hunting coupled with loss of habitat led to the fast disappearance of this bird from all known places of report.

Pink-headed Duck was last observed in the wild in 1949. Though amenable to live in captivity for a long time it failed to breed in captivity and in 1944 the last bird in the captivity died. As there have been some local reports of the sighting of this bird in Northern Burma, this bird has been categorised as 'Critically Endangered' instead of extinct. It is assumed that a small population of around 50 birds may exist in Northern Burma which is yet to be explored fully. The elusive search of Pink-headed Duck is still moves on.

Our research team visited Sompeta wetland in October 2011 and January 2012; the first visit being a reconnaissance survey. During the first visit in order to obtain a preliminary idea about the presence of various birds in the wetland, photographs of several species were shown to many villagers who were intimately related to the wetlands. Along with the photographs of bird species already confirmed from those wetlands many villagers firmly reiterated, after seeing the photograph of Pink-headed Duck, that the bird is available in the area during November to December end and sometimes up to January.

Due to compelling reasons we could not visit the wetland during possible season. Therefore, we decided to adopt 'Participatory Biodiversity Appraisal' methodology to ascertain the veracity of the information obtained during the previous visit. The core area of the 'Peddabeela' of Sompeta wetland is inundated with water even in extreme summer (approximately 50 ha) with a thick growth of grass and sedge spp. (*Typha angustifolia, Cyperus exaltatus,* and *Scirpus articulates*,) and *Ipomoea carnea* which are more than 5 ft high having enough hiding places. As per the available literature, Pink-headed Ducks prefer similar habitats. The approach to the core area is very marshy and even cattle avoid these areas and hence little disturbed. Only fishermen go to the core area, approachable only by dugout canoes, for fishing.

Since these fishers have been doing fishing in these areas for generations they are very familiar with the biodiversity, the hydro-period and the habitats of the area. Therefore, it was decided to conduct the exercise of Participatory Biodiversity

Appraisal (PBA) with the fishermen. Photographs of 10 species of birds were selected, 4 common species in the area, 4 uncommon and 2 which were not reported from the area. Showing the photographs, fishermen were asked to indicate the presence and absence of each species in the wetland and their local name. All the fishermen (n=15) except two could correctly identify the birds that were present there and their local name, and could tell which species were absent correctly. Thereafter they were shown the photograph of the Pink-headed Duck. All the fishermen except 2 stated that the bird is available during November to January in the wetland. Therefore, the existence of the bird in the Sompeta wetland is a strong possibility.

### Water supply

Our PRA exercise brought out the information that 33 villages with an approximate population of 90000 reside within 3 Km radius of the wetland. While 11 villages are exclusively engaged in agriculture, 8 villages are occupied by the marine fishers, and 4 villages are engaged in fishing along with cultivation. One village, Manikkapuram is engaged fully in inland 'Beela' fishing. Seventeen villages are engaged in farming along with rearing of the cattle. In two villages some of the households earn their livelihood from making mats whereas spinning coir was taken up as an occupation by some households in two villages.

Due to the "Beela' the ground water table is always high. In fact the Beela is vital for supporting the water needs of the Paddy cultivated in approximately 5000 acres (two crops). The area around the Beela is very fertile. In and around the Beela there is lush green coconut groves interspersed with areca nut trees. This area is also known for its vegetables. A food mile analysis in the nearby areas indicated that except potatoes all other food materials are locally produced. Three lift irrigation schemes which cater to 750 acres of agriculture are operated in the area. Water could be sourced without any interruption from the wells located in the wetland to pump to upstream areas.

## Fisheries

The inhabitants of the Manikkapuram village of the Kaviti mandal depend exclusively upon the Beelas for fishing. The residents here are traditional fishers belonging to Behera community of Odisha origin. Here, around 400 families are engaged in subsistence fishing (Appendix 6). All members in the family are engaged in fishing related activities by some means. While the menfolk involve in capture fisheries, the womenfolk market the fishes locally earning extra income for the family. Traditional gears made of plant materials are used for fishing. The residents spent their free time in mending their fishing gears. The Fishers here are organised into cooperative societies patronised by the Department of Fisheries and the wetlands are leased out to these societies every year.

## Fodder

Farmers in seventeen villages falling within the 3 Km from the wetland are chiefly into agriculture and rearing cattle. Hundreds of cattle graze in the wetland during dry season. The villagers harvest fodder from the wetland for stall feeding. Thousands of cattle are reared in homesteads.

## Materials for roofing and mats

The wetland is a rich source of raw material, such as *Scirpus* sp., to make mats. It is an income source crucial to hundreds of people. The material is also used for thatching and roofing.

## Medicinal and Edible plants

Sompeta wetland and its environs are habitat for 495 plant species out of which many have medicinal properties and many edible. Local people depend on these plants as remedy for many of their maladies and also collect tubers and fruits for consumption.

## Conservation priorities

As noted earlier, Sompeta wetland is a complex wetland. Whereas Pedda Beela consists of about 50 ha of permanently inundated area with typical aquatic macrophytes, and surrounded by marshy area covered by grass and sedge species. Throughout the monsoon (for almost six months) these areas remain submerged. Surrounding the 'Pedda Beela' is hundreds of acres of lush paddy fields which yield two crops. Hundreds of acres of coconut plantations are also sustained by high water table maintained by the 'Pedda beela'. Numerous seasonal channels and streams feed 'Pedda Beela' during rainy season. The altitude of Pedda Beela is just two meters above sea level. Pedda Beela harbours significant faunal and floral biodiversity.

The other two 'Beelas' are fed by the water from the Pedda Beela and have a water regime which may have wider implications in terms of the water table, water quality and sustenance of the biodiversity of the surrounding areas.

Table 16 Birds recorded in Sompeta wetlands and its environs

| Sl. No. | English name | Scientific name | Status |
|---|---|---|---|
| 1. | Alexandrine Parakeet | *Psittacula eupatria* | |
| 2. | Ashy Drongo | *Dicrurus leucophaeus* | |
| 3. | Ashy Prinia | *Prinia socialis* | |
| 4. | Ashy-crowned Sparrow Lark | *Eremopterix griseus* | |
| 5. | Asian Koel | *Eudynamys scolopacea* | |
| 6. | Asian Openbill | *Anastomus oscitans* | |
| 7. | Asian Palm Swift | *Cypsiurus balasiensis* | |
| 8. | Asian Pied Starling | *Sturnus contra* | |
| 9. | Baya Weaver | *Ploceus philippinus* | |
| 10. | Bay-backed Shrike | *Lanius vittatus* | |
| 11. | Black Bittern | *Dupetor flavicollis* | |
| 12. | Black Drongo | *Dicrurus macrocercus* | |
| 13. | Black Kite | *Milvus migrans* | |
| 14. | Black-crowned Night Heron | *Nycticorax nycticorax* | |
| 15. | Black-headed Ibis | *Threskiornis melanocephalus* | NT |
| 16. | Black-shouldered Kite | *Elanus caeruleus* | |
| 17. | Black-winged Stilt | *Himantopus himantopus* | |

| Sl. No. | English name | Scientific name | Status |
|---|---|---|---|
| 18. | Blue-eared Kingfisher | *Alcedo meninting* | |
| 19. | Blue-tailed Bee-eater | *Merops philippinus* | |
| 20. | Brahminy Kite | *Haliastur Indus* | |
| 21. | Brahminy Starling | *Sturnus pagodarum* | |
| 22. | Bronze-winged Jacana | *Metopidius indicus* | |
| 23. | Cattle Egret | *Bubulcus ibis* | |
| 24. | Cinnamon Bittern | *Ixobrychus cinnamomeus* | |
| 25. | Common Coot | *Fulica atra* | |
| 26. | Common Hoopoe | *Upupa epops* | |
| 27. | Common Kingfisher | *Alcedo atthis* | |
| 28. | Common Moorhen | *Gallinula chloropus* | |
| 29. | Common Myna | *Acridotheres tristis* | |
| 30. | Common Poachard | *Aythya ferina* | |
| 31. | Common Sandpiper | *Actitis hypoleucos* | |
| 32. | Common Teal | *Anas crecca* | |
| 33. | Cotton Pygmy-Goose | *Nettapus coromandelianus* | |
| 34. | Darter | *Anhinga melanogaster* | NT |
| 35. | Eurasian Collared Dove | *Streptopelia decaocta* | |
| 36. | Eurasian Marsh Harrier | *Circus aeruginosus* | |
| 37. | Eurasian Spoonbill | *Platalea leucorodia* | NT & Sch. I |
| 38. | Eurasian Wigeon | *Anas penelope* | |
| 39. | Fulvous Whistling Duck | *Dendrocygna bicolor* | |
| 40. | Gargany Teal | *Anas querquedula* | |
| 41. | Great Cormorant | *Phalacrocorax carbo* | |
| 42. | Greater Coucal | *Centropus sinensis* | |
| 43. | Greater Egret | *Casmerodius albus* | |
| 44. | Green Sandpiper | *Tringa ochropus* | |
| 45. | Grey Francolin | *Francolinus pondicerianus* | |
| 46. | Grey Heron | *Ardea cinerea* | |
| 47. | House Crow | *Corvus splendens* | |
| 48. | House Sparrow | *Passer domesticus* | |
| 49. | Indian Cormorant | *Phalacrocorax fuscicollis* | |
| 50. | Indian Grey Hornbill | *Ocyceros birostris* | |
| 51. | Indian Peafowl | *Pavo cristatus* | Sch. I |
| 52. | Indian Pond Heron | *Ardeola grayii* | |
| 53. | Indian Robin | *Saxicoloides fulicata* | |
| 54. | Indian Roller | *Coracias benghalensis* | |
| 55. | Indian Silverbill | *Lonchura malabarica* | |
| 56. | Intermediate Egret | *Mesophoyx intermedia* | |

| Sl. No. | English name | Scientific name | Status |
|---|---|---|---|
| 57. | Jungle Babbler | *Turdoides striatus* | |
| 58. | Jungle Crow | *Corvus macrorhynchos* | |
| 59. | Jungle Myna | *Acridotheres fuscus* | |
| 60. | Laughing Dove | *Streptopelia senegalensis* | |
| 61. | Lesser Coucal | *Centropus bengalensis* | |
| 62. | Little Cormorant | *Phalacrocorax niger* | |
| 63. | Little Egret | *Egretta garzetta* | |
| 64. | Little Grebe | *Tachybaptus ruficollis* | |
| 65. | Little Heron | *Butorides striata* | |
| 66. | Little Ringed Plover | *Charadrius dubius* | |
| 67. | Marsh Sandpiper | *Tringa stagnatilis* | |
| 68. | Northern Pintail | *Anas acuta* | |
| 69. | Northern Shoveler | *Anas clypeata* | |
| 70. | Oriental Magpie Robin | *Copsychus saularis* | |
| 71. | Paddyfield Pipit | *Anthus rufulus* | |
| 72. | Painted Stork | *Mycteria leucocephala* | NT |
| 73. | Pallid Harrier | *Circus macrourus* | NT & Sch I |
| 74. | Pheasant Tailed Jacana | *Hydrophasianus chirurgus* | |
| 75. | Pied Harrier | *Circus melanoleucos* | |
| 76. | Pied Kingfisher | *Ceryle rudis* | |
| 77. | Pintail Snipe | *Gallinago stenura* | |
| 78. | Purple Heron | *Ardea purpurea* | |
| 79. | Purple Swamphen | *Porphyrio porphyrio* | |
| 80. | Purple-rumped Sunbird | *Nectarinia zeylonica* | |
| 81. | Red Avadavat | *Amandava amandava* | |
| 82. | Red Collared Dove | *Streptopelia tranquebarica* | |
| 83. | Red-crested Pochard | *Rhodonessa rufina* | |
| 84. | Red-vented Bulbul | *Pycnonotus cafer* | |
| 85. | Red-wattled Lapwing | *Vanellus indicus* | |
| 86. | River Lapwing | *Vanellus duvaucalii* | |
| 87. | River Tern | *Sterna aurantia* | |
| 88. | Rock Pigeon | *Columba livia* | |
| 89. | Rose-ringed Parakeet | *Psittacula krameri* | |
| 90. | Rosy Starling | *Sturnus roseus* | |
| 91. | Rufous Treepie | *Dendrocitta vagabunda* | |
| 92. | Shikra | *Accipiter badius* | |
| 93. | Small Green Bee-eater | *Merops orientalis* | |
| 94. | Spot-billed Duck | *Anas poecilorhyncha* | |
| 95. | Spot-billed Pelican | *Pelecanus philippensis* | NT |

| Sl. No. | English name | Scientific name | Status |
|---|---|---|---|
| 96. | Spotted Dove | *Streptopelia chinensis* | |
| 97. | White-bellied Drongo | *Dicrurus caerulescens* | |
| 98. | White-breasted Kingfisher | *Halcyon smyrnensis* | |
| 99. | White-breasted Waterhen | *Amaurornis phoenicurus* | |
| 100. | White-browed Bulbul | *Pycnonotus luteolus* | |
| 101. | White-browed Wagtail | *Motacilla maderaspatensis* | |
| 102. | White-headed Babbler | *Turdoides affinis* | |
| 103. | Yellow Bittern | *Ixobrychus sinensis* | |
| 104. | Yellow Wagtail | *Motacilla flava* | |
| 105. | Yellow-wattled Lapwing | *Vanellus malabaricus* | |
| 106. | Brown-headed Barbet | *Megalaima zeylanica* | |
| 107. | *White Stork | *Ciconia ciconia* | |
| 108. | *Black-necked Stork | *Ephippiorhynchus asiaticus* | NT |
| 109. | *Lesser Adjudant | *Leptoptilos javanicus* | VU |
| 110. | *Black Ibis | *Pseudibis papillosa* | |
| 111. | *Glossy Ibis | *Plegadis falcinellus* | |
| 112. | *White-eyed Buzzard | *Butastur teesa* | |
| 113. | *Greater Grey-headed Fish Eagle | *Ichthyophagia ichthyaetus* | NT |
| 114. | *Egyptian Vulture | *Neophron percnopterus* | |
| 115. | *Short-toed Snake Eagle | *Circaetus gallicus* | |
| 116. | *Grey Junglefowl | *Gallus sonneratii* | |
| 117. | *Grey Francolin | *Francolinus pondicerianus* | |
| 118. | *Common Babbler | *Turdoides caudatus* | |
| 119. | *Common Crane | *Grus grus* | |
| 120. | *Indian Cuckoo | *Cuculus micropterus* | |
| 121. | *Jungle Owlet | *Glaucidium radiatum* | |

*** included based on secondary information;** NT- Near Threatened; VU-Vulnerable (IUCN status); Sch.1- Schedule I as per Indian Wildlife Protection Act, 1972

Table 17 Plants recorded in Sompeta wetlands and its environs

| No. | Plant Species | Family |
|---|---|---|
| 1. | *Abrus precatorius* L. | Fabaceae |
| 2. | *Abutilon hirtum* (Lam.) Sweet | Malvaceae |
| 3. | *Abutilon indicum* (L.) Sweet | Malvaceae |
| 4. | *Acacia auriculiformis* A. Cunn ex Benth. | Mimosaceae |
| 5. | *Acacia leucophloea* (Roxb.) Willd. | Mimosaceae |
| 6. | *Acacia nilotica* (L.) Willd. ex Del. | Mimosaceae |
| 7. | *Acacia torta* (Roxb.) Craib | Mimosaceae |
| 8. | *Acalypha brachystachya* Hornem. | Euphorbiaceae |

| No. | Plant Species | Family |
|---|---|---|
| 9. | *Acalypha indica* L. | Euphorbiaceae |
| 10. | *Acalypha paniculata* Willd. | Euphorbiaceae |
| 11. | *Acanthospermum hispidum* DC. | Asteraceae |
| 12. | *Achyranthes aspera* L. | Amaranthaceae |
| 13. | *Aeluropus lagopoides* (Linn.) Trin. ex Thw. | Poaceae |
| 14. | *Aerva sanguinolenta* (L.) Blume | Amaranthaceae |
| 15. | *Aeschynomene aspera* L. | Fabaceae |
| 16. | *Ailanthus excelsa* Roxb. | Simaroubaceae |
| 17. | *Alangium salviifolium* (L.f.) Wang. | Alangiaceae |
| 18. | *Albizia amara* (Roxb.) Boivin | Mimosaceae |
| 19. | *Albizia lebbeck* (L.) Willd. | Mimosaceae |
| 20. | *Albizia saman* (Jacq.) F.v. Muell. | Mimosaceae |
| 21. | *Allophylus serratus* Kurz. | Sapindaceae |
| 22. | *Aloe vera* (L.) Burm.f. | Aloeaceae |
| 23. | *Alstonia scholaris* (L.) R.Br. | Apocynaceae |
| 24. | *Alternanthera paronychioides* A. St.-Hilaire | Amaranthaceae |
| 25. | *Alternanthera pungens* Kunth | Amaranthaceae |
| 26. | *Alternanthera sessilis* (L.) R.Br. ex DC. | Amaranthaceae |
| 27. | *Alternanthera tenella* Colla. | Amaranthaceae |
| 28. | *Alysicarpus longifolius* Wight & Arn. | Fabaceae |
| 29. | *Alysicarpus monilifer* (L.) DC. | Fabaceae |
| 30. | *Alysicarpus rugosus* DC. | Fabaceae |
| 31. | *Amaranthus spinosus* L. | Amaranthaceae |
| 32. | *Amaranthus viridis* L. | Amaranthaceae |
| 33. | *Ammannia baccifera* Linn. | Lythraceae |
| 34. | *Amorphophallus paeoniifolius* (Dennst.) Nicolson | Araceae |
| 35. | *Ampelocissus latifolia* (Roxb.) Planch. | Vitaceae |
| 36. | *Ampelocissus tomentosa* (Heyne ex Roth) Planch. | Vitaceae |
| 37. | *Anacardium occidentale* L. | Anacardiaceae |
| 38. | *Andrographis alata* (Vahl) Nees | Acanthaceae |
| 39. | *Andrographis paniculata* (Burm.f.) Wall. ex Nees | Acanthaceae |
| 40. | *Andropogon pumilus* Roxb. | Poaceae |
| 41. | *Anisochilus carnosus* (L.f.) wall. | Lamiaceae |
| 42. | *Anisochilus scaber* Benth. | Lamiaceae |
| 43. | *Anisomeles indica* (L.) Kuntze | Lamiaceae |
| 44. | *Anisomeles malabarica* (L.) R. Br. ex Sims. | Lamiaceae |
| 45. | *Anogeissus acuminata* (Roxb. ex DC.) Guill. & Perr. | Combretaceae |
| 46. | *Aponogeton natans* (L.) Engl. & K.Krause | Aponogetonaceae |
| 47. | *Arachis hypogaea* L. | Fabaceae |

| No. | Plant Species | Family |
|---|---|---|
| 48. | *Argemone mexicana* L. | Papaveraceae |
| 49. | *Argyreia cuneata* (Willd.) Ker-Gawl. | Convolvulaceae |
| 50. | *Argyreia elliptica* (Roth) Choisy | Convolvulaceae |
| 51. | *Aristida adscensionis* L. | Poaceae |
| 52. | *Aristida funiculata* Trin & Rupr. | Poaceae |
| 53. | *Aristida hystrix* L. | Poaceae |
| 54. | *Aristida setacea* Retz. | Poaceae |
| 55. | *Aristolochia bracteolata* Lam. | Aristolochiaceae |
| 56. | *Aristolochia indica* L. | Aristolochiaceae |
| 57. | *Artemesia vulgaris* L. | Asteraceae |
| 58. | *Arundo donax* L. | Poaceae |
| 59. | *Asclepias curassavica* L. | Asclepiadaceae |
| 60. | *Asparagus racemosus* Willd. | Asparagaceae |
| 61. | *Asystasia dalzelliana* Sant. | Acanthaceae |
| 62. | *Atalantia monophylla* (L.) Corr. Serr. | Rutaceae |
| 63. | *Atalantia racemosa* Wight & Arn. | Rutaceae |
| 64. | *Atylosia scarabaeoides* (L.) Benth. | Fabaceae |
| 65. | *Azadirachta indica* A. Juss. | Meliaceae |
| 66. | *Azima tetracantha* Lam. | Salvadoraceae |
| 67. | *Bacopa monnieri* (L.) Pennell | Scrophulariaceae |
| 68. | *Balanites aegyptiaca* (L.) Del. | Balanitaceae |
| 69. | *Bambusa bambos* Voss | Poaceae |
| 70. | *Barleria acuminata* Wight ex Nees. | Acanthaceae |
| 71. | *Barleria buxifolia* L. | Acanthaceae |
| 72. | *Barleria cristata* L. | Acanthaceae |
| 73. | *Barleria mysorensis* Roth. | Acanthaceae |
| 74. | *Barleria prionitis* L. | Acanthaceae |
| 75. | *Barringtonia racemosa* (L.) Spreng. | Lecythidaceae |
| 76. | *Basella rubra* L. | Chenopodiaceae |
| 77. | *Bassia latifolia* Roxb. | Sapotaceae |
| 78. | *Benkara malabarica* (Lam.) Tirvengadum | Rubiaceae |
| 79. | *Bergia ammannioides* Roxb. | Elatinaceae |
| 80. | *Bidens pilosa* L. | Asteraceae |
| 81. | *Biophytum reinwardtii* (Zucc.) Klotzsch. | Oxalidaceae |
| 82. | *Blainvillea acmella* (L.) Philipson | Asteraceae |
| 83. | *Blepharis maderaspatensis* (L.) Heyne ex Roth | Acanthaceae |
| 84. | *Blepharis repens* (Vahl) Roth | Acanthaceae |
| 85. | *Blumea lacera* (Burm.f) DC. | Asteraceae |
| 86. | *Blumea mollis* (D.Don) Merr. | Asteraceae |

| No. | Plant Species | Family |
|---|---|---|
| 87. | *Boerhavia diffusa* L. | Nyctaginaceae |
| 88. | *Boerhavia erecta* L. | Nyctaginaceae |
| 89. | *Bombax ceiba* L. | Bombacaceae |
| 90. | *Borassus flabellifer* L. | Arecaceae |
| 91. | *Bothriochloa bladhii* (Retz.) S. T. Blake | Poaceae |
| 92. | *Bothriochloa pertusa* (L.) A. Camus | Poaceae |
| 93. | *Brachiaria ramosa* (L.) Stapf | Poaceae |
| 94. | *Brachiaria remota* (Retz.) Haines | Poaceae |
| 95. | *Breynia retusa* (Dennst.) Alston | Euphorbiaceae |
| 96. | *Breynia vitis-idaea* (Burm.f.) Fischer | Euphorbiaceae |
| 97. | *Bulbostylis barbata* (Rottb.) C.B. Clarke | Cyperaceae |
| 98. | *Bulbostylis densa* (Wall. ex Roxb.) Hand.-Mazz. | Cyperaceae |
| 99. | *Butea monosperma* (Lam.) Taub. | Fabaceae |
| 100. | *Cadaba fruticosa* (L.) Druce | Capparidaceae |
| 101. | *Caesalpinia bonduc* (L.) Roxb. | Caesalpiniaceae |
| 102. | *Caesalpinia* sp. | Caesalpiniaceae |
| 103. | *Calophyllum inophyllum* L. | Clusiaceae |
| 104. | *Calotropis gigantea* (L.) R.Br. | Apocynaceae |
| 105. | *Calotropis procera* (Ait.) R.Br. | Apocynaceae |
| 106. | *Canavalia cathartica* Thouars | Fabaceae |
| 107. | *Cardiospermum halicacabum* L. | Sapindaceae |
| 108. | *Carissa carandas* L. | Apocynaceae |
| 109. | *Carissa inermis* Vahl | Apocynaceae |
| 110. | *Carissa spinarum* L. | Apocynaceae |
| 111. | *Carmona retusa* (Vahl) Masam. | Boraginaceae |
| 112. | *Casearia tomentosa* Roxb. | Flacourtiaceae |
| 113. | *Cassia fistula* L. | Caesalpiniaceae |
| 114. | *Cassia obtusa* L. | Caesalpiniaceae |
| 115. | *Cassia siamea* Lam. | Caesalpiniaceae |
| 116. | *Cayratia pedata* (Lam.) Juss. ex Gagnep. | Vitaceae |
| 117. | *Cayratia trifolia* (L.) Domin. | Vitaceae |
| 118. | *Celastrus paniculatus* Willd. | Celastraceae |
| 119. | *Celosia polygonoides* Retz. | Amaranthaceae |
| 120. | *Cenchrus barbatus* Schumach. | Poaceae |
| 121. | *Cenchrus ciliaris* L. | Poaceae |
| 122. | *Cenchrus setigera* Vahl. | Poaceae |
| 123. | *Centella asiatica* (L.) Urban | Apiaceae |
| 124. | *Cereus pterogonus* Lem. | Cactaceae |
| 125. | *Chloris barbata* Sw. | Poaceae |

| No. | Plant Species | Family |
|---|---|---|
| 126. | *Chloris dolichostachya* Lagasca | Poaceae |
| 127. | *Chloris tenella Koen*. ex Roxb. | Poaceae |
| 128. | *Chloroxylon swietenia* DC. | Rutaceae |
| 129. | *Chromolaena odorata* (L.) King & Robinson | Asteraceae |
| 130. | *Cipadessa baccifera* (Roth) Miq. | Meliaceae |
| 131. | *Cissampelos pareira* L. | Menispermaceae |
| 132. | *Cissus quadrangularis* L. | Vitaceae |
| 133. | *Cissus repanda* Vahl. | Vitaceae |
| 134. | *Cleome aspera* Koen ex. DC. | Capparidaceae |
| 135. | *Cleome monophylla* L. | Capparidaceae |
| 136. | *Cleome viscosa* L. | Capparidaceae |
| 137. | *Clerodendrum inerme* (L.) Gaertn. | Verbenaceae |
| 138. | *Clerodendrum infortunatum* L. | Verbenaceae |
| 139. | *Clerodendrum phlomidis* L.f. | Verbenaceae |
| 140. | *Clitoria ternatea* L. | Fabaceae |
| 141. | *Coccinia grandis* (L.) Voigt | Cucurbitaceae |
| 142. | *Cocculus hirsutus* (L.) Diels | Menispermaceae |
| 143. | *Cocculus pendulus* (Forst.) Diels | Menispermaceae |
| 144. | *Coldenia procumbens* Linn. | Boraginaceae |
| 145. | *Colocasia esculenta* (L.) Schott | Araceae |
| 146. | *Combretum albidum* G. Don | Combretaceae |
| 147. | *Commelina benghalensis* L. | Commelinaceae |
| 148. | *Commelina clavata* Clarke | Commelinaceae |
| 149. | *Commelina longifolia* Lam. | Commelinaceae |
| 150. | *Conyza leucantha* (D.Don) Ludlow & Raven | Asteraceae |
| 151. | *Corchorus aestuans* L. | Tiliaceae |
| 152. | *Corchorus tridens* L. | Tiliaceae |
| 153. | *Corchorus trilocularis* L. | Tiliaceae |
| 154. | *Costus speciosus* (Koen.) J. E. Smith | Costaceae |
| 155. | *Crotalaria evolvuloides* Wight ex Wight & Arn. | Fabaceae |
| 156. | *Crotalaria juncea* L. | Fabaceae |
| 157. | *Crotalaria mysorensis* Roth. | Fabaceae |
| 158. | *Crotalaria pallida* Dryand. var. *obovata* (G.Don) Polhill | Fabaceae |
| 159. | *Croton bonplandianum* Baill. | Euphorbiaceae |
| 160. | *Cuscuta reflexa* Roxb. | Convolvulaceae |
| 161. | *Cyanotis tuberosa* (Roxb.) Schultes & Schultes | Commelinaceae |
| 162. | *Cynodon dactylon* (L.) Pers. | Poaceae |
| 163. | *Cynoglossum zeylanicum* (Vahl ex Hornem.) Thunb. ex Lehm. | Boraginaceae |

| No. | Plant Species | Family |
|---|---|---|
| 164. | *Cyperus articulatus* L. | Cyperaceae |
| 165. | *Cyperus difformis* L. | Cyperaceae |
| 166. | *Cyperus exaltatus* Retz. | Cyperaceae |
| 167. | *Cyperus halpan* L. | Cyperaceae |
| 168. | *Cyperus iria* L. | Cyperaceae |
| 169. | *Cyperus pangorei* Rottb. | Cyperaceae |
| 170. | *Cyperus rotundus* L. | Cyperaceae |
| 171. | *Dactyloctenium aegyptium* (L.) Willd. | Poaceae |
| 172. | *Dactyloctenium aristatum* Link. | Poaceae |
| 173. | *Datura innoxia* Mill. | Solanaceae |
| 174. | *Datura metal* L. | Solanaceae |
| 175. | *Desmostachya bipinnata* (L.) Stapf | Poaceae |
| 176. | *Dicanthium annulatum* (Forsk.) Stapf. | Poaceae |
| 177. | *Dichrostachys cinerea* (L.) Wight & Arn. | Mimosaceae |
| 178. | *Dicoma tomentosa* Cass. | Asteraceae |
| 179. | *Digera muricata* (L.) Mart. | Amaranthaceae |
| 180. | *Digitaria bicornis* (Lam.) Roem. & Schult. | Poaceae |
| 181. | *Dinebra retroflexa* (Vahl) Panzer | Poaceae |
| 182. | *Diospyros buxifolia* (Blume) Hiern | Ebenaceae |
| 183. | *Diplocyclos palmatus* (L.) Jeffrey | Cucurbitaceae |
| 184. | *Echinochloa colona* (L.) Link | Poaceae |
| 185. | *Echinops echinatus* Roxb. | Asteraceae |
| 186. | *Eclipta prostrata* (L.) L. | Asteraceae |
| 187. | *Eichhornia crassipes* (Mart.) Solms-Laub. | Pontederiaceae |
| 188. | *Eleusine indica* (L.) Gaertn. | Poaceae |
| 189. | *Elytraria acaulis* (L.f.) Lindau. | Acanthaceae |
| 190. | *Embelia ribes* Burm.f. | Myrisinaceae |
| 191. | *Emilia sonchifolia* (L.) DC. | Asteraceae |
| 192. | *Enicostema axillare* (Lam.) Raynal | Gentianaceae |
| 193. | *Eragrostiella bifaria* (Vahl) | Poaceae |
| 194. | *Eragrostis maderaspatana* Bor | Poaceae |
| 195. | *Eragrostis minor* Host | Poaceae |
| 196. | *Eragrostis nigra* Nees ex Steud. | Poaceae |
| 197. | *Eragrostis nutans* (Retz.) Nees ex Steud. | Poaceae |
| 198. | *Eragrostis pilosa* P. Beauv | Poaceae |
| 199. | *Eragrostis* sp. | Poaceae |
| 200. | *Eragrostis unioloides* (Retz.) Nees ex Steud. | Poaceae |
| 201. | *Eragrostis viscosa* (Retz.) Trin. | Poaceae |
| 202. | *Eremopogon foveolatus* (Del.) Stapf. | Poaceae |

| No. | Plant Species | Family |
|---|---|---|
| 203. | *Euphorbia hirta* L. | Euphorbiaceae |
| 204. | *Euphorbia rosea* Retz. | Euphorbiaceae |
| 205. | *Euphorbia thymifolia* L. | Euphorbiaceae |
| 206. | *Euphorbia tirucalli* L. | Euphorbiaceae |
| 207. | *Evolvulus alsinoides* (L.) L. | Convolvulaceae |
| 208. | *Evolvulus nummularius* (L.) L. | Convolvulaceae |
| 209. | *Fimbristylis aestivalis* (Retz.) Vahl. | Cyperaceae |
| 210. | *Fimbristylis argentea* (Rottb.) Vahl. | Cyperaceae |
| 211. | *Fimbristylis bisumbellata* (Forssk.) Bubani | Cyperaceae |
| 212. | *Fimbristylis complanata* (Retz.) Link. | Cyperaceae |
| 213. | *Fimbristylis dichotoma* (L.) Vahl. | Cyperaceae |
| 214. | *Fimbristylis falcata* (Vahl.) Kunth. | Cyperaceae |
| 215. | *Fimbristylis miliacea* (L.) Vahl. | Cyperaceae |
| 216. | *Fimbristylis ovata* (Burm. F.) Kern. | Cyperaceae |
| 217. | *Fimbristylis tetragona* R.Br. | Cyperaceae |
| 218. | *Flacourtia indica* (Burm.f.) Merr. | Flacourtiaceae |
| 219. | *Giseckia pharnaceoides* L. | Aizoaceae |
| 220. | *Glinus lotoides* Linnaeus | Aizoaceae |
| 221. | *Gloriosa superba* L. | Colchicaceae |
| 222. | *Glycosmis mauritiana* (Lam.) Tanaka | Rutaceae |
| 223. | *Glycosmis pentaphylla* (Retz.) DC. | Rutaceae |
| 224. | *Glycyrrhiza glabra* L. | Fabaceae |
| 225. | *Gmelina arborea* Roxb. | Verbenaceae |
| 226. | *Gmelina asiatica* L. | Verbenaceae |
| 227. | *Gnaphalium luteo-album* L. | Asteraceae |
| 228. | *Gnaphalium polycaulon* Pers. | Asteraceae |
| 229. | *Gomphrena serrata* L. | Amaranthaceae |
| 230. | *Grangea maderaspatana* (L.) Poir. | Asteraceae |
| 231. | *Grewia hirsuta* Vahl. | Tiliaceae |
| 232. | *Grewia tiliifolia* Vahl. | Tiliaceae |
| 233. | *Grewia villosa* Willd. | Tiliaceae |
| 234. | *Gymnema sylvestre* R. Br. | Asclepiadaceae |
| 235. | *Hedyotis biflora* (L.) Lam. | Rubiaceae |
| 236. | *Hedyotis corymbosa* (L.) Lam. | Rubiaceae |
| 237. | *Helicteres isora* L. | Sterculiaceae |
| 238. | *Heliotropium curasavicum* L. | Boraginaceae |
| 239. | *Hemidesmus indicus* (L.) R. Br. | Asclepiadaceae |
| 240. | *Heteropogon contortus* (L.) P.Beauv | Poaceae |
| 241. | *Hibiscus micranthus* L.f. | Malvaceae |

| No. | Plant Species | Family |
|---|---|---|
| 242. | *Holarrhena pubescens* (Buch. - Ham) Wall. ex G. Don | Apocynaceae |
| 243. | *Holoptelea integrifolia* (Roxb.) Planch. | Ulmaceae |
| 244. | *Hugonia mystax* L. | Linaceae |
| 245. | *Hybanthus enneaspermus* (L.) F. Muell. | Violaceae |
| 246. | *Hydrilla verticillata* (L. f.) Royle | Hydrocharitaceae |
| 247. | *Hygrophila auriculata* (Schum) Heine | Acanthaceae |
| 248. | *Hyptis suaveolens* (L.) Poit. | Lamiaceae |
| 249. | *Ichnocarpus frutescens* (L.) R.Br. | Asclepiadaceae |
| 250. | *Imperata cylindrica* (L.) Beauv. | Poaceae |
| 251. | *Indigofera caerulea* Roxb. | Fabaceae |
| 252. | *Indigofera linifolia* (L.f.) Retz. | Fabaceae |
| 253. | *Indigofera linnaei* Ali | Fabaceae |
| 254. | *Indigofera sp.* | Fabaceae |
| 255. | *Indigofera trifoliata* L. | Fabaceae |
| 256. | *Indigofera trita* L.f. | Fabaceae |
| 257. | *Indoneesiella echioides* (L) Nees. | Acanthaceae |
| 258. | *Ipomoea alba* L. | Convolvulaceae |
| 259. | *Ipomoea aquatica* Forssk. | Convolvulaceae |
| 260. | *Ipomoea biloba* Forssk. | Convolvulaceae |
| 261. | *Ipomoea carnea* Jacq. | Convolvulaceae |
| 262. | *Ipomoea hederifolia* L. | Convolvulaceae |
| 263. | *Ipomoea pes-tigridis* L. | Convolvulaceae |
| 264. | *Ipomoea staphylina* Roem. & Schultes | Convolvulaceae |
| 265. | *Ischaemum indicum* (Houtt.) Merr. var. *depressum* (Scribn. & J.G. Sm.) Rydb | Poaceae |
| 266. | *Ischaemum indicum* (Houtt.) Merr. var. *indicum* | Poaceae |
| 267. | **Iseilema anthephoroides* Hack. | Poaceae |
| 268. | *Iseilema laxum* Hack. | Poaceae |
| 269. | *Ixora arborea* Roxb. ex Sm. | Rubiaceae |
| 270. | *Jatropha curcas* L. | Euphorbiaceae |
| 271. | *Jatropha gossypifolia* L. | Euphorbiaceae |
| 272. | **Jatropha tanjorensis* Ellis & Saroja | Euphorbiaceae |
| 273. | *Justicia adhatoda* L. | Acanthaceae |
| 274. | *Justicia betonica* Linn. | Acanthaceae |
| 275. | *Justicia gendarussa* Burm.f. | Acanthaceae |
| 276. | *Justicia* sp. | Acanthaceae |
| 277. | *Kedrostis foetidissima* (Jacq.) Cogn. | Cucurbitaceae |
| 278. | *Kleinia grandiflora* (Wall. ex DC.) Rani | Asteraceae |
| 279. | *Kyllingia nemoralis* (J. R. & G. Forst.) Dandy ex | Cyperaceae |

| No. | Plant Species | Family |
|---|---|---|
| | Hutchinson & Dalziel | |
| 280. | *Lagascea mollis* Cav. | Asteraceae |
| 281. | *Lemna minor* L. | Lemnaceae |
| 282. | *Leonotis nepetiifolia* (L.) R. Br. | Lamiaceae |
| 283. | *Leptadenia reticulata* Wight & Arn. | Asclepiadaceae |
| 284. | *Lindernia antipoda* (L.) Alston | Scrophulariaceae |
| 285. | *Lindernia crustacea* (L.) F.v.Muell. | Scrophulariaceae |
| 286. | *Lindernia hyssopioides* (L.) Haines | Scrophulariaceae |
| 287. | *Lindernia parviflora* (Roxb.) Haines | Scrophulariaceae |
| 288. | *Ludwigia adscendens* (L.) H. Hara | Onagraceae |
| 289. | *Ludwigia perennis* L. | Onagraceae |
| 290. | *Ludwigia peruviana* (L.) Hara | Onagraceae |
| 291. | *Madhuca longifolia* (J.Konig) J.F.Macbr. | Sapotaceae |
| 292. | *Malvastrum coromandelianum* (L.) Garcke | Malvaceae |
| 293. | *Manisuris myuros* L. | Poaceae |
| 294. | *Martynia annua* L. | Asteraceae |
| 295. | *Maytenus emarginata* (Willd.) Ding Hou | Celastraceae |
| 296. | *Maytenus heyneana* (Roth) Raju & Babu | Celastraceae |
| 297. | *Memecylon edule* Roxb. | Melastomataceae |
| 298. | *Memecylon umbellatum* Burm.f. | Melastomataceae |
| 299. | *Merremia hastata* (Hallier f.) Ooststr. | Convolvulaceae |
| 300. | *Merremia tridentata* (L.) Hall.f. | Convolvulaceae |
| 301. | *Mikania cordata* (Burm. f.) Robinson | Asteraceae |
| 302. | *Millingtonia hortensis* L.f. | Bignoniaceae |
| 303. | *Mimosa hamata* Willd. | Mimosaceae |
| 304. | *Mitragyna parvifolia* (Roxb.) Korth. | Rubiaceae |
| 305. | *Mollugo cerviana* (L.) Ser. | Aizoaceae |
| 306. | *Mollugo disticha* Ser. | Aizoaceae |
| 307. | *Mollugo nudicaulis* Lam. | Aizoaceae |
| 308. | *Mollugo pentaphylla* L. | Aizoaceae |
| 309. | *Monochoria hastata* (L.) Solms-Laub. | Pontideriaceae |
| 310. | *Monochoria vaginalis* (Burm. F.) Presl | Pontideriaceae |
| 311. | *Morinda pubescens* J.E. Smith. | Rubiaceae |
| 312. | *Mucuna monosperma* DC. | Fabaceae |
| 313. | *Mucuna pruriens* (L.) DC. | Fabaceae |
| 314. | *Mukia maderaspatana* (L.) M. Roem. | Cucurbitaceae |
| 315. | *Murraya paniculata* (L.) Jack | Rutaceae |
| 316. | *Najas indica* (Willd.) Cham. | Najadaceae |
| 317. | *Najas marina* L. | Najadaceae |

| No. | Plant Species | Family |
|---|---|---|
| 318. | *Najas minor* All. | Najadaceae |
| 319. | *Nelumbo nucifera* Gaertn. | Nymphaeaceae |
| 320. | *Neonotonia wightii* (Wight & Arn.) J.A. Lackey | Fabaceae |
| 321. | *Nothosaerva brachiata* (L.) Wight | Amaranthaceae |
| 322. | *Nymphaea nouchali* Burm. f. | Nymphaeaceae |
| 323. | *Nymphaea pubescens* Willd. | Nymphaeaceae |
| 324. | *Nymphaea rubra* Roxb. ex Salisb. | Nymphaeaceae |
| 325. | *Nymphoides indicum* (L.) Kuntze | Menyanthaceae |
| 326. | *Ocimum canum* Sims. | Lamiaceae |
| 327. | *Oldenlandia umbellata* L. | Rubiaceae |
| 328. | *Ophiuros exaltatus* (Linnaeus) Kuntze | Poaceae |
| 329. | *Oplismenus compositus* (L.) P. Beauv. | Poaceae |
| 330. | *Oropetium thomaeum* (Linn.f.) Trin. | Poaceae |
| 331. | *Ottelia alismoides* (L.) Pers. | Hydrocharitaceae |
| 332. | *Oxalis corniculata* L. | Oxalidaceae |
| 333. | *Oxystelma esculentum* R. Br. | Asclepiadaceae |
| 334. | *Pandanus odoratissimus* L.f. | Pandanaceae |
| 335. | *Panicum miliaceum* L. | Poaceae |
| 336. | *Panicum notatum* Retz. | Poaceae |
| 337. | *Panicum paludosum* Roxb. | Poaceae |
| 338. | *Panicum psilopodium* Trin. | Poaceae |
| 339. | *Panicum repens* L. | Poaceae |
| 340. | *Panicum trypheron* Schult. | Poaceae |
| 341. | *Parthenium hysterophorus* L. | Asteraceae |
| 342. | *Paspalidium flavidum* (Retz.) A. Camus. | Poaceae |
| 343. | *Paspalum scrobiculatum* L. | Poaceae |
| 344. | *Passiflora foetida* L. | Passifloraceae |
| 345. | *Pavetta indica* L. | Rubiaceae |
| 346. | *Pavetta tomentosa* Roxb. ex J.E. Smith | Rubiaceae |
| 347. | *Pavonia odorata* Willd. | Malvaceae |
| 348. | *Pavonia procumbens* (Wall ex Wight & Arn.) Walp. | Malvaceae |
| 349. | *Pavonia zeylanica* (L.) Cav. | Malvaceae |
| 350. | *Pedalium murex* L. | Pedaliaceae |
| 351. | *Pennisetum americanum* (L.) R.Br. | Poaceae |
| 352. | *Pentatropis microphylla* L. | Asclepiadaceae |
| 353. | *Pergularia daemia* (Forrsk.) Chiov. | Asclepiadaceae |
| 354. | *Peristrophe bicalyculata* (Forssk.) Brummitt. | Acanthaceae |
| 355. | *Phoenix loureirii* Kunth. | Arecaceae |
| 356. | *Phoenix sylvestris* (L.) Roxb. | Arecaceae |

