



# General Studies Manual for UPSC and State Public Services Examinations 2014

Environment, Biodiversity and Climate Change  
Module-3: Wetlands, Forests and Forest Rights Act

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## Chapter 1. The Wetland Biome

### What is a wetland?

The land area where **soil is saturated with moisture** either permanently or seasonally are called Wetlands. These wetlands may be marshes, swamps, bogs etc. The water in these wetlands may be saltwater, freshwater or brackish water. It may be running or stagnant.

The wetlands are most biologically diverse of all ecosystems supporting numerous plant as well as animal lives.

The Ramsar convention on wetlands defines the wetland as follows:

*wetlands are 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 metres."*

Study of Wetlands is called **Paludology**. World's largest wetland is Pantanal, which is spread in Brazil, Bolivia and Paraguay.

### Functions of Wetlands

There are two important functions of Wetlands that make them so important in the climate change. One is the mitigation effect by which they are able to **sink carbon**. Another is adaptation by which they are able **to store and regulate water**. Wetlands have become a focal issue for conservation due to their biological production, ability to filter and store water, mitigate flood damages, importance in providing habitat and food for waterfowl, as well as the many other species they host.

The major functions of wetlands involve the water filtration, water storage, biological productivity, and provide habitat for wildlife.

#### Water Filtration:

Wetlands remove the excess nutrients and slow the water allowing particulates to settle out of the water which can then be absorbed into plant roots. It has been proved that up to up to 92% of phosphorus and 95% of nitrogen can be removed from passing water through a wetland. The pollutants get settled by sticking to the soil particles. Some wetlands **accumulate the heavy metals** and this decrease the pollutant load of the surrounding waters.

The wetlands support a vast and intricate food web and these complex food chains host various microbes and bacteria on which the invertebrates feed upon. These invertebrates can filter up to 90% of bacteria in this way.

#### Water Storage:

The wetlands are able to store around 1-1.5 million gallons of floodwater per acre. The water is stored and is slowed. This allows the recharging of the groundwater.

**Biological Productivity:**

The wetlands are able to absorb nutrients and are highly biologically productive because they produce biomass very quickly, almost equivalent to the tropical rainforests. The efficiency in creation of the biomass makes them important for the development of alternate sources of energy.

**Wildlife Habitat**

The wetlands are important wildlife habitats. Many species are dependent upon wetlands.

**Ramsar Convention on Wetlands**

Formal title of the Ramsar Convention is "*The Convention on Wetlands of International Importance, especially as Waterfowl Habitat*".

Ramsar is a town in **Iran** and this international treaty aims the conservation and sustainable utilization of wetlands, to stem the progressive encroachment on and loss of wetlands now and in the future. It was signed in Ramsar on February 2, 1971, and came into force on December 21, 1975. To commemorate its signing date, February 2 is observed as **World Wetland Day** every year.

The meeting was invited by Mr Eskander Firouz, Director of Iran's Game and Fish Department, and held in the Caspian seaside resort of Ramsar in Iran, the text of the Convention was agreed on 2 February 1971 and signed by the delegates of 18 nations the next day.

- 👉 The total number of ramsar sites is around 2100 covering an area above 20 Cr. Hectare.
- 👉 The maximum Ramsar sites are located in UK i.e. 168.
- 👉 The largest area covered by the Ramsar sites is in Canada.
- 👉 The number of parties to the Ramsar Convention is 160.
- 👉 They meet every three years.
- 👉 The Ramsar Secretariat is hosted by IUCN-The World Conservation Union in Gland, Switzerland.

**Rationale of Ramsar Convention**

The Ramsar Convention on Wetlands was developed as a means to call international attention to the rate at which wetland habitats were disappearing, in part due to a lack of understanding of their important functions, values, goods and services. Governments that join the Convention are expressing their willingness to make a commitment to helping to reverse that history of wetland loss and degradation.

Many wetlands are international systems lying across the boundaries of two or more countries, or are part of river basins that include more than one State. The health of these and other wetlands is dependent upon the quality and quantity of the transboundary water supply from rivers, streams, lakes, or underground aquifers. The best intentions of countries on either side of those frontiers can be frustrated without a framework for international discussion and cooperation toward mutual benefits.