| No. | Plant Species | Family |
|---|---|---|
| 357. | *Phragmites karka* Trin. ex Steud. | Poaceae |
| 358. | *Phyla nodiflora* (L.) E. Greene | Verbenaceae |
| 359. | *Phyllanthus amarus* Schum. & Thonn. | Euphorbiaceae |
| 360. | *Phyllanthus emblica* L. | Euphorbiaceae |
| 361. | *Phyllanthus maderaspatensis* L. | Euphorbiaceae |
| 362. | *Phyllanthus polyphyllus* L. | Euphorbiaceae |
| 363. | *Phyllanthus reticulatus* Poir. | Euphorbiaceae |
| 364. | **Phyllanthus rotundifolius* Klein ex Willd. | Euphorbiaceae |
| 365. | *Phyllanthus urinaria* L. | Euphorbiaceae |
| 366. | *Physalis minima* Linn. | Solanaceae |
| 367. | *Pistia stratiotes* L. | Araceae |
| 368. | *Plecospermum spinosum* Trec. | Moraceae |
| 369. | *Polyalthia cerasoides* (Roxb.) Bedd. | Annonaceae |
| 370. | *Polyalthia suberosa* (Roxb.) Thw. | Annonaceae |
| 371. | *Polycarpaea corymbosa* (L.) Lam. | Caryophyllaceae |
| 372. | *Polygonum barbatum* ( L. ) H.Hara var. *barbatum* | Polygonaceae |
| 373. | *Polygonum glabrum* Willdenow | Polygonaceae |
| 374. | *Polygonum hydropiper* L. | Polygonaceae |
| 375. | *Polygonum plebeium* R. Br. | Polygonaceae |
| 376. | *Polygonum* sp. | Polygonaceae |
| 377. | *Pongamia pinnata* (L.) Pierre | Fabaceae |
| 378. | *Portulaca oleracea* L. | Portulacaceae |
| 379. | *Portulaca quadrifida* L. | Portulacaceae |
| 380. | *Potamogeton nodosus* Poiret | Potamogetonaceae |
| 381. | *Premna tomentosa* L. | Verbenaceae |
| 382. | *Pseudarthria viscida* (L) Wight & Arn. | Fabaceae |
| 383. | *Psilotrichum elliotii* Baker & Clarke | Amaranthaceae |
| 384. | *Pulicaria wightiana* C.B. Clarke | Asteraceae |
| 385. | *Pupalia lappacea* (L.) Juss. | Amaranthaceae |
| 386. | *Pycreus globosus* (All.) Reichenb. | Cyperaceae |
| 387. | *Randia dumetorum* (Retz.) Poiret. | Rubiaceae |
| 388. | *Rauwolfia serpentina* (L.) Benth. ex Kurz. | Apocynaceae |
| 389. | *Rhynchosia densiflora* (Roth) DC. | Fabaceae |
| 390. | *Rhynchosia minima* (L.) DC. | Fabaceae |
| 391. | *Rivea hypocrateriformis* (Desr.) Choisy | Convolvulaceae |
| 392. | *Rottboellia cochinchinensis* (Lour.) Clayton | Poaceae |
| 393. | *Ruellia tuberosa* L. | Acanthaceae |
| 394. | *Saccharum spontaneum* Linn. | Poaceae |
| 395. | *Sacciolepis indica* (L.) Chase | Poaceae |

| No. | Plant Species | Family |
|---|---|---|
| 396. | *Salacia chinensis* L. | Hippocratiaceae |
| 397. | *Salicornia brachiata* Miq. | Chenopodiaceae |
| 398. | *Salvinia molesta* D.Mitch. | Salviniaceae |
| 399. | *Sansevieria roxburghiana* Schultes & Schultes | Dracaenaceae |
| 400. | *Sapindus emarginatus* Vahl. | Sapindaceae |
| 401. | *Scirpus articulatus* Linn. | Cyperaceae |
| 402. | *Scleria lithosperma* (L.) Sw. | Cyperaceae |
| 403. | *Scoparia dulcis* L. | Scrophulariaceae |
| 404. | *Scutia myrtina* (Burm. f.) Kurz. | Rhamnaceae |
| 405. | *Sebastiania chamaelea* (L.) Muell.-Arg. | Euphorbiaceae |
| 406. | *Sehima nervosum* (Rottl.) Stapf. | Poaceae |
| 407. | *Sehima sulcatum* (Hack.) A. Camus | Poaceae |
| 408. | *Senna alata* (L.) Roxb. | Caesalpiniaceae |
| 409. | *Senna auriculata* (L.) Roxb. | Caesalpiniaceae |
| 410. | *Senna hirsuta* (L.) Irwin & Barneby | Caesalpiniaceae |
| 411. | *Senna italica* Mill. | Caesalpiniaceae |
| 412. | *Senna occidentalis* (L.) Link | Caesalpiniaceae |
| 413. | *Senna tora* (L.) Roxb. | Caesalpiniaceae |
| 414. | *Sesbania bispinosa* (Jacq.) W. F. Wight | Fabaceae |
| 415. | *Sesuvium portulacastrum* (L.) L. | Aizoaceae |
| 416. | *Setaria italica* (L.) P. Beauv | Poaceae |
| 417. | *Sida acuta* Burm.f. | Malvaceae |
| 418. | *Sida cordata* (Burm. f.) Borss. | Malvaceae |
| 419. | *Sida cordifolia* L. | Malvaceae |
| 420. | *Sida rhombifolia* L. var. *retusa* (L.) Borss. | Malvaceae |
| 421. | *Sida rhombifolia* L. var. *rhombifolia* | Malvaceae |
| 422. | *Sida spinosa* Linn. | Malvaceae |
| 423. | *Solanum surattense* Burm. f. | Solanaceae |
| 424. | *Solanum trilobatum* L. | Solanaceae |
| 425. | *Solena amplexicaulis* (Lam.) Gandhi | Cucurbitaceae |
| 426. | *Sonchus oleraceus* L. | Asteraceae |
| 427. | *Spermacoce hispida* L. | Rubiaceae |
| 428. | *Spermacoce ocymoides* Burm.f. | Rubiaceae |
| 429. | *Sphaeranthus indicus* Linn. | Asteraceae |
| 430. | *Spilanthes calva* DC. | Asteraceae |
| 431. | *Spilanthes uliginosa* Sw. | Asteraceae |
| 432. | *Spinifex littoreus* (Burm.f.) Merr. | Poaceae |
| 433. | *Sporobolus coromandelianus* (Retz.) Kunth | Poaceae |
| 434. | *Sporobolus indicus* (L.) R.Br. | Poaceae |

| No. | Plant Species | Family |
|---|---|---|
| 435. | *Sporobolus spicatus* (Vahl.) Kunth | Poaceae |
| 436. | *Sporobolus wallichii* Munro ex Trimen | Poaceae |
| 437. | *Stemodia viscosa* Roxb. | Scrophulariaceae |
| 438. | *Streblus asper* Lour. | Moraceae |
| 439. | *Striga asiatica* (L.) Kuntze | Scrophulariaceae |
| 440. | *Strychnos nux-vomica* L. | Loganiaceae |
| 441. | *Suaeda fruticosa* Forssk. ex J.F. Gmelin | Chenopodiaceae |
| 442. | *Suaeda nudiflora* (Willd) Moq. | Chenopodiaceae |
| 443. | *Suregada lanceolata* (Willd.) Kuntze | Euphorbiaceae |
| 444. | *Synedrella nodiflora* (L.) Gaertn. | Asteraceae |
| 445. | *Syzygium cumini* (L.) Skeels | Myrtaceae |
| 446. | *Tamarindus indica* L. | Caesalpiniaceae |
| 447. | *Taraxacum officinale* F.H.Wigg | Asteraceae |
| 448. | *Tarenna asiatica* (L.) Kuntze ex K. Schum. | Rubiaceae |
| 449. | *Tecoma stans* (L.) Kunth | Bignoniaceae |
| 450. | *Tectona grandis* L.f. | Verbenaceae |
| 451. | *Tephrosia purpurea* (L.) Pers. | Fabaceae |
| 452. | *Tephrosia villosa* (L.) Pers. | Fabaceae |
| 453. | *Terminalia arjuna* (Roxb.) Wight & Arn. | Myrtaceae |
| 454. | *Terminalia catappa* L. | Myrtaceae |
| 455. | *Themeda triandra* Forssk. | Poaceae |
| 456. | *Thespesia populnea* (L.) Soland ex Correa | Malvaceae |
| 457. | *Thevetia peruviana* K.Schum | Apocynaceae |
| 458. | *Tinospora cordifolia* (Willd.) Miers ex Hook. f. & Thoms. | Menispermaceae |
| 459. | *Tragia involucrata* L. | Euphorbiaceae |
| 460. | *Tragia plukenetii* R. Smith | Euphorbiaceae |
| 461. | *Trewia nudiflora* L. | Euphorbiaceae |
| 462. | *Trewia polycarpa* Benth. | Euphorbiaceae |
| 463. | *Trianthema triquetra* Rottl. | Aizoaceae |
| 464. | *Tribulus lanuginosis* L. | Zygophyllaceae |
| 465. | *Tribulus terrestris* L. | Zygophyllaceae |
| 466. | *Trichodesma indicum* (L.) R. Br. | Boraginaceae |
| 467. | *Tridax procumbens* L. | Asteraceae |
| 468. | *Triumfetta pentandra* A. Rich | Tiliaceae |
| 469. | *Triumfetta rhomboidea* Jacq. | Tiliaceae |
| 470. | *Triumfetta rotundifolia* Lam. | Tiliaceae |
| 471. | *Turnera subulata* Smith | Turneraceae |
| 472. | *Typha angustifolia* L. | Typhaceae |

| No. | Plant Species | Family |
|---|---|---|
| 473. | *Urena lobata* L. subsp. *Lobata* | Malvaceae |
| 474. | *Urena lobata* L. subsp. *sinuata* (L.) Borss. | Malvaceae |
| 475. | *Vallisneria spiralis* L. | Hydrocharitaceae |
| 476. | *Vernonia cinerea* (L.) Less. | Asteraceae |
| 477. | *Vetiveria zizanioides* (L.) Nash. | Poaceae |
| 478. | *Vigna trilobata* (L.) Verdc. | Fabaceae |
| 479. | *Vitex altissima* L.f. | Verbenaceae |
| 480. | *Vitex leucoxylon* L.f. | Verbenaceae |
| 481. | *Vitex negundo* L. var. *negundo* | Verbenaceae |
| 482. | *Vitex negundo* L. var. *purpurascens* Sivar. & Moldenke | Verbenaceae |
| 483. | *Waltheria indica* L. | Sterculiaceae |
| 484. | *Wedelia chinensis* (Osbeck) Merr. | Asteraceae |
| 485. | *Wrightia tinctoria* (Roxb.) R.Br. | Apocynaceae |
| 486. | *Xanthium indicum* Koen. | Asteraceae |
| 487. | *Youngia japonica* (L.) DC. | Asteraceae |
| 488. | *Ziziphus mauritiana* Lam. | Rhamnaceae |
| 489. | *Ziziphus nummularia* (Burm.f.) Wight & Arn. | Rhamnaceae |
| 490. | *Ziziphus oenoplia* (L.) Mill. | Rhamnaceae |
| 491. | *Zornia diphylla* (L.) | Fabaceae |
| 492. | *Zornia gibbosa* Span. | Fabaceae |
| 493. | *Zoysia matrella* (L.) Merr. | Poaceae |

Where: * Endemic plants to Peninsular India

## 3.3 MAHENDRATANAYA RIVER MOUTH

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Damodarapuram | Tekkali | Sompeta | $18^0$ 52′ 39.61″ N | $84^0$ 34′ 52.08″ E | Natural |

The river Mahendratanaya originates in the Eastern Ghats in the Gajapati district of Odisha state. It flows through Mandasa and Sompeta mandals of Srikakulam district and joins the Bay of Bengal at Damodarapuram. Our rapid survey indicated that the area is rich in biodiversity. Forty nine bird species, which included one schedule-I species (IWPA 1972), one vulnerable and 4 Near Threatened species (IUCN 2012???), were recorded. Out of the 145 plant species recorded one was endemic to Peninsular India.


Figure 11 Satellite image of Mahendratanaya River mouth

Local fishers are engaged in both inland and marine fishing. Inland fishermen report about the declining catches and fish diversity affecting their livelihoods. The river mouth is a nesting site for the Olive Ridley turtles.

## 3.4 KUDDIRAM SAGARAM

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Kuddiram | Srikakulam | Amadalavalasa | 180 24' 28.68" N | 830 53' 13.47" E | Natural |

Kuddiram Sagaram is a large natural wetland with about 80 ha water spread supporting several species of birds. Of the 45 bird species recorded here 4 belonged to Near Threatened category. Poaching is a major threat to the birds here, with professional poachers from outside the village being into the business.

Thirty three plant species were recorded from the environs of the wetland. Apart from supporting a rich biodiversity, water from this wetland is used for irrigation. Approximately 100 agricultural families depend on this wetland for irrigation cultivating around 100 ha of land. The main crops cultivated are paddy and pulses. Fishermen belonging to Neyla community do seasonal fishing in this wetland. During the dry season the wetland is a grazing land for cattle. Around 50 families are engaged in rearing cattle.


| | |
|---|---|
| Geographical extent (in Hectare) | 16.58 |
| Avian Species Richness | 45 |
| IUCN Red Listed | 4 |
| Floral Richnes | 33 |

Figure 12 Satellite image of Kuddiram sagaram

## 3.5 LANKA CHERUVU

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Peddaraopalle | Srikakulam | Laveru | $18^0$ 10′ 38.19″ N | $83^0$ 48′ 22.79″ E | Natural |

It is a large seasonal, natural but modified wetland with a water spread area of 120 ha during monsoon. It provides various ecosystem services; water for irrigation, washing, fisheries, bathing, etc. 5 villages around with an approximate population of 7000 people depend on the wetland for their various needs. Villagers depend upon bore wells for drinking water which apparently is being recharged mainly by the wetland. Around 120 ha of agriculture is directly irrigated by this wetland. Majority of the inhabitants of the surrounding villages are engaged in agriculture and related activities.


| | |
|---|---|
| Geographical extent (in Hectare) | 26.97 |
| Avian Species Richness | 30 |
| IUCN Red Listed | - |
| Floral Richnes | 34 |

Figure 13 Satellite image of Lanka Cherivu

Sixteen families are engaged in fishing during season. During off season they are engaged in agriculture related activities. In dry season the wetland is extensively grazed since around 60% of the people keep cattle. Poaching of birds by outsiders is a major threat here. Solid waste is indiscriminately dumped in the wetland. People are apprehensive that once the proposed Nuclear Power plant at Kovvada, which is just 5 Km away, is established it will have detrimental impacts on the wetland.

## 3.6 CHERI CHERUVU

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Patha Sundarapalam | Srikakulam | Etcherla | 18$^0$ 10′ 38.30″ N | 83$^0$ 48′ 22.71″ E | Natural |

Twenty three bird species and 18 plant species were reported from the environs of Cheri Cheruvu during our rapid survey. Seven villages, with about 2000 people, in the surroundings depend upon the wetland for various purposes such as irrigation, cattle grazing during dry season, washing of cloths etc. The surrounding areas are very fertile supporting a variety of crops such as paddy, groundnut, plantains and several vegetables. The tank is also leased out to fishers on a yearly basis. The villagers are well aware about the role of the wetland in sustaining their agricultural crops. According to the villagers the wetland is free from poaching of birds.


| | |
|---|---|
| Geographical extent (in Hectare) | 1.17 |
| Avian Species Richness | 23 |
| IUCN Red Listed | - |
| Floral Richnes | 18 |

Figure 14 Satellite imagery of Cheri Cherivu

## 3.7 MADDUVALASA RESERVOIR

| Location | Division | Mandal | Latitude | Longitude | Type of Wetland |
|---|---|---|---|---|---|
| Madduvalasa | Palakonda | Vangara | $18^0$ 10′ 38.19″ N | $83^0$ 48′ 22.79″ E | artificial |

Madduvalasa reservoir is the major man made wetland, constructed on the rivers Vegavati and Swarnamukhi, in the hilly area of the district. Its construction was completed in 2002. It is in the Vangara Mandal of Palakonda Division. Madduvalasa dam and its immediate environs are habitats for rich biodiversity. Our rapid survey revealed 58 bird and 71 plant species here. Among the birds Black bellied Tern, Darter and Painted Stork are 'Near Threatened' ones and White bellied sea Eagle falls under Schedule-I of IWPA. A large flock of adult Tufted Ducks without the prominent tufts (apparently a morphological anomaly) was recorded from this reservoir. Among the 71 plant species reported, *Pterospermum xylocarpum* is endemic to Peninsular India. Poaching of birds is a major threat faced here.


| | |
|---|---|
| Geographical extent (in Hectare) | 2332.73 |
| Avian Species Richness | 58 |
| IUCN Red Listed | 3 |
| Floral Richnes | 71 |

Figure 15 Satellite image of Madduvalasa reservoir

## 3.8 NARAYANAVALASA

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Narayanavalasa | Tekkali | Kottabommali | $18^0$ 28′ 57.60″ N | $84^0$ 3′ 45.52″ E | Natural, Modified |

It is a seasonal, natural wetland but modified later, which retains water only for 3-4 months. Around 20 ha of agriculture, belonging to 2 villages, mainly paddy is supported by this wetland. This wetland is extensively used by cattle for grazing. Washing of vehicles in the wetland seen frequently pollutes the water and needs to be avoided.


| | |
|---|---|
| Geographical extent (in Hectare) | 7.16 |
| Avian Species Richness | 15 |
| IUCN Red Listed | 1 |
| Floral Richnes | 10 |

Figure 16 Satellite image of Naraynavalasa

Only 15 species of birds could be located during our survey, perhaps being dry season. Darter, a 'Near Threatened' species, was seen here. Villagers report that migratory ducks visit the wetland during season. They also indicated that poaching is a serious threat to the birds here.

## 3.9 PECHCHERUVU (ROOPSAGARAM)

| Location/Mandal | Division | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|
| Jalumuru | Tekkali | $18^0$ 30′ 53.72″ N | $84^0$ 2′ 6.64″ E | Natural |

It is a tank with 6 acres of water spread area. It harbours 39 bird species which includes Darter, a Near Threatened species, and 23 plant species. Being fed by the river Vamsadhara through canals it is a perennial wetland performing various ecosystem services to around 500 families in the surrounding villages. Paddy is extensively cultivated in the nearby areas irrigated by the water from this wetland. Thirty fisher families make a living exclusively by fishing in the wetland which is leased out to them by the Fisheries Department. Poaching is a major threat to the bird biodiversity of this wetland.


| | |
|---|---|
| Geographical extent (in Hectare) | 0.32 |
| Avian Species Richness | 39 |
| IUCN Red Listed | 1 |
| Floral Richness | 23 |

Figure 17 Satellite image of Pechcheruvu

## 3.10 METTUCHERUVU

| Location | Division | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|
| Saravakota | Palakonda | 180 37' 25.79" N | 840 02' 40.0" E | Natural |

Mettucheruvu is a large wetland with 200 acres of water spread during monsoon. During the survey 30 bird species including Black Bellied Tern, a Near Threatened species, and six plant species were recorded. It provides a variety of ecosystem services, irrigation being the major one. Hundreds of hectares of paddy, chillies and pulses are irrigated by the water. One hundred fishing families depend upon the wetland for part time fishing.


Figure 18 Satellite image of Mettucheruvu

## 3.11 THAMARAI CHERUVU

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Saravakota | Palakonda | Saravakota | 18$^0$ 39′ 42.41″ N | 84$^0$ 02′ 3.82″ E | Natural |

Natural, but seasonal, wetland with 20 ha of water spread area is an important habitat for 'Near Threatened' birds like Painted Stork, Spot Billed Pelican, Pallied Harrier and Indian Pea Fowl. The last two falls under the Schedule –I of Indian Wildlife Protection Act. The wetland harbours 21 species of birds and 14 plant species. Water is used for irrigation. During dry season wetland is a grazing ground for cattle.


| | |
|---|---|
| Geographical extent (in Hectare) | 8.72 |
| Avian Species Richness | 21 |
| IUCN Red Listed | 3 |
| Floral Richnes | 14 |

Figure 19 Satellite image of Thamarai cheruvu

## 3.12 RAJAKARU CHERUVU

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Tungatampara | Palakonda | Hiramandalam | 18$^0$ 37′ 25.79″ N | 84$^0$ 02′ 40.0″ E | Natural |

Rajakaru Cheruvu, a natural wetland, has 60 ha of water spread area during monsoon. During the survey 49 bird species were recorded which included Painted Stork, a Near Threatened species, and 21 plant species. During dry months the wetland is replenished with water from the river Vamsadhara through a canal. Because of this 100 agricultural families depend on the wetland for irrigation. Around 120 to 200 ha of land is irrigated. Paddy and pulses are the major crops in the area. During extreme dry season wetland is used for grazing for cattle on which many families depend upon for a living. The wetland is also leased out to fishermen society for fishing.


| | |
|---|---|
| Geographical extent (in Hectare) | 19.43 |
| Avian Species Richness | 49 |
| IUCN Red Listed | 2 |
| Floral Richnes | 21 |

Figure 20 Satellite image of Rajakaru Cheruvu

## 3.13 KOTABOMMALI PEDDA CHERUVU


| Location/ Mandal | Division | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|
| Kotabommal | Tekkali | 18$^0$ 31′ 13.27″ N | 84$^0$ 09′ 56.30″ E | Natural |

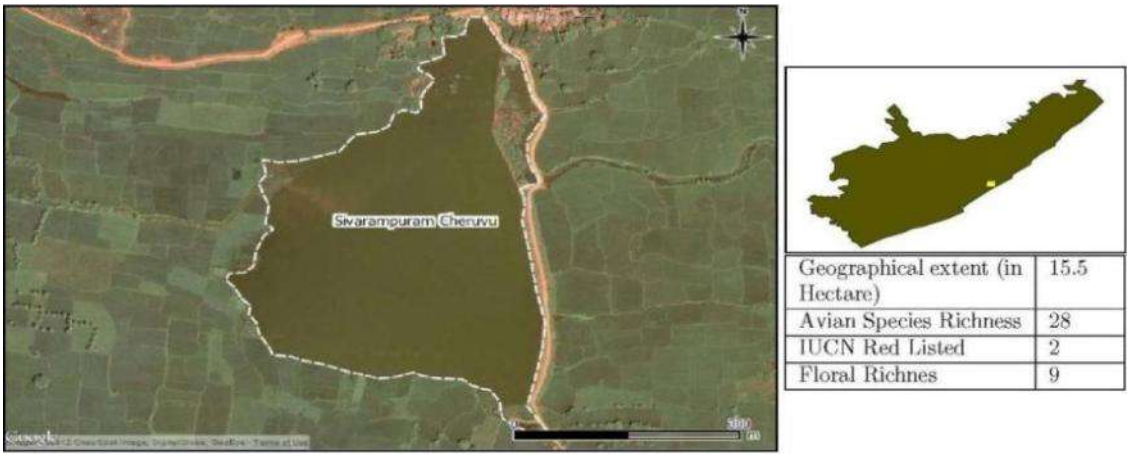
It is a natural, urban wetland with about 8 ha of water spread area, fed by rainwater. Twenty one species of birds were recorded which includes Darter, a Near Threatened species, during the period of our survey. Plant diversity recorded was very poor with only 5 species.


Figure 21 Satellite image of Kotabommali Pedda cheruvu

## 3.14 SIVARAMPURAM CHERUVU

| Location/Mandal | Division | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|
| Santhabommali | Tekkali | $18^0$ 32′ 32.71″ N | $84^0$ 12′ 49.99″ E | Natural |

This wetland has a water spread area of 16 ha, harbouring 28 species of birds. Darter was the only IUCN category listed bird among them. During our visit only 9 plant species were reported. The wetland helps in irrigating more than 200 hundred acres of agricultural land. The main crops are paddy, pulses, sunflower and chillies. Seven villages around the wetland depend on it for some purpose. Fishing rights are leased to fishermen cooperative society comprising of 50-60 members. They do annual stocking of Indian Major Carps. The major threat faced by the wetland is poaching by outsiders.




| | |
|---|---|
| Geographical extent (in Hectare) | 15.5 |
| Avian Species Richness | 28 |
| IUCN Red Listed | 2 |
| Floral Richnes | 9 |

Figure 22 Satellite image of Sivaramapuram Cheruvu

## 3.15 PATHATEKKALI PEDDA CHERUVU

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Pathatekkali | Tekkali | Vajrapukoturu | $18^0$ 38′ 02.71″ N | $84^0$ 21′ 39.35″ E | Natural |

In monsoon this wetland has a water spread area of 28 ha. It is also fed by a canal from the river Vamsadhara. Twenty nine birds and 19 plant species were recorded from this wetland. Some interesting bird species were Tufted Duck, Little Grebe, Great Crested Grebe and Indian Open Bill. Water is used for irrigation. Paddy is the main crop in the nearby areas. Fishing by Fishermen Cooperative Society members is a major activity in the wetland.


| | |
|---|---|
| Geographical extent (in Hectare) | 38.49 |
| Avian Species Richness | 29 |
| IUCN Red Listed | - |
| Floral Richnes | 19 |

Figure 23 Satellite image of Pathatekkali Pedda cheruvu

## 3.16 DAMODAR SAGARAM

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Mahadevupuram | Tekkali | Palasa | 18$^0$ 50′ 22.49″ N | 84$^0$ 26′ 39.15″ E | Artificial |

It is a large wetland with an area of 100 acres with rich biodiversity. It is a natural wetland, later modified. Among the 16 bird species reported two species fall under IUCN categories among which Darter is a 'Near threatened' species, Palla's Fish eagle is Vulnerable and White Bellied Sea Eagle is a Schedule-1 bird. Only 16 plant species were recorded in the wetlands during the survey. Of this *Jatropha tanjorensis* is endemic to Peninsular India.


| | |
|---|---|
| Geographical extent (in Hectare) | 78.86 |
| Avian Species Richness | 16 |
| IUCN Red Listed | 2 |
| Floral Richnes | 26 |

Figure 24 Satellite image of Damodar Sagaram

Water from the wetland is used for irrigating large areas of paddy and vegetable cultivation. Fishermen Cooperative Society members are engaged in fishing. They stock fingerlings at the onset of monsoon.

## 3.17 PEDDHAPADU CHERUVU

| Location | Division/ Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|
| Peddhapadu | Srikakulam | 18$^0$ 18′ 55.08″ N | 83$^0$ 55′ 38.30″ E | Natural |

Peddapadu Cheruvu is an important wetland near Srikakulam town with a water spread of nearly 36 acres. It is a natural wetland being replenished by water from the river Nagavalli by a channel making it a perennial one. It is rich in biodiversity with 41 species of birds among which Painted Stork is a Near Threatened one. Forty seven species of plants were recorded from the immediate environs of the wetland.

Approximately 100 farmers draw water from the wetland to irrigate 120 acres of land. Paddy and vegetables are major crops cultivated. Fishing Cooperative Society members take the wetland on lease for fishing. Fingerlings of IMCs are stocked during monsoon.


| | |
|---|---|
| Geographical extent (in Hectare) | 0.32 |
| Avian Species Richness | 39 |
| IUCN Red Listed | 1 |
| Floral Richnes | 23 |

Figure 25 Satellite image of Peddhapadu cheruvu

The wetland is under threat from effluents released from a nearby factory and also from a milk processing unit.

## 3.18 RAJALU CHERUVU

| Location/Mandal | Division | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|
| Narasannapeta | Srikakulam | 18$^0$ 24′ 48.63″ N | 84$^0$ 02′ 30.61″ E | Natural |

It is an urban wetland in the Narasannapeta town. It is a degraded natural wetland. It is a dumping place for solid wastes and effluents from the town. People report that till two years ago there was fishing in the wetland. Water is not used for irrigation. Biodiversity is poor with only 6 species of birds and 11 species of plants. Now the wetland has been divided into two by a bund and one half is kept free from solid wastes dumping and pollution. People use this half for washing clothes.


Figure 26 Satellite image of Rajalu Cheruvu

## 3.19 VADDITHANDRA KAARICHERUVU

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Vaddithandra | Tekkali | Santhabommali | $18^0$ 32′ 24.52″ N | $84^0$ 14′ 16.86″ | Natural |

It is a perennial, natural wetland near to Naupada swamps with an area of 40 acres. It harbours 32 bird species. It is a foraging area for Spot Billed Pelican, Black Headed Ibis, of which Painted Stork is Near Threatened species. Nineteen plant species were reported from the wetland. Water from the wetland is used for irrigating 100 acres of paddy. Fifty fisher families, who are organised as a cooperative society, depend upon the wetland for their livelihood.


Figure 27 Satellite image of Vaddithandra Kaaricheruvu

The proposed Super Thermal Power Plant by East Coast Energy Ltd Is perceived as a threat by the local villagers to the wetland.

## 3.20 NARAYANPURAM RESERVOIR

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Labham | Palakonda | Burja | $18^0$ 29′ 12.81″ N | $83^0$ 48′ 34.75″ E | Natural |

This reservoir is a rich habitat for 48 bird species of which Black Bellied Tern and Darter fall under the Near Threatened category. Twenty two plant species were also reported form the reservoir area. Narayanapuram reservoir is a source for irrigating hundreds of acres of agriculture. Through channels it replenishes water for several wetlands in the adjoining areas.


Figure 28 Satellite image of Narayanapuram reservoir

## 3.21 CHINTADA CHERUVU

| Location | Division/ Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|
| Chintada | Srikakulam | 180 23' 04.44" N | 830 53' 52.71" E | Artificial |

It is an artificial wetland, water being drawn from the Getta barrage through canals, making it a perennial one. It has an approximate area of 40 ha. It supports 33 species of birds which include Darter and Painted Stork, both categorised as 'Near Threatened' ones and thirty eight plant species were also reported.

The wetland is a source of irrigation for large areas. Paddy, pulses and vegetables are extensively cultivated. Part of the wetland is used by animals for grazing. Many families depend upon cattle for their living. Several fishers also elk out a living by fishing here during season and in off season they are engaged as agricultural labourers. The people in the immediate villagers are poor and ready to leave their present occupation to take industrial jobs.


| | |
|---|---|
| Geographical extent (in Hectare) | 5.73 |
| Avian Species Richness | 33 |
| IUCN Red Listed | 2 |
| Floral Richnes | 38 |

Figure 29 Satellite image of Chintada Cherivu

## 3.22 CHITTADI CHERUVU (ARISADU WETLAND)

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Arisadu | Palakonda | Vangara | $18^0$ 32′ 55.23″ N | $83^0$ 38′ 41.33″ E | Natural/ Modified |

It is a natural wetland fed by rain water sheltering rich biodiversity. Seventy two bird species were recorded. This includes 'Near Threatened' Darter and Painted Stork, Green Avadavat that falls under Vulnerable category and Indian Pea Fowl, a schedule – I species. Thirty three plant species are also available in the environs of the wetland.

Around 20 ha of agriculture, mainly paddy and sugarcane is supported by the wetland. Ten fisher families live by fishing in the wetland. It is partially used for grazing by cattle.


| | |
|---|---|
| Geographical extent (in Hectare) | 2 |
| Avian Species Richness | 72 |
| IUCN Red Listed | 3 |
| Floral Richnes | 33 |

Figure 30 Satellite image of Chittadi Cheruvu (Arisadu wetland)

## 3.23 BHAVANAPADU CREEK AREA

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Bhavanapdu | Tekkali | Santhabommali | 18$^0$ 33′ 35.08″ N | 84$^0$ 20′ 35.56″ E | Natural |

The Bhavanapadu Creek mouth is an ecosystem harbouring rich and vulnerable species. The bird biodiversity is quite rich. Black Bellied Tern, Black Headed Ibis and Eurasian Curlew are the 'Near Threatened' and Eurasian Open Bill and Pallied Harrier are 'Near Threatened' and Schedule –I bird species and White Bellied Sea Eagle is the Schedule-I bird found here among the 27 birds recorded during our rapid survey. Seventeen plant species are seen here at the time of our survey. A patch of mangrove is also coming up near to the fishing harbour.


Figure 31 Satellite image of Bhavanapadu Creek area

## 3.24 DHAYAL CHERUVU (DHEVUNIVALU)

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Bejupuram | Srikakulam | Laveru | 18$^0$ 13′ 57.75″ N | 83$^0$ 44′ 56.95″ E | Natural |

Dhayal Cheruvu is a large seasonal, modified wetland, water being drawn from canals from the river Nagavalli which is retained only for six months. Its water spread area is 200 hasupporting more than 200 acres of agriculture, mainly paddy, for one season. Twenty fisher families organised as cooperative societies do fishing during season after releasing fingerlings at the onset of monsoon. Cattle graze in the wetland during off season.

A 'Vulnerable' species, Green Avadavat is among the 32 species of birds recorded here. Sixteen plant species were also seen here.


| | |
|---|---|
| Geographical extent (in Hectare) | 56.36 |
| Avian Species Richness | 38 |
| IUCN Red Listed | 1 |
| Floral Richnes | 16 |

Figure 32 Satellite image of Dhayal Cheruvu

## 3.25 NARASAPURAM PEDDHA CHERUVU

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Narasapuram | Tekkali | Nandigam | 18$^0$ 38′ 36.93″ N | 84$^0$ 16′ 22.59″ E | Natural |

It is a natural, modified wetland with 53 acres of area. Black Headed Ibis, a Near Threatened species, was among the 34 bird species reported from there. Nineteen plant species are also seen here. It supports more than 100 acres of agricultural land for a single crop of paddy. Ten fisher families do fishing after taking fishing rights in auction.


Figure 33 Satellite image of Narasipuram Peddha Cheruvu

## 3.26 NAGAVALLI RIVER MOUTH

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Kallepalli | Srikakulam | Srikakulam & Etcherla | $18^0$ 12′ 40.78″ | $83^0$ 56′ 40.12″ | Natural |

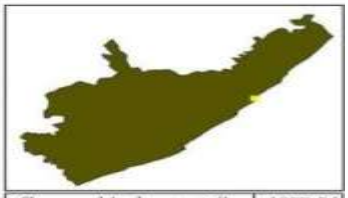
Nagavalli River Mouth and its surrounding environs is an ecologically sensitive area. These areas are nesting grounds of the endangered Olive Ridley Turtles. It is also a habitat for IUCN listed birds. White Bellied Sea Eagle, a Schedule-1 bird, Eurasian Spoon Bill, a 'Near Threatened' and Schedule-I species and Eurasian Curlew, a 'Near Threatened' one were among the 47 birds recorded during our rapid survey. 44 plant species were also seen. This area is thickly populated by both marine and freshwater fisherfolk.


Figure 34 Satellite image of Nagavalli River mouth

## 3.27 POONDI BACK WATERS

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Nuvalarevu | Tekkali | Vajrapukotturu | 18$^0$ 40′ 34.28″ N | 84$^0$ 26′ 18.81″ E | Natural |

Poondi wetland complex consists of Poondi backwaters, adjacent salt pans and several aquaculture farms. The total area is approximately 800 acres. During our rapid survey at the backwater mouth, 29 bird species which included Black Bellied Tern and Black Headed Ibis, both 'Near threatened' species were reported.

| | |
|---|---|
| Geographical extent (in Hectare) | 1077.54 |
| Avian Species Richness | 29 |
| IUCN Red Listed | 2 |
| Floral Richnes | 12 |

Figure 35 Satellite image of Poondi Backwaters

Poondi wetland complex is a very fertile and productive area supporting both biodiversity and human habitations. There are a number of marine fisher habitations. This wetland supports large areas of agriculture crops; mainly paddy and coconut.

The beaches of this area are potential nesting grounds for the Olive Ridley turtles.

## 3.28 MARANDUPADA CHERUVU

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Dharmavaram | Srikakulam | Etcherla | 18$^0$ 20′ 11.27″ N | 83$^0$ 85′ 92.54″ E | Natural |

It is a natural wetland with an approximate area of 36 ha. It harbours 38 species of birds which includes 3 'Near Threatened' birds viz. Painted Stork, Spot Billed Pelican and Darter. Nineteen plant species were recorded in the wetland during our survey. It is an extensive grazing land for cattle from the nearby villages and also supplies fodder for the villagers. Fishery resources and water for irrigation are the other major ecosystem services provided by the wetland.


Figure 36 Satellite image of Marandupada cheruvu

## 3.29 TELINEELAPURAM WETLAND

| Location | Division/ Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|
| Telineeliapuram | Tekkali | $18^0$ 34′ 36.55″ N | $84^0$ 15′ 46.35″ E | Natural |

This is one among the many wetlands near the Telineelapuram heronry and is a foraging ground for the Pelicans and Painted Storks thus playing a major role for the sustainability of the bird population in the heronry. Twenty eight bird species which include 3 'Near Threatened' birds viz. Darter, Painted Stork and Spot Billed Pelican were recorded from the wetland. Twenty four plant species were also recorded.

Water for irrigation, grazing land for cattle and fisheries resources are the major ecosystem services provided by the wetland.


Figure 37 Satellite image of Telineelapuram wetland

## 3.30 NALLA CHERUVU (PYDIBHIMAVARAM)

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Pydibhimavaram | Srikakulam | Ranastalam | 18$^0$ 08′ 18.62″ N | 83$^0$ 37′ 44.99″ E | Natural |

This is one of the numerous natural wetlands which exist in the southern part of the Srikakulam district. Pyidibhimavaram is the major industrial area in the district. Arobindo Lab is a major industry operating adjacent to the wetland. However, no effluents are seen released into this wetland. Nalla Cheruvu is a seasonal wetland of 6 ha supporting 16 half single crop paddy cultivation in the nearby areas. Fingerlings of Indian Major Carps (IMC) are stocked in the wetland at the beginning of monsoon by the fishermen society and fishing is done at the end of monsoon.

Fourteen bird species and 15 plant species were recorded from the wetland during our survey.


| | |
|---|---|
| Geographical extent (in Hectare) | 8.92 |
| Avian Species Richness | 14 |
| IUCN Red Listed | - |
| Floral Richnes | 15 |

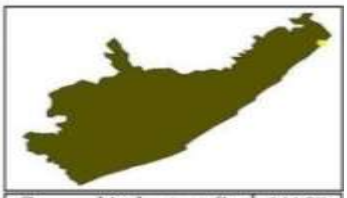
Figure 38 Satellite image of Nallacheruvu

## 3.31 DUNKURU WETLANDS

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Dunkuru | Tekkali | Ichapuram | 19$^0$ 03′ 19.08″ N | 84$^0$ 44′ 23.78″ E | Natural |

It is an important seasonal wetland land with an area of 60 ha situated near to the Ichapuram wetland complex. Thirty nine bird species were recorded from the area. This included Black Headed Ibis and Painted Stork which are 'Near Threatened', Eurasian Spoon Bill, which is 'Near Threatened' and Schedule-I species, Palla's Fish Eagle, a 'Vulnerable' species and White Bellied Sea eagle, a Schedule-1 species. Flora consists of 32 species which included *Iseilma anthphoroides*, an endemic species to Peninsular India.

The surrounding areas of the wetland are very fertile and water from the tank is used for irrigating around 400 ha of paddy, pulses and other cereals. Around hundred farmers depend on the wetland for their agriculture. The wetland is a major grazing field for cattle during dry season. Poaching of birds is a threat in the wetland.

| | |
|---|---|
| Geographical extent (in Hectare) | 144.97 |
| Avian Species Richness | 39 |
| IUCN Red Listed | 4 |
| Floral Richnes | 32 |

Figure 39 Satellite image of Dunkuru wetlands

## 3.32 NARAYANA SAGARAM

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Budumuru | Srikakulam | Laveru | 18$^0$ 15′ 17.89″ N | 83$^0$ 46′ 37.56″ E | Natural/ Modified |

It is a seasonal, natural wetland, modified later, spread over 300 ha. Thirty four bird species and 25 plant species were recorded form the wetland area. More than 1000 farmers depend upon this wetland for irrigation. Paddy and pulses are the major crops. During season fingerlings are stocked and fishing cooperative society members are engaged in fishing. In dry season the wetland is a major grazing field for cattle.


| | |
|---|---|
| Geographical extent (in Hectare) | 81.23 |
| Avian Species Richness | 34 |
| IUCN Red Listed | - |
| Floral Richnes | 25 |

Figure 40 Satellite image of Narayana Sagaram

## 3.33 ICHAPURAM WETLANDS

| Location/Mandal | Division | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|
| Ichapuram | Tekkali Ichapuram | $18^0$ 15' 17.89" N | $83^0$ 46' 37.56" E | Natural |

This important perennial wetland complex is situated partly in Srikakulam district and partly in the Ganjam district of Odisha. Hundreds of acres of Salt pans and aquaculture farms spread across this wetland. Nevertheless it has got rich biodiversity. During our rapid survey 54 bird species and 231 plant species were recorded. Black Bellied tern, Black Headed Ibis, Eurasian Curlew, and Painted Stork 'Near Threatened' species, Palla's Fish Eagle which is 'Vulnerable' and Osprey and Pallid Harrier Schedule-1 species were found in the wetland. Poaching birds is rampant here. *Phyllanthus rotundifilia*, an endemic species to Peninsular India was also reported from the wetland.