**Is Ramsar Part of UN Environment Conventions?**

UNESCO serves as Depositary for the Convention, but the **Ramsar Convention is NOT part of the United Nations and UNESCO system of environment conventions and agreements.**

**Commitments under Ramsar Convention**

When the countries join the Ramsar Convention, they get enlisted in an international effort to ensure the conservation and wise use of wetlands. The treaty includes following commitments that the contracting parties agree before joining:

**Designation:**

The first obligation under the Convention is for a Party to designate at least one wetland at the time of accession for inclusion in the List of Wetlands of International Importance. This list is called Ramsar List. After that the country may continue to designate the suitable wetland subject to selection.

**Selection:**

Selection for the Ramsar List should be based on the wetland's significance in terms of ecology, botany, zoology, limnology, or hydrology. The Contracting Parties have developed specific criteria and guidelines for identifying sites that qualify for inclusion in the Ramsar List.

**Information:**

The Party has to commit itself "to arrange to be informed at the earliest possible time if the ecological character of any wetland in its territory and included in the List has changed, is changing or is likely to change as the result of technological developments, pollution or other human interference. Information on such changes shall be passed without delay" to the Ramsar Secretariat.

**Wise Use:**

There is a general obligation for the Contracting Parties to include wetland conservation considerations in their national land-use planning. They have committed themselves to formulate and implement this planning so as to promote, as far as possible, "the wise use of wetlands in their territory".

**Reserves:**

The contracting Parties undertake to establish nature reserves in wetlands, whether or not they are included in the Ramsar List, and they are expected to promote training in the fields of wetland research, management and wardening.

**International cooperation:**

The parties agree to consult with other Contracting Parties about implementation of the Convention, especially in regard to Transboundary wetlands, shared water systems, and shared species.

**3 pillars of Ramsar Convention:**

Three key parts of the treaty are now referred to as the "**Three Pillars**" of the Convention, to which all Parties have expressed their commitments upon their accession.

- 👉 **Wise Use** – There is a general obligation to include wetland conservation in national land-use planning, and the Parties have committed themselves to implement this planning to promote the wise use of all wetlands in their territory, not just those that are listed as internationally important.

- 👉 **List of Wetlands of International Importance** – Each Party must designate **at least one wetland** for the List and promote its conservation, and then continue to “designate suitable wetlands within its territory”. When a country designates a wetland in “Ramsar List” as one of the “Ramsar Sites”, it implies that it selected according to agreed Criteria for being considered “internationally important”.
- 👉 **International Cooperation** – Member governments have agreed to consult with other Parties about implementation of the Convention, especially in regard to transboundary wetlands, shared water systems, and shared or migratory species, and to share expertise and resources with Parties less able to meet their commitments. In addition to these three pillars the Convention also recognizes two additional goals – that of enhancing implementation capacity through capacity building and training, and achieving universal membership.

#### **Is Ramsar Convention legally binding?**

No. The Ramsar Convention is not a regulatory legally binding regime – nevertheless, its terms do constitute a solemn treaty and they are binding in international law in that sense.

#### **What is the Montreux Record under Ramsar List?**

Montreux Record is a register of wetland sites on the List of Wetlands of International Importance **where changes in ecological character have occurred, are occurring, or are likely to occur as a result of technological developments, pollution or other human interference**. So, it is maintained as part of the Ramsar List.

For these sites, the Secretariat may send a technical mission, known as the “Ramsar Advisory Mission”, to analyse the situation at one or more particular Montreux Record sites, provide advice on the measures to be taken, and assess the desirability of removing a site from the Montreux Record when measures have been implemented successfully. This implies that a site in Montreux record is

- ✓ Either threatened by ecological change now or may in future
- ✓ The Ramsar advisory Mission suggests measures to do away with those threats
- ✓ Once, it is clear that now the measures have been applied, the sites may be removed from Montreux Record.

#### **Ramsar Convention's International Organization Partners (IOPs)**

The Ramsar Convention works especially closely with some global non-governmental organizations (NGOs) which have been associated with the treaty since its beginnings. They have been given the formal status of International Organization Partners (IOPs) of the Convention. The five IOPs are:

- 👉 BirdLife International (formerly ICBP)
- 👉 IUCN – The International Union for the Conservation of Nature
- 👉 IWMI – The International Water Management Institute
- 👉 Wetlands International (formerly IWRB, the Asian Wetlands Bureau, and Wetlands for the Americas)
- 👉 WWF (World Wide Fund for Nature) International

## Chapter 2. Wetlands of India

India has a wealth of wetland ecosystems distributed across various eco- geographical regions that range from Himalayas to Deccan plateau. Varied topography and climatic regimes support and sustain diverse and unique wetland habitats in our country.