Figure 41 Satellite image of Ichapuram wetlands

## 3.34 TELIKUNJI WETLANDS

| Location | Division | Mandal | Latitude | Longitude | Type of wetland |
|---|---|---|---|---|---|
| Telikunji | Tekkali | Ichapuram | $18^0$ 15′ 17.89″ N | $83^0$ 46′ 37.56″ E | Natural and modified |

Telikunji wetland is designated as an Important Bird Area. It harbours thousands Open Bills along with several other species. During our survey we recorded 18 bird species which included Painted Stork, a 'Near Threatened' species. It is harbouring a rich plant biodiversity with 132 species, which included *Jatropha tanjorensis,* an endemic species to Peninsular India.


Figure 42 Satellite image of Thelikunji wetland

# 4 DISCUSSION

## 4.1 COASTAL WETLANDS

Coastal wetlands are the most valuable, productive and critically threatened wetlands in the world. They are a critical interface between the terrestrial and marine environments and are ideally positioned to reduce impacts from land-based sources. There are various types of coastal wetlands including riparian wetlands, tidal freshwater marshes, tidal salt marshes, and mangroves. While many coastal nations have developed coastal-zone management policies and legislation, degradation and losses of coastal wetlands continue due to altered hydrology, increased sediment and nutrient loading, urban development, agriculture, and aquaculture (Bruland, 2008)

The coastal land at the continental margin accounts for less than 5% of the Earth's land area, yet 17% of the earth's human population lives within this zone (*http://qui.unep-wcmc.org/MA/Index.cfml*). Furthermore, approximately 4 billion people live within 60 Km of the world's coastlines (Kennish, 2002). In fact, 27% of the earth's human population lives within 50 Km distance from an estuary. Coastal population densities have been estimated to be 100 people per square kilometer compared to only 38 people per square kilometer in inland areas (Agardy & Alder, 2005).

## 4.2 COASTAL BELT OF SRIKAKULAM- A BIODIVERSITY HUB

The coastal plains consist of 10-15 Km strip of land all along the seacoast of 193 Km starting from Itchapuram to Kandivalasagedda. The major rivers of the district, namely the Nagavalli drains into Bay of Bengal near Kallepalli, the Vamsadhara near Kalingapatnam and the Mahendratanaya near Baruva creating estuaries.

The Coastal Plains all along the seacoast are characterized by Beelas (in vernacular) or backwaters, typical wetland systems fed by flood waters through a vast network

of small streams/channels and connected to the sea via a creek/channel marked by sandy dunes. The two major Beelas of the district are Sompeta swamp and Bhavanapadu swamp. Sompeta swamp is situated in the northern part of the district and Bhavanapadu lies near to Tekkali town in the central part of the district. The Poondi wetland complex, extending to about 320 ha acres with more than 200 acres of back water area and adjacent salt pans and aquaculture fields, is a major wetland near Vajrapukkotturu in Nandigam mandal. Ichapuram wetland, into which the river Bahuda drains, is partly situated in the extreme north of the Srikakulam district and partly in the Odisha state.

Apart from the above major wetlands there are hundreds of wetlands with fresh water, most of them being perennial, and providing habitat for important varied biodiversity. Some such wetlands surveyed are Dunkuru, Narasipuram Peddacheruvu, Pathatekkali, Telineelapuram, Kotabommali, Sivarampuram, Narayanapuram, Mettucheruvu, Lanka and Kuddiram Cheruvu.

As discussed above coastal plains are highly productive with similar but varied ecosystem characteristics. Sand bars / mounds can be seen near Kallepalli, Srikakulam, kalingapatnam, Bhavanapadu, Vajrapukotturu, Baruva etc., along the estuaries of the rivers Nagavalli near Kallepalli, Vamsadhara near kalingapatnam and Mahendratanaya near Baruva. During our survey 662 plant species were recorded from the entire district. The Sompeta wetland and its environs alone harbour 491 plant species which is 74.17% of the total plants recorded in the district. Excluding Sompeta the other coastal wetlands of the district is a habitat for 422 plant species which is 63.75% of the total plant species recorded in the district. Two hundred and thirty six bird species were recorded from the entire district and 190 species were from the coastal areas.

## 4.3 SOMPETA WETLAND COMPLEX – THE NEED FOR CONSERVATION

### 4.3.1 BIODIVERSITY VALUES

#### *4.3.1.1 Important Bird Habitats*

The Sompeta wetland and its environs is habitat to 122 bird species, of which 11 species fall under IUCN Red List. Black Headed Ibis, Darter, Eurasian Spoon Bill, Painted Stork, Pallid Harrier, Spot Billed Pelican, Black Necked Stork and Greater Grey Headed Fish Eagle seen here belong to 'Near Threatened' categories by IUCN. Among these, Eurasian Spoon Bill and Pallid Harrier fall under Schedule –I of the Indian Wildlife Protection Act. Lesser Adjutant is a 'Vulnerable' species found here.

As mentioned in the site inspection report by the committee formed by the MoEF, Go I, in October every year thousands of birds, locally known as '*Kondamkodi and Nathagotta*' said to be coming from Siberia and Australia visit the wetland and stay there up to 5-6 months. The Beela is used as a resting and feeding habitat. This is an important migrant route and passage migrant place (Report of the site inspection committee, MoEF, 2010).

#### *4.3.1.2 A potential habitat for Pink Headed Duck*

As mentioned earlier, circumstantial evidences point to the possibility of the 'Critically Endangered' Pink Headed Duck occurring in the core area of the Pedda Beela in the Sompeta Wetland complex. As per literature stray populations of this bird were reported from Maharashtra and AP earlier. As the core area of the Pedda Beela is inundated throughout the year and with tall vegetation, extensive efforts will have to be taken in order to ascertain the presence of Pink Headed Duck during migratory season.

#### *4.3.1.3 An area of great floristic wealth*

Our three rapid surveys conducted during the months of October 2011 and February-March 2012 revealed the presence of 491 plant species in the Sompeta

wetland area which indicate the floristic wealth of this area. Out of these 491 plants 206 plants are with medicinal properties, 15 plants edible and 10 plants are edible possessing medicinal properties. *Jatropha tanjorensis reported from* here is endemic to Coromandel costs of peninsular India. Apart from this, following plants viz., *Asystasia dalzelliana, Barleria acuminata, Iseilema anthephorodes* and *Phyllanthus rotundifolius* are endemic to Indian subcontinent. Further surveys during different seasons may establish the presence of many other species.

Apart from the rich bird and plant biodiversity, it is a habitat for several important butterfly species. Because of the complex nature of the ecosystem, a detailed survey is required and that certainly would reveal the presence of several more vertebrate and invertebrate species.

#### *4.3.1.4 Ecosystem Services of the Wetland*

Numerous seasonal channels and streams feed 'Pedda Beela' during rainy season. The other two 'Beelas' are fed by the water from the Pedda Beela, with a typical water regime which have wider implications in terms of the water table, water quality and sustenance of the biodiversity of the surrounding areas.

Around 2000 ha of rice cultivation (two crops) is supported by these beelas. Three lift irrigations projects, each covering an ayacut of 80 ha, is maintained by the water directly drawn from the Beela even during the extreme summer. Mostly vegetables are cultivated using the water from the lift irrigations. There are hundreds of acres of lush coconut and arecanut groves surrounding the Beela providing crucial income for the survival of local inhabitants.

Manikkapuram in the Kanchili Mandal is an exclusive fishing village of Behra community, having their origin in Odisha. Around 800 traditional fishermen form this village and Kaviti Mandal fish in the wetland throughout the year for their sustenance. Apart from providing them income, the catches are locally sold which is a valuable source for comparatively cheap animal protein for the local people. The

fisher households earn additional income, from marketing the fish in the local market by their womenfolk.

The wetlands act as a huge grazing ground for cattle during dry season. Almost all the families surrounding the wetland keep cattle as an additional source of income. The wetland is also a valuable source of medicinal plants and several edible plants which are extensively consumed by the local people. Many villagers depend on the wetland plants for preparation of mats which is the only source of their income.

Our Participatory Rural Appraisal exercise revealed that out of the 33 villages in the periphery of the wetland 17 villages are involved in agriculture, and 16 villages are engaged in cattle rearing along with agriculture. There are 9 fishing villages where some of the villagers also hold agricultural land. One village mostly depend upon coir spinning along with agriculture whereas two villages are engaged in mat preparation along with agriculture.

Our study indicate that the 969.44 ha of land acquired by M/s Nagaurjuna Construction Company for setting up the proposed 4x660 MW Coal Based Thermal Power Plant, except the 10 ha of Pamalumetta highland, forms part of the Sompetta wetland complex (refer to Map). Setting up the proposed plant will have irreversible negative impact on the wetland system. The change in the water regime because of the diversion of the water inlets and the flood waters by blocking the natural flow by the construction of the plant will permanently alter the characteristics of the wetland leading to the loss of biodiversity of plants, birds and several other taxa.

Each bird species occupies a niche for itself, and if that is disturbed it will lead to the loss of the species from this area. At present the core area of the Pedda beela is relatively undisturbed except by random activities of the traditional fishermen.

The construction work involving the movement of man, machinery and materials for the establishment of the thermal power plant will play havoc with the natural setup of the area. After the operationalisation of the plant, it is possible that its emissions

would bring down the environmental quality of the area, and the massive physical interventions will impact the agriculture, and over all environmental health and ecosystem dynamics of the area.

The ash pond where thousands of tons of fly ash will be deposited will pollute the water, although use of modern technology may help reducing the levels. The changes which will happen by design and as a natural consequence of setting up the power plant will impact the beelas which in turn affecting the capture fisheries which has been the chief livelihood of generations of local fishers. Since these fishermen lack any other skill to earn a livelihood, their survival will be in peril.

2000 ha of paddy with 2 crops will suffer by the change in the hydrological regime of the wetland and its surroundings. Apart from the paddy cultivation thousands of acres of coconut farms and 750 acres of vegetable cultivation which depend on the three lift irrigation schemes will face severe threat hitting the livelihood of around 3 lakh people in 33 villages. In effect the physical and operational interventions due to the establishment of the power plant would alter the natural system drastically in the coming years. In the process several species, known and unknown, is likely to disappear from the two areas, several crucial ecosystem services will be seriously undermined affecting the environmental security.

### 4.3.2 **NAUPADA SWAMPS**

#### *4.3.2.1 Biodiversity*

A comprehensive biodiversity survey is yet to be conducted in the Naupada swamp areas, in spite of several projects being implemented there. Our rapid survey reveals that both faunal and floral biodiversity is quite high in the swamp area.

#### *4.3.2.2 Faunal Biodiversity*

Data collected from the present study period and from the various secondary sources indicates that Naupada wetland harbours 145 birds. Naupada wetland is

visited by large number of migratory birds such as Bar-headed Goose, Shoveller, Spot-billed Pelican, Grey Pelican, Sarus Crane, Common Teal, Cotton Teal and Common Pochard. Many of these species are observed even during non migratory season in parts of the wetland where there is sufficient water. As per the IUCN categories, there is one 'Endangered' species, ten 'Near Threatened' species and two 'Vulnerable' species present in the wetland. Among the 'Near Threatened' Pallied Harrier is also a Schedule -I species as per the Indian Wild Life (Protection Act) 1972. The Monitor Lizard, another Schedule- I animal is also present in the wetland. SACON has reported 7147 birds belonging to just 20 species from the Naupada swamps (Vijayan et al, 2004). The wetland is a foraging ground for thousands of birds during all the seasons. It is the major foraging ground for more than 150 Spot Billed Pelicans and 250 Painted Storks nesting in the Telineelapuram, an Important Bird Area.

As per the Environmental Impact Assessment Report prepared by M/s B.S. Envi-Tech (P) Ltd, this wetland is also a habitat for several mammals, snakes and other reptiles many of which fall under Schedule-I as per the IWLP-1972.

#### *4.3.2.3 Plant biodiversity*

Our rapid survey revealed that there are 236 plant species in the Naupada wetland area. *Jatropha tanjoriensis,* an endemic species to Peninsular India is present.

#### *4.3.2.4 Ecosystem services provided by the wetland*

Though the extent of wetlands shown as swamps in the revenue records is 2965.60 ha or approximately 30 square kilometres, extent of the Naupada wetland is much higher since it is a complex of wetlands consisting of marshes, swamps, mud and salt meadows and a creek. The Tekkali creek itself has an approximate water spread area of 1000 ha. The approximate area of the wetland complex may be more than 4800 ha which include the vast salt pans found in the area. While considering that there are many permanent shallow marine waters on the coastal lines adjoining the

Naupada wetland, the area of this complex will be much higher. It is the only remaining wetland of this type on the entire east coast.

During monsoon the entire area gets flooded and the water gradually drains into the Tekkali creek debouched into the sea. The flooding helps in the recharging of the ground water table in a larger area, apart from bringing in huge quantity of nutrients. Large areas remain inundated even after monsoon which is being mixed with the sea water through the creek in the marshes which generate a unique hydrological regime in the wetland complex. This unique hydrological regime supports a vast and dynamic biodiversity not only in the immediate wetland area but also its environs.

The canals from the river Vamsadhara and other numerous drains flowing into the wetland brings in a large quantity of sediments which is being retained by the large wetland area thus maintaining the health of the Tekkali creek. The nutrients being brought in by flood waters play a major role in maintaining the fertility of a vast area. But for the wetlands a lot more sedimentation will take place in the Tekkali creek and valuable nutrients will be lost.

During migratory season it is a habitat for tens of thousands birds since the food is abundant. As per the information provided by the local fishermen 36 species of fishes breed and grow in the wetland. This is the foraging ground for the Pelicans and Painted Storks of the Telineelapuram Heronry.

Around 5000 fishers depend on the wetland for their livelihood. Apart from the fishers involved directly in fishing, the womenfolk of the fishermen community are marketing the fish, thus earning valuable additional income. Vaddithandra is an exclusive fisher community village who are still engaged in traditional fishing employing traditional fishing gears and methods.

Thousands of people depend on the wetland for plant biomass as medicinal plants, edible plants, fodder, materials for thatching and preparation of mats etc. Thousands of cattle graze on the wetland during dry season.

#### *4.3.2.5 Need for the conservation of the wetland*

M/s East Coast Energy Pvt Ltd has partially established a 2640 MW Coal based Thermal power Project in an area which falls under Kakarapalli, Vaddithandra, Antlavaram, Kotapadu, Akasalakkavaram and Pothinadupeta villages in Santhabommali mandal of Tekkali Division of Srikakulam district. 820 ha is allotted for the purpose. Of this, as per the company sources 200 acres will be left free of any alterations.

Our field survey indicates that the area occupied by M/s ECEPL is part of the wetland complex (see map-). According to the company sources, 400 ha acres is earmarked for filling and raising for the power plant block, ash pond and auxiliary structures. Of these, 160 ha acres will be filled and raised to build the main power plant, coal handling area, infrastructure and internal roads. Of the 250 acres acquired for making drainage facilities 70 ha has been used for forming the drainage / garland channel to drain out the flood waters during monsoon to the creek.

### 4.3.3 POSSIBLE ADVERSE IMPACTS OF THE PROPOSED THERMAL POWER PLANT PROJECT

#### *4.3.3.1 Adverse changes in the ecosystem*

As mentioned earlier the marshland and the Naupada swamps are formed by the natural process of the mixing of the water drained out by the Tekkali creek and the flood waters reaching the area through a network of canals originating from the river Vamsadhara and numerous drainage channels. The filling or raising the area would alter the natural land characteristics and flow pattern that will consequently disturb the structure and dynamics of the hydrological / ecological system and processes happening there. It is also likely that it will lead to uncontrolled floods, inundation pattern and cycles and submersion of about 30000 acres of land in the nearby

villages during rainy season. The natural hydrologic regime and the life strategy of animal and plant species are inextricably interconnected and the changes in the former would lead to disappearance of several species from the area.

#### *4.3.3.2 Impact on biodiversity*

The regular grounds for the birds to forage and for other activities will be lost because of the resultant changes. Since the wetland is apparently the main foraging ground for the Pelicans and Painted Storks of Telineelapuram, the very existence of such heronries may be doubtful.

#### *4.3.3.3 Decline in soil and water quality*

The locals expressed their apprehension that in lean season back flow of marine water through the garland canal by the M/s ECEPL for diverting the flood waters to Tekkali creek would adversely impact the soil and water quality, and benthic and other water dependent and aquatic organisms. The natural process the sediment retention, nutrient cycling, and self purification process and assimilation capacity of the swamp area will be disturbed.

#### *4.3.3.4 Impact on livelihood avenues*

The surrounding areas are lush green farm lands cultivating paddy and coconut in thousands of acres which contributes to the prosperity of the area. Increased and uncontrolled flooding during monsoon season, decline in soil and water quality and changes in the hydrological regime is likely to lead to decline in agriculture.

The southern side of the land acquired by the M/s ECEPL has been traditionally used by the fishers for hundreds of years. The adverse impacts on the wetland will lead to the decline in the diversity of fish fauna, fall in the quantum of fish catches and also the number of fish eating birds and other animals.

### *4.3.3.5 Status of other coastal wetlands surveyed*

Dunkur, Poondi wetland complex, Narsipuram Peddacheruvu, Padhatekkali, Telineelpuram, Kottabommali, Sivarampuram, Narayanapuram, Mettucheruvu, Lanka Cheruvu and Kuddiram Cheruvu, Ichapuram, and the river mouths of Nagavalli, Vamsadhara and Mahendratanaya are other coastal wetlands surveyed during present study. Excluding Sompeta wetland, 422 plant species were recorded from the coastal wetlands and environs compared to 662 plant species recorded from the entire district. Out of the 236 bird species recorded from the district, 190 were from the coastal belt alone.

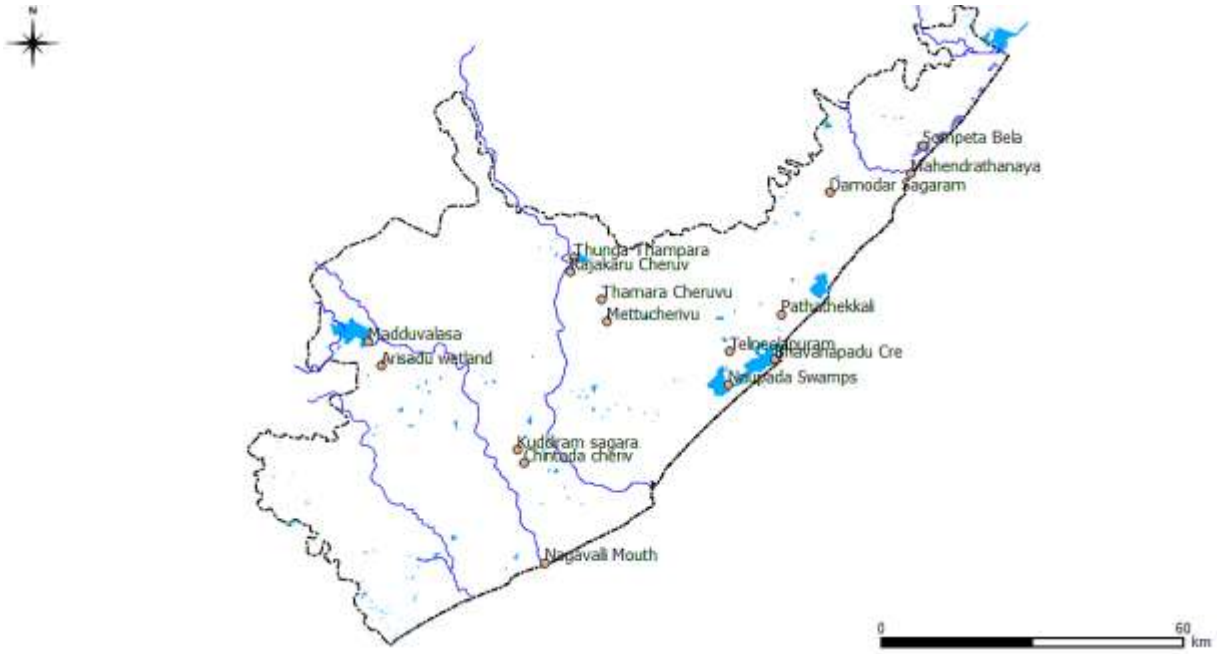



Figure 43 Some of the ecologically important wetland areas

Spot billed pelican, Painted Stork, Sarus Crane, White eyed Pochard, Bear's Pochard, Grey Headed Fish Eagle, Darter, Eurasian Spoon Bill, pallid Harrier, Black necked Stork, Lesser Adjutant, Greater rey headed Fish Eagle, Black bellied Tern, Black Headed Ibis, Eurasian Curlew, Palla's Sea Eagle, and White bellied sea Eagle were the birds fall in the IUCN Red data List reported from the entire district and all of them are from the coastal belt. The possibility of the existence of Pink Headed Duck in the Sompeta wetland makes entire coastal belt a biodiversity hot spot.

#### *4.3.3.6 Srikakulam Coast-an important Olive Ridley nesting site*

Odisha coast is the site of largest congregations of Olive Ridley turtles (*Lepidochelys olivacea)* for nesting. More than a lakh Olive Ridley turtles congregate at Gahirmatha in the Odisha coast. After the Gahirmatha, coastal AP has the largest nesting sites for Olive Ridleys in India. Beaches of Srikakulam district from Ichapuram north to the Nagavalli river mouth in the south are grounds for this turtle's nesting. Bahuda-Vamsadhara-Nagavalli belt are major nesting sites for the species in Srikakulam district. Eight hundred and thirty five nesting sites were reported in 2001 from this belt. Olive Ridleys prefer river mouths for nesting (Tripathy et al., 2001).

The coastal waters of AP are an important pathway for Olive Ridley migrating from the south of Srilanka towards the Odisha coast, with the onset of winter, from September. Usually these animals move at a depth of 5 to 30 m at 5-10 Km off the coast (Mishra, et al., 2011).

Both the proposed Super Thermal Power Plants by M/s NCC Ltd and M/s ECEPL Ltd propose to construct Jetties in the Bay of Bengal for transportation of machineries and coal. Once the plants are established and operational, they would also discharge millions of litres of thermally or otherwise polluted water into the sea, which would impact the biodiversity especially species such as Olive Ridley.

#### *4.3.3.7 Coastal Areas-livelihood for millions*

All coastal areas are thickly populated and the major towns of the district Viz., Srikakulam, Narasannapeta, Tekkali, Palasa, Sompeta and Ichapuram are situated in this belt. Fishers (both inland and marine) and agrarian communities, thickly populated and interspersed, inhabit the coastal belt from south to north of the district (Annexure-6). There are 104 villages of fishermen communities. These communities have been living in these areas for hundreds of years. Any major industrialization will jeopardize their means of livelihood since they vitally depend upon ecosystem services for their living. Fishing and associated activities are also an

important vocation for many others. Fish is exported from Srikakulam district to different parts of the country. There are 54 marine fish landing centres (Annexure-5), 47 fish drying platforms, 41 shore shelters and 11 shore sheds (Annexure- 7,8) along the district coast.

### 4.3.4 WETLANDS OF THE PLAINS AND HILLY AREAS

#### *4.3.4.1 Madduvalasa Reservoir*

Madduvalasa is the major reservoir, in the Vangara Mandal of Palakonda Division, built in 2002 on the course of rivers Vegavati and Swarnamukhi. Having water round the year, the reservoir has developed as a habitat for diverse animals and plants. During our rapid survey 18 bird species were identified from the environs of the reservoir. It was interesting to note a large flock of Tufted Ducks with morphological variations such as Ducks with rudimentary tuft or without any tuft. 76 species of plants were identified from the areas near the reservoir. Being in an isolated location, the birds here are subject to poaching with the connivance of the fishers fishing in the reservoir.

Plains of the district abound in wetlands of different sizes and characteristics, and performing different types of ecosystem services. The wetlands in the plains, similar to the wetlands of the coastal areas, play a major role in the well being of the people and also in sustaining the biodiversity, especially the bird population. Most wetlands in the plains are foraging grounds for many important bird species. Thus, scattered populations of 'Near Threatened' species such as Painted Stork, Spot Billed Pelican, Darter and Pallied Harrier could be spotted in several wetlands such as Thamarai Cheruvu in Sarvakota Mandal of Palakonda Division. Painted Stork was also seen spotted in Peddapadu Cheruvu of Srikakulam mandal, Black Bellied Tern was seen in Mettucheruvu of Sarvakota Mandal, Black Bellied Tern and Darter in Narayanapuram Cheruvu in Burja Mandal in Palakonda Division. Chittadi Cheruvu in Vangara Mandal of Palakonda Division was a habitat for Green Avadavat, a 'Vulnerable' species. Chittadi Cheruvu was habitat for 72 bird species, Narayanapuram Cheruvu gives

shelter to 48 bird species, Rajakaru Cheruvu was habitat for 49 bird species, and 21 bird species were found in Thamarai Cheruvu in Sarvakota Mandal of Palakonda Division. All these wetlands were habitat for a number of plant species also.

Most of the wetlands perform the dual function of providing water for agriculture, mostly for a season when rain water is the only source sustaining the wetland, and for two crops when wetland is served by canals from rivers or barrages. Since the district is receiving only 1200 mm rainfall annually, that also from heavy rainfall concentrated in a few days, the process of water harvesting through these wetlands is vital in sustaining the rural economy and ensuring environmental security.

Most of these wetlands are grazing fields for cattle and sheep during dry season. Cattle are a major source of additional income for the rural people. Wetlands provide other services such as providing water for other uses and as a source of fodder for cattle.

### 4.3.5 WETLANDS UNDER THREAT

Most of the wetland ecosystems of Srikakulam are under severe pressure posed by multiple threats. The major threats are given below.

#### *4.3.5.1 Industrialisation*

As discussed earlier major coastal wetlands are under threat form large industries. The small and medium wetlands are also facing threats of different types.

**Agricultural run off**

About 10-15 years ago, people report that, the water was of potable quality in most of the wetlands. It is painful to note that none of the wetlands visited during the present survey has potable water. Currently people depend upon bore wells for drinking water. Heavy usages of chemical fertilizers and pesticides for agriculture, dumping wastes and open defecation are the main reasons for the deterioration of the water quality.

## Industrial pollution

Srikakulam is an industrially backward district. Most industries are concentrated in Pyedibhimavaram, located in the boarder of Visakhapatnam and Srikakulam districts, of which M/s Arobindo Pharma and M/s Dr. Reddy's Lab are the major ones. These industries release their effluents to the nearby rivulets which carry the effluent to the Bay of Bengal. Mercifully the nearby wetlands looks as if not under serious direct threat, perhaps the effluents are better treated, the quanity is relatively low or the self-purification capacity of the system is not overwhelmed or not poisoned by the quanity and quality of the pollutants. However, the wetlands near the M/s Nagarjuna Agrochem Ltd in Akkivalasa village of Etcherla Mandal in Srikakulam district could not survive. They have released their deleterious effluents to the wetland which was a source of various ecosystem services for more than 1000 households. Today the whole area stinks of chemicals and the health of people and animals are affected and nearby agricultural lands have become barren.

Likewise the Eenadu Paper Factory and a nearby milk processing unit release effluents to the Peddapadu Cheruvu near the Srikakulam town. This wetland is a habitat for Painted Storks and thousands of other birds. Nearby inhabitants and fishers complain that the water quality has gone down and they are not getting the yield as they used to get earlier.

## Curing of Jute

The industrial sector in the district is dominated by Jute based industries since Jute is a major crop cultivated in the district. Umpteen number of wetlands are used for curing Jute which pollutes the water making it unfit for other purposes. It would be advisable that a study of impact of the process on ecosystems is conducted and alternate ways of curing the plant is developed.

### Eutrophication

Many wetlands are facing eutrophication due to heavy nutrient load from domestic and municipal effulents, agricultural runoff, open defecation, industrial pollution and curing Jute.

### Dumping solid wastes

Most of the urban and semi urban wetlands are being used for dumping solid wastes and are facing permanent destruction.

### Domination of weeds and single species growth

Many wetlands are dominated by the growth of weeds which negatively impact the plant diversity there. Similarly there is an overgrowth of species like *Vetivera zizanoides* in many wetlands. While these types of growth are favorable for many bird species, it is unfavourable to several other ones.

### Excessive grazing

Srikakulam district boasts of a substantial population of cattle and sheep as most of the agricultural households rear cattle as an additional source of income. Wetlands during dry season are extensively grazed as well as used for harvesting fodder which is detrimental to the plant biodiversity which in turn impact the faunal diversity.

### Cleaning and Expansion of wetlands under MNREGA

Biodiversity is indiscriminately removed while taking up cleaning and expansion programme in several wetlands which adversely impact the biodiversity of the wetlands.

### Poaching

Poaching of birds is rampant in all the wetlands mostly by the fishermen or with their connivance by others. Many traditional fishermen are also known hunting turtles. At

the current rate of reported poaching the survival of birds and other wild fauna associated with wetlands are in peril.

### Conflict of interests for water between irrigation and fishing

While the farmers require the water released promptly for their seasonal crops, the fishers would like to retain water for a longer time to enable the fishes to grow larger. Retaining the water for a longer duration will help the resident and migratory birds also. However, this conflict of interest between the stakeholder groups continues without any proper solution.

# 5 Conclusions and Recommendations

- Srikakulam district is rich in wetlands, with many major wetlands located along the coastal plains. In hilly regions the wetlands are mostly man-made.
- The coastal wetlands of Srikakulam present a complex inter-connected wetland system that needs to be conserved in its entirety to preserve the functional linkages between these wetlands and to sustain the invaluable ecosystem services.
- The wetlands of Srikakulam district provide habitats for 236 bird species and 662 plant species. Information on other taxa remains almost absent.
- Several bird species falling under the 'Near Threatened', 'Vulnerable' and 'Endangered' IUCN categories and Schedule- I of IWPA-1972 are seen in the wetlands and its surroundings.
- Documentation of other taxa associated with the wetlands in the district is very scarce and it needs to be done at the earliest.
- The wetlands in the district face various types of threats. Diversion for industrial use is a major and serious one.
- Rampant poaching of wild birds is a major threat to the birds of the area.
- The wetlands serve several ecosystem services such as water for irrigation, ground water recharging, water for other human uses, support several species

of fauna and flora, fishery, control of salt water intrusion, pollution abatement etc.

- A large number of people get their livelihood from fishing and other weland goods.
- The coastal wetlands should be protected as they are ecologically sensitive, habitats for rich biodiversity that includes several IUCN redlisted species, and to ensure ecological security and sustainability.
- Lakhs of people depend upon the various ecosystem services provided by the coastal wetlands. For their survival, therefore no activity which will threaten the integrity of these wetlands should be allowed.
- Srikakulam coast is the second largest nesting site of Olive Ridley turtles in India. These species prefer areas close to river mouths for breeding. Therefore special protective measures have to be devised and executed in the coastal belt of Srikakulam.
- It has been established that coastal waters of AP is an important pathway for Olive Ridley turtles migrating from south of Srilanka to Odisha in search of their breeding and nesting sites. Therefore construction of Jetties in the Bay of Bengal near the Srikakulam coast and also the release of effluents to the sea should not be allowed.
- For protection of the breeding sites of the Olive Ridley Turtles 'Interest Groups' involving all the stakeholders need to be formed and substantial awareness campaigns and strict enforcement of relevant laws and regulations should be ensured.
- The core area of the Sompeta wetland is a suspected habitat of the endangered Pink Headed Duck, which has not been sighted in the country for more than half a century. However, since its presence is indicated during our attempts using PRA tools, immediate steps should be taken to protect the habitat from any disturbance and investigations should be taken up right away to ascertain the presence of the bird. Nevertheless, pending confirmation of its presence /

absence in the area, protection should be given immediately to the area so that the chance of survival of this singular bird is not jeopardized by unscrupulous actions.

- Both Naupada swamps and Sompeta wetland are rich and distinctive ecosystems. However, scientific documentation on these wetlands is sparse and grossly inadequate. Therefore, it is imperative that a multidisciplinary research programme is taken up on these wetlands and a comprehensive management plan is prepared. Looking at their apparent ecological values efforts should be initiated to declare both the wetlands as Ramsar sites.
- A comprehensive survey of the wetlands of Srikakulam district should be conducted and all the wetlands with more than 500 ha area should be identified and the same should not be allowed to be converted for any other purpose as stipulated in the national Wetland Rules-2010.
- As the present survey has indicated that many smaller wetlands also harbor substantial biodiversity, provide habitats at times for several species of conservation importance and are ecologically sensitive and valuable. Such wetlands should be identified and protected as per the stipulations of Wetlands (Conservation & Management) Rules-2010. A strategy for sustainably and wisely using them whilst ensuring their entire ecosystem structure, functions and services should be identified and executed.
- Jute cultivation and processing, being an important economic activity in the district appropriate methods that will not spoil the wetlands may be executed for curing jute. Cement water tanks should be considered for curing of Jute.
- The present survey indicates that many fishermen indulge in poaching of birds and other wild life wherever available. They are unaware of the importance of such species. Awareness programmes have to be initiated to address this issue. Programmes with stakeholder participation should be formulated to protect such wetlands.

- Many wetlands have the potential for development as recreation centres and nature educational avenues. Such wetlands should be identified and developed.
- Under the Mahatma Gandhi National Employment Guarantee Programme cleaning and expansion work has been taken up in many wetlands which lead to the complete removal of plant biodiversity which in turn impact the bird and other animal biodiversity. Measures to sustain the biodiversity of the wetland have to be devised and implemented while carrying out such works, perhaps using MNERGP funds.
- Wetlands should not be used as dump yards for wastes of any kind, municipal, industrial, commercial or domestic. Industrial effluents should not be allowed to be discharged into the wetlands even after treatment.
- Awareness programmes should be taken up for educating people about the harmful effects of open defecation, such as contamination of drinking water and its health implications and sufficient toilets may be provided.

In brief, it is suggested that all the wetlands in the district with more than 500 ha should be identified and protected alongwith the wetlands that are ecologically sensitive and important which are major wildlife habitats, areas of of outstanding natural beauty or historical or heritage areas and the areas rich in genetic diversity as stipulated in the National Wetland (Conservation & Management) Rules-2010. They should not be allowed to be converted for any other purpose. It is also suggested that firm attempts should be made, especially for the four major wetland complexes in the coastal plains, to document their ecological and conservational values, the ecological goods and services form these and to conserve them.

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Appendix 1 Ramsar classification of wetlands

| | Marine/Coastal Wetlands |
|---|---|
| **A** | Permanent shallow marine waters in most cases less than six metres deep at low tide; includes sea bays and straits. |
| **B** | Marine sub tidal aquatic beds; includes kelp beds, sea-grass beds, and tropical marine meadows. |
| **C** | Coral reefs. |
| **D** | Rocky marine shores; includes rocky offshore islands, sea cliffs. |
| **E** | Sand, shingle or pebble shores; includes sand bars, spits and sandy islets; includes dune systems and humid dune slacks. |
| **F** | Estuarine waters; permanent water of estuaries and estuarine systems of deltas. |
| **G** | Intertidal mud, sand or salt flats. |
| **H** | Intertidal marshes; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes. |
| **I** | Intertidal forested wetlands; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests. |
| **J** | Coastal brackish/saline lagoons; brackish to saline lagoons with at least one relatively narrow connection to the sea. |
| **K** | Coastal freshwater lagoons; includes freshwater delta lagoons. |
| **Zk(a)** | Karst and other subterranean hydrological systems, marine/coastal |
| | Inland Wetlands |
| **L** | Permanent inland deltas. |
| **M** | Permanent rivers/streams/creeks; includes waterfalls. |
| **N** | Seasonal/intermittent/irregular rivers/streams/creeks. |
| **O** | Permanent freshwater lakes (over 8 ha); includes large oxbow lakes. |
| **P** | Seasonal/intermittent freshwater lakes (over 8 ha); includes floodplain lakes. |
| **Q** | Permanent saline/brackish/alkaline lakes. |
| **R** | Seasonal/intermittent saline/brackish/alkaline lakes and flats. |
| **Sp** | Permanent saline/brackish/alkaline marshes/pools. |
| **Ss** | Seasonal/intermittent saline/brackish/alkaline marshes/pools. |
| **Tp** | Permanent freshwater marshes/pools; ponds (below 8 ha), marshes and swamps on inorganic soils; with emergent vegetation water-logged for at least most of the growing season. |
| **Ts** | Seasonal/intermittent freshwater marshes/pools on inorganic soils; includes sloughs, potholes, seasonally flooded meadows, sedge marshes. |
| **U** | Non-forested peat lands; includes shrub or open bogs, swamps, fens. |
| **Va** | Alpine wetlands; includes alpine meadows, temporary waters from snowmelt. |
| **Vt** | Tundra wetlands; includes tundra pools, temporary waters from snowmelt. |
| **W** | Shrub-dominated wetlands; shrub swamps, shrub-dominated freshwater marshes, shrub carr, alder thicket on inorganic soils. |
| **Xf** | Freshwater, tree-dominated wetlands; includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils. |
| **X** | Forested peat lands; peat swamp forests. |
| **Y** | Freshwater springs; oases. |

| | |
|---|---|
| | Marine/Coastal Wetlands |
| **Za** | Geothermal wetlands |
| **Zb** | Karst and other subterranean hydrological systems, inland |
| | Human-made wetlands |
| **1** | Aquaculture (e.g., fish/shrimp) ponds |
| **2** | Ponds; includes farm ponds, stock ponds, small tanks; (generally below 8 ha). |
| **3** | Irrigated land; includes irrigation channels and rice fields: |
| **4** | Seasonally flooded agricultural land (including intensively managed or grazed wet meadow or pasture). |
| **5** | Salt exploitation sites; salt pans, salines, etc. |
| **6** | Water storage areas; reservoirs/barrages/dams/impoundments (generally over 8 ha). |
| **7** | Excavations; gravel/brick/clay pits; borrow pits, mining pools. |
| **8** | Wastewater treatment areas; sewage farms, settling ponds, oxidation basins, etc. |
| **9** | Canals and drainage channels, ditches. |
| **Zk(c)** | Karst and other subterranean hydrological systems, human-made |