According to the Directory of Asian Wetlands (1989), India has totally 27,403 wetlands, of which 23,444 are inland wetlands and 3,959 are coastal wetlands. *This implies that India has 6 times more inland wetlands in comparision to the coastal wetalnds.*

Wetlands occupy 18.4% of the country's area of which **70% are under paddy cultivation.**

Natural wetlands in India consist of high altitude wetlands in Himalayas; flood plains of the major river systems; saline and temporary wetlands of the arid and semi-arid regions; coastal wetlands such as lagoons, backwaters, estuaries, mangroves, swamps and coral reefs, and so on. In addition to these natural wetlands, a large number of man-made wetlands, which have resulted from the needs of irrigation, water supply, electricity, fisheries and flood control, are substantial in number. These wetlands can be classified into different categories on the basis of *their origin, vegetation, nutrient status and thermal characteristics.*

In India, out of an estimated 4.1 m ha (excluding irrigated agricultural lands, rivers, and streams) of wetlands, **1.5 m ha are natural, while 2.6 m ha are manmade.** This implies that majority of the wetlands in India are Manmade.

The coastal wetlands occupy an estimated 6,750 sq km, and are largely dominated by mangrove vegetation. The Wildlife Institute of India's survey reveals that they are disappearing at a rate of 2% to 3% every year.

### Types of Indian Wetlands

Wetlands in India are distributed in different geographical regions. Based on their origin, vegetation, nutrient status and thermal characteristics, they are classified into different types as following:

- **Glaciatic Wetlands** : Such as Tsomoriri in Jammu and Kashmir, Chandertal in Himachal Pradesh
- **Tectonic Wetlands** : Such as Nilnag in Jammu and Kashmir, Khajjiar in Himachal Pradesh, and Nainital and Bhimtal in Uttarakhand.
- **Oxbow Wetlands** : Such as Dal Lake, Wular Lake in Jammu & Kashmir and Loktak Lake in Manipur and some of the wetlands in the river plains of Brahmaputra and Indo- Gangetic region. Deepor Beel in Assam, Kabar in Bihar, Surahtal in Uttar Pradesh
- **Lagoons** : Such as Chilika in Odisha
- **Crater Wetlands** such as Lonar lake in Maharashtra
- **Salt Water Wetlands** such as Pangong Tso in Jammu and Kashmir and Sambhar in Rajasthan
- **Urban Wetlands** such as Dal Lake in Jammu and Kashmir, Nainital in Uttarakhand and Bhoj in Madhya Pradesh
- **Ponds/Tanks, Man-made Wetlands** such as Harike in Punjab and Pong Dam in Himachal Pradesh.
- **Reservoirs** such as Idukki, Hirakud dam, Bhakra-Nangal dam
- **Mangroves** such as Bhitarkanika in Odisha
- **Coral reefs, creeks and eustaries.**

There are more than 100 identified wetlands under the National Wetland Conservation & Management Programme (NWCPMP).

### 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, wetlands which require urgent conservation and management interventions are selected and protected. The objective of this programme is the conservation of wetlands in the country so as to prevent their further degradation and ensuring their wise use for the benefit of local communities and overall conservation of biodiversity.

### Is there any specific Legal Framework in India regarding Wetlands?

No, as of now there is no specific legal framework for wetland conservation, management and their wise use. Draft regulatory framework for conservation and management of wetlands is being finalized to be notified under the Environment (Protection) Act, 1986. At present conservation and wise use of wetlands is being ensured through various legal instruments, related to environment and forests.

### India's Ramsar sites

Efforts to conserve wetlands in India began in 1987 and the main focus of governmental efforts is on biological methods of conservation rather than adopting engineering options. A national wetland mapping project has also been initiated for an integrated approach on conservation.

India became a contracting party to the Ramsar Convention in October 1981 and designated **Chilika Lake (Odisha)** and **Keoladeo National Park (Rajasthan)** as its first two Ramsar Sites.