*Source: www.ramsar.org*

Appendix 2 Plants recorded from the study area

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 1. | *Abelmoschus esculentus* (L.) Moench | Malvaceae | Shrub | Terrestrial | Cultivated |
| 2. | *Abrus precatorius* L. | Fabaceae | Straggler | Terrestrial | Wild |
| 3. | *Abutilon hirtum* (Lam.) Sweet | Malvaceae | Shrub | Terrestrial | Wild |
| 4. | *Abutilon indicum* (L.) Sweet | Malvaceae | Shrub | Terrestrial | Wild |
| 5. | *Acacia auriculiformis* A. Cunn ex Benth. | Mimosaceae | Tree | Terrestrial | Exotic |
| 6. | *Acacia caesia* (L.) Willd. | Mimosaceae | Straggler | Terrestrial | Wild |
| 7. | *Acacia catechu* (L.f.) Willd. | Mimosaceae | Tree | Terrestrial | Wild |
| 8. | *Acacia chundra* (Roxb. ex Rottl.) Willd. | Mimosaceae | Tree | Terrestrial | Wild |
| 9. | *Acacia farnesiana* (L.) Willd. | Mimosaceae | Tree | Terrestrial | Wild |
| 10. | *Acacia holosericea* A.Cunn. | Mimosaceae | Tree | Terrestrial | Planted |
| 11. | *Acacia leucophloea* (Roxb.) Willd. | Mimosaceae | Tree | Terrestrial | Wild |
| 12. | *Acacia nilotica* (L.) Willd. ex Del. | Mimosaceae | Tree | Terrestrial | Wild |
| 13. | *Acacia sinuata* (Lour.) Merr. | Mimosaceae | Tree | Terrestrial | Wild |
| 14. | *Acacia torta* (Roxb.) Craib | Mimosaceae | Straggler | Terrestrial | Wild |
| 15. | *Acalypha brachystachya* Hornem. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 16. | *Acalypha fruticosa* Forssk. | Euphorbiaceae | Shrub | Terrestrial | Wild |
| 17. | *Acalypha indica* L. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 18. | *Acalypha paniculata* Willd. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 19. | *Acanthospermum hispidum* DC. | Asteraceae | Herb | Terrestrial | Wild |
| 20. | *Acanthus ilicifolius* Linn. | Acanthaceae | Herb | Semi-aquatic | Wild |
| 21. | *Achras sapota* Linn. | Sapotaceae | Tree | Terrestrial | Cultivated |
| 22. | *Achyranthes aspera* L. | Amaranthaceae | Herb | Terrestrial | Wild |
| 23. | *Acorus calamus* L | Zingiberaceae | Herb | Terrestrial | Cultivated |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 24. | *Adansonia digitata* L. | Bombacaceae | Tree | Terrestrial | Wild |
| 25. | *Aegle marmelos* (L.) Correa | Rutaceae | Tree | Terrestrial | Wild |
| 26. | *Aeluropus lagopoides* (Linn.) Trin. ex Thw. | Poaceae | Grass | Semi-aquatic | Wild |
| 27. | *Aerides ringens* (Lindl.) C.E.C.Fischer | Orchidaceae | Herb | Epiphytic | Wild |
| 28. | *Aerva lanata* (L.) Juss. ex Schultes | Amaranthaceae | Herb | Terrestrial | wild |
| 29. | *Aerva persica* (Burm.f.) Merr. | Amaranthaceae | Herb | Terrestrial | wild |
| 30. | *Aerva sanguinolenta* (L.) Blume | Amaranthaceae | Herb | Terrestrial | Wild |
| 31. | *Aeschynomene aspera* L. | Fabaceae | Herb | Terrestrial | Wild |
| 32. | *Aglaia elaeagnoidea* (Juss.) Benth. | Meliaceae | Tree | Terrestrial | Wild |
| 33. | *Ailanthus excelsa* Roxb. | Simaroubaceae | Tree | Terrestrial | Wild |
| 34. | *Alangium salviifolium* (L.f.) Wang. | Alangiaceae | Tree | Terrestrial | Wild |
| 35. | *Albizia amara* (Roxb.) Boivin | Mimosaceae | Tree | Terrestrial | Wild |
| 36. | *Albizia lebbeck* (L.) Willd. | Mimosaceae | Tree | Terrestrial | Wild |
| 37. | *Albizia saman* (Jacq.) F.v. Muell. | Mimosaceae | Tree | Terrestrial | Planted |
| 38. | *Allophylus serratus* Kurz. | Sapindaceae | Tree | Terrestrial | Wild |
| 39. | *Aloe vera* (L.) Burm.f. | Aloeaceae | Herb | Terrestrial | Wild |
| 40. | *Alstonia scholaris* (L.) R.Br. | Apocynaceae | Tree | Terrestrial | Cultivated |
| 41. | *Alstonia venenata* R.Br. | Apocynaceae | Tree | Terrestrial | Wild |
| 42. | *Alternanthera paronychioides* A. St.-Hilaire | Amaranthaceae | Herb | Terrestrial | Wild |
| 43. | *Alternanthera pungens* Kunth | Amaranthaceae | Herb | Terrestrial | Wild |
| 44. | *Alternanthera sessilis* (L.) R.Br. ex DC. | Amaranthaceae | Herb | Aquatic | Wild |
| 45. | *Alternanthera tenella* Colla. | Amaranthaceae | Herb | Semi-aquatic | Wild |
| 46. | *Alysicarpus longifolius* Wight & Arn. | Fabaceae | Herb | Terrestrial | Wild |
| 47. | *Alysicarpus monilifer* (L.) DC. | Fabaceae | Herb | Terrestrial | Wild |
| 48. | *Alysicarpus rugosus* DC. | Fabaceae | Herb | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 49. | *Amaranthus spinosus* L. | Amaranthaceae | Herb | Terrestrial | Wild |
| 50. | *Amaranthus viridis* L. | Amaranthaceae | Herb | Terrestrial | Wild |
| 51. | *Ammannia baccifera* Linn. | Lythraceae | Herb | Semi-aquatic | Wild |
| 52. | *Amorphophallus paeoniifolius* (Dennst.) Nicolson | Araceae | Herb | Marshy | Wild |
| 53. | *Ampelocissus latifolia* (Roxb.) Planch. | Vitaceae | Climber | Terrestrial | Wild |
| 54. | *Ampelocissus tomentosa* (Heyne ex Roth) Planch. | Vitaceae | Climber | Terrestrial | Wild |
| 55. | *Anacardium occidentale* L. | Anacardiaceae | Tree | Terrestrial | Planted |
| 56. | *Andrographis alata* (Vahl) Nees | Acanthaceae | Herb | Terrestrial | Wild |
| 57. | *Andrographis paniculata* (Burm.f.) Wall. ex Nees | Acanthaceae | Herb | Terrestrial | Wild |
| 58. | *Andropogon pumilus* Roxb. | Poaceae | Grass | Terrestrial | Wild |
| 59. | *Anisochilus carnosus* (L.f.) wall. | Lamiaceae | Shrub | Terrestrial | Wild |
| 60. | *Anisochilus scaber* Benth. | Lamiaceae | Shrub | Terrestrial | Wild |
| 61. | *Anisomeles indica* (L.) Kuntze | Lamiaceae | Herb | Terrestrial | Wild |
| 62. | *Anisomeles malabarica* (L.) R. Br. ex Sims. | Lamiaceae | Herb | Terrestrial | Wild |
| 63. | *Annona reticulata* L. | Annonaceae | Tree | Terrestrial | Planted |
| 64. | *Annona squamosa* L. | Annonaceae | Tree | Terrestrial | Cultivated |
| 65. | *Anogeissus acuminata* (Roxb. ex DC.) Guill. & Perr. | Combretaceae | Tree | Terrestrial | Wild |
| 66. | *Anogeissus latifolia* (Roxb. Ex DC.) Wall ex Guill. & Perr. | Combretaceae | Tree | Terrestrial | Wild |
| 67. | *Anthocephalus cadamba* (Roxb.) Miq. | Rubiaceae | Tree | Terrestrial | Cultivated |
| 68. | *Aponogeton natans* (L.) Engl. & K.Krause | Aponogetonaceae | Herb | Aquatic | Wild |
| 69. | *Arachis hypogaea* L. | Fabaceae | Herb | Terrestrial | Cultivated |
| 70. | *Araucaria cunninghamii* Aiton ex D.Don | Araucariaceae | Tree | Terrestrial | Ornamental |
| 71. | *Ardisia solanacea*Roxb. | Myrisinaceae | Tree | Marshy | Wild |
| 72. | *Argemone mexicana* L. | Papaveraceae | Herb | Terrestrial | Exotic |
| 73. | *Argyreia cuneata* (Willd.) Ker-Gawl. | Convolvulaceae | Straggler | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 74. | *Argyreia elliptica* (Roth) Choisy | Convolvulaceae | Straggler | Terrestrial | Wild |
| 75. | *Argyreia hirsuta* Wight & Arn. | Convolvulaceae | Straggler | Terrestrial | Wild |
| 76. | *Argyreia nervosa* (Burm.f.) Boj. | Convolvulaceae | Straggler | Terrestrial | Wild |
| 77. | *Argyreia setosa* (Roxb.) Choisy | Convolvulaceae | Straggler | Terrestrial | Wild |
| 78. | *Aristida adscensionis* L. | Poaceae | Grass | Terrestrial | Wild |
| 79. | *Aristida funiculata* Trin & Rupr. | Poaceae | Grass | Terrestrial | Wild |
| 80. | *Aristida hystrix* L. | Poaceae | Grass | Terrestrial | Wild |
| 81. | *Aristida setacea* Retz. | Poaceae | Grass | Terrestrial | Wild |
| 82. | *Aristolochia bracteolata* Lam. | Aristolochiaceae | Straggler | Terrestrial | Wild |
| 83. | *Aristolochia indica* L. | Aristolochiaceae | Climber | Terrestrial | Wild |
| 84. | *Artabotrys hexapetalus* (L. f.) Bhandari | Annonaceae | Straggler | Terrestrial | Cultivated |
| 85. | *Artemesia vulgaris* L. | Asteraceae | Herb | Terrestrial | Cultivated |
| 86. | *Arundo donax* L. | Poaceae | Shrub | Marshy | Wild |
| 87. | *Asclepias curassavica* L. | Asclepiadaceae | Herb | Marshy | Wild |
| 88. | *Asparagus racemosus* Willd. | Asparagaceae | Straggler | Terrestrial | Wild |
| 89. | A*systasia dalzelliana* Sant. | Acanthaceae | Shrub | Terrestrial | Wild |
| 90. | *Asystasia gangetica* (L.) T. And. | Acanthaceae | Shrub | Terrestrial | Wild |
| 91. | *Atalantia monophylla* (L.) Corr. Serr. | Rutaceae | Tree | Terrestrial | Wild |
| 92. | *Atalantia racemosa* Wight & Arn. | Rutaceae | Tree | Terrestrial | Wild |
| 93. | *Atylosia scarabaeoides* (L.) Benth. | Fabaceae | Herb | Terrestrial | Wild |
| 94. | *Avicennia marina* (Forsk.) Vierh. | Avicenniaceae | Tree | Marshy | Wild |
| 95. | *Avicennia officinalis* L. | Avicenniaceae | Tree | Marshy | Wild |
| 96. | *Azadirachta indica* A. Juss. | Meliaceae | Tree | Terrestrial | Wild |
| 97. | *Azima tetracantha* Lam. | Salvadoraceae | Shrub | Terrestrial | Wild |
| 98. | *Bacopa monnieri* (L.) Pennell | Scrophulariaceae | Herb | Aquatic | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 99. | *Balanites aegyptiaca* (L.) Del. | Balanitaceae | Tree | Terrestrial | Wild |
| 100. | *Bambusa bambos* Voss | Poaceae | Tree | Terrestrial | Wild |
| 101. | *Barleria acuminata* Wight ex Nees. | Acanthaceae | Undershrub | Terrestrial | Wild |
| 102. | *Barleria buxifolia* L. | Acanthaceae | Herb | Terrestrial | Wild |
| 103. | *Barleria cristata* L. | Acanthaceae | Herb | Terrestrial | Planted |
| 104. | *Barleria mysorensis* Roth. | Acanthaceae | Herb | Terrestrial | Wild |
| 105. | *Barleria prionitis* L. | Acanthaceae | Herb | Terrestrial | Wild |
| 106. | *Barringtonia racemosa* (L.) Spreng. | Lecythidaceae | Tree | Terrestrial | Wild |
| 107. | *Basella rubra* L. | Chenopodiaceae | Climber | Terrestrial | Cultivated |
| 108. | *Bassia latifolia* Roxb. | Sapotaceae | Tree | Terrestrial | Wild |
| 109. | *Bauhinia purpurea* L. | Caesalpiniaceae | Tree | Terrestrial | Cultivated |
| 110. | *Bauhinia racemosa* Lam. | Caesalpiniaceae | Tree | Terrestrial | Wild |
| 111. | *Benkara malabarica* (Lam.) Tirvengadum | Rubiaceae | Shrub | Terrestrial | Wild |
| 112. | *Bergia ammannioides* Roxb. | Elatinaceae | Herb | Aquatic | Wild |
| 113. | *Bidens pilosa* L. | Asteraceae | Herb | Terrestrial | Wild |
| 114. | *Biophytum reinwardtii* (Zucc.) Klotzsch. | Oxalidaceae | Herb | Terrestrial | Wild |
| 115. | *Blainvillea acmella* (L.) Philipson | Asteraceae | Herb | Terrestrial | Wild |
| 116. | *Blepharis maderaspatensis* (L.) Heyne ex Roth | Acanthaceae | Herb | Terrestrial | Wild |
| 117. | *Blepharis repens* (Vahl) Roth | Acanthaceae | Herb | Terrestrial | Wild |
| 118. | *Blumea lacera* (Burm.f) DC. | Asteraceae | Herb | Terrestrial | Wild |
| 119. | *Blumea mollis* (D.Don) Merr. | Asteraceae | Herb | Terrestrial | Wild |
| 120. | *Boerhavia diffusa* L. | Nyctaginaceae | Herb | Terrestrial | Wild |
| 121. | *Boerhavia erecta* L. | Nyctaginaceae | Herb | Terrestrial | Wild |
| 122. | *Bombax ceiba* L. | Bombacaceae | Tree | Terrestrial | Wild |
| 123. | *Borassus flabellifer* L. | Arecaceae | Tree | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 124. | *Bothriochloa bladhii* (Retz.) S. T. Blake | Poaceae | Grass | Terrestrial | Wild |
| 125. | *Bothriochloa pertusa* (L.) A. Camus | Poaceae | Grass | Terrestrial | Wild |
| 126. | *Brachiaria ramosa* (L.) Stapf | Poaceae | Grass | Terrestrial | Wild |
| 127. | *Brachiaria remota* (Retz.) Haines | Poaceae | Grass | Terrestrial | Wild |
| 128. | *Breynia retusa* (Dennst.) Alston | Euphorbiaceae | Shrub | Terrestrial | Wild |
| 129. | *Breynia vitis-idaea* (Burm.f.) Fischer | Euphorbiaceae | Shrub | Terrestrial | Wild |
| 130. | *Bridelia crenulata* Roxb. | Euphorbiaceae | Tree | Terrestrial | Wild |
| 131. | *Buchanania axillaris* (Desr.) Ramam. | Anacardiaceae | Tree | Terrestrial | Wild |
| 132. | *Buchanania lanzan* Spreng. | Anacardiaceae | Tree | Terrestrial | Wild |
| 133. | *Bulbostylis barbata* (Rottb.) C.B. Clarke | Cyperaceae | Herb | Terrestrial | Wild |
| 134. | *Bulbostylis densa* (Wall. ex Roxb.) Hand.-Mazz. | Cyperaceae | Herb | Terrestrial | Wild |
| 135. | *Butea monosperma* (Lam.) Taub. | Fabaceae | Tree | Terrestrial | Wild |
| 136. | *Cadaba fruticosa* (L.) Druce | Capparidaceae | Straggler | Terrestrial | Wild |
| 137. | *Caesalpinia bonduc* (L.) Roxb. | Caesalpiniaceae | Straggler | Terrestrial | Wild |
| 138. | *Caesalpinia sp*. | Caesalpiniaceae | Shrub | Terrestrial | Wild |
| 139. | *Calophyllum inophyllum* L. | Clusiaceae | Tree | Terrestrial | Wild |
| 140. | *Calotropis gigantea* (L.) R.Br. | Apocynaceae | Shrub | Terrestrial | Wild |
| 141. | *Calotropis procera* (Ait.) R.Br. | Apocynaceae | Shrub | Terrestrial | Wild |
| 142. | *Canavalia cathartica* Thouars | Fabaceae | Straggler | Terrestrial | Wild |
| 143. | *Canna indica* L. | Cannaceae | Herb | Terrestrial | Planted |
| 144. | *Cansjera rheedii* Gmel. | Opeliaceae | Straggler | Terrestrial | Wild |
| 145. | *Capparis decidua* (Forssk.) Edgew. | Capparidaceae | Tree | Terrestrial | Wild |
| 146. | *Capparis grandis* L. | Capparidaceae | Tree | Terrestrial | Wild |
| 147. | *Capparis sepiaria* L. | Capparidaceae | Straggler | Terrestrial | Wild |
| 148. | *Capparis zeylanica* L. | Capparidaceae | Straggler | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 149. | *Caralluma adscendens* Wight | Asclepiadaceae | Herb | Terrestrial | Wild |
| 150. | *Cardiospermum halicacabum* L. | Sapindaceae | Climber | Terrestrial | Wild |
| 151. | *Carissa carandas* L. | Apocynaceae | Straggler | Terrestrial | Wild |
| 152. | *Carissa inermis* Vahl | Apocynaceae | Straggler | Terrestrial | Wild |
| 153. | *Carissa spinarum* L. | Apocynaceae | Straggler | Terrestrial | Wild |
| 154. | *Carmona retusa* (Vahl) Masam. | Boraginaceae | Shrub | Terrestrial | Wild |
| 155. | *Caryota urens* L. | Arecaceae | Tree | Terrestrial | Wild |
| 156. | *Casearia tomentosa* Roxb. | Flacourtiaceae | Tree | Terrestrial | Wild |
| 157. | *Casearia wyanadensis* Bedd. | Flacourtiaceae | Tree | Terrestrial | Wild |
| 158. | *Cassia fistula* L. | Caesalpiniaceae | Tree | Terrestrial | Wild |
| 159. | *Cassia obtusa* L. | Caesalpiniaceae | Tree | Terrestrial | Wild |
| 160. | *Cassia siamea* Lam. | Caesalpiniaceae | Tree | Terrestrial | Wild |
| 161. | *Casuarina equisetifolia* L. | Casuarinaceae | Tree | Terrestrial | Planted |
| 162. | *Cayratia pedata* (Lam.) Juss. ex Gagnep. | Vitaceae | Climber | Terrestrial | Wild |
| 163. | *Cayratia trifolia* (L.) Domin. | Vitaceae | Climber | Terrestrial | Wild |
| 164. | *Ceiba pentandra* (L.) Gaertn. | Bombacaceae | Tree | Terrestrial | Wild |
| 165. | *Celastrus paniculatus* Willd. | Celastraceae | Straggler | Terrestrial | Wild |
| 166. | *Celosia argentea* L. | Amaranthaceae | Herb | Terrestrial | Wild |
| 167. | *Celosia polygonoides* Retz. | Amaranthaceae | Herb | Terrestrial | Wild |
| 168. | *Cenchrus barbatus* Schumach. | Poaceae | Grass | Terrestrial | Wild |
| 169. | *Cenchrus ciliaris* L. | Poaceae | Grass | Terrestrial | Wild |
| 170. | *Cenchrus setigera* Vahl. | Poaceae | Grass | Terrestrial | Wild |
| 171. | *Centella asiatica* (L.) Urban | Apiaceae | Herb | Semi-aquatic | Wild |
| 172. | *Cereus pterogonus* Lem. | Cactaceae | Tree | Terrestrial | Wild |
| 173. | *Chloris barbata* Sw. | Poaceae | Grass | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 174. | *Chloris dolichostachya* Lagasca | Poaceae | Grass | Terrestrial | Wild |
| 175. | *Chloris tenella* Koen. ex Roxb. | Poaceae | Grass | Terrestrial | Wild |
| 176. | *Chloroxylon swietenia* DC. | Rutaceae | Tree | Terrestrial | Wild |
| 177. | *Chromolaena odorata* (L.) King & Robinson | Asteraceae | Shrub | Terrestrial | Exotic |
| 178. | *Chrysopogon aciculatus (Retz.) Trin.* | Poaceae | Grass | Terrestrial | Wild |
| 179. | *Chrysopogon asper* (Heyne ex Hook. f.) Blatter & Mc Can | Poaceae | Grass | Terrestrial | Wild |
| 180. | *Cipadessa baccifera* (Roth) Miq. | Meliaceae | Shrub | Terrestrial | Wild |
| 181. | *Cissampelos pareira* L. | Menispermaceae | Climber | Terrestrial | Wild |
| 182. | *Cissus quadrangularis* L. | Vitaceae | Climber | Terrestrial | Wild |
| 183. | *Cissus repanda* Vahl. | Vitaceae | Climber | Terrestrial | Wild |
| 184. | *Cleome aspera* Koen ex. DC. | Capparidaceae | Herb | Terrestrial | Wild |
| 185. | *Cleome monophylla* L. | Capparidaceae | Herb | Terrestrial | Wild |
| 186. | *Cleome viscosa* L. | Capparidaceae | Herb | Terrestrial | Wild |
| 187. | *Clerodendrum inerme* (L.) Gaertn. | Verbenaceae | Straggler | Terrestrial | Wild |
| 188. | *Clerodendrum infortunatum* L. | Verbenaceae | Shrub | Terrestrial | Wild |
| 189. | *Clerodendrum phlomidis* L.f. | Verbenaceae | Shrub | Terrestrial | Wild |
| 190. | *Clitoria ternatea* L. | Fabaceae | Climber | Terrestrial | Wild |
| 191. | *Coccinia grandis* (L.) Voigt | Cucurbitaceae | Climber | Terrestrial | Wild |
| 192. | *Cocculus hirsutus* (L.) Diels | Menispermaceae | Climber | Terrestrial | Wild |
| 193. | *Cocculus pendulus* (Forst.) Diels | Menispermaceae | Straggler | Terrestrial | Wild |
| 194. | *Cochlospermum religiosum* (L.) Alston | Cochlospermaceae | Tree | Terrestrial | Wild |
| 195. | *Coldenia procumbens* Linn. | Boraginaceae | Herb | Terrestrial | Wild |
| 196. | *Colocasia esculenta* (L.) Schott | Araceae | Herb | Aquatic | Wild |
| 197. | *Combretum albidum* G. Don | Combretaceae | Straggler | Terrestrial | Wild |
| 198. | *Commelina benghalensis* L. | Commelinaceae | Herb | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 199. | *Commelina clavata* Clarke | Commelinaceae | Herb | Terrestrial | Wild |
| 200. | *Commelina longifolia* Lam. | Commelinaceae | Herb | Terrestrial | Wild |
| 201. | *Commiphora berryi* (Arn.) Engler | Burseraceae | Tree | Terrestrial | Wild |
| 202. | *Commiphora caudata* (Wight & Arn.) Engler | Burseraceae | Tree | Terrestrial | Wild |
| 203. | *Convolvulus arvensis* L. | Convolvulaceae | Climber | Terrestrial | Wild |
| 204. | *Conyza leucantha* (D.Don) Ludlow & Raven | Asteraceae | Herb | Terrestrial | Wild |
| 205. | *Corchorus aestuans* L. | Tiliaceae | Herb | Terrestrial | Wild |
| 206. | *Corchorus tridens* L. | Tiliaceae | Herb | Terrestrial | Wild |
| 207. | *Corchorus trilocularis* L. | Tiliaceae | Herb | Terrestrial | Wild |
| 208. | *Cordia dichotoma* G. Forst. | Boraginaceae | Tree | Terrestrial | Wild |
| 209. | *Cordia domestica* Roth | Boraginaceae | Tree | Terrestrial | Wild |
| 210. | *Cordia myxa* L. | Boraginaceae | Tree | Terrestrial | Wild |
| 211. | *Cordia sebestena* L. | Boraginaceae | Tree | Terrestrial | Ornamental |
| 212. | *Costus speciosus* (Koen.) J. E. Smith | Costaceae | Herb | Terrestrial | Planted |
| 213. | *Couroupita guianensis* Aubl. | Lecythidaceae | Tree | Terrestrial | Ornamental |
| 214. | *Crotalaria evolvuloides* Wight ex Wight & Arn. | Fabaceae | Herb | Terrestrial | Wild |
| 215. | *Crotalaria juncea* L. | Fabaceae | Shrub | Terrestrial | Wild |
| 216. | *Crotalaria mysorensis* Roth. | Fabaceae | Herb | Terrestrial | Wild |
| 217. | *Crotalaria pallida* Dryand. var. *obovata* (G.Don) Polhill | Fabaceae | Herb | Terrestrial | Wild |
| 218. | *Croton bonplandianum* Baill. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 219. | *Cryptolepis buchananii* Roem. & Schult. | Asclepiadaceae | Straggler | Terrestrial | Wild |
| 220. | *Cryptolepis grandiflora* Wight | Asclepiadaceae | Straggler | Terrestrial | Wild |
| 221. | *Curculigo orchioides* Gaertn | Hypoxidaceae | Herb | Terrestrial | Wild |
| 222. | *Cuscuta reflexa* Roxb. | Convolvulaceae | Climber | Terrestrial | Wild |
| 223. | *Cyanotis tuberosa* (Roxb.) Schultes & Schultes | Commelinaceae | Herb | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 224. | *Cycas circinalis* L. | Cycadaceae | Tree | Terrestrial | Ornamental |
| 225. | *Cynodon dactylon* (L.) Pers. | Poaceae | Grass | Terrestrial | Wild |
| 226. | *Cynoglossum zeylanicum* (Vahl ex Hornem.) Thunb. ex Lehm. | Boraginaceae | Herb | Terrestrial | Wild |
| 227. | *Cyperus articulatus* L. | Cyperaceae | Herb | Aquatic | Wild |
| 228. | *Cyperus difformis* L. | Cyperaceae | Herb | Semi-aquatic | Wild |
| 229. | *Cyperus exaltatus* Retz. | Cyperaceae | Herb | Aquatic | Wild |
| 230. | *Cyperus halpan* L. | Cyperaceae | Herb | Semi-aquatic | Wild |
| 231. | *Cyperus iria* L. | Cyperaceae | Herb | Semi-aquatic | Wild |
| 232. | *Cyperus pangorei* Rottb. | Cyperaceae | Herb | Semi-aquatic | Wild |
| 233. | *Cyperus rotundus* L. | Cyperaceae | Herb | Terrestrial | Wild |
| 234. | *Dactyloctenium aegyptium* (L.) Willd. | Poaceae | Grass | Terrestrial | Wild |
| 235. | *Dactyloctenium aristatum* Link. | Poaceae | Grass | Terrestrial | Wild |
| 236. | *Dalbergia sissoo* Roxb. | Fabaceae | Tree | Terrestrial | Planted |
| 237. | *Datura innoxia* Mill. | Solanaceae | Shrub | Terrestrial | Wild |
| 238. | *Datura metal* L. | Solanaceae | Shrub | Terrestrial | Wild |
| 239. | *Delonix elata* (L.) Gamble | Caesalpiniaceae | Tree | Terrestrial | Wild |
| 240. | *Delonix regia* (Boj. ex Hook) Rafin. | Caesalpiniaceae | Tree | Terrestrial | Wild |
| 241. | *Derris scandens* (Roxb.) Benth | Fabaceae | Straggler | Terrestrial | Wild |
| 242. | *Desmostachya bipinnata* (L.) Stapf | Poaceae | Grass | Terrestrial | Wild |
| 243. | *Dicanthium annulatum* (Forsk.) Stapf. | Poaceae | Grass | Terrestrial | Wild |
| 244. | *Dichrostachys cinerea* (L.) Wight & Arn. | Mimosaceae | Shrub | Terrestrial | Wild |
| 245. | *Dicoma tomentosa* Cass. | Asteraceae | Herb | Terrestrial | Wild |
| 246. | *Digera muricata* (L.) Mart. | Amaranthaceae | Herb | Terrestrial | Wild |
| 247. | *Digitaria bicornis* (Lam.) Roem. & Schult. | Poaceae | Grass | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 248. | *Dillenia indica* L. | Dilleniaceae | Tree | Terrestrial | Planted |
| 249. | *Dinebra retroflexa* (Vahl) Panzer | Poaceae | Grass | Terrestrial | Wild |
| 250. | *Diospyros buxifolia* (Blume) Hiern | Ebenaceae | Tree | Terrestrial | Wild |
| 251. | *Diospyros chloroxylon* Roxb. | Ebenaceae | Tree | Terrestrial | Wild |
| 252. | *Diospyros malabarica* (Desr.) Kostel. | Ebenaceae | Tree | Terrestrial | Wild |
| 253. | *Diospyros melanoxylon* Roxb. | Ebenaceae | Tree | Terrestrial | Wild |
| 254. | *Diplocyclos palmatus* (L.) Jeffrey | Cucurbitaceae | Climber | Terrestrial | Wild |
| 255. | *Dodonaea viscosa* (L.) Jacq. | Sapindaceae | Shrub | Terrestrial | Wild |
| 256. | *Echinochloa colona* (L.) Link | Poaceae | Grass | Semi-aquatic | Wild |
| 257. | Echinochloa crus-gulli (L.) P. Beauv. | Poaceae | Grass | Semi-aquatic | Wild |
| 258. | *Echinops echinatus* Roxb. | Asteraceae | Herb | Terrestrial | Wild |
| 259. | *Eclipta prostrata* (L.) L. | Asteraceae | Herb | Semi-aquatic | Wild |
| 260. | *Eichhornia crassipes* (Mart.) Solms-Laub. | Pontederiaceae | Herb | Aquatic | Wild |
| 261. | *Eleusine indica* (L.) Gaertn. | Poaceae | Grass | Terrestrial | Wild |
| 262. | *Elytraria acaulis* (L.f.) Lindau. | Acanthaceae | Herb | Terrestrial | Wild |
| 263. | *Embelia ribes* Burm.f. | Myrisinaceae | Straggler | Terrestrial | Wild |
| 264. | *Emilia sonchifolia* (L.) DC. | Asteraceae | Herb | Terrestrial | Wild |
| 265. | *Enicostema axillare* (Lam.) Raynal | Gentianaceae | Herb | Terrestrial | Wild |
| 266. | *Eragrostiella bifaria* (Vahl) | Poaceae | Grass | Terrestrial | Wild |
| 267. | *Eragrostis maderaspatana* Bor | Poaceae | Grass | Terrestrial | Wild |
| 268. | *Eragrostis minor* Host | Poaceae | Grass | Terrestrial | Wild |
| 269. | *Eragrostis nigra* Nees ex Steud. | Poaceae | Grass | Terrestrial | Wild |
| 270. | *Eragrostis nutans* (Retz.) Nees ex Steud. | Poaceae | Grass | Terrestrial | Wild |
| 271. | *Eragrostis pilosa* P. Beauv | Poaceae | Grass | Terrestrial | Wild |
| 272. | *Eragrostis* sp. | Poaceae | Grass | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 273. | *Eragrostis unioloides* (Retz.) Nees ex Steud. | Poaceae | Grass | Terrestrial | Wild |
| 274. | *Eragrostis viscosa* (Retz.) Trin. | Poaceae | Grass | Terrestrial | Wild |
| 275. | *Eremopogon foveolatus* (Del.) Stapf. | Poaceae | Grass | Terrestrial | Wild |
| 276. | *Erythrina stricta* Roxb. | Fabaceae | Tree | Terrestrial | Planted |
| 277. | *Erythroxylum monogynum* Roxb. | Erythroxylaceae | Tree | Terrestrial | Wild |
| 278. | *Euphorbia geniculata* Ortega | Euphorbiaceae | Herb | Terrestrial | Wild |
| 279. | *Euphorbia hirta* L. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 280. | *Euphorbia nivulia* L. | Euphorbiaceae | Shrub | Terrestrial | Wild |
| 281. | *Euphorbia rosea* Retz. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 282. | *Euphorbia thymifolia* L. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 283. | *Euphorbia tirucalli* L. | Euphorbiaceae | Tree | Terrestrial | Wild |
| 284. | *Euphorbia trigona* Mill. | Euphorbiaceae | Tree | Terrestrial | Wild |
| 285. | *Evolvulus alsinoides* (L.) L. | Convolvulaceae | Herb | Terrestrial | Wild |
| 286. | *Evolvulus nummularius* (L.) L. | Convolvulaceae | Herb | Terrestrial | Wild |
| 287. | *Exocoecaria agallocha* Linn. | Euphorbiaceae | Tree | Aquatic | Wild |
| 288. | *Ficus amplissima* J.E. Smith | Moraceae | Tree | Terrestrial | Wild |
| 289. | *Ficus benghalensis* L. | Moraceae | Tree | Terrestrial | Wild |
| 290. | *Ficus hispida* L.f. | Moraceae | Tree | Terrestrial | Wild |
| 291. | *Ficus microcarpa* var. *microcarpa* L.f. | Moraceae | Tree | Terrestrial | Wild |
| 292. | *Ficus microcarpa* var. *retusa* L.f. | Moraceae | Tree | Terrestrial | Wild |
| 293. | *Ficus racemosa* L. | Moraceae | Tree | Terrestrial | Wild |
| 294. | *Ficus religiosa* L. | Moraceae | Tree | Terrestrial | Wild |
| 295. | *Ficus tinctoria* Forst.f. | Moraceae | Tree | Terrestrial | Wild |
| 296. | *Ficus virens* Ait. | Moraceae | Tree | Terrestrial | Wild |
| 297. | *Filicium decipiens* (Wight & Arn.) Thw. | Sapindaceae | Tree | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 298. | *Fimbristylis aestivalis* (Retz.) Vahl. | Cyperaceae | Herb | Terrestrial | Wild |
| 299. | *Fimbristylis argentea* (Rottb.) Vahl. | Cyperaceae | Herb | Aquatic | Wild |
| 300. | *Fimbristylis bisumbellata* (Forssk.) Bubani | Cyperaceae | Herb | Semi-aquatic | Wild |
| 301. | *Fimbristylis complanata* (Retz.) Link. | Cyperaceae | Herb | Semi-aquatic | Wild |
| 302. | *Fimbristylis dichotoma* (L.) Vahl. | Cyperaceae | Herb | Semi-aquatic | Wild |
| 303. | *Fimbristylis falcata* (Vahl.) Kunth. | Cyperaceae | Herb | Terrestrial | Wild |
| 304. | *Fimbristylis miliacea* (L.) Vahl. | Cyperaceae | Herb | Semi-aquatic | Wild |
| 305. | *Fimbristylis ovata* (Burm. F.) Kern. | Cyperaceae | Herb | Terrestrial | Wild |
| 306. | *Fimbristylis tetragona* R.Br. | Cyperaceae | Herb | Semi-aquatic | Wild |
| 307. | *Flacourtia indica* (Burm.f.) Merr. | Flacourtiaceae | Tree | Terrestrial | Wild |
| 308. | *Flacourtia ramontchi* L'Herit. | Flacourtiaceae | Tree | Terrestrial | Wild |
| 309. | *Flueggea leucopyrus* Willd. | Euphorbiaceae | Shrub | Terrestrial | Wild |
| 310. | *Flueggea virosa* (Willd.) Baill. | Euphorbiaceae | Shrub | Terrestrial | Wild |
| 311. | *Galactia villosa* Wight & Arn. | Fabaceae | Straggler | Terrestrial | Wild |
| 312. | *Gardenia latifolia* Ait. | Rubiaceae | Tree | Terrestrial | Wild |
| 313. | *Giseckia pharnaceoides* L. | Aizoaceae | Herb | Terrestrial | Wild |
| 314. | *Glinus lotoides* Linnaeus | Aizoaceae | Herb | Terrestrial | Wild |
| 315. | *Gliricidia sepium* (Jacq.) Kunth ex Walp. | Fabaceae | Tree | Terrestrial | Exotic |
| 316. | *Gloriosa superba* L. | Colchicaceae | Herb | Terrestrial | Wild |
| 317. | *Glycosmis mauritiana* (Lam.) Tanaka | Rutaceae | Shrub | Terrestrial | Wild |
| 318. | *Glycosmis pentaphylla* (Retz.) DC. | Rutaceae | Shrub | Terrestrial | Wild |
| 319. | *Glycyrrhiza glabra* L. | Fabaceae | Straggler | Terrestrial | Wild |
| 320. | *Gmelina arborea* Roxb. | Verbenaceae | Tree | Terrestrial | Wild |
| 321. | *Gmelina asiatica* L. | Verbenaceae | Shrub | Terrestrial | Wild |
| 322. | *Gnaphalium luteo-album* L. | Asteraceae | Herb | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 323. | *Gnaphalium polycaulon* Pers. | Asteraceae | Herb | Terrestrial | Wild |
| 324. | *Gomphrena serrata* L. | Amaranthaceae | Herb | Terrestrial | Wild |
| 325. | *Grangea maderaspatana* (L.) Poir. | Asteraceae | Herb | Terrestrial | Wild |
| 326. | *Grewia hirsuta* Vahl. | Tiliaceae | Shrub | Terrestrial | Wild |
| 327. | *Grewia tiliifolia* Vahl. | Tiliaceae | Tree | Terrestrial | Wild |
| 328. | *Grewia villosa* Willd. | Tiliaceae | Shrub | Terrestrial | Wild |
| 329. | *Guazuma ulmifolia* Lam. | Sterculiaceae | Tree | Terrestrial | Planted |
| 330. | *Gymnema sylvestre* R. Br. | Asclepiadaceae | Straggler | Terrestrial | Wild |
| 331. | *Hedyotis biflora* (L.) Lam. | Rubiaceae | Herb | Terrestrial | Wild |
| 332. | *Hedyotis corymbosa* (L.) Lam. | Rubiaceae | Herb | Terrestrial | Wild |
| 333. | *Helicteres isora* L. | Sterculiaceae | Shrub | Terrestrial | Wild |
| 334. | *Heliotropium curasavicum* L. | Boraginaceae | Herb | Terrestrial | Wild |
| 335. | *Heliotropium indicum* L. | Boraginaceae | Herb | Terrestrial | Wild |
| 336. | *Hemidesmus indicus* (L.) R. Br. | Asclepiadaceae | Climber | Terrestrial | Wild |
| 337. | *Heteropogon contortus* (L.) P.Beauv | Poaceae | Grass | Terrestrial | Wild |
| 338. | *Hibiscus cannabinus* L. | Malvaceae | Shrub | Terrestrial | Planted |
| 339. | *Hibiscus micranthus* L.f. | Malvaceae | Herb | Terrestrial | Wild |
| 340. | *Hibiscus rosa-sinensis* Linn. | Malvaceae | Tree | Terrestrial | Planted |
| 341. | *Hibiscus subdariffa* L. | Malvaceae | Shrub | Terrestrial | Planted |
| 342. | *Hibiscus tiliaceus* L. | Malvaceae | Tree | Terrestrial | Wild |
| 343. | *Hibiscus vitifolius* L. | Malvaceae | Shrub | Terrestrial | Wild |
| 344. | *Holarrhena pubescens* (Buch. - Ham) Wall. ex G. Don | Apocynaceae | Shrub | Terrestrial | Wild |
| 345. | *Holoptelea integrifolia* (Roxb.) Planch. | Ulmaceae | Tree | Terrestrial | Wild |
| 346. | *Hugonia mystax* L. | Linaceae | Straggler | Terrestrial | Wild |
| 347. | *Hybanthus enneaspermus* (L.) F. Muell. | Violaceae | Herb | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 348. | *Hydrilla verticillata* (L. f.) Royle | Hydrocharitaceae | Herb | Aquatic | Wild |
| 349. | *Hygrophila auriculata* (Schum) Heine | Acanthaceae | Herb | Marshy | Wild |
| 350. | *Hyptis suaveolens* (L.) Poit. | Lamiaceae | Herb | Terrestrial | Wild |
| 351. | *Ichnocarpus frutescens* (L.) R.Br. | Asclepiadaceae | Climber | Terrestrial | Wild |
| 352. | *Imperata cylindrica* (L.) Beauv. | Poaceae | Grass | Terrestrial | Wild |
| 353. | *Indigofera caerulea* Roxb. | Fabaceae | Herb | Terrestrial | Wild |
| 354. | *Indigofera linifolia* (L.f.) Retz. | Fabaceae | Herb | Terrestrial | Wild |
| 355. | *Indigofera linnaei* Ali | Fabaceae | Herb | Terrestrial | Wild |
| 356. | *Indigofera* sp. | Fabaceae | Herb | Terrestrial | Wild |
| 357. | *Indigofera trifoliata* L. | Fabaceae | Herb | Terrestrial | Wild |
| 358. | *Indigofera trita* L.f. | Fabaceae | Shrub | Terrestrial | Wild |
| 359. | *Indoneesiella echioides* (L) Nees. | Acanthaceae | Herb | Terrestrial | Wild |
| 360. | *Ipomoea alba* L. | Convolvulaceae | Climber | Terrestrial | Wild |
| 361. | *Ipomoea aquatica* Forssk. | Convolvulaceae | Climber | Aquatic | Wild |
| 362. | *Ipomoea biloba* Forssk. | Convolvulaceae | Climber | Marshy | Wild |
| 363. | *Ipomoea carnea* Jacq. | Convolvulaceae | Shrub | Aquatic | Wild |
| 364. | *Ipomoea hederifolia* L. | Convolvulaceae | Climber | Terrestrial | Wild |
| 365. | *Ipomoea pes-tigridis* L. | Convolvulaceae | Climber | Terrestrial | Wild |
| 366. | *Ipomoea staphylina* Roem. & Schultes | Convolvulaceae | Climber | Terrestrial | Wild |
| 367. | *Ischaemum indicum* (Houtt.) Merr. var. *depressum* (Scribn. & J.G. Sm.) Rydb | Poaceae | Grass | Terrestrial | Wild |
| 368. | *Ischaemum indicum* (Houtt.) Merr. var. *indicum* | Poaceae | Grass | Terrestrial | Wild |
| 369. | *Iseilema anthephoroides* Hack. | Poaceae | Grass | Terrestrial | Wild |
| 370. | *Iseilema laxum* Hack. | Poaceae | Grass | Terrestrial | Wild |
| 371. | *Ixora arborea* Roxb. ex Sm. | Rubiaceae | Tree | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 372. | *Jacaranda mimosifolia* D.Don. | Bignoniaceae | Tree | Terrestrial | Ornamental |
| 373. | *Jasminum auriculatum* Vahl | Oleaceae | Straggler | Terrestrial | Wild |
| 374. | *Jatropha curcas* L. | Euphorbiaceae | Shrub | Terrestrial | Planted |
| 375. | *Jatropha gossypifolia* L. | Euphorbiaceae | Shrub | Terrestrial | Wild |
| 376. | *Jatropha tanjorensis* Ellis & Saroja | Euphorbiaceae | Shrub | Terrestrial | Wild |
| 377. | *Justicia adhatoda* L. | Acanthaceae | Shrub | Terrestrial | Ornamental |
| 378. | *Justicia betonica* Linn. | Acanthaceae | Shrub | Terrestrial | Wild |
| 379. | *Justicia gendarussa* Burm.f. | Acanthaceae | Shrub | Terrestrial | Cultivated |
| 380. | *Justicia* sp. | Acanthaceae | Herb | Terrestrial | Wild |
| 381. | *Kedrostis foetidissima* (Jacq.) Cogn. | Cucurbitaceae | Climber | Terrestrial | Wild |
| 382. | *Kigelia pinnata* (Jacq.) DC. | Bignoniaceae | Tree | Terrestrial | Planted |
| 383. | *Kleinhovia hospita* L. | Sterculiaceae | Tree | Terrestrial | Planted |
| 384. | *Kleinia grandiflora* (Wall. ex DC.) Rani | Asteraceae | Shrub | Terrestrial | Wild |
| 385. | *Kyllingia nemoralis* (J. R. & G. Forst.) Dandy ex Hutchinson & Dalziel | Cyperaceae | Herb | Marshy | Wild |
| 386. | *Lagascea mollis* Cav. | Asteraceae | Herb | Terrestrial | Wild |
| 387. | *Lagerstroemia reginae* Roxb. | Lythraceae | Tree | Terrestrial | Ornamental |
| 388. | *Lantana camara* L. | Verbenaceae | Shrub | Terrestrial | Exotic |
| 389. | *Lantana wightiana* Wallich ex Gamble | Verbenaceae | Undershrub | Terrestrial | Wild |
| 390. | *Lawsonia inermis* L. | Lythraceae | Shrub | Terrestrial | Planted |
| 391. | *Lemna minor* L. | Lemnaceae | Herb | Aquatic | Wild |
| 392. | *Leonotis nepetiifolia* (L.) R. Br. | Lamiaceae | Herb | Terrestrial | Wild |
| 393. | *Lepisanthes tetraphylla* (Vahl.) Radlk. | Sapindaceae | Tree | Terrestrial | Wild |
| 394. | *Leptadenia reticulata* Wight & Arn. | Asclepiadaceae | Climber | Terrestrial | Wild |
| 395. | *Leucaena leucocephala* (L.) Gills | Mimosaceae | Tree | Terrestrial | Exotic |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 396. | *Limonia acidissima* L. | Rutaceae | Tree | Terrestrial | Planted |
| 397. | *Lindernia antipoda* (L.) Alston | Scrophulariaceae | Herb | Aquatic | Wild |
| 398. | *Lindernia crustacea* (L.) F.v.Muell. | Scrophulariaceae | Herb | Aquatic | Wild |
| 399. | *Lindernia hyssopioides* (L.) Haines | Scrophulariaceae | Herb | Aquatic | Wild |
| 400. | *Lindernia parviflora* (Roxb.) Haines | Scrophulariaceae | Herb | Aquatic | Wild |
| 401. | *Ludwigia adscendens* (L.) H. Hara | Onagraceae | Herb | Aquatic | Wild |
| 402. | *Ludwigia perennis* L. | Onagraceae | Herb | Aquatic | Wild |
| 403. | *Ludwigia peruviana* (L.) Hara | Onagraceae | Herb | Semi-aquatic | Wild |
| 404. | *Madhuca longifolia* (J.Konig) J.F.Macbr. | Sapotaceae | Tree | Terrestrial | Wild |
| 405. | *Malva* sp. | Malvaceae | Shrub | Aquatic | Exotic |
| 406. | *Malvastrum coromandelianum* (L.) Garcke | Malvaceae | Herb | Terrestrial | Wild |
| 407. | *Mangifera indica* L. | Anacardiaceae | Tree | Terrestrial | Planted |
| 408. | *Manilkara hexandra* (Roxb.) Dubard | Sapotaceae | Tree | Terrestrial | Wild |
| 409. | *Manisuris myuros* L. | Poaceae | Grass | Terrestrial | Wild |
| 410. | *Markhamia stipulata* Seem. | Bignoniaceae | Tree | Terrestrial | Ornamental |
| 411. | *Martynia annua* L. | Asteraceae | Herb | Terrestrial | Wild |
| 412. | *Maytenus emarginata* (Willd.) Ding Hou | Celastraceae | Straggler | Terrestrial | Wild |
| 413. | *Maytenus heyneana* (Roth) Raju & Babu | Celastraceae | Straggler | Terrestrial | Wild |
| 414. | *Melia azedarach* L. | Meliaceae | Tree | Terrestrial | Ornamental |
| 415. | *Memecylon edule* Roxb. | Melastomataceae | Tree | Terrestrial | Wild |
| 416. | *Memecylon umbellatum* Burm.f. | Melastomataceae | Tree | Terrestrial | Wild |
| 417. | *Merremia hastata* (Hallier f.) Ooststr. | Convolvulaceae | Herb | Terrestrial | Wild |
| 418. | *Merremia tridentata* (L.) Hall.f. | Convolvulaceae | Herb | Terrestrial | Wild |
| 419. | *Mikania cordata* (Burm. f.) Robinson | Asteraceae | Climber | Marshy | Wild |
| 420. | *Millingtonia hortensis* L.f. | Bignoniaceae | Tree | Terrestrial | Ornamental |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 421. | *Mimosa hamata* Willd. | Mimosaceae | Shrub | Terrestrial | Wild |
| 422. | *Mimusops elengi* L. | Sapotaceae | Tree | Terrestrial | Ornamental |
| 423. | *Mitragyna parvifolia* (Roxb.) Korth. | Rubiaceae | Tree | Terrestrial | Wild |
| 424. | *Mollugo cerviana* (L.) Ser. | Aizoaceae | Herb | Terrestrial | Wild |
| 425. | *Mollugo disticha* Ser. | Aizoaceae | Herb | Terrestrial | Wild |
| 426. | *Mollugo nudicaulis* Lam. | Aizoaceae | Herb | Terrestrial | Wild |
| 427. | *Mollugo pentaphylla* L. | Aizoaceae | Herb | Terrestrial | Wild |
| 428. | *Momordica dioica* Roxb. ex. Willd. | Cucurbitaceae | Climber | Terrestrial | Wild |
| 429. | *Monochoria hastata* (L.) Solms-Laub. | Pontederiaceae | Herb | Aquatic | Wild |
| 430. | *Monochoria vaginalis* (Burm. F.) Presl | Pontederiaceae | Herb | Aquatic | Wild |
| 431. | *Morinda pubescens* J.E. Smith. | Rubiaceae | Tree | Terrestrial | Wild |
| 432. | *Moringa concanensis* Nimmo ex Dalz. & Gibs. | Moringaceae | Tree | Terrestrial | Wild |
| 433. | *Moringa oleifera* Lam. | Moringaceae | Tree | Terrestrial | Cultivated |
| 434. | *Mucuna monosperma* DC. | Fabaceae | Straggler | Terrestrial | Wild |
| 435. | *Mucuna pruriens* (L.) DC. | Fabaceae | Shrub | Terrestrial | Wild |
| 436. | *Mukia maderaspatana* (L.) M. Roem. | Cucurbitaceae | Climber | Terrestrial | Wild |
| 437. | *Murraya koenigii* (L.) Spreng. | Rutaceae | Tree | Terrestrial | Planted |
| 438. | *Murraya paniculata* (L.) Jack | Rutaceae | Shrub | Terrestrial | Ornamental |
| 439. | *Musa parasidiaca* L. | Musaceae | Tree | Terrestrial | Planted |
| 440. | *Najas indica* (Willd.) Cham. | Najadaceae | Herb | Aquatic | Wild |
| 441. | *Najas marina* L. | Najadaceae | Herb | Aquatic | Wild |
| 442. | *Najas minor* All. | Najadaceae | Herb | Aquatic | Wild |
| 443. | *Naringi crenulata* (Roxb.) Nicolson | Rutaceae | Tree | Terrestrial | Wild |
| 444. | *Nelumbo nucifera* Gaertn. | Nymphaeaceae | Herb | Aquatic | Wild |
| 445. | *Neonotonia wightii* (Wight & Arn.) J.A. Lackey | Fabaceae | Straggler | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 446. | *Nothosaerva brachiata* (L.) Wight | Amaranthaceae | Herb | Terrestrial | Wild |
| 447. | *Nyctanthes arbor-tristis* L. | Oleaceae | Tree | Terrestrial | Ornamental |
| 448. | *Nymphaea nouchali* Burm. f. | Nymphaeaceae | Herb | Aquatic | Wild |
| 449. | *Nymphaea pubescens* Willd. | Nymphaeaceae | Herb | Aquatic | Wild |
| 450. | *Nymphaea rubra* Roxb. ex Salisb. | Nymphaeaceae | Herb | Aquatic | Wild |
| 451. | *Nymphoides indicum* (L.) Kuntze | Menyanthaceae | Herb | Aquatic | Wild |
| 452. | *Ocimum canum* Sims. | Lamiaceae | Herb | Terrestrial | Wild |
| 453. | *Oldenlandia umbellata* L. | Rubiaceae | Herb | Terrestrial | Wild |
| 454. | *Ophiuros exaltatus* (Linnaeus) Kuntze | Poaceae | Grass | Terrestrial | Wild |
| 455. | *Oplismenus compositus* (L.) P. Beauv. | Poaceae | Grass | Terrestrial | Wild |
| 456. | *Opuntia stricta* (Haw.) Haw. | Cactaceae | Shrub | Terrestrial | Wild |
| 457. | *Oropetium thomaeum* (Linn.f.) Trin. | Poaceae | Grass | Terrestrial | Wild |
| 458. | *Ottelia alismoides* (L.) Pers. | Hydrocharitaceae | Herb | Aquatic | Wild |
| 459. | *Oxalis corniculata* L. | Oxalidaceae | Herb | Terrestrial | Wild |
| 460. | *Oxystelma esculentum* R. Br. | Asclepiadaceae | Climber | Marshy | Wild |
| 461. | *Pandanus odoratissimus* L.f. | Pandanaceae | Tree | Aquatic | Wild |
| 462. | *Panicum miliaceum* L. | Poaceae | Grass | Terrestrial | Wild |
| 463. | *Panicum notatum* Retz. | Poaceae | Grass | Terrestrial | Wild |
| 464. | *Panicum paludosum* Roxb. | Poaceae | Grass | Terrestrial | Wild |
| 465. | *Panicum psilopodium* Trin. | Poaceae | Grass | Terrestrial | Wild |
| 466. | *Panicum repens* L. | Poaceae | Grass | Terrestrial | Wild |
| 467. | *Panicum trypheron* Schult. | Poaceae | Grass | Semi-aquatic | Wild |
| 468. | *Parkia biglandulosa* Wight Arn. | Mimosaceae | Tree | Terrestrial | Ornamental |
| 469. | *Parkinsonia aculeata* L. | Fabaceae | Tree | Semi-aquatic | Wild |
| 470. | *Parthenium hysterophorus* L. | Asteraceae | Herb | Terrestrial | Exotic |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 471. | *Paspalidium flavidum* (Retz.) A. Camus. | Poaceae | Grass | Semi-aquatic | Wild |
| 472. | *Paspalum scrobiculatum* L. | Poaceae | Grass | Semi-aquatic | Wild |
| 473. | Passiflora edulis Sims | Passifloraceae | Climber | Terrestrial | Cultivated |
| 474. | *Passiflora foetida* L. | Passifloraceae | Climber | Terrestrial | Wild |
| 475. | *Pavetta indica* L. | Rubiaceae | Shrub | Terrestrial | Wild |
| 476. | *Pavetta tomentosa* Roxb. ex J.E. Smith | Rubiaceae | Shrub | Terrestrial | Wild |
| 477. | *Pavonia odorata* Willd. | Malvaceae | Herb | Terrestrial | Wild |
| 478. | *Pavonia procumbens* (Wall ex Wight & Arn.) Walp. | Malvaceae | Herb | Terrestrial | Wild |
| 479. | *Pavonia zeylanica* (L.) Cav. | Malvaceae | Herb | Terrestrial | Wild |
| 480. | *Pedalium murex* L. | Pedaliaceae | Herb | Terrestrial | Wild |
| 481. | *Peltophorum pterocarpum* (DC.) | Caesalpiniaceae | Tree | Terrestrial | Planted |
| 482. | *Pennisetum americanum* (L.) R.Br. | Poaceae | Grass | Terrestrial | Cultivated |
| 483. | *Pennisetum purpureum* Schum | Poaceae | Grass | Terrestrial | Planted |
| 484. | *Pentatropis microphylla* L. | Asclepiadaceae | Climber | Terrestrial | Wild |
| 485. | *Pergularia daemia* (Forrsk.) Chiov. | Asclepiadaceae | Climber | Terrestrial | Wild |
| 486. | *Peristrophe bicalyculata* (Forssk.) Brummitt. | Acanthaceae | Herb | Terrestrial | Wild |
| 487. | *Phoenix loureirii* Kunth. | Arecaceae | Shrub | Terrestrial | Wild |
| 488. | *Phoenix sylvestris* (L.) Roxb. | Arecaceae | Tree | Terrestrial | Planted |
| 489. | *Phragmites karka* Trin. ex Steud. | Poaceae | Grass | Semi-aquatic | Wild |
| 490. | *Phyla nodiflora* (L.) E. Greene | Verbenaceae | Herb | Aquatic | Wild |
| 491. | *Phyllanthus amarus* Schum. & Thonn. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 492. | *Phyllanthus emblica* L. | Euphorbiaceae | Tree | Terrestrial | Planted |
| 493. | *Phyllanthus maderaspatensis* L. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 494. | *Phyllanthus polyphyllus* L. | Euphorbiaceae | Shrub | Terrestrial | Wild |
| 495. | *Phyllanthus reticulatus* Poir. | Euphorbiaceae | Shrub | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 496. | *Phyllanthus rotundifolius* Klein ex Willd. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 497. | *Phyllanthus urinaria* L. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 498. | *Physalis minima* Linn. | Solanaceae | Herb | Terrestrial | Wild |
| 499. | *Pisonia aculeata* L. | Nyctaginaceae | Tree | Terrestrial | Ornamental |
| 500. | *Pistia stratiotes* L. | Araceae | Herb | Aquatic | Wild |
| 501. | *Pithecellobium dulce* (Roxb.) Benth. | Mimosaceae | Tree | Terrestrial | Planted |
| 502. | *Plecospermum spinosum* Trec. | Moraceae | Straggler | Terrestrial | Wild |
| 503. | *Plumeria acuminata* Ait. | Apocynaceae | Tree | Terrestrial | Ornamental |
| 504. | *Plumeria alba* L. | Apocynaceae | Tree | Terrestrial | Ornamental |
| 505. | *Plumeria rubra* L. | Apocynaceae | Tree | Terrestrial | Ornamental |
| 506. | *Polyalthia cerasoides* (Roxb.) Bedd. | Annonaceae | Tree | Terrestrial | Wild |
| 507. | *Polyalthia longifolia* (Sonner.) Thw. | Annonaceae | Tree | Terrestrial | Ornamental |
| 508. | *Polyalthia suberosa* (Roxb.) Thw. | Annonaceae | Tree | Terrestrial | Wild |
| 509. | *Polycarpaea corymbosa* (L.) Lam. | Caryophyllaceae | Herb | Terrestrial | Wild |
| 510. | *Polygonum barbatum*( L. ) H.Hara var. *barbatum* | Polygonaceae | Shrub | Aquatic | Wild |
| 511. | *Polygonum glabrum* Willdenow | Polygonaceae | Shrub | Aquatic | Wild |
| 512. | *Polygonum hydropiper* L. | Polygonaceae | Shrub | Aquatic | Wild |
| 513. | *Polygonum plebeium* R. Br. | Polygonaceae | Herb | Marshy | Wild |
| 514. | *Polygonum* sp. | Polygonaceae | Straggler | Marshy | Wild |
| 515. | *Pongamia pinnata* (L.) Pierre | Fabaceae | Tree | Terrestrial | Wild |
| 516. | *Portulaca oleracea* L. | Portulacaceae | Herb | Terrestrial | Wild |
| 517. | *Portulaca quadrifida* L. | Portulacaceae | Herb | Terrestrial | Wild |
| 518. | *Potamogeton nodosus* Poir. | Potamogetonaceae | Herb | Aquatic | Wild |
| 519. | *Premna tomentosa* L. | Verbenaceae | Tree | Terrestrial | Wild |
| 520. | *Prosopis cineraria* (L.) Druce | Mimosaceae | Tree | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 521. | *Prosopis juliflora* (Sw.) Dc. | Mimosaceae | Tree | Terrestrial | Exotic |
| 522. | *Pseudarthria viscida* (L) Wight & Arn. | Fabaceae | Herb | Terrestrial | Wild |
| 523. | *Psilotrichum elliotii* Baker & Clarke | Amaranthaceae | Herb | Terrestrial | Wild |
| 524. | *Pterocarpus marsupium* Roxb. | Fabaceae | Tree | Terrestrial | Wild |
| 525. | *Pterocarpus santalinus* L. | Fabaceae | Tree | Terrestrial | Wild |
| 526. | *Pterolobium hexapetalum* (Roth.) Sant. & Wagh | Fabaceae | Straggler | Terrestrial | Wild |
| 527. | *Pterospermum acerifolium* (L.) Willd. | Sterculiaceae | Tree | Terrestrial | Wild |
| 528. | *Pterospermum xylocarpum* (Gaertn) S & W. | Sterculiaceae | Tree | Terrestrial | Wild |
| 529. | *Pulicaria wightiana* C.B. Clarke | Asteraceae | Herb | Terrestrial | Wild |
| 530. | *Punica granatum* L. | Punicaceae | Tree | Terrestrial | Planted |
| 531. | *Pupalia lappacea* (L.) Juss. | Amaranthaceae | Herb | Terrestrial | Wild |
| 532. | *Pycreus globosus* (All.) Reichenb. | Cyperaceae | Herb | Marshy | Wild |
| 533. | *Randia brandisii* Gamble | Rubiaceae | Shrub | Terrestrial | Wild |
| 534. | *Randia dumetorum* (Retz.) Poiret. | Rubiaceae | Shrub | Terrestrial | Wild |
| 535. | *Randia parviflora* (Thunb.) Lam. | Rubiaceae | Shrub | Terrestrial | Wild |
| 536. | *Rauwolfia serpentina* (L.) Benth. ex Kurz. | Apocynaceae | Herb | Terrestrial | Wild |
| 537. | *Ravenala madagascarensis* Sonner | Musaceae | Tree | Terrestrial | Planted |
| 538. | *Rhizophora apiculata* Blume | Rhizophoraceae | Tree | Marshy | Wild |
| 539. | *Rhynchosia capitata* DC. | Fabaceae | Herb | Terrestrial | Wild |
| 540. | *Rhynchosia densiflora* (Roth) DC. | Fabaceae | Herb | Terrestrial | Wild |
| 541. | *Rhynchosia minima* (L.) DC. | Fabaceae | Herb | Terrestrial | Wild |
| 542. | *Ricinus communis* L. | Euphorbiaceae | Tree | Terrestrial | Cultivated |
| 543. | *Rivea hypocrateriformis* (Desr.) Choisy | Convolvulaceae | Straggler | Terrestrial | Wild |
| 544. | *Rottboellia cochinchinensis* (Lour.) Clayton | Poaceae | Grass | Terrestrial | Wild |
| 545. | *Ruellia patula* Jacq. | Acanthaceae | Herb | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 546. | *Ruellia tuberosa* L. | Acanthaceae | Herb | Terrestrial | Wild |
| 547. | *Saccharum officinarum* L. | Poaceae | Grass | Terrestrial | Cultivated |
| 548. | *Saccharum spontaneum* Linn. | Poaceae | Shrub | Aquatic | Wild |
| 549. | *Sacciolepis indica* (L.) Chase | Poaceae | Grass | Marshy | Wild |
| 550. | *Salacia chinensis* L. | Hippocratiaceae | Straggler | Terrestrial | Wild |
| 551. | *Salicornia brachiata* Miq. | Chenopodiaceae | Shrub | Semi-aquatic | Wild |
| 552. | *Salix tetrasperma* Roxb. | Salicaceae | Tree | Aquatic | Wild |
| 553. | *Salvinia molesta* D.Mitch. | Salviniaceae | Herb | Aquatic | Wild |
| 554. | *Sansevieria roxburghiana* Schultes & Schultes | Dracaenaceae | Herb | Terrestrial | Wild |
| 555. | *Sapindus emarginatus* Vahl. | Sapindaceae | Tree | Terrestrial | Wild |
| 556. | *Scirpus articulatus* Linn. | Cyperaceae | Herb | Aquatic | Wild |
| 557. | *Scleria lithosperma* (L.) Sw. | Cyperaceae | Herb | Marshy | Wild |
| 558. | *Scoparia dulcis* L. | Scrophulariaceae | Herb | Semi-aquatic | Wild |
| 559. | *Scutia myrtina* (Burm. f.) Kurz. | Rhamnaceae | Straggler | Terrestrial | Wild |
| 560. | *Sebastiania chamaelea* (L.) Muell.-Arg. | Euphorbiaceae | Herb | Terrestrial | Wild |
| 561. | *Sehima nervosum* (Rottl.) Stapf. | Poaceae | Grass | Terrestrial | Wild |
| 562. | *Sehima sulcatum* (Hack.) A. Camus | Poaceae | Grass | Terrestrial | Wild |
| 563. | *Senna alata* (L.) Roxb. | Caesalpiniaceae | Shrub | Terrestrial | Ornamental |
| 564. | *Senna auriculata* (L.) Roxb. | Caesalpiniaceae | Shrub | Terrestrial | Wild |
| 565. | *Senna hirsuta* (L.) Irwin & Barneby | Caesalpiniaceae | Herb | Terrestrial | Wild |
| 566. | *Senna italica* Mill. | Caesalpiniaceae | Herb | Terrestrial | Wild |
| 567. | *Senna occidentalis* (L.) Link | Caesalpiniaceae | Herb | Terrestrial | Wild |
| 568. | *Senna tora* (L.) Roxb. | Caesalpiniaceae | Herb | Terrestrial | Wild |
| 569. | *Sesamum indicum* L. | Pedaliaceae | Shrub | Terrestrial | Cultivated |
| 570. | *Sesbania bispinosa* (Jacq.) W. F. Wight | Fabaceae | Tree | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 571. | *Sesuvium portulacastrum* (L.) L. | Aizoaceae | Herb | Terrestrial | Wild |
| 572. | *Setaria italica* (L.) P. Beauv | Poaceae | Grass | Terrestrial | Wild |
| 573. | *Sida acuta* Burm.f. | Malvaceae | Herb | Terrestrial | Wild |
| 574. | *Sida cordata* (Burm. f.) Borss. | Malvaceae | Herb | Terrestrial | Wild |
| 575. | *Sida cordifolia* L. | Malvaceae | Herb | Terrestrial | Wild |
| 576. | *Sida rhombifolia* L. var. *retusa* (L.) Borss. | Malvaceae | Herb | Terrestrial | Wild |
| 577. | *Sida rhombifolia* L. var. *rhombifolia* | Malvaceae | Herb | Terrestrial | Wild |
| 578. | *Sida spinosa* Linn. | Malvaceae | Herb | Terrestrial | Wild |
| 579. | *Solanum surattense* Burm. f. | Solanaceae | Herb | Terrestrial | Wild |
| 580. | *Solanum trilobatum* L. | Solanaceae | Straggler | Terrestrial | Wild |
| 581. | *Solena amplexicaulis* (Lam.) Gandhi | Cucurbitaceae | Climber | Terrestrial | Wild |
| 582. | *Sonchus oleraceus* L. | Asteraceae | Herb | Terrestrial | Wild |
| 583. | *Sonneratia apetala* Buch. - Ham. | Sonneratiaceae | Tree | Marshy | Wild |
| 584. | *Sorghum bicolor* (L.) Moench | Poaceae | Grass | Terrestrial | Cultivated |
| 585. | *Spermacoce hispida* L. | Rubiaceae | Herb | Terrestrial | Wild |
| 586. | *Spermacoce ocymoides* Burm.f. | Rubiaceae | Herb | Terrestrial | Wild |
| 587. | *Sphaeranthus indicus* Linn. | Asteraceae | Herb | Terrestrial | Wild |
| 588. | *Spilanthes calva* DC. | Asteraceae | Herb | Marshy | Wild |
| 589. | *Spilanthes uliginosa* Sw. | Asteraceae | Herb | Marshy | Wild |
| 590. | *Spinifex littoreus* (Burm.f.) Merr. | Poaceae | Grass | Terrestrial | Wild |
| 591. | *Spondias pinnata* Kurz. | Anacardiaceae | Tree | Terrestrial | Planted |
| 592. | *Sporobolus coromandelianus* (Retz.) Kunth | Poaceae | Grass | Terrestrial | Wild |
| 593. | *Sporobolus indicus* (L.) R.Br. | Poaceae | Grass | Terrestrial | Wild |
| 594. | *Sporobolus spicatus* (Vahl.) Kunth | Poaceae | Grass | Terrestrial | Wild |
| 595. | *Sporobolus wallichii* Munro ex Trimen | Poaceae | Grass | Terrestrial | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 596. | *Stemodia viscosa* Roxb. | Scrophulariaceae | Herb | Marshy | Wild |
| 597. | *Sterculia foetida* Linn. | Sterculiaceae | Tree | Terrestrial | Ornamental |
| 598. | *Streblus asper* Lour. | Moraceae | Tree | Terrestrial | Wild |
| 599. | *Striga asiatica* (L.) Kuntze | Scrophulariaceae | Herb | Terrestrial | Wild |
| 600. | *Strychnos nux-vomica* L. | Loganiaceae | Tree | Terrestrial | Wild |
| 601. | *Strychnos potatorum* L. | Loganiaceae | Tree | Terrestrial | Wild |
| 602. | *Suaeda fruticosa* Forssk. ex J.F. Gmelin | Chenopodiaceae | Herb | Semi-aquatic | Wild |
| 603. | *Suaeda nudiflora* (Willd) Moq. | Chenopodiaceae | Herb | Semi-aquatic | Wild |
| 604. | *Suregada lanceolata*(Willd.) Kuntze | Euphorbiaceae | Tree | Terrestrial | Wild |
| 605. | *Swietenia macrophylla* King | Meliaceae | Tree | Terrestrial | Planted |
| 606. | *Swietenia mahagoni* (L.) Jacq. | Meliaceae | Tree | Terrestrial | Planted |
| 607. | *Synedrella nodiflora* (L.) Gaertn. | Asteraceae | Herb | Terrestrial | Wild |
| 608. | *Syzygium cumini* (L.) Skeels | Myrtaceae | Tree | Terrestrial | Planted |
| 609. | *Tabebuia arjentea* Britton | Bignoniaceae | Tree | Terrestrial | Planted |
| 610. | *Tabebuia rosea* (Bertol.) DC. | Bignoniaceae | Tree | Terrestrial | Planted |
| 611. | *Tabernaemontana divaricata* (L.) R.Br. | Apocynaceae | Shrub | Terrestrial | Planted |
| 612. | *Tamarindus indica* L. | Caesalpiniaceae | Tree | Terrestrial | Planted |
| 613. | *Taraxacum officinale* F.H.Wigg | Asteraceae | Herb | Terrestrial | Wild |
| 614. | *Tarenna asiatica* (L.) Kuntze ex K. Schum. | Rubiaceae | Shrub | Terrestrial | Wild |
| 615. | *Tecoma stans* (L.) Kunth | Bignoniaceae | Tree | Terrestrial | Ornamental |
| 616. | *Tectona grandis* L.f. | Verbenaceae | Tree | Terrestrial | Wild |
| 617. | *Tephrosia purpurea* (L.) Pers. | Fabaceae | Herb | Terrestrial | Wild |
| 618. | *Tephrosia villosa* (L.) Pers. | Fabaceae | Herb | Terrestrial | Wild |
| 619. | *Terminalia arjuna* (Roxb.) Wight & Arn. | Myrtaceae | Tree | Terrestrial | Planted |
| 620. | *Terminalia catappa* L. | Myrtaceae | Tree | Terrestrial | Ornamental |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 621. | *Themeda quadrivalvis* (L.) Kuntze | Poaceae | Grass | Terrestrial | Wild |
| 622. | *Themeda triandra* Forssk. | Poaceae | Grass | Terrestrial | Wild |
| 623. | *Thespesia populnea* (L.) Soland ex Correa | Malvaceae | Tree | Terrestrial | Wild |
| 624. | *Thevetia peruviana* K.Schum | Apocynaceae | Tree | Terrestrial | Wild |
| 625. | *Tinospora cordifolia* (Willd.) Miers ex Hook. f. & Thoms. | Menispermaceae | Climber | Terrestrial | Wild |
| 626. | *Tragia involucrata* L. | Euphorbiaceae | Straggler | Terrestrial | Wild |
| 627. | *Tragia plukenetii* R. Smith | Euphorbiaceae | Straggler | Terrestrial | Wild |
| 628. | *Trewia nudiflora* L. | Euphorbiaceae | Tree | Marshy | Wild |
| 629. | *Trewia polycarpa* Benth. | Euphorbiaceae | Tree | Marshy | Wild |
| 630. | *Trianthema triquetra* Rottl. | Aizoaceae | Herb | Terrestrial | Wild |
| 631. | *Tribulus lanuginosis* L. | Zygophyllaceae | Herb | Terrestrial | Wild |
| 632. | *Tribulus terrestris* L. | Zygophyllaceae | Herb | Terrestrial | Wild |
| 633. | *Trichodesma indicum* (L.) R. Br. | Boraginaceae | Herb | Terrestrial | Wild |
| 634. | *Tridax procumbens* L. | Asteraceae | Herb | Terrestrial | Wild |
| 635. | *Triumfetta pentandra* A. Rich | Tiliaceae | Herb | Terrestrial | Wild |
| 636. | *Triumfetta rhomboidea* Jacq. | Tiliaceae | Herb | Terrestrial | Wild |
| 637. | *Triumfetta rotundifolia* Lam. | Tiliaceae | Herb | Terrestrial | Wild |
| 638. | *Turnera subulata* Smith | Turneraceae | Herb | Terrestrial | Exotic |
| 639. | *Typha angustifolia* L. | Typhaceae | Shrub | Aquatic | Wild |
| 640. | *Urena lobata* L. subsp. lobata | Malvaceae | Herb | Terrestrial | Wild |
| 641. | *Urena lobata* L. subsp. sinuata (L.) Borss. | Malvaceae | Herb | Terrestrial | Wild |
| 642. | *Vallisneria spiralis* L. | Hydrocharitaceae | Herb | Aquatic | Wild |
| 643. | *Vanda tessellata* (Roxb.) G.Don. | Orchidaceae | Herb | Epiphytic | Wild |
| 644. | *Vernonia cinerea* (L.) Less. | Asteraceae | Herb | Terrestrial | Wild |
| 645. | *Vetiveria zizanioides* (L.) Nash. | Poaceae | Grass | Marshy | Wild |

| Sl. No. | Species | Family | Habit | Habitat | Type |
|---|---|---|---|---|---|
| 646. | *Vigna trilobata* (L.) Verdc. | Fabaceae | Herb | Terrestrial | Wild |
| 647. | *Vitex altissima* L.f. | Verbenaceae | Tree | Marshy | Wild |
| 648. | *Vitex leucoxylon* L.f. | Verbenaceae | Tree | Marshy | Wild |
| 649. | *Vitex negundo* L. var. *negundo* | Verbenaceae | Tree | Terrestrial | Wild |
| 650. | *Vitex negundo* L. var. *purpurascens* Sivar. & Moldenke | Verbenaceae | Tree | Terrestrial | Wild |
| 651. | *Waltheria indica* L. | Sterculiaceae | Herb | Terrestrial | Wild |
| 652. | *Wedelia chinensis* (Osbeck) Merr. | Asteraceae | Herb | Terrestrial | Wild |
| 653. | *Wrightia arborea* (Dennst.) Mabberley | Apocynaceae | Tree | Terrestrial | Wild |
| 654. | *Wrightia tinctoria* (Roxb.) R.Br. | Apocynaceae | Tree | Terrestrial | Wild |
| 655. | *Xanthium indicum* Koen. | Asteraceae | Herb | Terrestrial | Wild |
| 656. | *Youngia japonica* (L.) DC. | Asteraceae | Herb | Terrestrial | Wild |
| 657. | *Ziziphus mauritiana* Lam. | Rhamnaceae | Tree | Terrestrial | Wild |
| 658. | *Ziziphus nummularia* (Burm.f.) Wight & Arn. | Rhamnaceae | Shrub | Terrestrial | Wild |
| 659. | *Ziziphus oenoplia* (L.) Mill. | Rhamnaceae | Straggler | Terrestrial | Wild |
| 660. | *Zornia diphylla* (L.) | Fabaceae | Herb | Terrestrial | Wild |
| 661. | *Zornia gibbosa* Span. | Fabaceae | Herb | Terrestrial | Wild |
| 662. | *Zoysia matrella* (L.) Merr. | Poaceae | Grass | Marshy | Wild |

Appendix 3 Birds recorded

| Sl. No. | Family | English name | Scientific name | Habitat | Status | IUCN status | Guild | IWPA |
|---|---|---|---|---|---|---|---|---|
| 1. | Psittacidae | Alexandrine Parakeet | *Psittacula eupatria* | T | R | LC | FR | S IV |
| 2. | Dicruridae | Ashy Drongo | *Dicrurus leucophaeus* | T | R | LC | IN | S IV |
| 3. | Sylviinae | Ashy Prinia | *Prinia socialis* | T | R | LC | IN | S IV |
| 4. | Alaudidae | Ashy-crowned Sparrow Lark | *Eremopterix griseus* | T | R | LC | IN | S IV |
| 5. | Cuculidae | Asian Koel | *Eudynamys scolopacea* | T | R | LC | FR | S IV |
| 6. | Ciconiidae | Asian Openbill | *Anastomus oscitans* | A | R | LC | PR | S IV |
| 7. | Apodidae | Asian Palm Swift | *Cypsiurus balasiensis* | T | R | LC | IN | S IV |
| 8. | Campephagidae | Asian Paradise-flycatcher | *Terpsiphone paradisi* | T | R | LC | IN | S IV |
| 9. | Sturnidae | Asian Pied Starling | *Sturnus contra* | T | R | LC | OM | S IV |
| 10. | Hirundinidae | Barn Swallow | *Hirundo rustica* | T | R | LC | IN | S IV |
| 11. | Ploceinae | Baya Weaver | *Ploceus philippinus* | T | R | LC | GR | S IV |
| 12. | Laniidae | Bay-backed Shrike | *Lanius vittatus* | T | R | LC | IN | S IV |
| 13. | Accipitridae | Besra | *Accipiter virgatus* | T | R | LC | PR | S IV |
| 14. | Ardeidae | Black Bittern | *Dupetor flavicollis* | A | R | LC | PI | S IV |
| 15. | Ardeidae | Black Crowned Night Heron | *Nycticorax nycticorax* | A | R | LC | PI | S IV |
| 16. | Dicruridae | Black Drongo | *Dicrurus macrocercus* | T | R | LC | IN | S IV |
| 17. | Accipitridae | Black Kite | *Milvus migrans* | T | R | LC | SC | S IV |
| 18. | Laridae | Black-bellied Tern | *Sterna acuticauda* | A | R | NT | PI | S IV |
| 19. | Alcedinidae | Black-capped Kingfisher | *Halcyon pileata* | A | R | LC | PI | S IV |
| 20. | Alaudidae | Black-crowned Sparrow Lark | *Eremopterix nigriceps* | T | R | LC | IN | S IV |
| 21. | Laridae | Black-headed Gull | *Larus ridibundus* | A | WV | LC | PI | S IV |
| 22. | Threskiornithidae | Black-headed Ibis | *Threskiornis melanocephalus* | A | R | NT | PR | S IV |
| 23. | Estrildidae | Black-headed Munia | *Lonchura malacca* | T | R | LC | GR | S IV |
| 24. | Oriolidae | Black-hooded Oriole | *Oriolus xanthornus* | T | R | LC | OM | S IV |
| 25. | Accipitridae | Black-shouldered Kite | *Elanus caeruleus* | T | R | LC | PR | S IV |
| 26. | Recurvirostridae | Black-winged Stilt | *Himantopus himantopus* | A | R | LC | IN | S IV |
| 27. | Turdinae | Blue-capped Rock Thrush | *Monticola cinclorhynchus* | T | SV | LC | IN | S IV |
| 28. | Alcedinidae | Blue-eared Kingfisher | *Alcedo meninting* | A | R | LC | PI | S IV |

| Sl. No. | Family | English name | Scientific name | Habitat | Status | IUCN status | Guild | IWPA |
|---|---|---|---|---|---|---|---|---|
| 29. | Cuculidae | Blue-faced Malkoha | *Phaenicophaeus viridirostris* | T | R | LC | FR | S IV |
| 30. | Meropidae | Blue-tailed Bee-eater | *Merops philippinus* | T | R | LC | IN | S IV |
| 31. | Sylviinae | Blyth's Reed Warbler | *Acrocephalus dumetorum* | T | WV | LC | IN | S IV |
| 32. | Accipitridae | Brahminy Kite | *Haliastur indus* | T | R | LC | SC | S IV |
| 33. | Sturnidae | Brahminy Starling | *Sturnus pagodarum* | T | R | LC | OM | S IV |
| 34. | Jacanidae | Bronze-winged Jacana | *Metopidius indicus* | A | R | LC | OM | S IV |
| 35. | Laniidae | Brown Shrike | *Lanius cristatus* | T | WV | LC | IN | S IV |
| 36. | Capitonidae | Brown-headed Barbet | *Megalaima zeylanica* | T | R | LC | FR | S IV |
| 37. | Laridae | Brown-headed Gull | *Larus brunnicephalus* | A | WV | LC | PI | S IV |
| 38. | Ardeidae | Cattle Egret | *Bubulcus ibis* | A | R | LC | IN | S IV |
| 39. | Meropidae | Chestnut-headed Bee-eater | *Merops leschenaulti* | T | R | LC | IN | S IV |
| 40. | Ardeidae | Cinnamon Bittern | *Ixobrychus cinnamomeus* | A | R | LC | PI | S IV |
| 41. | Motacillidae | Citrine Wagtail | *Motacilla citreola* | T | WV | LC | IN | S IV |
| 42. | Rallidae | Common Coot | *Fulica atra* | A | R | LC | OM | S IV |
| 43. | Picidae | Common Flameback | *Dinopium javanense* | T | R | LC | IN | S IV |
| 44. | Scolopacidae | Common Greenshank | *Tringa nebularia* | A | WV | LC | IN | S IV |
| 45. | Cuculidae | Common Hawk Cuckoo | *Hierococcyx varius* | T | R | LC | IN | S IV |
| 46. | Upupidae | Common Hoopoe | *Upupa epops* | T | SV | LC | IN | S IV |
| 47. | Irenidae | Common Iora | *Aegithina tiphia* | T | R | LC | IN | S IV |
| 48. | Falconidae | Common Kestrel | *Falco tinnunculus* | T | WV | LC | PR | S IV |
| 49. | Alcedinidae | Common Kingfisher | *Alcedo atthis* | A | R | LC | PI | S IV |
| 50. | Rallidae | Common Moorhen | *Gallinula chloropus* | A | R | LC | OM | S IV |
| 51. | Sturnidae | Common Myna | *Acridotheres tristis* | T | R | LC | OM | S IV |
| 52. | Anatidae | Common Poachard | *Aythya ferina* | A | WV | LC | OM | S IV |
| 53. | Scolopacidae | Common Redshank | *Tringa totanus* | A | WV | LC | IN | S IV |
| 54. | Charadriidae | Common Ringed Plover | *Charadrius hiaticula* | A | WV | LC | IN | S IV |
| 55. | Scolopacidae | Common Sandpiper | *Actitis hypoleucos* | A | WV | LC | IN | S IV |
| 56. | Scolopacidae | Common Snipe | *Gallinago gallinago* | A | R | LC | IN | S IV |
| 57. | Sylviinae | Common Tailorbird | *Orthotomus atrogularis* | T | R | LC | IN | S IV |

| Sl. No. | Family | English name | Scientific name | Habitat | Status | IUCN status | Guild | IWPA |
|---|---|---|---|---|---|---|---|---|
| 58. | Anatidae | Common Teal | *Anas crecca* | A | WV | LC | OM | S IV |
| 59. | Capitonidae | Coppersmith Barbet | *Megalaima haemacephala* | T | R | LC | FR | S IV |
| 60. | Anatidae | Cotton Pygmy-Goose | *Nettapus coromandelianus* | A | R | LC | OM | S IV |
| 61. | Hemiprocnidae | Crested Treeswift | *Hemiprocne coronata* | T | R | LC | IN | S IV |
| 62. | Scolopacidae | Curlew Sandpiper | *Calidris ferruginea* | A | WV | LC | IN | S IV |
| 63. | Anhingidae | Darter | *Anhinga melanogaster* | A | R | NT | PI | S IV |
| 64. | Columbidae | Eurasian Collared Dove | *Streptopelia decaocta* | T | R | LC | GR | S IV |
| 65. | Scolopacidae | Eurasian Curlew | *Numenius arquata* | A | WV | NT | IN | S IV |
| 66. | Strigidae | Eurasian Eagle Owl | *Bubo bubo* | T | R | LC | PR | S IV |
| 67. | Oriolidae | Eurasian Golden Oriole | *Oriolus oriolus* | T | SV | LC | OM | S IV |
| 68. | Accipitridae | Eurasian Marsh Harrier | *Circus aeruginosus* | T | WV | LC | PR | S IV |
| 69. | Accipitridae | Eurasian Sparrowhawk | *Accipiter nisus* | T | R | LC | PR | S IV |
| 70. | Threskiornithidae | Eurasian Spoonbill | *Platalea leucorodia* | A | R | NT | OM | S I |
| 71. | Anatidae | Eurasian Wigeon | *Anas penelope* | A | WV | LC | OM | S IV |
| 72. | Anatidae | Fulvous Whistling Duck | *Dendrocygna bicolor* | A | R | LC | OM | S IV |
| 73. | Anatidae | Gargany Teal | *Anas querquedula* | A | WV | LC | OM | S IV |
| 74. | Phalacrocoracidae | Great Cormorant | *Phalacrocorax carbo* | A | R | LC | PI | S IV |
| 75. | Podicipedidae | Great Crested Grebe | *Podiceps cristatus* | A | WV | LC | PI | S IV |
| 76. | Laridae | Great Crested Tern | *Sterna bergii* | A | R | LC | PI | S IV |
| 77. | Cuculidae | Greater Coucal | *Centropus sinensis* | T | R | LC | IN | S IV |
| 78. | Ardeidae | Greater Egret | *Casmerodius albus* | A | R | LC | IN | S IV |
| 79. | Estrildidae | Green Avadavat | *Amandava formosa* | T | R | VU | GR | S IV |
| 80. | Scolopacidae | Green Sandpiper | *Tringa ochropus* | A | WV | LC | IN | S IV |
| 81. | Phasianidae | Grey Francolin | *Francolinus pondicerianus* | T | R | LC | OM | S IV |
| 82. | Ardeidae | Grey Heron | *Ardea cinerea* | A | R | LC | PI | S IV |
| 83. | Motacillidae | Grey Wagtail | *Motacilla cinerea* | T | WV | LC | IN | S IV |
| 84. | Charadriidae | Grey-headed Lapwing | *Vanellus cinereus* | A | WV | LC | IN | S IV |
| 85. | Corvidae | House Crow | *Corvus splendens* | T | R | LC | SC | S IV |
| 86. | Passerinae | House Sparrow | *Passer domesticus* | T | R | LC | GR | S IV |

| Sl. No. | Family | English name | Scientific name | Habitat | Status | IUCN status | Guild | IWPA |
|---|---|---|---|---|---|---|---|---|
| 87. | Apodidae | House Swift | *Apus affinis* | T | R | LC | IN | S IV |
| 88. | Phalacrocoracidae | Indian Cormorant | *Phalacrocorax fuscicollis* | A | R | LC | PI | S IV |
| 89. | Bucerotidae | Indian Grey Hornbill | *Ocyceros birostris* | T | R | LC | FR | S IV |
| 90. | Caprimulgidae | Indian Nightjar | *Caprimulgus asiaticus* | T | R | LC | IN | S IV |
| 91. | Phasianidae | Indian Peafowl | *Pavo cristatus* | T | R | LC | OM | S I |
| 92. | Pittidae | Indian Pitta | *Pitta brachyura* | T | R | LC | IN | S IV |
| 93. | Ardeidae | Indian Pond Heron | *Ardeola grayii* | A | R | LC | PI | S IV |
| 94. | Turdinae | Indian Robin | *Saxicoloides fulicata* | T | R | LC | IN | S IV |
| 95. | Coraciidae | Indian Roller | *Coracias benghalensis* | T | R | LC | IN | S IV |
| 96. | Estrildidae | Indian Silverbill | *Lonchura malabarica* | T | R | LC | GR | S IV |
| 97. | Ardeidae | Intermediate Egret | *Mesophoyx intermedia* | A | R | LC | IN | S IV |
| 98. | Scolopacidae | Jack Snipe | *Lymnocryptes minimus* | A | WV | LC | IN | S IV |
| 99. | Timaliinae | Jungle Babbler | *Turdoides striatus* | T | R | LC | IN | S IV |
| 100. | Corvidae | Jungle Crow | *Corvus macrorhynchos* | T | R | LC | SC | S IV |
| 101. | Sturnidae | Jungle Myna | *Acridotheres fuscus* | T | R | LC | OM | S IV |
| 102. | Sylviinae | Jungle Prinia | *Prinia sylvatica* | T | R | LC | IN | S IV |
| 103. | Scolopacidae | Kentish Plover | *Charadrius alexandrinus* | A | WV | LC | IN | S IV |
| 104. | Campephagidae | Large Cuckooshrike | *Coracina macei* | T | R | LC | IN | S IV |
| 105. | Turdinae | Large Grey Babbler | *Turdoides malcolmi* | T | R | LC | IN | S IV |
| 106. | Columbidae | Laughing Dove | *Streptopelia senegalensis* | T | R | LC | GR | S IV |
| 107. | Cuculidae | Lesser Coucal | *Centropus bengalensis* | T | R | LC | IN | S IV |
| 108. | Anatidae | Lesser Whistling Duck | *Dendrocygna javanica* | A | R | LC | OM | S IV |
| 109. | Laridae | Lesser-crested Tern | *Sterna bengalensis* | A | WV | LC | PI | S IV |
| 110. | Phalacrocoracidae | Little Cormorant | *Phalacrocorax niger* | A | R | LC | PI | S IV |
| 111. | Ardeidae | Little Egret | *Egretta garzetta* | A | R | LC | IN | S IV |
| 112. | Podicipedidae | Little Grebe | *Tachybaptus ruficollis* | A | R | LC | PI | S IV |
| 113. | Ardeidae | Little Heron | *Butorides striata* | A | R | LC | PI | S IV |
| 114. | Scolopacidae | Little Ringed Plover | *Charadrius dubius* | A | R | LC | IN | S IV |
| 115. | Scolopacidae | Little Stint | *Calidris minuta* | A | WV | LC | IN | S IV |

| Sl. No. | Family | English name | Scientific name | Habitat | Status | IUCN status | Guild | IWPA |
|---|---|---|---|---|---|---|---|---|
| 116. | Laniidae | Long-tailed Shrike | *Lanius schach* | T | R | LC | IN | S IV |
| 117. | Nectariniidae | Loten's Sunbird | *Nectarinia lotenia* | T | R | LC | NE | S IV |
| 118. | Scolopacidae | Marsh Sandpiper | *Tringa stagnatilis* | A | WV | LC | IN | S IV |
| 119. | Anatidae | Northern Pintail | *Anas acuta* | A | WV | LC | OM | S IV |
| 120. | Anatidae | Northern Shoveler | *Anas clypeata* | A | WV | LC | OM | S IV |
| 121. | Turdinae | Orange-headed Thrush | *Zoothera citrina* | T | R | LC | IN | S IV |
| 122. | Turdinae | Oriental Magpie Robin | *Copsychus saularis* | T | R | LC | IN | S IV |
| 123. | Pandionidae | Osprey | *Pandion haliaetus* | T | WV | LC | PR | S I |
| 124. | Motacillidae | Paddyfield Pipit | *Anthus rufulus* | T | R | LC | IN | S IV |
| 125. | Ciconiidae | Painted Stork | *Mycteria leucocephala* | A | R | NT | PR | S IV |
| 126. | Accipitridae | Palla's Fish Eagle | *Haliaeetus leucoryphus* | T | R | VU | PR | S IV |
| 127. | Accipitridae | Pallid Harrier | *Circus macrourus* | T | WV | NT | PR | S IV |
| 128. | Jacanidae | Pheasant Tailed Jacana | *Hydrophasianus chirurgus* | A | R | LC | OM | S IV |
| 129. | Scolopacidae | Pied Avocet | *Recurvirostra avosetta* | A | WV | LC | IN | S IV |
| 130. | Turdinae | Pied Bushchat | *Saxicola caprata* | T | R | LC | IN | S IV |
| 131. | Cuculidae | Pied Cuckoo | *Clamator jacobinus* | T | R | LC | IN | S IV |
| 132. | Accipitridae | Pied Harrier | *Circus melanoleucos* | T | R | LC | PR | S IV |
| 133. | Alcedinidae | Pied Kingfisher | *Ceryle rudis* | A | R | LC | PI | S IV |
| 134. | Scolopacidae | Pintail Snipe | *Gallinago stenura* | A | WV | LC | IN | S IV |
| 135. | Sylviinae | Plain Prinia | *Prinia inornata* | T | R | LC | IN | S IV |
| 136. | Psittacidae | Plum-headed Parakeet | *Psittacula cyanocephala* | T | R | LC | FR | S IV |
| 137. | Ardeidae | Purple Heron | *Ardea purpurea* | A | R | LC | PI | S IV |
| 138. | Nectariniidae | Purple Sunbird | *Nectarinia asiatica* | T | R | LC | NE | S IV |
| 139. | Rallidae | Purple Swamphen | *Porphyrio porphyrio* | A | R | LC | OM | S IV |
| 140. | Nectariniidae | Purple-rumped Sunbird | *Nectarinia zeylonica* | T | R | LC | NE | S IV |
| 141. | Estrildidae | Red Avadavat | *Amandava amandava* | T | R | LC | GR | S IV |
| 142. | Columbidae | Red Collared Dove | *Streptopelia tranquebarica* | T | R | LC | GR | S IV |
| 143. | Anatidae | Red-crested Pochard | *Rhodonessa rufina* | A | WV | LC | OM | S IV |
| 144. | Hirundinidae | Red-rumped Swallow | *Hirundo daurica* | T | R | LC | IN | S IV |

| Sl. No. | Family | English name | Scientific name | Habitat | Status | IUCN status | Guild | IWPA |
|---|---|---|---|---|---|---|---|---|
| 145. | Pycnonotidae | Red-vented Bulbul | *Pycnonotus cafer* | T | R | LC | FR | S IV |
| 146. | Charadriidae | Red-wattled Lapwing | *Vanellus indicus* | A | R | LC | IN | S IV |
| 147. | Charadriidae | River Lapwing | *Vanellus duvaucalii* | A | R | LC | IN | S IV |
| 148. | Laridae | River Tern | *Sterna aurantia* | A | R | LC | PI | S IV |
| 149. | Columbidae | Rock Pigeon | *Columba livia* | T | R | LC | GR | S IV |
| 150. | Psittacidae | Rose-ringed Parakeet | *Psittacula krameri* | T | R | LC | FR | S IV |
| 151. | Sturnidae | Rosy Starling | *Sturnus roseus* | T | WV | LC | FR | S IV |
| 152. | Corvidae | Rufous Treepie | *Dendrocitta vagabunda* | T | R | LC | OM | S IV |
| 153. | Estrildidae | Scaly-breasted Munia | *Lonchura punctulata* | T | R | LC | GR | S IV |
| 154. | Accipitridae | Shikra | *Accipiter badius* | T | R | LC | PR | S IV |
| 155. | Meropidae | Small Green Bee-eater | *Merops orientalis* | T | R/SV | LC | IN | S IV |
| 156. | Campephagidae | Small Minivet | *Pericrocotus cinnamomeus* | T | R | LC | IN | S IV |
| 157. | Anatidae | Spot-billed Duck | *Anas poecilorhyncha* | A | R | LC | OM | S IV |
| 158. | Pelecanidae | Spot-billed Pelican | *Pelecanus philippensis* | A | R | NT | PI | S IV |
| 159. | Columbidae | Spotted Dove | *Streptopelia chinensis* | T | R | LC | GR | S IV |
| 160. | Strigidae | Spotted Owlet | *Athene brama* | T | R | LC | PR | S IV |
| 161. | Scolopacidae | Spotted Redshank | *Tringa erythropus* | A | WV | LC | IN | S IV |
| 162. | Alcedinidae | Stork-billed Kingfisher | *Halcyon capensis* | A | R | LC | PI | S IV |
| 163. | Scolopacidae | Temminck's Stint | *Calidris temminckii* | A | WV | LC | IN | S IV |
| 164. | Dicaeidae | Thick-billed Flowerpecker | *Dicaeum agile* | T | R | LC | NE | S IV |
| 165. | Dicaeidae | Tickell's Flowerpecker | *Dicaeum erythrorynchos* | T | R | LC | NE | S IV |
| 166. | Anatidae | Tufted Duck | *Aythya fuligula* | A | WV | LC | OM | S IV |
| 167. | Scolopacidae | Whimbrel | *Numenius phaeopus* | A | WV | LC | IN | S IV |
| 168. | Laridae | Whiskered Tern | *Chlidonias hybridus* | A | R | LC | PI | S IV |
| 169. | Dicruridae | White-bellied Drongo | *Dicrurus caerulescens* | T | R | LC | IN | S IV |
| 170. | Accipitridae | White-bellied Sea Eagle | *Haliaeetus leucogaster* | T | R | LC | PR | S I |
| 171. | Alcedinidae | White-breasted Kingfisher | *Halcyon smyrnensis* | A | R | LC | PI | S IV |
| 172. | Rallidae | White-breasted Waterhen | *Amaurornis phoenicurus* | A | R | LC | IN | S IV |
| 173. | Pycnonotidae | White-browed Bulbul | *Pycnonotus luteolus* | T | R | LC | FR | S IV |

| Sl. No. | Family | English name | Scientific name | Habitat | Status | IUCN status | Guild | IWPA |
|---|---|---|---|---|---|---|---|---|
| 174. | Motacillidae | White-browed Wagtail | *Motacilla maderaspatensis* | T | R | LC | IN | S IV |
| 175. | Timaliinae | White-headed Babbler | *Turdoides affinis* | T | R | LC | IN | S IV |
| 176. | Hirundinidae | Wire-tailed Swallow | *Hirundo smithii* | T | R | LC | IN | S IV |
| 177. | Scolopacidae | Wood Sandpiper | *Tringa glariola* | A | WV | LC | IN | S IV |
| 178. | Ardeidae | Yellow Bittern | *Ixobrychus sinensis* | A | R | LC | PI | S IV |
| 179. | Motacillidae | Yellow Wagtail | *Motacilla flava* | T | WV | LC | IN | S IV |
| 180. | Charadriidae | Yellow-wattled Lapwing | *Vanellus malabaricus* | A | R | LC | IN | S IV |
| 181. | Scolopacidae | *Lesser Sand Plover | *Charadrius mongolus* | A | R | LC | IN | S IV |
| 182. | Scolopacidae | *Greater Sand Plover | *Charadrius leschenaultii* | A | WV | LC | IN | S IV |
| 183. | Scolopacidae | *Dunlin | *Calidris alpina* | A | WV | LC | IN | S IV |
| 184. | Scolopacidae | *Ruddy Turnstone | *Arenaria interpres* | A | WV | LC | IN | S IV |
| 185. | Scolopacidae | *Grey Plover | *Pluvialis squatarola* | A | WV | LC | IN | S IV |
| 186. | Scolopacidae | *Pacific Golden Plover | *Pluvialis fulva* | A | WV | LC | IN | S IV |
| 187. | Scolopacidae | *Asian Dowitcher | *Limnodromus semipalmatus* | A | WV | NT | IN | S IV |
| 188. | Scolopacidae | *Black-tailed Godwit | *Limosa limosa* | A | WV | LC | IN | S IV |
| 189. | Scolopacidae | *Bar-tailed Godwit | *Limosa lapponica* | A | WV | LC | IN | S IV |
| 190. | Anatidae | *Ruddy Shelduck | *Tadorna ferruginea* | A | WV | LC | OM | S IV |
| 191. | Anatidae | *Gadwall | *Anas strepera* | A | WV | LC | OM | S IV |
| 192. | Anatidae | *Bar-headed Goose | *Anser indicus* | A | WV | LC | OM | S IV |
| 193. | Anatidae | *Comb Duck | *Sarkidiornis melanotos* | A | R | LC | OM | S IV |
| 194. | Phoenicopteridae | *Greater Flamingo | *Phoenicopterus roses* | A | R/WV | LC | OM | S IV |
| 195. | Gruidae | *Sarus Crane | *Grus antigone* | T | R | VU | OM | S IV |
| 196. | Ciconiidae | *Woolly-necked Stork | *Ciconia episcopus* | A | R | LC | PR | S IV |
| 197. | Anatidae | *White Eye Pochard | *Aythya nyroca* | A | WV | NT | OM | S IV |
| 198. | Anatidae | *Bear's Poachard | *Aythya baeri* | A | WV | EN | OM | S IV |
| 199. | Anatidae | *Ferruginous Poachard | *Aythya nyroca* | A | WV | NT | OM | S IV |
| 200. | Rallidae | *Blue-breasted Banded Rail | *Rallus striatus* | A | R | LC | OM | S IV |
| 201. | Rallidae | *Ballions Crake | *Porzana pusilla* | A | WV | LC | OM | S IV |
| 202. | Rallidae | *Brown Crake | *Amaluromis akool* | A | R | LC | OM | S IV |

| Sl. No. | Family | English name | Scientific name | Habitat | Status | IUCN status | Guild | IWPA |
|---|---|---|---|---|---|---|---|---|
| 203. | Scolopacidae | *Wood Snipe | *Gallnago nemoricola* | A | R | LC | IN | S IV |
| 204. | Alaudidae | *Bush lark | *Mirafra assamica* | T | R | LC | IN | S IV |
| 205. | Alaudidae | *Rufous Tailed Finch Lark | *Ammomanes phoenicurus* | T | R | LC | IN | S IV |
| 206. | Alaudidae | *Common crested lark | *Galerida cristata* | T | R | LC | IN | S IV |
| 207. | Alaudidae | *Small Sky Lark | *Alauda gulgula* | T | R/WV | LC | IN | S IV |
| 208. | Tytonidae | *Barn Owl | *Tyto alba* | T | R | LC | PR | S IV |
| 209. | Falconidae | *Peregrine Falcon | *Falco peregrinus* | T | R | LC | PR | S IV |
| 210. | Cuculidae | *Plaintive Cuckoo | *Cacomantis merulinus* | T | R | LC | IN | S IV |
| 211. | Turdinae | *Indian Blue Robin | *Luscinia brunnea* | T | R | LC | IN | S IV |
| 212. | Apodidae | *White-rumped Needletail | *Zoonavena sylvatica* | T | R | LC | IN | S IV |
| 213. | Campephagidae | *Black-headed Cuckoo-shrike | *Coracina melanoptera* | T | R | LC | OM | S IV |
| 214. | Timaliinae | *Common Babbler | *Turdoides caudatus* | T | R | LC | OM | S IV |
| 215. | Gruidae | *Common Crane | *Grus grus* | T | WV | LC | OM | S IV |
| 216. | Irenidae | *Blue-winged Leafbird | *Chloropsis cochinchinsis* | T | R | LC | OM | S IV |
| 217. | Irenidae | *Golden-fronted Leafbird | *Chloropsis aurifrons* | T | R | LC | OM | S IV |
| 218. | Dicruridae | *Greater Racket-tailed Drongo | *Dicrurus pardiseus* | T | R | LC | IN | S IV |
| 219. | Cuculidae | *Indian Cuckoo | *Cuculus micropterus* | T | R | LC | IN | S IV |
| 220. | Strigidae | *Jungle Owlet | *Glaucidium radiatum* | T | R | LC | PR | S IV |
| 221. | Burhinidae | *Eurasian Thick-knee | *Burhinus oedicnemus* | T | R | LC | OM | S IV |
| 222. | Accipitridae | *Greater Grey-headed Fish Eagle | *Ichthyophagia ichthyaetus* | A | R | NT | PR | S IV |
| 223. | Phasianidae | *Grey Junglefowl | *Gallus sonneratii* | T | R | LC | OM | S IV |
| 224. | Phasianidae | *Grey Francolin | *Francolinus pondicerianus* | T | R | LC | OM | S IV |
| 225. | Picidae | *Brown -Caped Pygmy Woodpecker | *Dendrocopos nanus* | T | R | LC | OM | S IV |
| 226. | Accipitridae | *Egyptian Vulture | *Neophron percnopterus* | T | R | LC | SC | S IV |
| 227. | Accipitridae | *Short-toed Snake Eagle | *Circaetus gallicus* | T | R | LC | PR | S IV |
| 228. | Ploceinae | *Streaked Weaver | *Ploceus manyar* | T | R | LC | GR | S IV |
| 229. | Rallidae | *Watercock | *Gallicrex cinerea* | A | R | LC | PI | S IV |
| 230. | Ciconiidae | *White Stork | *Ciconia ciconia* | A | R/WV | LC | PI | S IV |
| 231. | Ciconiidae | *Black-necked Stork | *Ephippiorhynchus asiaticus* | A | R | NT | PI | S IV |

| Sl. No. | Family | English name | Scientific name | Habitat | Status | IUCN status | Guild | IWPA |
|---|---|---|---|---|---|---|---|---|
| 232. | Ciconiidae | *Lesser Adjudant | *Leptoptilos javanicus* | A | R | VU | PI | S IV |
| 233. | Threskiornithidae | *Black Ibis | *Pseudibis papillosa* | A | R | LC | OM | S IV |
| 234. | Threskiornithidae | *Glossy Ibis | *Plegadis falcinellus* | A | R/WV | LC | OM | S IV |
| 235. | Accipitridae | *White-eyed Buzzard | *Butastur teesa* | T | R | LC | PR | S IV |
| 236. | Columbidae | *Yellow-footed Green Piegeon | *Treron phoenicoptera* | T | R | LC | GR | S IV |

**Where**: T-Terrestrial; W-water bird; R-Resident; WR-Widespread resident; WV-Winter visitor; SV-Summer visitor; WWV-Wisespread winter visitor; BR-Breading resident; LC-Least concern; VU-Vulnerable; EN-Endangered; NT-Near threatened; IN-Insectivorous; OM-Omnivorus; PR-Predators; FR-Frugivorous; PI-Piscivorous; GR-Granivorous; NE-Nectarivorous; SC-Scavengers; S I-Schedule I; S IV-Schedule IV; IWPA-Indian Wildlife Protection Act.

**ANNEXURE 1**

[TO BE PUBLISHED IN THE GAZETTE OF INDIA, PART II, SECTION 3, SUBSECTION (ii)]

**GOVERNMENT OF INDIA**

**MIINSTRY OF ENVIRONMENT AND FORESTS**

**NOTIFICATION**

New Delhi the ..... of November, 2010

**G.S.R. --------- WHEREAS** the wetlands, vital parts of the hydrological cycle, are highly productive, support exceptionally large biological diversity and provide a wide range of ecosystem services, such as waste assimilation, water purification, flood mitigation, erosion control, ground water recharge, microclimate regulation, aesthetic enhancement of the landscape while simultaneously supporting many significant recreational, social and cultural activities, besides being a part of the cultural heritage;

**AND WHEREAS** many wetlands are seriously threatened by reclamation through drainage and landfill, pollution (discharge of domestic and industrial effluents, disposal of solid wastes), hydrological alterations (water withdrawal and inflow changes) and over-exploitation of their natural resources resulting In loss of biodiversity and disruption in goods and services provided by wetlands;

**AND WHEREAS** India is a signatory to the Ramsar Convention for the conservation and wise use of wetlands, which includes in its ambit a wide variety of habitats, such as rivers and lakes, coastal lagoons, mangroves, peatlands, coral reefs, and numerous man-made wetlands, such as ponds, farm ponds, irrigated agricultural lands, sacred groves, salt pans, reservoirs, gravel pits, sewage farms, and canals;

**AND WHEREAS** the Central Government has identified certain wetlands for conservation and management under its conservation programme and provides financial and technical assistance to the State Governments and Union territory Administrations for various conservation activities through approval of the Management Action Plans;

**AND WHEREAS** the National Environment Policy, 2006 recognises the ecological services provided by wetlands and emphasizes the need to set up a regulatory mechanism consistent with the Ramsar Convention to maintain the ecological character of the identified wetlands and develop a national inventory of such wetlands;

**NOW, THEREFORE,** in exercise of the powers conferred by section 25, read with sub-section (1) and clause (v) of sub-section (2) and sub section (3) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules for conservation and management of wetlands, namely:-

**1. Short title and commencement**

1. These rules may be called the Wetlands (Conservation and Management) Rules,

2010.

2. They shall come into force on the date of their publication in the Official Gazette.

2. **Definitions-(1) In these rules, unless the context otherwise requires**

(a) "Act" means the Environment (Protection) Act, 1986 (29 of 1986);

(b) "Authority" means the Central Wetlands Regulatory Authority constituted under rule 5;

(c) "dredging" means an excavation activity or operation usually carried out at least partly underwater, in shallow sea or fresh water areas with the purpose of gathering up bottom sediments and disposing them off at a different location;

(d) "National Park" means an area declared, as National Park under section 35 or section 38, or deemed to be declared as a National Park under sub-section (3) of section 66, of the Wild Life (Protection) Act, 1972 (35 of 1972);

(e) "Ramsar Convention" means the Convention on Wetlands signed at Ramsar, Iran in 1971;

(f) "UNESCO" means the United Nations Educational Scientific and Cultural Organisation;

(g) "wetland" means an area or of marsh, fen, peatland or water; natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six meters and includes all inland waters such as lakes, reservoirs, tanks, backwaters, lagoon, creeks, estuaries and manmade wetland and the zone of direct influence on wetlands that is to say the drainage area or catchment region of the wetlands as determined by the authority but does not include main river channels, paddy fields and the coastal wetland covered under the notification of the Government of India in the Ministry of Environment and Forest, S.O. number 114 (E) dated the 19th February, 1991 published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) of dated the 20th February, 1991;

(h) "Wildlife sanctuary" means an area declared as a wildlife sanctuary under the provisions of Chapter IV of the Wildlife (Protection) Act, 1972 (35 of 1972) and shall include an area deemed to be sanctuary under sub section (4) of section 66, of the said Act.

The word and expressions used in these rules and not defined but defined in the Act, shall have the meaning respectively assigned to them in the Act.

**3. Protected wetlands**

Based on the significance of the functions performed by the wetlands for overall well being of the people and for determining the extent and level of regulation, the following wetlands shall be regulated under these rules, namely:-

i. wetlands categorised as Ramsar wetlands of International Importance under the

Ramsar Convention as specified in the Schedule.

ii. wetlands in areas that are ecologically sensitive and important, such as, national parks, marine parks, sanctuaries, reserved forests, wildlife habitats, mangroves, corals, coral reefs, areas of outstanding natural beauty or historical or heritage areas and the areas rich in genetic diversity;

iii. wetlands recognised as or lying within a UNESCO World Heritage Site;

iv. high altitude wetlands or high altitude wetland complexes at or above an elevation of two thousand five hundred metres with an area equal to or greater than five ha;

v. wetlands or wetland complexes below an elevation of two thousand five hundred metres with an area equal to or greater than five hundred ha.

vi. any other wetland as so identified by the Authority and thereafter notified by the Central Government under the provisions of the Act for the purposes of these rules.

**4. Restrictions on activities within wetlands**

(1). The following activities within the wetlands shall be prohibited, namely:-

(i) reclamation of wetlands;

(ii) setting up of new industries and expansion of existing industries;

(iii) manufacture or handling or storage or disposal of hazardous substances covered under the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 notified vide S.O. number 966 (E) dated the 27th November, 1989 or the Rules for Manufacture, Use, Import, Export and Storage of Hazardous Micro-organisms/Genetically engineered organisms or cells notified vide GSR number 1037 (E) dated the 5th December, 1989 or the Hazardous Wastes (Management, Handling and Transboundry Movement) Rules, 2008 notified vide S.O. number 2265 (E), dated the 24th September, 2008;

(iv) solid waste dumping: provided that the existing practices, if any, existed before the commencement of these rules shall be phased out within a period not exceeding six months from the date of commencement of these rules;

(v) discharge of untreated wastes and effluents from industries, cities or towns and other human settlements: provided that the practices, if any, existed before the commencement of these rules shall be phased out within a period not exceeding one year from the date of commencement of these rules;

(vi) any construction of a permanent nature except for boat jetties within fifty metres from the mean high flood level observed in the past ten years calculated from the date of commencement of these rules.

(vii) any other activity likely to have an adverse impact on the ecosystem of the wetland to be specified in writing by the Authority constituted in accordance with these rules.

(2) The following activities shall not be undertaken without the prior approval of the State

Government within the wetlands, namely:-

i. withdrawal of water or the impoundment, diversion or interruption of water sources within the local catchment area of the wetland ecosystem;
ii. harvesting of living and non-living resources;
iii. grazing to the level that the basic nature and character of the biotic community is not adversely affected;
iv. treated effluent discharges from industries, cities or towns, human settlements and agricultural fields falling within the limits laid down by the Central Pollution Control Board or the State Pollution Control Committee, as the case may be;
v. plying of motorized boat, if it is not detrimental to the nature and character of the biotic community;
vi. dredging, only if the wetland is impacted by siltation;
vii. construction of boat jetties;
viii. activities within the zone of influence, as per the definition of wetlands, that may directly affect the ecological character of the wetland;
ix. facilities required for temporary use, such as pontoon bridges, that do not affect the ecological character of the wetland;
x. Aquaculture, agriculture and horticulture activities within the wetland;
xi. repair of existing buildings or infrastructure including reconstruction activities.
xii. any other activity to be identified by the Authority.

Not withstanding anything in sub-rule (1) or sub-rule (2), the Central Government may permit any of the prohibited activities or non-wetland use in the protected wetland on the recommendation of the Authority.
The State Government shall ensure that a detailed Environment Impact Assessment is carried out in accordance with the procedures specified in the notification of the Government of India in the Minister of Environment and Forests S.O. number 1533 (E) dated the September 14th, 2006 as amended from time to time.
No wetland shall be converted to non-wetland use unless the Central Government is satisfied on the recommendation of the Authority that it is expedient in the public interest and reasons justifying the decision are recorded.

**5**. **Constitution of Central Wetlands Regulatory Authority**

The Central Government, in exercise of the powers conferred by sub-section (3) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986), hereby constitutes Central Wetlands Regulatory Authority consisting of the following Chairpersons and members for the purpose of these rules, namely: -

(a) Secretary, Ministry of Environment and Forests, Government of India - Chairperson;
(b) a representative (not below the rank of Joint Secretary) from Ministry of

Tourism, Government of India- Member ex-officio;

(c) a representative (not below the rank of Joint Secretary) from Ministry of Water Resources, Government of India -Member ex-officio;

(d) a representative (not below the rank of Joint Secretary) from Ministry of Agriculture, Government of India - Member ex-officio;

(e) a representative (not below the rank of Joint Secretary) from Ministry of Social Justice, Government of India- Member ex-officio;

(f) Chairman or his nominee, the Central Pollution Control Board,- Member ex-officio;

(g) Joint Secretary or Adviser, dealing with the wetland in the Ministry of Environment and Forests, Government of India, - member ex-officio;

(h) Dr. Asad R. Rahmani, Director, Bombay Natural History Society, Hornbill House, Salim Ali Chowk, Shaheed Bhagat Singh Road, Mumbai-400 023; Expert Ornithology -Member.

(i) Dr. M.R.D. Kunadangar, Darul Aloom Qasmia Lane, Botshah Mohalla, Lal Bazar, Srinagar, Kashmir ; Expert limnology- Member

(j) Dr. CK. Varshney, 88 Vaishali, Pitampura, New Delhi-110034; Expert Ecology- Member

(k) Dr E.J. James, Director, Water Institute, Karunya University, Coimbatore, Tamil Nadu ; Expert Hydrology- Member;

(l) Director or Additional Director or Joint Director dealing with the Wetland in the Ministry of Environment and Forests-Member Secretary.

The term of the Authority shall be three years effected from the date of publication of the notification referred to in sub-rule (1).

The Authority shall exercise the following powers and perform the following functions, namely:-

(i) appraise proposals for identification of new wetlands, projects or activities in consultations with the concerned local authorities;

(ii) identify and interface with the concerned local authorities to enforce the provisions contained under these rules and other laws for the time being in force;

(iii) grant clearances or identify in consultation with the local state government, the areas for the grant of clearance for regulated activities in the wetlands within their respective jurisdictions;

(iv) determine, in consultation with concerned local authority, the zone of direct influence of the wetlands;

(v) issue whatever directions, necessary for the conservation, preservation and wiseuse of wetlands to the State Governments.

(4) The Authority shall periodically review the list of wetlands and the details of prohibited and regulated activities under the rules.

(5) The Authority shall specify the threshold levels for activities to be regulated and the mode and methodology for undertaking activities in wetland.

**6. Process for identification of wetlands under different categories**

(1) Wetlands covered under item (i) of rule 3 specified under Schedule shall be the wetland to be regulated under these rules.

(2) The States Government shall prepare, within a period of one year from the commencement of these rules, 'Brief Document' identifying and classifying the wetlands within their respective territories in accordance with the criteria specified under Rule 3 and submit the same to Authority.

(3) The 'Brief Document' of each wetland for identification shall comprise of following information, namely:-

i) broad geographic delineation of the wetland;

ii) its zone of influence along with a map (accurate and to scale);

iii) the size of the wetland;

iv) account of pre-existing rights and privileges, consistent or not consistent with the ecological health of the wetland.

(4) The Authority, shall on receipt of the 'Brief document' under sub-rule(2), if consider it necessary refer in consultation with the State Government to a research institute or university having relevant multi-disciplinary expertise related to wetlands, to conduct a comprehensive survey of the wetland within a period of thirty days: provided that the institute or university to which the matter has been referred under sub-rule(4) shall submit a report within next ninety days from the date of such reference to Authority, which shall contain information with respect to the criteria specified under rule 3.

(5) The Authority shall, thereafter, arrive at a decision in consultation with the State Government, on the proposal, within a period of ninety days from the date of receipt of the report under sub-rule(4).

(6) The Central Government shall on the receipt of the recommendation of the Authority notify the area of wetlands as recommended by the Authority for public information inviting objections and suggestions from the general public likely to be affected to make representation to the Central Government within a period of sixty days;

(7) The Authority shall consider all the representations which the Central Government may receive under sub-rule (6) and submit its recommendation on the such representations to Central Government within a period of sixty days for final notification;

(8) The Central Government shall on receipt of the recommendations of the Authority under sub-rule (7) issue a final notification notifying therein the area of the wetland its category or classification to be regulated under these rules and display the said notification in public places in English and vernacular languages.

(10) The Authority may, *suo moto* or on application made to it, review any decision under these rules or issue direction for inclusion of wetland under these rule.

**7. Overlapping provisions**

(1) The wetlands within the protected areas of the National Parks and Wildlife Sanctuaries

shall be regulated by the provisions of WildLife (Protection) Act, 1972 (35 of 1972).

(2) The wetlands within the protected or notified forest areas shall be regulated by the provisions of the Indian Forest Act, 1927(16 of 1972); the Forest (Conservation) Act, 1980(69 of 1980); and the Environment (Protection) Act, 1986(29 of 1986).

(3) The gaps in the regulation of wetlands within the protected and notified forest areas, if any, under the provisions of the Indian Forest Act, 1927; Wildlife (Protection) Act, 1972; and Forest (Conservation) Act, 1980; shall be plugged by invoking provisions of the Environment (Protection) Act, 1986.

(4) The wetlands situated outside the protected or notified forest areas referred to in sub rule(2) shall be regulated by the relevant provisions of the Environment (Protection) Act, 1986(29 of 1986)

**8. Enforcement of regulated activities**

(1) The identified activities for management and wise use of wetlands situated within the protected or notified forest areas referred to in sub rule (2) of rule 7 shall be regulated by the Forest Department of the State concerned.

(2) The identified activities for management and wise use of wetlands situated outside the protected or notified forest areas shall be regulated by the nodal Department or the relevant local state agencies to be designated by the State Government within a period of six months from the date of commencement of these rules.

**9. Appeals against the decisions of Authority**

Any person aggrieved by the decision of the Authority may prefer an appeal to the National Green Tribunal constituted under the National Green Tribunal Act, 2010(19 of 2010) with in a period of sixty days from the date of such decision: Provided the National Green Tribunal may entertain any appeal after the expiry of the said period of sixty days if it is satisfied that the appellant was prevented by sufficient cause from, filing the appeal in time.

**THE SCHEDULE [see- rule 3(i)]**

**List of wetlands in India identified as Ramsar sites under Ramsar Convention on Wetland**

| Sl. No. | Name of the Wetland | State |
|---|---|---|
| 1 | Ashtamudi Wetland | Kerala |
| 2 | Bhitarkanika Mangroves | Odisha |
| 3 | Bhoj Wetland | Madhya Pradesh |
| 4 | Chilika Lake | Odisha |
| 5 | Deepor Beel | Assam |
| 6 | East Calcutta Wetlands | West Bengal |
| 7 | Harike Lake | Punjab |
| 8 | Kanjli | Punjab |
| 9 | Keoladeo National Park | Rajasthan |

| | | |
|---|---|---|
| 10 | Kolleru Lake | Andhra Pradesh |
| 11 | Loktak Lake | Manipur |
| 12 | Point Calimere Wildlife and Bird Sanctuary | Tamil Nadu |
| 13 | Pong Dam Lake | Himachal Pradesh |
| 14 | Ropar | Punjab |
| 15 | Sambhar Lake | Rajasthan |
| 16 | Sasthamkotta Lake | Kerala |
| 17 | Tsomoriri | Jammu and Kashmir |
| 18 | Vembanad-Kol Wetland | Kerala |
| 19 | WularLake | Jammu and Kashmir |
| 20 | Chandratal | Himachal Pradesh |
| 21 | Renuka | Himachal Pradesh |
| 22 | Rudrasagar | Tripura |
| 23 | Uppai Ganga | Uttar Pradesh |
| 24 | Hokarsar (Hokera) | Jammu and Kashmir |
| 25 | Surinsar and Mansar (complex) | Jammu and Kashmir |

**[F.No. J-22012/3t/05-CS(W)]**

(R. Mehta)
Adviser to the Government of India

**Source***: http://moef.nic.in/downloads/public-information/Wetlands-Rules-2010.pdf*

Appendix 5 CMFRI identified fish landing centres in Srikakulam

| Sl. No. | | Mandal | Landing Centre |
|---|---|---|---|
| 1 | 1 | Ichapuram | Donkuru |
| 2 | 1 | Kaviti | Kapasakuddu |
| 3 | 2 | | Chinnakarrivanipalem |
| 4 | 3 | | Peddakarrivanipalem |
| 5 | 4 | | Idduvanipalem |
| 6 | 5 | | Kotha Calingapatnam |
| 7 | 1 | Sompeta | Isakalapalem |
| 8 | 2 | | Ramayyapatnam |
| 9 | 3 | | Gollagandi |
| 10 | 4 | | Baruva kotturu |
| 11 | 5 | | Battigalluru |
| 12 | 6 | | Ekuvooru |
| 13 | 1 | Mandasa | Gedduru |
| 14 | 2 | | M. Ganguvada |
| 15 | 1 | V.Kothuru | Gunupalli |
| 16 | 2 | | Akkupalli |
| 17 | 3 | | Dokulapadu |
| 18 | 4 | | Chinnakotturu |
| 19 | 5 | | Nuvvalarevu |
| 20 | 6 | | Machineellapeta |
| 21 | 7 | | Hukumpeta |
| 22 | 8 | | Kambalarayudupeta |
| 23 | 9 | | Kothapeta |
| 24 | 10 | | Althada |
| 25 | 1 | Santhabommali | Bhavanapadu |
| 26 | 2 | | M. Sunnapalli |
| 27 | 3 | | Meghavaram |
| 28 | 4 | | Maruvada |
| 29 | 5 | | Geddalapadu |
| 30 | 6 | | Kumunduvanipeta |
| 31 | 7 | | Jagannadhapuram |
| 32 | 8 | | Umilada |
| 33 | 1 | Polaki | Peddakoviripeta |
| 34 | 2 | | Guppidipeta |
| 35 | 3 | | Jogampeta |
| 36 | 4 | | Kotharevu |
| 37 | 5 | | Ampalam (Rajarampuram) |
| 38 | 1 | Gara | Bandaruvanipeta |
| 39 | 2 | | Komaravanipeta |
| 40 | 3 | | Moghadalapadu |
| 41 | 4 | | Srikurmam Machilesam |

| Sl. No. | | Mandal | Landing Centre |
|---|---|---|---|
| 42 | 5 | | Balarampuram |
| 43 | 1 | Srikakulam | Kunduvanipeta |
| 44 | 2 | | Pukkallapeta |
| 45 | 1 | Etcharla | Pathadibbalapalem |
| 46 | 2 | | Kothadebbalapalem |
| 47 | 3 | | Badevanipeta |
| 48 | 4 | | Budagtlapalem |
| 49 | 1 | Ranasthalam | Kothamukkam |
| 50 | 2 | | Jeerupalem |
| 51 | 3 | | Allivalasa |
| 52 | 4 | | Peddakovvada |
| 53 | 5 | | Gurayyapeta |
| 54 | 6 | | Donipeta |

Source*: Report of Deputy Director, Fisheries, Srikakulam*

Appendix 6 Marine fishers' habitations in Srikakulam district

| Sl No | | Mandal | | Village |
|---|---|---|---|---|
| 1 | 1 | Ichapuram | 1 | Donkuru |
| 2 | 2 | Kaviti | 1 | Kapasukuddi |
| 3 | | | 2 | Idduvanipalem |
| 4 | | | 3 | Ck palem |
| 5 | | | 4 | Battivanipalem |
| 6 | | | 5 | Kothapalem |
| 7 | | | 6 | Pk palem |
| 8 | | | 7 | K calingapatnam |
| 9 | | | 8 | Ontooru |
| 10 | | | 9 | Pukkallapalem |
| 11 | 3 | Sompeta | 1 | Isukalapalem |
| 12 | | | 2 | Ramayyapatnam |
| 13 | | | 3 | Gollagandi |
| 14 | | | 4 | B kotturu |
| 15 | | | 5 | Donkuluru |
| 16 | | | 6 | Battigalluru |
| 17 | | | 7 | Nadumuru |
| 18 | | | 8 | Ekkavuru |
| 19 | | | 9 | Erramukkam |
| 20 | | | 10 | Vadapalem |
| 21 | 4 | Mandasa | 1 | Bettalapadu |
| 22 | | | 2 | Geddaru |
| 23 | | | 3 | M ganguvada |
| 24 | | | 4 | Nolluru |
| 25 | | | 5 | Ratti |
| 26 | 5 | Vajrapukotturu | 1 | Manchineelapeta |
| 27 | | | 2 | Hukumpeta |
| 28 | | | 3 | Kambalaraidupeta |
| 29 | | | 4 | Kothapeta |
| 30 | | | 5 | Dokulapadu |
| 31 | | | 6 | Devunalthada |
| 32 | | | 7 | Akkupalli |
| 33 | | | 8 | Gunupalli |
| 34 | | | 9 | Nuvvalarevu |
| 35 | | | 10 | Chinna kotturu |
| 36 | | | 11 | Kidisingi |
| 37 | | | 12 | Vajrapukotturu |
| 38 | 6 | Santhabommali | 1 | Bhavanapadu |
| 39 | | | 2 | Kothapeta |
| 40 | | | 3 | Vadapeta |

| Sl No | Mandal | | Village |
|---|---|---|---|
| 41 | | 4 | M sunnapalli |
| 42 | | 5 | Geddalapadu |
| 43 | | 6 | Suradavanipeta |
| 44 | | 7 | Maruvada |
| 45 | | 8 | D maruvada |
| 46 | | 9 | Ch maruvada |
| 47 | | 10 | Guddimeda peta |
| 48 | | 11 | Yampallavanipeta |
| 49 | | 12 | Chakkavanipeta |
| 50 | | 13 | Pittavanipeta |
| 51 | | 14 | Deepillivanipeta |
| 52 | | 15 | Cheruvugattuvanipeta |
| 53 | | 16 | Suradavanipeta |
| 54 | | 17 | Karipeta |
| 55 | | 18 | Pukkallavanipeta |
| 56 | | 19 | Gorjanivanipeta |
| 57 | | 20 | Kumuduvani peta |
| 58 | | 21 | Jagannadhapuram |
| 59 | | 22 | Umilada |
| 60 | | 23 | Patha megavaram |
| 61 | 7 Polaki | 1 | Guppidi peta |
| 62 | | 2 | Ch koviripeta |
| 63 | | 3 | Gullavanipeta |
| 64 | | 4 | Pedda koviripeta |
| 65 | | 5 | Rajaram puram |
| 66 | | 6 | Jogampeta |
| 67 | 8 Gara | 1 | Balarampuram |
| 68 | | 2 | S matyalesam |
| 69 | | 3 | Perlavanipeta |
| 70 | | 4 | Mogadalapadu |
| 71 | | 5 | Komaravanipeta |
| 72 | | 6 | Bandaruvanipeta |
| 73 | | 7 | K matyalesam |
| 74 | 9 Srikakulam | 1 | Narasayyapeta |
| 75 | | 2 | Pedda ganagallapeta |
| 76 | | 3 | Chinna ganagallapeta |
| 77 | | 4 | Khaji peta |
| 78 | | 5 | Pukkallapeta |
| 79 | | 6 | Kunduvanipeta |
| 80 | | 7 | Mofus bandar |
| 81 | | 8 | Jalaripeta |
| 82 | 10 Etcherla | 1 | Bg palem |

| Sl No | Mandal | | Village |
|---|---|---|---|
| 83 | | 2 | D matyalesam |
| 84 | | 3 | Rallapeta |
| 85 | | 4 | K matyalesam |
| 86 | | 5 | Sd palem |
| 87 | | 6 | Pd palem |
| 88 | | 7 | Kd palem |
| 89 | | 8 | Ginnivanipeta |
| 90 | | 9 | Musavanipeta |
| 91 | | 10 | J koyyam |
| 92 | | 11 | Bodelavanipea |
| 93 | | 12 | J. Koyyam |
| 94 | 11 Ranasthalam | 1 | Donipeta |
| 95 | | 2 | Pothayyapeta |
| 96 | | 3 | Gurrayyapeta |
| 97 | | 4 | Cheekatipeta |
| 98 | | 5 | Chinna kovvada |
| 99 | | 6 | Kovvada |
| 100 | | 7 | Athivalasa |
| 101 | | 8 | Komaravanipeta |
| 102 | | 9 | Kothamukkam |
| 103 | | 10 | Teerupalem |
| 104 | | 11 | Jagannadapuram |

Source*: Report of Deputy Director, Fisheries, Srikakulam*

Appendix 7 Fish drying platforms in Srikakulam district

| S. No. | | Mandal | Village | | Fish Drying Platforms |
|---|---|---|---|---|---|
| 1 | 1 | Ichapuram | 1 | Donkuru | 1 |
| 2 | 2 | Kaviti | 1 | Kasapakuddi | 2 |
| 3 | | | 2 | Kothapalame | 1 |
| 4 | | | 3 | Peddakarrivanipalem | 1 |
| 5 | | | 4 | Kotha Kalingapatnan | 1 |
| 6 | 3 | Sompeta | 1 | Ramayyapatnam | 1 |
| 7 | | | 2 | Battigalluru | 2 |
| 8 | | | 3 | Nadumuru | 1 |
| 9 | | | 4 | Ekavooru | 1 |
| 10 | 4 | Mandasa | 1 | Geddavooru | 1 |
| 11 | | | 2 | M. Ganguvada | 1 |
| 12 | 5 | Vajrapukotturu | 1 | Gunupalli | 1 |
| 13 | | | 2 | Thoturu | 1 |
| 14 | | | 3 | Akkupalli | 1 |
| 15 | | | 4 | Dokulapadu | 1 |
| 16 | | | 5 | Manchineellapeta | 2 |
| 17 | | | 6 | Hukumpeta | 1 |
| 18 | | | 7 | Kambalarayudupeta | 2 |
| 19 | | | 8 | Kothapeta | 2 |
| 20 | 6 | Santhabommali | 1 | Bhavanapadu | 1 |
| 21 | | | 2 | Pathameghavaram | 1 |
| 22 | | | 3 | Mastyalesam Maruvada | 1 |
| 23 | | | 4 | Dibbala Maruvada | 1 |
| 24 | | | 5 | Pittavanipeta | 1 |
| 25 | 7 | Polaki | 1 | Gullavanipeta | 1 |
| 26 | | | 2 | Jogampeta | 1 |
| 27 | 8 | Gara | 1 | Perlavanipeta | 2 |

| S. No. | Mandal | Village | Fish Drying Platforms |
|---|---|---|---|
| 28 | | 2 Mogadalapadu | 1 |
| 29 | | 3 Balarampuram | 1 |
| 30 | 9 Srikakulam | 1 Pukkallapeta | 1 |
| 31 | | 2 Khajipeta | 1 |
| 32 | 10 Etcherla | 1 Rallapeta | 1 |
| 33 | | 2 Jalarikoyyam | 1 |
| 34 | | 3 Badevanipeta | 2 |
| 35 | | 4 Budagatlapalem | 1 |
| 36 | | 5 Pathadibbalapalem | 1 |
| 37 | 11 Ranasthalam | 1 Donipeta | 1 |
| 38 | | 2 Kothamukkam | 1 |
| 39 | | 3 Komaravanipeta | 1 |
| 40 | | 4 Allivalasa | 1 |
| | | **Total:** | **47** |

Source*: Report of Deputy Director, Fisheries, Srikakulam*

Appendix 8 Shore sheds in Srikakulam district

| S. No. | Mandal | Village | Shore Sheds |
|---|---|---|---|
| 1 | 1 Kaviti | Kapasakuddi | 1 |
| 2 | 2 Sompeta | Isakalapalem | 1 |
| 3 | | Nadumuru | 1 |
| 4 | 3 Vajrapukotturu | Manchineelapeta | 1 |
| 5 | | D.Althada | 1 |
| 6 | 4 S.Bommali | Geddalapadu | 1 |
| 7 | 5 Polaki | Guppidipeta | 1 |
| 8 | 6 Gara | S.Matsyalesam | 1 |
| 9 | 7 Etcherla | D.Matsyalesam | 1 |
| 10 | 8 Ranasthalam | Guruyyapeta | 1 |
| 11 | | Allivalasa | 1 |
| | | **Total:** | **11** |

Source*: Report of Deputy Director, Fisheries, Srikakulam*

Appendix 9 Minor irrigation tanks (ayacut >100 Acres) of Srikakulam Irrigation division

| S.No. | Constituency | Mandalam | No. of M.I.Tanks | Regd. Ayacut in Acres |
|---|---|---|---|---|
| 1 | Srikakulam | Srikakulam | 4 | 539.16 |
| | | Gara | 4 | 474.80 |
| 2 | Amadalavalasa | Amadalavalasa | 3 | 542.82 |
| | | Burja | 7 | 1811.73 |
| | | L.N.Peta | 14 | 2504.77 |
| | | Sarubujjili | 13 | 2543.34 |
| | | Srikakulam | 3 | 402.96 |
| 3 | Palakonda | Santhakaviti | 15 | 4232.13 |
| 4 | Unukuru | Vangara | 3 | 672.22 |
| | | Regidi | 15 | 2647.97 |
| | | Rajam | 27 | 4338.47 |
| 5 | Pathapatnam | Meliaputti | 11 | 2070.28 |
| | | Kotturu | 3 | 394.26 |
| | | Pathapatnam | 11 | 1725.61 |
| | | Saravakota | 4 | 483.15 |
| | | Hiramandalam | 7 | 1197.71 |
| 6 | Kotturu | Kotturu | 11 | 1926.53 |
| | | Bhamini | 13 | 2245.51 |
| 7 | Sompeta | Mandasa | 6 | 1148.92 |
| | | Sompeta | 11 | 2225.45 |
| 8 | Tekkali | Palasa | 8 | 1702.77 |
| | | Vajrapukotturu | 2 | 257.24 |
| 9 | Harischandapuram | Kotabommali | 5 | 1187.71 |
| | | Jalumuru | 5 | 713.09 |
| 10 | Narasannapeta | Jalumuru | 1 | 142.10 |
| | | Saravakota | 6 | 2421.35 |
| 11 | Cheepurupalli | G.Sigadam | 24 | 4207.15 |
| | | Ponduru | 3 | 471.44 |
| | | | **239** | **45230.64** |

Source*: Report of Executive Engineer, I&CAD, Irrigation Division, Srikakulam*

Appendix 10 Tank Details, Srikakulam

| Sl. No. | Sub-Division | Mandal | Village | Tank name | Type of tank (M.I/ L.I. Schems/ Anicut/ Others) | Regd. Ayacut in Acres as per Dist. Gazettee | Irrigated ayacut in acres | Total catch ment area (Sq.Km) | Utilisable yield | Capacity of tank in M.Cft | Average Rainfall in MM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6 | 8 | 9 | 10 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 1 | Tekkali | Nandigam | Haridasupuram | Pedda tank | Rain fed | 169.96 | 169.96 | 0.18 | 21.25 | 5.62 | 369.4 |
| 2 | Tekkali | Nandigam | Madanapuram | Pedda tank | Rain fed | 126.33 | 126.33 | 0.16 | 15.79 | 8.42 | 369.4 |
| 3 | Tekkali | Nandigam | Sagaram peta | Padmanabha sagaram | Rain fed | 352.77 | 352.77 | 22.32 | 44.09 | 23.51 | 369.4 |
| 4 | Tekkali | Nandigam | Kaputemburu | Siddasagaram | Rain fed | 182.01 | 182.01 | 0.12 | 22.75 | 12.13 | 369.4 |
| 5 | Tekkali | Nandigam | Deenabandupuram | Patnaikuni tank | Rain fed | 208.71 | 208.71 | 0.13 | 26.08 | 13.91 | 369.4 |
| 6 | Tekkali | Nandigam | Nowgam-I | Ammagai tank | Rain fed | 135.0 | 135.0 | 0.2 | 16.9 | 9.0 | 369.4 |
| 7 | Tekkali | Nandigam | Nowgam-II | Banugai tank | Rain fed | 103.07 | 103.07 | 0.96 | 12.89 | 6.87 | 369.4 |
| 8 | Tekkali | Nandigam | Peddalowni palli | Racha tank | Rain fed | 180.28 | 180.28 | 1.14 | 22.53 | 11.26 | 369.4 |
| 9 | Tekkali | Nandigam | Turakala kota | Konda tank | Rain fed | 105.2 | 105.2 | 0.92 | 13.15 | 7.51 | 369.4 |
| 10 | Tekkali | Nandigam | Badagam | Tada tank | Rain fed | 140 | 140 | 1.03 | 17.5 | 8.75 | 369.4 |
| 11 | Tekkali | Pathapatnam | Temburu | Asarlasagaram | Rain fed | 3162.88 | 3162.88 | 23.85 | 395.36 | 140.13 | 378 |
| 12 | Tekkali | Tekkali | Polavaram | Nandasagaram | Rain fed | 213.39 | 213.39 | 0.27 | 26.67 | 14.22 | 357.9 |
| 13 | Tekkali | Tekkali | VRK Puram | Pedda tank | Rain fed | 178.63 | 178.63 | 0.15 | 22.32 | 11.16 | 351.9 |
| 14 | Sompeta | Kanchili | Binnala kotturu | Hetha tank | M.I | 131.23 | 97.14 | 2.49 | 16.4 | 8.24 | 772 |
| 15 | Sompeta | Kanchili | M.S.Palli | Boga tank | M.I | 101.34 | 75.16 | 2.62 | 12.65 | 6.38 | 772 |
| 16 | Sompeta | Kanchili | Kolluru | Kunchagai tank | M.I | 160.3 | 118.56 | 2.91 | 20.1 | 9.8 | 772 |
| 17 | Sompeta | Kanchili | Sasanam | Lodda Loddi Reservoir | M.I | 343.1 | 256.36 | 4.29 | 42.8 | 18.6 | 772 |
| 18 | Sompeta | Kanchili | Jalantrakota | Gangasagaram | M.I | 202.98 | 152 | -- | 26.5 | 13.59 | 772 |
| 19 | Sompeta | Kanchili | Talatampara | Kodandam naidu tank | M.I | 100.18 | 74.98 | 0.98 | 12.5 | 5.81 | 772 |
| 20 | Sompeta | Kanchili | D.G.Puram | Govindasagaram | M.I | 665.71 | 498.7 | 12.74 | 104.1 | 28.26 | 772 |
| 21 | Sompeta | Kanchili | Mundala | Sunkili sagaram | M.I | 619.5 | 462.07 | 32.34 | 77.4 | 29.12 | 772 |
| 22 | Sompeta | Kanchila | Kuttuma | Hetha tank | M.I | 166.1 | 122.9 | 3.6 | 20.8 | 10.67 | 772 |
| 23 | Sompeta | Kanchila | Bogabani | Pedda tank | M.I | 135.28 | 100.8 | 2.83 | 16.94 | 8.78 | 772 |
| 24 | Sompeta | Kanchila | Buragam | Padmanabha sagara | M.I | 233.93 | 173.59 | 4.47 | 30.9 | 13.86 | 772 |
| 25 | Sompeta | Kanchila | Karthali | Rakasi tank | M.I | 142.6 | 106.34 | 2.65 | 17.85 | 8.5 | 772 |
| 26 | Sompeta | Kanchila | Keesari pada | Tallasagaram | M.I | 247.23 | 184 | 4.47 | 30.9 | 14.5 | 772 |
| 27 | Sompeta | Kanchila | Kolluru | Pedda tank | M.I | 142.27 | 105.72 | 2.83 | 17.82 | 8.37 | 772 |
| 28 | Sompeta | Kanchila | Yekkala | Voora tank | M.I | 151.8 | 113.57 | 2.91 | 18.98 | 9.04 | 772 |
| 29 | Sompeta | Kanchila | J.Narayanapuram | Patigundam tank | M.I | 111.17 | 83.26 | 2.54 | 13.89 | 7.02 | 772 |
| 30 | Sompeta | Kaviti | Karapadu | Voora tank | M.I | 148.12 | 111.27 | 3.15 | 18.5 | 8.81 | 783 |
| 31 | Sompeta | Kaviti | Karapadu | Kajugai | M.I | 194.24 | 145.63 | 3.43 | 24.24 | 12.18 | 783 |
| 32 | Sompeta | Kaviti | Rajapuram | Hathibandadi tank | M.I | 132.19 | 99.09 | 2.65 | 16.55 | 8.37 | 783 |
| 33 | Sompeta | Kaviti | Garlapdu | Bandirevughai tank | M.I | 124.68 | 93.37 | 2.7 | 15.6 | 7.43 | 783 |
| 34 | Sompeta | Kaviti | Nelavanka | Dukkapotenna tank | M.I | 159.26 | 119.25 | 3.32 | 19.98 | 9.16 | 783 |
| 35 | Sompeta | Itchapuram | Mandapalli | Bheemasamudram | M.I | 213.97 | 160.13 | 4.12 | 26.8 | 12.64 | 815/ 32.11 |

| Sl. No. | Sub-Division | Mandal | Village | Tank name | Type of tank (M.I/ L.I. Schems/ Anicut/ Others) | Regd. Ayacut in Acres as per Dist. Gazettee | Irrigated ayacut in acres | Total catch ment area (Sq.Km) | Utilisable yield | Capacity of tank in M.Cft | Average Rainfall in MM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | Sompeta | Itchapuram | Mutchindra | Devalayam tank | M.I | 132.44 | 98.99 | 2.85 | 16.58 | 7.68 | 815/ 32.11 |
| 37 | Sompeta | Itchapuram | Bellupada | Siddi tank | M.I | 350.62 | 264.68 | 8.11 | 43.95 | 20.67 | 815/ 32.11 |
| 38 | Sompeta | Sompeta | Tallabhadra | Gangasagaram | M.I | 197.23 | 197.23 | 2.5 | 24.65 | 11.74 | -- |
| 39 | Sompeta | Sompeta | Tallabhadra | Uondai tank | M.I | 106.5 | 101 | 3.05 | 13.31 | 8.1 | -- |
| 40 | Sompeta | Sompeta | T.Sasanam | Gorakala gai tank | M.I | 228.16 | 208 | 2.98 | 28.52 | 13.86 | -- |
| 41 | Sompeta | Sompeta | Pottangi | Jamili tank | M.I | 234.48 | 200.48 | 3 | 29.31 | 13.46 | -- |
| 42 | Sompeta | Sompeta | Makannapuram | Chinthala tank | M.I | 107.05 | 107.05 | 2.8 | 13.38 | 6.99 | -- |
| 43 | Sompeta | Sompeta | BRC puram | Chinna tank | M.I | 206.29 | 190.54 | 5.2 | 25.78 | 12.94 | -- |
| 44 | Sompeta | Sompeta | Korlam | Dasari bedda | M.I | 102.44 | 102.44 | 1.72 | 12.8 | 33.07 | -- |
| 45 | Sompeta | Sompeta | Korlam | Pedda tank | M.I | 160.9 | 145 | 2.29 | 20.11 | 19.55 | -- |
| 46 | Sompeta | Sompeta | BRC puram | Pedda tank | M.I | 648.34 | 608.24 | 3 | 77.29 | 69.02 | -- |
| 47 | Sompeta | Sompeta | Lakkavaram | Kari tank | M.I | 113.93 | 102.05 | 3.4 | 14.24 | 7.28 | -- |
| 48 | Sompeta | Sompeta | Lakkavaram | Nalla tank | M.I | 136.06 | 125.06 | 2.5 | 17 | 8.94 | -- |
| 49 | Sompeta | Sompeta | Gjinku bhadra | Neelakanta sagara | M.I | 123.58 | 111.08 | 3.2 | 15.45 | 8.54 | -- |
| 50 | Sompeta | Sompeta | Palasapuram | Pedda tank | M.I | 306.5 | 280.46 | 3 | 38.31 | 19.16 | -- |
| 51 | Sompeta | Kanchili | Buragam | Kurmasagaram | M.I | 193.82 | 184.52 | 2.5 | 24.22 | 32.15 | -- |
| 52 | Sompeta | Kanchili | Sasanam | Rani sagaram | M.I | 149.35 | 139 | 6.2 | 18.66 | 30.16 | -- |
| 53 | Sompeta | Mandasa | Devupuram | Damodara sagaram | M.I | 199.31 | 199.31 | 5.99 | 24.91 | 15.84 | -- |
| 54 | Sompeta | Mandasa | Byrisaranga puram | Netapatruni tank | M.I | 112.2 | 100.64 | 2.54 | 14.02 | 6.99 | -- |
| 55 | Sompeta | Mandasa | Byrisaranga puram | Pedda tank | M.I | 150.64 | 120.28 | 3.99 | 18.83 | 10.24 | -- |
| 56 | Sompeta | Mandasa | Sondipudi | Kurmanna tank | M.I | 101.5 | 101.5 | 2.84 | 12.64 | 6.94 | -- |
| 57 | Sompeta | Mandasa | Sondipudi | Godiabanda | M.I | 116.06 | 102.4 | 2.24 | 14.5 | 8.4 | -- |
| 58 | Sompeta | Mandasa | VVR Puram | Malabanda | M.I | 140.7 | 128.54 | 3.24 | 17.59 | 58 | -- |

Appendix 11 Consolidated list of plants recorded in the visited wetlands and its environs

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Abrus precatorius* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | |
| *Abutilon hirtum* | √ | √ | | | | √ | √ | | | | | √ | | √ | √ | | √ | | | √ | √ | | | | √ | √ | | | | | √ | √ | √ |
| *Abutilon indicum* | √ | √ | | | | √ | √ | | | | | √ | | | | | √ | | | √ | √ | | | | √ | √ | | √ | √ | | √ | √ | √ |
| *Acacia caesia* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acacia holosericea* | √ | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Acacia leucophloea* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acacia nilotica* | √ | √ | | | | √ | √ | | | | | | | | | | | | | | | | √ | | | | | | | | √ | | |
| *Acacia torta* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acalypha brachystachya* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acalypha fruticosa* | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acalypha indica* | √ | √ | √ | | | | √ | | | | √ | √ | √ | √ | √ | | | | | | | √ | √ | √ | √ | | | | | | | | |
| *Acalypha paniculata* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Acanthospermum hispidum* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Acanthus ilicifolius* | | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | √ |
| *Achyranthes aspera* | √ | √ | √ | | | √ | √ | | | | | √ | | | | √ | √ | | | | | | | | | | | | | | | | √ |
| *Aegle marmelos* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Aeluropus lagopoides* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | √ | | | | | √ | √ | | |
| *Aerva lanata* | | √ | | | | √ | √ | | | | | √ | | | | | √ | | | | | | | | | | | | | | √ | √ | √ |
| *Aerva persica* | | √ | | | | | √ | | | | | √ | | | | | | | | | | | | | | | | | | | √ | | |
| *Aerva sanguinolenta* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aeschynomene aspera* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ailanthus excelsa* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Alangium salviifolium* | √ | √ | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Albizia amara* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Albizia lebbeck* | √ | √ | | | | | √ | | | | | | | | | √ | | | | | | | | | | | √ | | | | | | |
| *Albizia saman* | √ | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Allophylus serratus* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Aloe vera* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Alstonia scholaris* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Alternanthera paronychioides* | √ | √ | | √ | | | √ | | √ | √ | | √ | | | | | √√ | | | √ | | √ | √ | √ | √ | | | | | | √ | √ | √ |
| *Alternanthera pungens* | √ | √ | | √ | | | √ | | | | | √ | | | | | | | | √ | | | | √ | √ | √ | √ | | | | √ | | |
| *Alternanthera sessilis* | √ | √ | | √ | | | √ | | | | | √ | | | | √ | √ | | | √ | | | | | | | | | | | √ | √ | √ |
| *Alternanthera tenella* | √ | √ | | √ | | | √ | | √ | √ | √ | √ | | | | | √ | | | √ | | | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Alysicarpus longifolius* | √ | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Alysicarpus monilifer* | √ | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Alysicarpus rugosus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Amaranthus spinosus* | √ | | | | | | √ | | | | | √ | | | | √ | √ | | | | | | | | | | | | | | √ | | |
| *Amaranthus viridis* | √ | √ | | | | | √ | | | | | √ | | | | √ | √ | | | | | | | | | | | | | | | | |
| *Ammannia baccifera* | √ | √ | | √ | √ | | | | | | | √ | | | | √ | √ | | √ | √ | | | | | | | | | | | | | |
| *Amorphophallus paeoniifolius* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ampelocissus latifolia* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ampelocissus tomentosa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anacardium occidentale* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Andrographis alata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Andrographis paniculata* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Andropogon pumilus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anisochilus carnosus* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anisochilus scaber* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Anisomeles indica* | √ | √ | √ | √ | √ | √ | √ | | √ | √ | | √ | | | | √ | √ | | | | √ | | √ | √ | √ | √ | √ | | | | √ | √ | √ |
| *Anisomeles malabarica* | √ | √ | √ | √ | √ | √ | √ | | | | | √ | | √ | √ | √ | √ | | | | | | | | | √ | √ | √ | √ | | √ | √ | √ |
| *Anogeissus acuminata* | √ | | √ | | | | | | | | √ | | | | | | | | √ | | √ | | | | | | | | | | √ | √ | √ |
| *Aponogeton natans* | √ | √ | | √ | | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | |
| *Arachis hypogaea* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Argemone mexicana* | √ | √ | | | √ | | | | | | | √ | | | | | | | √ | | | | | | | | | | | | √ | | |
| *Argyreia cuneata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Argyreia elliptica* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ardisia littoralis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Aristida adscensionis* | √ | √ | | | | | √ | | | | | √ | | √ | √ | | √ | √ | | | √ | √ | | | | √ | √ | | √ | √ | √ | | |
| *Aristida funiculata* | √ | √ | | | | | √ | | | | | √ | | √ | | | √ | | | | √ | √ | | | | | √ | | √ | √ | √ | √ | √ |
| *Aristida hystrix* | √ | √ | | | | | √ | | | | | √ | | √ | √ | | | √ | | | √ | √ | | | | √ | | | √ | √ | √ | √ | √ |
| *Aristida setacea* | √ | √ | | | | | | | | | | | | √ | √ | | √ | √ | | | | √ | | | | √ | √ | | √ | √ | √ | √ | √ |
| *Aristolochia bracteolata* | √ | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | √ | | √ |
| *Aristolochia indica* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Artemesia vulgaris* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Arundo donax* | √ | | √ | √ | √ | | √ | | | | | √ | √ | √ | √ | √ | √ | | | √ | | | | √ | √ | | | √ | √ | √ | | | |
| *Asclepias curassavica* | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Asparagus racemosus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Asystasia dalzelliana* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Atalantia monophylla* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Atalantia racemosa* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Atylosia scarabaeoides* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Avicennia marina* | | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | |
| *Avicennia officinalis* | | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | |
| *Azadirachta indica* | √ | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | √ | √ | √ |
| *Azima tetracantha* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Bacopa monnieri* | √ | √ | √ | √ | | √ | | | √ | √ | | | | | | √ | | √ | √ | √ | √ | | √ | √ | | √ | √ | √ | √ | | | | |
| *Balanites aegyptiaca* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Bambusa bambos* | √ | | | | | | | √ | | | | | | | √ | | | | | | | | | | | | | | | | | | |
| *Barleria acuminata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Barleria buxifolia* | √ | | | | | | √ | | | | | √ | | | √ | √ | | √ | √ | | | √ | √ | √ | √ | | | √ | √ | | √ | | |
| *Barleria cristata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Barleria mysorensis* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Barleria prionitis* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Barringtonia racemosa* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Basella rubra* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Bassia latifolia* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Benkara malabarica* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bergia ammannioides* | √ | √ | | √ | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | |
| *Bidens pilosa* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Biophytum reinwardtii* | √ | √ | | | | √ | √ | √ | √ | | | | √ | √ | | √ | √ | | √ | √ | | √ | √ | | | | | | | √ | | |
| *Blainvillea acmella* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Blepharis maderaspatensis* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Blepharis repens* | √ | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | |
| *Blumea lacera* | √ | √ | | √ | | √ | | √ | | | | | | | √ | √ | √ | | | √ | | | | | | | | | | | | | |
| *Blumea mollis* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Boerhavia diffusa* | √ | √ | √ | | | | √ | √ | √ | | √ | √ | √ | | √ | √ | √ | √ | √ | | | | √ | √ | √ | | √ | √ | | | √ | | |
| *Boerhavia erecta* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bombax ceiba* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Borassus flabellifer* | √ | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | | |
| *Bothriochloa bladhii* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bothriochloa pertusa* | √ | √ | | | | | | | | | | | | | √ | | | | | | √ | | | | | | | | | | | | |
| *Brachiaria ramosa* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Brachiaria remota* | √ | | | | | √ | | √ | √ | | √ | √ | √ | | √ | √ | √ | √ | | √ | √ | | √ | √ | √ | | | | | | | | |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Breynia retusa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Breynia vitis-idaea* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bulbostylis barbata* | √ | √ | | | | √ | √ | √ | √ | | √ | √ | | √ | √ | √ | | √ | √ | | √ | √ | | √ | √ | | √ | √ | | | √ | √ | √ |
| *Bulbostylis densa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Butea monosperma* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cadaba fruticosa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Caesalpinia bonduc* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Caesalpinia sp* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Calophyllum inophyllum* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Calotropis gigantea* | √ | | | | √ | √ | | | | | | √ | √ | | | √ | √ | | | | | √ | √ | | | | | | | | √ | √ | √ |
| *Calotropis procera* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Canavalia cathartica* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Capparis decidua* | √ | √ | | | | | | √ | √ | | | | | | | √ | √ | | | | | | √ | √ | | | | | | | √ | √ | √ |
| *Capparis grandis* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Capparis sepiaria* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Capparis zeylanica* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Caralluma adscendens* | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cardiospermum halicacabum* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Carissa carandas* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Carissa inermis* | √ | | √ | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Carissa spinarum* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Carmona retusa* | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | √ | | |
| *Caryota urens* | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | |
| *Casearia tomentosa* | √ | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Casearia wyanadensis* | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Cassia fistula* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ |
| *Cassia obtusa* | √ | √ | √ | | √ | √ | √ | √ | √ | | | | √ | √ | | | | | √ | √ | √ | √ | | | √ | √ | √ | √ | | | √ | | |
| *Cassia siamea* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cayratia pedata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cayratia trifolia* | √ | √ | √ | √ | | | | | | | | | | √ | √ | | | √ | √ | | √ | √ | | | √ | √ | | | | | √ | √ | √ |
| *Celastrus paniculatus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Celosia argentea* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Celosia polygonoides* | √ | √ | √ | | | | | √ | √ | √ | √ | √ | √ | √ | | | | √ | √ | | | | | √ | √ | | | | | | √ | √ | √ |
| *Cenchrus barbatus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Cenchrus ciliaris* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Cenchrus setigera* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Centella asiatica* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cereus pterogonus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chloris barbata* | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | | √ | √ | | √ | √ | √ | √ | | √ | √ | | √ | √ | √ | | √ | | √ | √ | √ |
| *Chloris dolichostachya* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chloris tenella* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chloroxylon swietenia* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Chromolaena odorata* | √ | | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | √ | √ | √ |
| *Chrysopogon aciculatus* | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Chrysopogon asper* | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Cipadessa baccifera* | √ | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Cissampelos pareira* | √ | | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cissus quadrangularis* | √ | | | | | | | | | √ | √ | | | | | | | | | | √ | √ | | | | | | | | | | √ | √ |
| *Cissus repanda* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cleome aspera* | √ | | | | | √ | √ | √ | | | | | | | √ | √ | | | | | | | | √ | √ | √ | | | | | | | |
| *Cleome monophylla* | √ | √ | √ | √ | √ | | √ | √ | √ | | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | | √ | √ | √ | | √ | √ | | √ | √ | | |
| *Cleome viscosa* | √ | | | | | | | | | | √ | √ | | | | √ | √ | | | | | √ | √ | | | √ | √ | | | | √ | √ | √ |
| *Clerodendrum inerme* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Clerodendrum infortunatum* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Clerodendrum phlomidis* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Clitoria ternatea* | √ | √ | √ | √ | | | √ | √ | √ | | | | | √ | √ | √ | | | | | | √ | √ | √ | | √ | √ | √ | | | √ | √ | √ |
| *Coccinia grandis* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Cocculus hirsutus* | √ | | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Cocculus pendulus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Coldenia procumbens* | √ | √ | | | √ | | √ | | | | √ | | | | √ | √ | | | √ | √ | | | √ | √ | √ | | | | | √ | √ | √ | √ |
| *Colocasia esculenta* | √ | √ | | | | | | | | | | | | | | | | √ | √ | √ | | | | | | | | | | | √ | | |
| *Combretum albidum* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Commelina benghalensis* | √ | √ | | | | √ | √ | √ | √ | | | | | √ | √ | | | | √ | √ | √ | | | | | √ | √ | | | √ | | |
| *Commelina clavata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Commelina longifolia* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Commiphora berryi* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Conyza leucantha* | √ | | | √ | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | |
| *Corchorus aestuans* | √ | √ | | | | | | | | | | √ | √ | √ | | | | √ | | √ | | | | | √ | √ | √ | | | | √ | √ | √ |
| *Corchorus tridens* | √ | | | | √ | √ | √ | | | | | | | | | | √ | √ | | | √ | √ | √ | | | | | | | | √ | | |
| *Corchorus trilocularis* | √ | | | | | | | | | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Cordia sebestena* | | | | | | | | | | | | | | | | | | | | | √ | | √ | | | | √ | √ | √ | | √ | | |
| *Costus speciosus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Crotalaria evolvuloides* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Crotalaria juncea* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Crotalaria mysorensis* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Crotalaria pallida*var. *obovata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Croton bonplandianum* | √ | | | | | | | | | | | | | | | √ | | | | | | | √ | √ | √ | | | | | | | | |
| *Cuscuta reflexa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Cyanotis tuberosa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Cynodon dactylon* | √ | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | √ | √ | √ |
| *Cynoglossum zeylanicum* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Cyperus articulatus* | √ | √ | | | | √ | √ | √ | | | √ | | | | | | | √ | √ | | | | | | √ | | | | | | √ | | √ |
| *Cyperus difformis* | √ | √ | | | | | | | | | | | | | | | | √ | | | | | | | √ | | | | | | √ | | √ |
| *Cyperus exaltatus* | √ | √ | √ | | | | | | | | √ | | | | | | | √ | | | | | | | √ | | | √ | | | | | |
| *Cyperus halpan* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | √ |
| *Cyperus iria* | √ | √ | √ | | | √ | √ | √ | | | | | | | | | | | | | | | | | √ | | | | | | √ | | √ |
| *Cyperus pangorei* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | √ | | | | | √ | | | |
| *Cyperus rotundus* | √ | √ | √ | | | | | | | | | | | | | √ | | | | | | | | √ | √ | | | | | √ | √ | √ | √ |
| *Dactyloctenium aegyptium* | √ | √ | | √ | √ | √ | | | | √ | | √ | √ | | √ | | √ | √ | | | √ | √ | √ | | √ | | | | | √ | √ | √ | √ |
| *Dactyloctenium aristatum* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | √ | | | | | √ | √ | | √ |
| *Datura innoxia* | √ | | | | | √ | √ | | √ | | | √ | √ | √ | | √ | √ | | √ | | | | √ | √ | | √ | | | | | | | |
| *Datura metal* | √ | √ | | | | | √ | | | | | | | | | | √ | | | | | | | | √ | | | √ | | | √ | √ | √ |
| *Derris scandens* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Desmostachya bipinnata* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Dicanthium annulatum* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Dichrostachys cinerea* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Dicoma tomentosa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Digera muricata* | √ | √ | | | | | √ | √ | √ | √ | √ | √ | √ | | | √ | √ | | | √ | √ | √ | √ | √ | | | | | | | | | |
| *Digitaria bicornis* | √ | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | √ |
| *Dinebra retroflexa* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | |
| *Diospyros buxifolia* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Diospyros melanoxylon* | | √ | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | |
| *Diplocyclos palmatus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Dodonaea viscosa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Echinochloa colona* | √ | √ | | √ | √ | | | | | | | | | | | | | | | √ | | | | √ | √ | | | | | √ | √ | √ | √ |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Echinochloa crista-galli* | | | | √ | √ | | | | | | | | | | | | | | | √ | | | | | √ | | | | | | | √ | √ |
| *Echinops echinatus* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Eclipta prostrata* | √ | √ | | | | | | | | | | | | | | √ | | √ | √ | | | | | | | | | | | | √ | √ | √ |
| *Eichhornia crassipes* | √ | √ | √ | | | √ | | √ | | √ | √ | | | | | √ | √ | √ | √ | | √ | | | | | √ | √ | √ | √ | | √ | √ | √ |
| *Eleusine indica* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Elytraria acaulis* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Embelia ribes* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Emilia sonchifolia* | √ | √ | | | | √ | √ | | | | | | | | √ | | √ | √ | | | | | √ | √ | | √ | | | √ | | | √ | |
| *Enicostema axillare* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eragrostiella bifaria* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eragrostis maderaspatana* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Eragrostis minor* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Eragrostis nigra* | √ | √ | √ | √ | √ | √ | √ | √ | | | | √ | | | | | | √ | | | | √ | | | √ | | | | | | √ | | |
| *Eragrostis nutans* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eragrostis pilosa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Eragrostis* sp | √ | | | | | | | | | | | | | | √ | | | | | | | | | | √ | | | | | | | | |
| *Eragrostis unioloides* | √ | √ | | √ | | | | | | | | | | | | | | | | √ | | | | | √ | | | | | | √ | | √ |
| *Eragrostis viscosa* | √ | √ | √ | √ | | | | | √ | √ | | | | √ | √ | √ | √ | | √ | | | √ | | | | | | | | √ | | |
| *Eremopogon foveolatus* | √ | √ | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | √ |
| *Euphorbia geniculata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Euphorbia hirta* | √ | √ | | | √ | √ | √ | √ | √ | | √ | | √ | | | | √ | √ | √ | √ | √ | √ | √ | √ | | √ | | | √ | | √ | √ | √ |
| *Euphorbia nivulia* | | | | √ | | | | | | | | √ | | | | | | | √ | √ | | | | | | | | | | | √ | | |
| *Euphorbia rosea* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Euphorbia thymifolia* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Euphorbia tirucalli* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Euphorbia trigona* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Evolvulus alsinoides* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Ficus benghalensis* | | | | | | | | | | | | | | | | √ | | | | | | | √ | | | | | | | | √ | √ | √ |
| *Ficus microcarpa* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Ficus religiosa* | | | | | | | | | | | | √ | | | | √ | | | | | | | | | | | | | | | √ | √ | √ |
| *Evolvulus nummularius* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Excoecaria agallocha* | | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | |
| *Fimbristylis aestivalis* | √ | √ | √ | √ | | | | | | | √ | √ | | | | | | | | | | | | | √ | | | | | √ | √ | √ | √ |
| *Fimbristylis argentea* | √ | √ | | | | | | | | | √ | | | | | | | | | | | | | | √ | | | | | | √ | | √ |
| *Fimbristylis bisumbellata* | √ | √ | | | | √ | √ | | | | | | | | | | | | | | | | | | √ | | | | | | √ | √ | √ |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Fimbristylis complanata* | √ | √ | | | | | | | | | √ | √ | | | | | | √ | | | | | | | √ | | | | | | √ | | √ |
| *Fimbristylis dichotoma* | √ | √ | | | | | | | | | | | | | | | | | | | | √ | | | √ | | | | | | √ | | |
| *Fimbristylis falcata* | √ | √ | | | | | √ | | | | | | | | | | | | | | | | | | √ | | | | | √ | √ | | √ |
| *Fimbristylis miliacea* | √ | √ | | | | | | | | √ | | | | | | | | √ | | | | | | | √ | | | | | √ | √ | √ | |
| *Fimbristylis ovata* | √ | √ | √ | √ | √ | √ | √ | | | | √ | | | √ | √ | √ | | | | √ | | | | | √ | | √ | | | | √ | √ | √ |
| *Fimbristylis tetragona* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | √ | | | | | √ | √ | | √ |
| *Fluggea leucopyrus* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Fluggea virosa* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Flacourtia indica* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Flacourtia ramontchi* | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | |
| *Gardenia latifolia* | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Giseckia pharnaceoides* | √ | √ | | | | | √ | | | | | √ | √ | √ | √ | | | | | √ | | | | | | | | | | | √ | √ | √ |
| *Glinus lotoides* | √ | √ | √ | | √ | | √ | | √ | √ | √ | √ | √ | | √ | | √ | √ | | √ | | | √ | √ | √ | | | √ | √ | √ | √ | √ | √ |
| *Gloriosa superba* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Glycosmis mauritiana* | √ | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Glycosmis pentaphylla* | √ | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Glycyrrhiza glabra* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gmelina arborea* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gmelina asiatica* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Gnaphalium luteo-album* | √ | √ | | √ | | | | | | | | √ | √ | | | | | | | √ | | | | | | | | | | | √ | | |
| *Gnaphalium polycaulon* | √ | √ | | √ | √ | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | |
| *Gomphrena serrata* | √ | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | √ | | |
| *Grangea maderaspatana* | √ | √ | | | | | | | | | | | | | | | | | | | | | | √ | √ | | | √ | √ | √ | √ | √ | √ |
| *Grewia hirsuta* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Grewia tiliifolia* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Grewia villosa* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gymnema sylvestre* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hedyotis biflora* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Hedyotis corymbosa* | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Helicteres isora* | √ | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Heliotropium curasavicum* | √ | √ | | | √ | | | | √ | √ | √ | √ | | | | √ | | √ | | | | | | √ | √ | √ | | | | | √ | | √ |
| *Heliotropium indicum* | √ | √ | | | √ | | | | √ | √ | √ | | | √ | | √ | | √ | | | √ | | | √ | √ | √ | | √ | | | √ | | √ |
| *Hemidesmus indicus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Heteropogon contortus* | √ | √ | | √ | √ | √ | | √ | √ | | √ | √ | √ | | | | | √ | √ | √ | √ | √ | √ | | √ | | | √ | | √ | | | √ |
| *Hibiscus micranthus* | √ | | | √ | | | | | | √ | | | | | √ | | | √ | | | √ | | | | √ | | √ | | | | √ | | |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Hibiscus tiliaceus* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Hibiscus vitifolius* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Holarrhena pubescens* | √ | | √ | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Holoptelea integrifolia* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Hugonia mystax* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hybanthus enneaspermus* | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | |
| *Hydrilla verticillata* | √ | √ | | | | √ | | √ | | √ | √ | | | | | √ | | | | | | | | | | | | | | | | | √ |
| *Hygrophila auriculata* | √ | √ | | | | | | √ | | | | | √ | √ | √ | | | √ | √ | | | | | | | | | | | | √ | √ | √ |
| *Hyptis suaveolens* | √ | √ | √ | | | | | √ | | √ | √ | √ | √ | | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | | √ |
| *Ichnocarpus frutescens* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Imperata cylindrica* | √ | √ | √ | | √ | √ | √ | √ | √ | | √ | | √ | √ | √ | | | √ | √ | | √ | | | √ | √ | | | √ | | √ | √ | | √ |
| *Indigofera caerulea* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Indigofera linifolia* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Indigofera linnaei* | √ | √ | | | | | √ | √ | √ | √ | √ | | | | | | √ | √ | | | | √ | √ | √ | | | | | | | √ | √ | √ |
| *Indigofera* sp. | √ | | | | | | | | | | | | | | √ | | | | | | √ | | | | | | | | | | | | |
| *Indigofera trifoliata* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Indigofera trita* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Indoneesiella echioides* | √ | √ | | | | | | | | | √ | | | | | | | | √ | | | √ | | | √ | | | √ | | | √ | √ | √ |
| *Ipomoea alba* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ipomoea aquatica* | √ | √ | | | | | | √ | √ | √ | √ | | | √ | | √ | | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| *Ipomoea biloba* | √ | √ | | | | | | | | | | | | | | | | | | | | √ | | | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| *Ipomoea carnea* | √ | √ | | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| *Ipomoea hederifolia* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ipomoea pes-tigridis* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ipomoea staphylina* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Ischaemum indicum* var. *depressum* | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | |
| *Ischaemum indicum*var. *indicum* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Iseilema anthephoroides* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | √ | | | | | √ | | | √ |
| *Iseilema laxum* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | √ | | | | | √ | √ | √ | √ |
| *Ixora arborea* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Jatropha curcas* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Jatropha gossypifolia* | √ | √ | | | √ | | | √ | √ | | | √ | √ | √ | √ | √ | √ | | | | √ | √ | | | | √ | √ | | | | √ | √ | √ |
| *Jatropha tanjorensis* | √ | √ | | | | | | | | | | | | | √ | | | | | | | | | | √ | | | | | | √ | √ | √ |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Justicia adhatoda* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Justicia betonica* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Justicia gendarussa* | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | √ |
| *Justicia* sp. | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Kedrostis foetidissima* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Kleinia grandiflora* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Kyllingia nemoralis* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lagascea mollis* | √ | √ | | | | | √ | √ | √ | √ | | | | √ | | | | | √ | | | √ | | √ | | | √ | | | | √ | √ | √ |
| *Lantana camara* | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | √ |
| *Lantana wightiana* | | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | |
| *Lemna minor* | √ | √ | | √ | √ | | | √ | | √ | √ | | | | | √ | √ | | | √ | √ | | | | | | | | | | | | |
| *Leonotis nepetiifolia* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Leptadenia reticulata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lindernia antipoda* | √ | √ | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lindernia crustacea* | √ | √ | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lindernia hyssopioides* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lindernia parviflora* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ludwigia adscendens* | √ | √ | √ | | | | | | | | | | | √ | √ | | | √ | | | | | | | | | | | | | | | √ |
| *Ludwigia perennis* | √ | √ | √ | | | | | | | | | | | √ | √ | | | | | | | | | | | | | | | | | | √ |
| *Ludwigia peruviana* | √ | √ | | | | | | | | | | | | | | | | √ | √ | | | | | | | | | | | | | | |
| *Maba buxifolia* | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | |
| *Madhuca longifolia* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Malvastrum coromandelianum* | √ | √ | √ | √ | √ | √ | √ | √ | √ | | | √ | √ | √ | √ | | | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | | | √ |
| *Manisuris myuros* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | √ | | | | | √ | √ | √ | √ |
| *Martynia annua* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Maytenus emarginata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Maytenus heyneana* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Memecylon edule* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Memecylon umbellatum* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Merremia hastata* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Merremia tridentata* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Mikania cordata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Millingtonia hortensis* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Mimosa hamata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Mitragyna parvifolia* | √ | | | √ | | | | | | | | | | | | | | | √ | √ | | | | | | | | | | | | | |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Mollugo cerviana* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Mollugo disticha* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Mollugo nudicaulis* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Mollugo pentaphylla* | √ | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | √ | √ | √ |
| *Monochoria hastata* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Monochoria vaginalis* | √ | √ | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Morinda pubescens* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Moringa concanensis* | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Moringa oleifera* | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Mucuna monosperma* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Mucuna pruriens* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Mukia maderaspatana* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Murraya paniculata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Najas indica* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Najas marina* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Najas minor* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nelumbo nucifera* | √ | | | | | | | √ | | √ | | | | √ | | | | | | | | | | | | | √ | √ | | | | | |
| *Neonotonia wightii* | √ | | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Nothosaerva brachiata* | √ | √ | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | √ | √ | √ |
| *Nymphaea nouchali* | √ | √ | | | | | | √ | | √ | | | | √ | | √ | | | | | | | | | | | √ | √ | | | | | |
| *Nymphaea pubescens* | √ | √ | | | | | | | | √ | | | | √ | | | | | | | | | | | | | √ | √ | | | | | |
| *Nymphaea rubra* | √ | √ | | | | | | √ | | | | | | | | | | | | | | | | | | | √ | √ | | | | | |
| *Nymphoides indicum* | √ | √ | | √ | √ | | | √ | | √ | √ | | | √ | | √ | | √ | | √ | | | | | | | √ | √ | | | | | |
| *Ocimum canum* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Oldenlandia umbellata* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Ophiuros exaltatus* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Opuntia stricta* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Oplismenus compositus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Oropetium thomaeum* | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Ottelia alismoides* | √ | √ | | √ | √ | √ | | √ | | √ | | | | | | √ | | | | √ | | | | | | | √ | √ | | | | | √ |
| *Oxalis corniculata* | √ | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | √ | √ | √ |
| *Oxystelma esculentum* | √ | √ | | | | | | | | | | | | | | | | | | | √ | | | | | √ | √ | √ | √ | | √ | √ | √ |
| *Pandanus odoratissimus* | √ | √ | | | | | | | | | | | √ | √ | | √ | | | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| *Panicum miliaceum* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Panicum notatum* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Panicum paludosum* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Panicum psilopodium* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Panicum repens* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Panicum trypheron* | √ | √ | √ | √ | | | | | | √ | √ | | √ | √ | | | | √ | √ | √ | | | | √ | √ | | | | | √ | √ | √ | √ |
| *Parkinsonia aculeata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Parthenium hysterophorus* | √ | √ | √ | √ | | | | | | | | | | | | √ | | | | | | | √ | | | | | | | | √ | √ | √ |
| *Paspalidium flavidum* | √ | √ | √ | √ | √ | | | | | | | | | | | | | √ | | √ | | | | | | | | | | | √ | √ | √ |
| *Paspalum scrobiculatum* | √ | √ | √ | | √ | | | | | | | | | | | | | √ | | √ | | | | | | | | | | | √ | √ | √ |
| *Passiflora edulis* | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | |
| *Passiflora foetida* | √ | √ | √ | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | √ | √ | √ |
| *Pavetta indica* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pavetta tomentosa* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pavonia odorata* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Pavonia procumbens* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pavonia zeylanica* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Pedalium murex* | √ | √ | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Pennisetum americanum* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pennisetum purpureum* | | | | √ | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | |
| *Pentatropis microphylla* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ |
| *Pergularia daemia* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Peristrophe bicalyculata* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Phoenix loureirii* | √ | √ | | | | | | | | | | | | √ | | √ | √ | | | | | | √ | | | | | | | | √ | √ | √ |
| *Phoenix sylvestris* | √ | | | | | | | | | | | | | | | √ | | | | | | | √ | | | | | | | | | √ | √ |
| *Phragmites karka* | √ | √ | √ | √ | | √ | | | | | √ | | √ | √ | √ | | | √ | √ | √ | | √ | √ | √ | √ | | | √ | √ | √ | √ | √ | √ |
| *Phyla nodiflora* | √ | √ | | | | √ | | | | | | | | | | √ | | √ | √ | | | | | | | | | | | | √ | √ | √ |
| *Phyllanthus amarus* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Phyllanthus emblica* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Phyllanthus maderaspatensis* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Phyllanthus polyphyllus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Phyllanthus reticulatus* | √ | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | | √ |
| *Phyllanthus rotundifolius* | √ | √ | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Phyllanthus urinaria* | √ | √ | | | | | √ | | | | | | | | √ | | | | | | | | | | | | | | | | √ | | |
| *Physalis minima* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Pistia stratiotes* | √ | √ | √ | √ | √ | | | √ | | √ | √ | | | | | √ | √ | √ | | √ | √ | | | | | √ | √ | √ | | | √ | √ | √ |
| *Plecospermum spinosum* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Polyalthia cerasoides* | √ | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Polyalthia suberosa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Polycarpaea corymbosa* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Polygonum barbatu* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Polygonum glabrum* | √ | √ | √ | | | | | | | | √ | | | √ | √ | | | | | | √ | | | | | √ | √ | √ | | √ | | | √ |
| *Polygonum hydropiper* | √ | √ | √ | | | | | | | | √ | | | √ | √ | | | | | | √ | | | √ | √ | √ | √ | √ | √ | √ | | | √ |
| *Polygonum plebeium* | √ | √ | | | | | | | | | | | | | | | | √ | √ | | | | √ | √ | √ | | | | | √ | | | |
| *Polygonum* sp | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pongamia pinnata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Portulaca oleracea* | √ | √ | √ | | √ | | | √ | | | √ | | √ | | | √ | √ | | | √ | | √ | | | √ | | | √ | | | √ | | |
| *Portulaca quadrifida* | √ | √ | | | | √ | | √ | | √ | | √ | | √ | | √ | √ | | √ | | √ | | | √ | | √ | | √ | | √ | √ | √ | √ |
| *Potamogeton nodosus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Premna tomentosa* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Prosopis cineraria* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Prosopis juliflora* | | | | | | | √ | √ | | | | √ | | | | √ | √ | | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| *Pseudarthria viscida* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Psilotrichum elliotii* | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Pterospermum xylocarpum* | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pulicaria wightiana* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Pupalia lappacea* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pycreus globosus* | √ | √ | | | | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | √ |
| *Randia brandisii* | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Randia dumetorum* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Randia parviflora* | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Rauwolfia serpentina* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Rhizophora apiculata* | | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | |
| *Rhynchosia densiflora* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Rhynchosia minima* | √ | √ | | | √ | | | √ | | | | √ | | | | | √ | | | | | √ | | | √ | | | √ | √ | | √ | | |
| *Rivea hypocrateriformis* | √ | √ | | | | √ | | | | | √ | | | | | | | √ | | √ | | | | √ | | √ | | √ | √ | | √ | | √ |
| *Rottboellia cochinchinensis* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Ruellia tuberosa* | √ | √ | | √ | √ | | | √ | | | | √ | | | | √ | | | √ | | | | √ | | | √ | √ | √ | √ | √ | | | |
| *Saccharum spontaneum* | √ | √ | √ | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | √ | √ |
| *Sacciolepis indica* | √ | √ | | √ | | √ | | √ | √ | √ | | | √ | | | √ | | | √ | | √ | | √ | | √ | | √ | | √ | √ | √ | √ | √ |
| *Salacia chinensis* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Salicornia brachiata* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Salvinia molesta* | √ | √ | | | | | | | | | √ | | | | | √ | √ | | | | | | | | | | | | | | | | |
| *Sansevieria roxburghiana* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sapindus emarginatus* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ |
| *Scirpus articulatus* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Scleria lithosperma* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Scoparia dulcis* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Scutia myrtina* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sebastiania chamaelea* | √ | √ | | | √ | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | |
| *Sehima nervosum* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Sehima sulcatum* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Senna alata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Senna auriculata* | √ | | | | | √ | | | | | | √ | | | | √ | | | | | √ | | | | √ | | | | | | √ | √ | √ |
| *Senna hirsuta* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Senna italica* | √ | √ | | | √ | √ | √ | √ | √ | √ | | | | √ | √ | √ | √ | √ | | | √ | | | √ | | √ | | √ | | √ | √ | √ | √ |
| *Senna occidentalis* | √ | √ | √ | √ | √ | √ | √ | | | | | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | | | | √ | √ | √ |
| *Senna tora* | √ | √ | | √ | √ | √ | √ | √ | √ | √ | | | √ | √ | √ | √ | √ | √ | √ | √ | | | | √ | √ | √ | √ | √ | | | √ | √ | √ |
| *Sesbania bispinosa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sesuvium portulacastrum* | √ | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | √ | √ | √ |
| *Setaria italica* | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | | | | | |
| *Sida acuta* | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | | | √ | √ | √ |
| *Sida cordata* | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | | | √ | | |
| *Sida cordifolia* | √ | | √ | | √ | | √ | | √ | | √ | | √ | | | | √ | | √ | | √ | | √ | | √ | | √ | | | | √ | √ | √ |
| *Sida rhombifolia*var. *retusa* | √ | | | | | √ | √ | √ | √ | √ | √ | √ | √ | | | | | | | | | | | | | | | | | | | | |
| *Sida rhombifolia*var. *rhombifolia* | √ | | | | | | | √ | √ | | | | | | | √ | √ | | | | | | | | | | | | | | | | |
| *Sida spinosa* | √ | | | | | | | √ | √ | | | | | | | √ | √ | | | | √ | √ | √ | | | | | | | | | | |
| *Solanum surattense* | √ | √ | | | √ | | | √ | √ | | | | | | | √ | √ | √ | | | | | | | | | | | | | √ | √ | √ |
| *Solanum trilobatum* | √ | √ | | | | | | √ | | | | | | | | √ | | | | | | | | | | | | | | | | | |
| *Solena amplexicaulis* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sonchus oleraceus* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sonneratia apetala* | | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | |
| *Spermacoce hispida* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Spermacoce ocymoides* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sphaeranthus indicus* | √ | √ | | | √ | | | √ | √ | √ | √ | √ | √ | | | √ | | √ | | √ | √ | | √ | √ | √ | | | √ | √ | √ | √ | √ | √ |
| *Spilanthes calva* | √ | √ | | √ | √ | | | √ | | | | | | | | | | √ | | √ | √ | | | | | | | | | | √ | √ | √ |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Spilanthes uliginosa* | √ | √ | | | √ | | | √ | | | | | | | | | | √ | | | | | | | | | | | | | | | |
| *Spinifex littoreus* | √ | | | | | | | | | | | | | | | | | | | | | √ | | | √ | | | | | | √ | | |
| *Spondias pinnata* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Sporobolus coromandelianus* | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| *Sporobolus indicus* | √ | √ | √ | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | | | √ | √ | √ | | | | √ | √ | | | √ |
| *Sporobolus spicatus* | √ | √ | √ | √ | √ | √ | | | | | √ | | √ | √ | √ | √ | | | | √ | √ | | | | | | | √ | √ | | √ | | |
| *Sporobolus wallichii* | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | | |
| *Stemodia viscosa* | √ | √ | | √ | | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | √ | | √ |
| *Sterculia foetida* | | | | √ | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | |
| *Streblus asper* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ |
| *Striga asiatica* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Strychnos nux-vomica* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Suaeda fruticosa* | √ | √ | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | √ | √ | √ |
| *Suaeda nudiflora* | √ | √ | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | √ | | √ |
| *Suregada lanceolata* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Synedrella nodiflora* | √ | √ | | | √ | | | √ | | | | √ | | | | | | √ | | | √ | | | | √ | | √ | | | | | √ | √ |
| *Syzygium cumini* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tamarindus indica* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Taraxacum officinale* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tarenna asiatica* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tecoma stans* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tectona grandis* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tephrosia purpurea* | √ | √ | | √ | √ | √ | √ | √ | | √ | √ | | | | √ | | | √ | | | | √ | | | | √ | | | √ | | √ | √ | √ |
| *Tephrosia villosa* | √ | √ | | | √ | √ | √ | √ | √ | | √ | | √ | | √ | | √ | | √ | √ | | | √ | √ | | √ | | √ | | | √ | √ | √ |
| *Terminalia arjuna* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Terminalia catappa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Themeda triandra* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Thespesia populnea* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Thevetia peruviana* | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tinospora cordifolia* | √ | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ |
| *Tragia involucrata* | √ | √ | √ | | √ | √ | √ | √ | √ | | | √ | | | | √ | | | √ | | √ | | | | √ | | | √ | | √ | √ | √ |
| *Tragia plukenetii* | √ | √ | √ | | √ | | | √ | | √ | √ | | √ | | | | | √ | | √ | | | √ | | | √ | | | | | √ | √ | √ |
| *Trewia nudiflora* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Trewia polycarpa* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Trianthema triquetra* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Tribulus lanuginosis* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Tribulus terrestris* | √ | √ | √ | | √ | √ | √ | √ | | √ | | √ | √ | √ | √ | | √ | √ | | √ | √ | | √ | √ | | √ | | | | √ | √ | | √ |
| *Trichodesma indicum* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Tridax procumbens* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Triumfetta pentandra* | √ | √ | | √ | | | | √ | | | √ | | | | | √ | | | | | √ | | √ | | | | √ | | | | √ | √ | √ |
| *Triumfetta rhomboidea* | √ | | | | | | √ | | | | | | √ | | | | | | | | √ | | | | √ | | | √ | | | | | |
| *Triumfetta rotundifolia* | √ | √ | √ | | | | | | | √ | | | | | √ | | | | | | √ | | | | | √ | | | | | | | |
| *Turnera subulata* | √ | √ | | | √ | | | | | √ | | | | √ | | | | √ | | | | | √ | | | | | | | | √ | √ | √ |
| *Typha angustifolia* | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| *Urena lobata* | √ | √ | | √ | | | | √ | | | | | | | | √ | | | | | | | | √ | | | | | | | √ | √ | √ |
| *Urena lobata* var. *sinuata* | √ | | | | | | | | | | | | | | | | √ | | | | | | √ | | | | | | | | | | |
| *Vallisneria spiralis* | √ | √ | | | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Vernonia cinerea* | √ | √ | | | | | √ | | | √ | | | √ | | | √ | | | | | √ | | | | √ | | | √ | | | √ | √ | √ |
| *Vetiveria zizanioides* | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| *Vigna trilobata* | √ | √ | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Vitex altissima* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Vitex leucoxylon* | √ | √ | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Vitex negundo* var. *negundo* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Vitex negundo* var. *purpurascens* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Waltheria indica* | √ | √ | | | √ | | √ | | | √ | | | | √ | | √ | √ | √ | | √ | | √ | | √ | | | √ | | √ | | √ | √ | √ |
| *Wedelia chinensis* | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Wrightia tinctoria* | √ | | √ | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | |
| *Xanthium indicum* | √ | √ | | √ | | √ | | | √ | | | | √ | | | | | √ | | | | | √ | | | √ | | √ | | | √ | √ | √ |
| *Youngia japonica* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ziziphus mauritiana* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | √ |
| *Ziziphus nummularia* | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ziziphus oenoplia* | √ | | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| *Zornia diphylla* | √ | √ | | √ | | | | | √ | | | | | √ | | | | | | √ | | | | | | | √ | | | | | | |
| *Zornia gibbosa* | √ | √ | | | | | √ | | | | | | | | | | | √ | | | | | | | √ | | | | | | | | |
| *Zoysia matrella* | √ | √ | √ | √ | √ | | | | √ | | √ | | | | √ | | | | | √ | √ | √ | √ | √ | √ | | | | | | √ | √ | √ |

Where: 1-Sompeta; 2-Bhavanapadu and Naupada swamps; 3-Madduvalasa Reservoir; 4-Kuddiram Sagaram; 5-Lanka cherivu; 6-Cheri chrivu; 7-Narayana valasa; 8-Pechrivu; 9-Mettucherivu; 10-Thamarai cherivu; 11-Rajakaru cherivu; 12-Kottabommali; 13-Sivarampuram cherivu; 14-Pathathekkali; 15-Damodar sagaram; 16-Peddhapadu cherivu; 17-Rajulau cherivu; 18; Kaaricherivu; 19-Narayanpuram reservoir; 20-Chintada cherivu; 21-Arisadu; 22-Bhavanapadu creek area; 23-Devunivalu cherivu; 24-Narasapuram peddha cherivu; 25-Nagavalli river mouth; 26-Poundi back water;

| Species | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

27-Marandupadu cherivu; 28_Telineelapuram wetland; 29-Nalla cherivu; 30-Dunkuru wetland; 31-Ichchapuram wetland; 32-Telikunji wetland; 33-Mahendrathanaiya river mouth.

Appendix 12 Consolidated list of birds recorded during the present study in the wetlands of Srikakulam district and its environs

| Common name | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alexandrine Parakeet | | √ | | | √ | | | | √ | | | √ | √ | | | √ | | √ | | √ | √ | | | | √ | | | | | | | √ | |
| Ashy Drongo | √ | √ | | √ | √ | √ | √ | √ | | | | √ | √ | √ | √ | √ | | √ | | √ | √ | √ | √ | | √ | | √ | √ | √ | √ | √ | √ | √ |
| Ashy Prinia | | √ | √ | √ | √ | | √ | √ | √ | √ | | √ | | | | | | √ | | √ | √ | | | | √ | | | √ | √ | | √ | √ | √ |
| Ashy-crowned Sparrow Lark | √ | √ | | | √ | | √ | | | √ | | √ | | | √ | | | √ | | √ | | | | √ | √ | √ | √ | | √ | | √ | √ | |
| Asian Koel | √ | √ | | | √ | | | | | √ | | √ | | | | √ | | √ | | √ | √ | √ | | | | | | √ | √ | | | | √ |
| Asian Openbill | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Asian Palm Swift | √ | √ | √ | √ | √ | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Asian Pied Starling | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Baya Weaver | | √ | | | | | | | | | √ | √ | | | | √ | √ | √ | | √ | √ | | | √ | √ | | √ | | √ | √ | √ | √ | √ |
| Bay-backed Shrike | √ | √ | | | | | | | √ | √ | √ | √ | | | √ | √ | √ | √ | | √ | √ | √ | | √ | √ | | √ | | √ | √ | √ | √ | √ |
| Besra | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | √ | | |
| Black Bittern | | √ | | | | | | | | √ | | | | | | | | | | | | | | √ | | | | | | | | | |
| Black Drongo | √ | √ | | √ | | | | √ | | | √ | | √ | | √ | √ | | √ | | √ | √ | √ | | | √ | √ | | | √ | √ | √ | √ | √ |
| Black Kite | √ | √ | √ | √ | | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ |
| Black-bellied Tern | √ | | √ | | | √ | | | | √ | | | | | | √ | | | √ | | | √ | √ | | | | | | √ | | √ | √ | |
| Black-crowned Night Heron | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Black-crowned Sparrow Lark | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Black-headed Gull | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | | | √ | | |
| Black-headed Ibis | √ | √ | | | | | | √ | | √ | | | | | √ | | | | √ | | √ | √ | √ | | | | √ | | √ | | | √ | |
| Black-headed Munia | | | | √ | | | | √ | | √ | √ | | | | | √ | | √ | | √ | √ | √ | | | | | | | √ | | | √ | √ |
| Black-shouldered Kite | √ | √ | | | | | √ | √ | √ | √ | | | √ | | | | | √ | √ | √ | √ | √ | √ | | √ | √ | √ | | √ | | √ | √ | |
| Black-winged Stilt | √ | √ | | | √ | | | | √ | √ | | | | | √ | √ | | √ | √ | | | √ | | | | | √ | | √ | | √ | √ | |
| Blue-eared Kingfisher | | √ | √ | | | | √ | √ | | | | | √ | | | √ | √ | √ | | | √ | √ | √ | √ | √ | | | | | | √ | |
| Blue-faced Malkoha | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | |
| Blue-tailed Bee-eater | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Brahminy Kite | √ | √ | | √ | √ | | √ | √ | | | | √ | √ | | | √ | | √ | | | √ | √ | √ | | | | √ | √ | √ | √ | √ | | |
| Brahminy Starling | √ | √ | | | √ | | √ | √ | | | √ | | | | √ | | | √ | | √ | √ | √ | | √ | | | | | | | √ | | |
| Bronze-winged Jacana | | | | | | | | √ | | | √ | | √ | √ | | | √ | √ | | | √ | √ | | | | | | | √ | | | √ | |
| Brown-headed Barbet | √ | √ | √ | | √ | | √ | | | | | | | | | | | √ | | | | | | | | | | | | | | | |
| Brown-headed Gull | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | | | | | |
| Cattle Egret | | √ | √ | √ | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Chestnut-headed Nee-eater | | | | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | |
| Cinnamon Bittern | | √ | | | | | | | | | | | | | | | | | | | | | | √ | | | | | | | | | |

| Common name | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Citrine Wagtail | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | √ | | |
| Common Coot | √ | √ | | | √ | | | √ | | √ | √ | | | | | | | √ | | | | √ | | √ | √ | | | | | | | √ | |
| Common Greenshank | √ | | √ | | | | | | | | | | | | | | √ | | √ | | √ | √ | | √ | | | √ | √ | √ | | √ | √ | |
| Common Hoopoe | | √ | | | | | | √ | | | | √ | | | √ | √ | | √ | | | | | | | | | | √ | √ | | √ | √ | √ |
| Common Kingfisher | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Common Moorhen | √ | √ | √ | √ | √ | | | √ | | √ | √ | | √ | | | | √ | √ | | | | √ | | √ | √ | | | | | | | √ | |
| Common Myna | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Common Poachard | √ | √ | | | | √ | | | | | √ | | | | | | | | | | | | | | | | | | | | | √ | |
| Common Redshank | √ | | | | | √ | | | | | | | | | | | | | √ | | | √ | √ | √ | | | √ | √ | √ | | √ | | |
| Common Ringed Plover | √ | | | | | √ | | | | | √ | | | | | | √ | | | | | | | | | √ | √ | √ | √ | | √ | | √ |
| Common Sandpiper | √ | √ | √ | √ | | √ | | | | √ | √ | | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | | √ | √ | √ |
| Common Snipe | | | | | | | | | | | | | | | | √ | | | | | | | | | | | √ | | | | | | |
| Common Tailorbird | | | | | | | | | | | | | | | | | | √ | | √ | √ | √ | | √ | √ | | | √ | √ | | | √ | √ |
| Common Teal | √ | √ | | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | | | |
| Coppersmith Barbet | | | | | | | | | | | | | | | | √ | √ | √ | | √ | | | | | | | | | | | | √ | |
| Cotton Pygmy-Goose | √ | √ | | | √ | | | √ | | | √ | | √ | | | | | | | | | | | | | | | | | | | √ | |
| Curlew Sandpiper | | | | | | | | | | | | | | | | | | | √ | | | √ | | | | | √ | | | | | | |
| Darter | √ | √ | √ | | √ | | | | √ | √ | √ | √ | | | | √ | √ | √ | | | | | | √ | √ | | | | | | √ | √ | √ |
| Eurasian Collared Dove | | √ | | √ | | √ | | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | | | √ | √ | | √ | √ | √ | √ | | √ |
| Eurasian Curlew | √ | | | | | | | | | | | | | | | | | | √ | | | √ | √ | | | | √ | | √ | | √ | | |
| Eurasian Marsh Harrier | √ | √ | | | | | | | | | | | | | | | | | √ | | | √ | | | | | | | √ | | √ | | |
| Eurasian Spoonbill | | √ | | | | | | | | | | | | | | | | | √ | | | √ | | | | | √ | | | | | | |
| Eurasian Wigeon | √ | √ | | | | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | |
| Fulvous Whistling Duck | √ | √ | | | | | | √ | | | | | √ | | | | | | | | | | | √ | √ | | √ | | | | | | |
| Gargany Teal | √ | √ | | | | | | | | | √ | | | | | | | | | | | | | √ | | | | | | | | | |
| Great Cormorant | √ | √ | √ | | | | | √ | | | √ | | | | √ | √ | √ | | √ | | √ | √ | √ | √ | √ | | | | √ | | √ | √ | √ |
| Greater Coucal | √ | √ | | | √ | √ | | √ | | | √ | √ | | | | √ | √ | √ | | √ | | √ | | | | | | | √ | | | | √ |
| Greater Egret | √ | √ | √ | √ | | √ | √ | √ | | √ | √ | √ | √ | | √ | √ | √ | √ | √ | | | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ |
| Green Avadavat | | | | | | | | | | | | | | | | | | √ | | √ | | | | | | | | | | | | | |
| Green Sandpiper | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ | | |
| Grey Francolin | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Grey Heron | √ | √ | √ | | | √ | √ | √ | √ | √ | | | √ | | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | | √ | | √ | √ | √ |
| Grey Wagtail | | | √ | | | √ | √ | | | | | | | | √ | √ | √ | √ | | | √ | | | | | | | √ | | | | √ | |
| House Crow | √ | √ | | √ | | | √ | √ | √ | √ | | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| House Sparrow | | √ | | | | | | √ | √ | | | | √ | √ | | √ | | | | √ | | | √ | | | | | √ | √ | √ | √ | √ |

| Common name | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| House Swift | √ | | √ | | | | | √ | √ | √ | | √ | √ | √ | | √ | | √ | √ | √ | √ | | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ |
| Indian Cormorant | √ | √ | | | | | | √ | | | | | √ | | | √ | | | √ | | | | √ | | | | | | | | | | |
| Indian Grey Hornbill | | √ | √ | | | | √ | √ | | | | | √ | | | √ | √ | √ | | √ | √ | | | √ | √ | | | √ | √ | √ | | √ | |
| Indian Peafowl | | √ | | | | | √ | √ | | | | | √ | | √ | √ | √ | √ | | √ | | | | | | | | | √ | √ | | √ | |
| Indian Pond Heron | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Indian Robin | √ | √ | | | | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | | √ | √ | √ | | √ | √ | | | √ | √ | | √ | √ | √ |
| Indian Roller | √ | √ | | | √ | | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | | √ | √ | √ | | | √ | √ | | √ | √ | √ | √ | √ | √ |
| Indian Silverbill | √ | √ | | √ | √ | | √ | √ | √ | √ | | √ | √ | √ | √ | √ | | √ | | √ | √ | √ | √ | | √ | | | √ | √ | √ | √ | √ | √ |
| Intermediate Egret | √ | √ | | | √ | √ | | √ | √ | | | | √ | | | √ | | √ | √ | | | √ | | | | | | | √ | | √ | | |
| Jack Snipe | | | √ | | | | | | | | | | | | | | | √ | | | | | | | | | √ | | | | | | |
| Jungle Babbler | | √ | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | √ | |
| Jungle Crow | √ | √ | | √ | | | | √ | √ | | | | √ | | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | |
| Jungle Myna | | √ | | | | | | √ | | | | | √ | | | | | √ | | | | | | | | | | | | | | √ | |
| Jungle Prinia | | | | | | | | √ | | | | √ | | | | | | √ | | | | √ | | | | | | | √ | | | √ | |
| Kentish Plover | √ | | | | √ | | | | | | | | | | √ | | | | | | | | | | | | √ | | | | | | |
| Large Grey Babbler | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Laughing Dove | √ | √ | | √ | √ | | | | | √ | | | √ | | √ | | | √ | | √ | √ | √ | | | √ | | | √ | √ | | √ | √ | √ |
| Lesser Coucal | | √ | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lesser-crested Tern | | | | | | | | | | | | | | | | | | √ | √ | | | | | | | | √ | | | | | | |
| Lesser Whistling Duck | √ | | | | | | | √ | | | | | √ | | | | | | | | | | | | | | √ | | | | | | |
| Little Cormorant | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | |
| Little Egret | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Little Grebe | √ | √ | √ | | √ | √ | | √ | | √ | √ | √ | | | | | √ | | | | | | | √ | √ | | √ | | | | | √ | |
| Little Heron | | √ | √ | | | | | | | | | | | | | | | | √ | | | | | | | | √ | | | | | √ | |
| Little Ringed Plover | √ | √ | √ | | | √ | | | | | | √ | √ | | √ | √ | √ | | √ | | √ | √ | √ | √ | | | √ | | √ | √ | √ | √ | √ |
| Little Stint | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Loten's Sunbird | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | |
| Marsh Sandpiper | √ | √ | √ | | | √ | | | | | √ | | | | √ | √ | √ | √ | √ | | | √ | √ | √ | √ | √ | | √ | √ | | √ | √ | √ |
| Northern Pintail | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Northern Shoveler | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Orange-headed Thrush | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | |
| Oriental Magpie Robun | | √ | | | | | | √ | | | | | | | | √ | | | | | | | | | | | | | √ | | | | |
| Osprey | | | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ | | |
| Paddyfiled Pipit | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | √ | | √ | √ | |
| Painted Stork | √ | √ | √ | | | √ | √ | √ | | | √ | | √ | | √ | √ | √ | √ | | | | √ | | √ | √ | | √ | | √ | √ | √ | √ | |

| Common name | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Palla's Fish Eagle | | | | | | | | | | | | √ | | | | | | | √ | | | | | | | √ | | √ | | √ | | |
| Pallid Harrier | √ | √ | | | | | √ | | | | | √ | | | | | | | √ | | | | | | | | | √ | | | | |
| Pheasant Tailed Jacana | √ | √ | √ | | | | √ | √ | | √ | | | √ | | | | √ | √ | | | | | | | | | | | | √ | | |
| Pied Avocet | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pied Buschat | √ | √ | | | | | | | | | | | | | | | | √ | | √ | √ | √ | | √ | | | | √ | √ | | √ | √ | |
| Pied Harrier | √ | √ | √ | | | √ | √ | | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | | | √ | √ | | | | √ | | √ | | | | |
| Pied Kingfisher | | | | √ | √ | | | | | | | | | | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Pintail Snipe | √ | √ | √ | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Plain Prinia | | | | √ | | | | | | √ | | | | | | | | √ | | √ | √ | | | | | | | √ | √ | | √ | | |
| Purple Heron | √ | √ | √ | | √ | | √ | √ | √ | | √ | | √ | | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ | | √ | √ | √ | | √ | √ | |
| Purple Sunbird | √ | | | | | | | √ | | | | | | | | | | | | √ | | | | | | | | | | | | √ | |
| Purple Swamphen | √ | √ | √ | | √ | | | √ | | | √ | | √ | | | | | √ | | | | | | | | | | | | | | √ | |
| Purple-rumped Sunbird | √ | √ | | | √ | | | √ | | | | | | | | √ | √ | √ | | | | √ | | | √ | | | | √ | | √ | √ | √ |
| Red Avadavat | √ | √ | | | √ | | | | | | | | | | | | | √ | | √ | | | | | | | | | | | | | |
| Red Collared Dove | √ | √ | | | | | | √ | | √ | | | | | √ | √ | √ | √ | | | | | | | | | | | | | √ | | |
| Red-rumped Swallow | | | | | | | | | | | | | | | | √ | | √ | | | | | | | | | | | √ | | √ | √ | √ |
| Red-vented Bulbul | | √ | | | | | | | | √ | √ | √ | √ | | √ | √ | √ | √ | | √ | √ | | | √ | | | | √ | √ | √ | √ | √ | |
| Red-wattled Lapwing | √ | √ | √ | | √ | √ | | √ | | √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| River Lapwing | √ | √ | √ | | | | | | | | | | | | √ | | √ | | | | | | | | | | | | | | √ | | |
| River Tern | √ | √ | √ | | | | | | | | | | | | √ | √ | | | | | | | | √ | √ | | √ | | | | √ | | |
| Rock Pigeon | | √ | | | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ |
| Rose-ringed Parakeet | √ | √ | | | √ | | √ | √ | √ | | | √ | √ | | √ | √ | √ | √ | | √ | √ | √ | | √ | | √ | | √ | √ | √ | √ | √ | √ |
| Rosy Starling | √ | √ | | | √ | | | √ | | | | | √ | | √ | √ | | √ | | √ | | | | | | | | | | | | | |
| Rufous Treepie | | √ | √ | | | | | √ | | | | | | | | √ | √ | √ | | √ | | | | | | √ | | √ | √ | | √ | √ | |
| Scaly-breasted Munia | | | | √ | √ | | | √ | | | | | | | | | | √ | | | | √ | | | | | | | √ | | | | |
| Shikra | | √ | | √ | | | | √ | | | | | | | | | √ | √ | | | | √ | | | | | √ | √ | √ | √ | | √ | √ |
| Small Green Bee-eater | √ | √ | √ | | | | | √ | √ | | | √ | √ | √ | | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | √ | √ |
| Small Minivet | | | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | |
| Spot-billed Duck | | √ | | | | | | | | | | | | | | | | | | | | | | √ | √ | | | | | | | | |
| Spot-billed Pelican | √ | √ | √ | | | | √ | | | | | | | | √ | | | | | | | | | √ | √ | | | | | | √ | √ | |
| Spotted Dove | √ | √ | | | | | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Spotted Redshank | √ | | | | | √ | | | | | | | | | | | | | | | | | | | | | √ | | | | √ | | |
| Whimbrel | | | | | | | | | | | | | | | | | | | √ | | | √ | √ | | | | | | | | √ | | |
| Whiskered Tern | | | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | | | | |
| White-bellied Drongo | | √ | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Common name | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| White-bellied Sea Eagle | | | | | | | | | | | | √ | | | | | | | √ | | | √ | | | | | √ | | | | √ | √ | |
| White-breasted Kingfisher | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| White-breasted Waterhen | √ | √ | √ | | √ | √ | | √ | | √ | √ | | √ | | √ | | √ | √ | | | | | | √ | | | √ | | √ | | √ | √ | √ |
| White-browed Bulbul | | √ | √ | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | √ | |
| White-browed Wagtail | | √ | | | | | | | | | | | | | | √ | | | | | | | | | | √ | | | | | | √ | |
| White-headed Babbler | √ | √ | | | | | √ | √ | | | | √ | | | √ | √ | | √ | | | | | | √ | | √ | | √ | √ | √ | | | |
| Wire-tailed Swallow | | | √ | | | | | √ | | | | | | | | √ | | | | | | | | | | | | | √ | | √ | √ | |
| Yellow Bittern | | √ | | | | | | | | | | | | | | | | √ | | | | | | | | | | | | | | | |
| Yellow Wagtail | | √ | | | | √ | | | | | | | | | √ | √ | | | | | | | | √ | | | | √ | √ | | | | |
| Yellow-wattled Lapwing | √ | √ | | | √ | | | | | | | | | | √ | | | √ | | | | | | √ | √ | √ | | | | | | √ | |
| Brown-headed barbet | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Spotted owlet | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Barn Owl | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Black-headed Gull | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ruddy Turnstone | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Black-bellied Plover | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ruddy Shelduck | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Grey Plover | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Pacific Golden Plover | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Asian Dowitcher | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Black-tailed Godwit | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bar-tailed Godwit | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Gadwall | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bar-headed Goose | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Comb Duck | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Greater Flamingo | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Sarus Crane | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Woolly-necked Stork | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *White Eye Pochard | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Bear's Poachard | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ferruginous Duck | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Blue-breasted Banded Rail | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ballions Crake | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Brown Crake | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Wood Snipe | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Common name | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Bush lark | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Rufous Tailed Finch Lark | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Common crested lark | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Small Sky Lark | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Peregrine Falcon | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Plaintive Cuckoo | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Indian Blue Robin | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *White-rumped Needletail | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Kentish Plover | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lesser Sand Plover | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Greater Sand Plover | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Dunlin | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Temminck's Stint | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Green Sandpiper | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Wood Sandpiper | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Black Crowned Night Heron | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Great Crested Grebe | √ | | √ | | | | | | | | √ | | | | | | | | | | | | | | | | | | | | | | |
| *Tufted Duck | √ | | | | | | | | | | √ | | | | | | | | | | | | | | | | | | | | √ | | |
| *Black-headed Cuckoo-shrike | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Common Babbler | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Common Crane | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Blue-winged Leafbird | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Golden-fronted Leafbird | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Greater Racket-tailed Drongo | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Indian Cuckoo | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Jungle Babbler | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Jungle Owlet | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Eurasian Thick-knee | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Grey-headed Fish Eagle | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Grey Junglefowl | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Grey Francolin | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Brown-Caped Pygmy Woodpecker | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Egyptian Vulture | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Short-toed Snake Eagle | √ | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Streaked Weaver | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Common name | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Water Cock | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *White Stork | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Black-necked Stork | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Lesser Adjudant | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Black Ibis | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Glossy Ibis | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *White-eyed Buzzard | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Greater Grey-headed Fish Eagle | | √ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Where: 1-Bhavanapadu and Naupada swamps; 2-Sompeta; 3-Kuddiram Sagaram; 4-Lanka cherivu;5-Pecherivu;6-Mettu Cherivu;7-Thamarai Cherivu;8-Rajakaru Cherivu;9-Kottabommali;10-Sivarampuram Cherivu;11-Pathathekkali;12-Damodar Sagarm;13-Peddhapadu Cherivu;14-Rajalu Cherivu;15-Kaaricherivu;16-Narayanapuram Reservoir;17-Chintdata;18-Arisadu;19-Bhavanapadu Creek area;20-Dhyal Cherivu;21-Narasapuram Pedda Cherivu;22-Nagavalli River mouth;23-Poundi back water;24-Marandupadu Cherivu;25-Telineelapuram wetland;26-Nalla Cherivu;27-Dunkuru wetland;28-Narayanasagaram;29-Ichchapuram wetland;30-Telikunchi wetland;31-Mahendrathanaya river mouth;32-Madduvalasa reservoir;33-Narayanavalasa;

Appendix 13 Summary Datasheet format

Date: ..... Data Sheet No:.....

Wetland Name: Place/village name: Lat:

Photo #: Post Office: Long:

**WETLAND CHARACTERS**

Natural / If Artificial, Age of WL:

Perennial/ If Seasonal , Dry Months:

Overflow? Yes / No

Isolated/ If inter connected, Details:

.....

.....

**WATER SOURCE FOR THE WETLAND:**

Rain-fed/ Ground/ River.....

/ Canal ..... / .....

**SIZE OF WETLAND (@ Max)**

Area: ..... Ha. Depth: ..... m

Shape 

Land-use Around wetland:

No. of Wells around: ..... Mean Depth .....

**Contact Person Name & No if any**

.....

.....

**Water Quality Parameters:**

Colour: ..... Odour: .....

Turbidity: .....

EC .....

pH .....

**AS WATER SOURCE**

| For Drinking water | For Irrigation | For Industries | Bathing/washing | Other |
|---|---|---|---|---|
| Human / Livestock/ Drinking water scheme: ..... | Agriculture Area: ..... Ha Crops: ..... | Type: ..... | Human/ Livestock/ Vehicle/ ..... | ..... ..... |

**OTHER RESOURCES**

| Waste Dumping - Y/ N | Fishing | Fodder/ Grazing | Cultural | Other use. | As Bird/WL habitat |
|---|---|---|---|---|---|
| If Yes, by whome? Houses/ Industry/ Public/ Details: ..... ..... ..... ..... | Sustenance/ Commercial Fish Species: ..... Annual catch : ..... Fishing Season: | Cattle population ..... | Religious/ Recreational/ ..... | ..... ..... ..... | Sp: ..... ..... Approx Nos: ..... Seasons: ..... |

PLATE 1 Birds recorded from the study area

Sandpiper


Black-winged stilt


Spot-billed Pelican at Thelineelapuram

Painted storks at Thelineelapuram

Fulvous Whistling duck

Cotton Teal

PLATE 2 Birds recorded from the study area

Little Ringed Plover

Common Redshank


Little Cormorant


White-breasted Kingfisher

Purple Heron


Tufted Duck

PLATE 3 Birds recorded from the study area

Great Egret

Alexandrine parakeets

Indian Grey Hornbill

Purple Swamp Hen

Blue-tailed Bee-eater *Merops philippinus javanicus*

Bronze-winged Jacana *Metopidius indicus*

PLATE 4 Birds recorded from the study area

Common Coot *Fulica atra atra*

White-bellied Sea eagle

Flock of Asian Openbills, *Anastomus oscitans*

Brahminy kite

Red-wattled lapwing

Red Avadavat *Amandava amandava amandava*

PLATE 5 Butterflies recorded from the area


Stripped Tiger

Common Pierrot

Common Rose

Common Mormon

Chocolate Pansy

Black Rajah

PLATE 6 Views of Bhavanapadu wetland






PLATE 7 Views of Bhavanapadu wetland

Fishermen shed at Bhavanapadu wetland

Fishing in Bhavanapadu





Avifaunal diversity at Bhavanapadu during March

PLATE 8 Views of Sompeta wetland

A view of Sompeta wetland during summer

Wild Boars grazing at Sompeta wetland


Water source within Sompeta wetland for lift irrigation

A flock of Rosy starlings at Sompeta

Irrigated rice field at Sompeta

Perennial marshy area of Sompeta wetland

PLATE 9 Field visit to Sompeta


Focused Group Discussions at Sompeta


Resource mapping of Sompeta wetland and nearby areas


A freshwater fish vendor at Manikkiapuram


Manikkiapuram fisher village


Freshwater fishers of Manikkiapuram village


Fishing using traditional gears at Sompeta Beela

PLATE 10 Threats to the wetlands

Jute curing in a wetland

Turtle poachers at Chintada lake

Wetlands are converted to Solid Waste dumps

Indiscriminate use of agrochemicals pollute wetlands

MNREGP at work-Biodiversity being wiped out

Effluents are released to streams by Industries


Top – Marshy area of Sompeta wetland. Bottom – Partial view of Sompeta wetland