Four additional sites were designated in 1990: Sambhar Lake (Rajasthan), Loktak Lake (Manipur), Harike Lake (Punjab) and Wular Lake (Jammu & Kashmir). Right now, India has **26 Ramsar Sites**.

No.	Ramsar Site	Date of Designation	State	
1	Kolleru Lake	19-08-2002	Andhra Pradesh	90,100 ha
2	Deepor Beel	19-08-2002	Assam	4,000 ha
3	Chandertal Wetland	08-11-2005	Himachal Pradesh	49 ha
4	Pong Dam Lake	19-08-2002	Himachal Pradesh	15,662 ha
5	Renuka Wetland (smallest wetland)	08-11-2005	Himachal Pradesh	20 ha
6	Hokera Wetland	08-11-2005	Jammu & Kashmir	1,375 ha
7	Surinsar-Mansar Lakes	08-11-2005	Jammu & Kashmir	350 ha
8	Tsomoriri	19-08-2002	Jammu & Kashmir	12,000 ha
9	Wular Lake	23-03-1990	Jammu & Kashmir	18,900 ha
10	Ashtamudi Wetland	19-08-2002	Kerala	61,400 ha
11	Sasthamkotta Lake	19-08-2002	Kerala	373 ha
12	Vembanad-Kol Wetland (Largest Wetland of India)	19-08-2002	Kerala	151,250 ha
13	Bhoj Wetland	19-08-2002	Madhya Pradesh	3,201 ha
14	Loktak Lake (Montreux Record)	23-03-1990	Manipur	26,600 ha
15	Bhitarkanika Mangroves	19-08-2002	Odisha	65,000 ha
16	Chilika Lake	01-10-1981	Odisha	116,500 ha
17	Harike Lake	23-03-1990	Punjab	4,100 ha
18	Kanjli	22-01-2002	Punjab	183 ha
19	Ropar	22-01-2002	Punjab	1,365 ha
20	Keoladeo National Park (Montreux Record)	01-10-1981	Rajasthan	2,873 ha
21	Sambhar Lake	23-03-1990	Rajasthan	24,000 ha
22	Point Calimere Wildlife and Bird Sanctuary	19-08-2002	Tamil Nadu	38,500 ha

23	Rudrasagar Lake	08-11-2005	Tripura	240	ha
24	Upper Ganga River (Brijghat to Narora Stretch)	08-11-2005	Uttar Pradesh	26,590	ha
25	East Calcutta Wetlands	19-08-2002	West Bengal	12,500	Ha
26	Nalsarovar Bird Sanctuary (Latest wetland added)	24-09-2012	Gujarat	123 Km <sup>2</sup>	

The most notable trivia about each of them is noted below: (Source: Ramsar.org and wikipedia)

#### Ashtamudi Wetland, Kerala

- ✓ It is an extensive estuarine system, the second largest in Kerala State.
- ✓ Supports fish, aquafauna and also mangroves.
- ✓ Nearly 100 species of fish sustain a lively fishing industry, with thousands of fishermen depending directly upon the estuary for their livelihood.
- ✓ The lake and the life on its shores have inspired many artists and writers. It has been the subject of many poems of renowned poet **Thirunalloor Karunakaran** who was born and brought up on its banks.

#### Bhitarkanika Mangroves, Odisha

- ✓ One of the finest remaining patches of mangrove forests along the Indian coast - 25 years of continued conservation measures have made the site one of the best known wildlife sanctuaries.
- ✓ The **Gahirmatha beach of site is said to host the largest known Olive Ridley sea turtle** nesting beach in the world, with half a million nesting annually.
- ✓ It has **highest density of saltwater crocodile in the country..**
- ✓ A major breeding and wintering place for many resident and migratory waterbirds. East coast's major nursery for brackish water and estuarine fish fauna.
- ✓ Like many mangrove areas, the dense coastal forests provide vital protection for millions of people from devastating cyclones and tidal surges - of India's 58 recorded species of mangroves, 55 species are found in Bhitarkanika, a wider mangrove diversity than in the Sundarbans!

#### Bhoj Wetland, Madhya Pradesh

- ✓ This site in Madhya Pradesh has two contiguous man-made reservoirs - the "Upper Lake" was created in the 11th century by **Raja Bhoj of Malwa** by construction of an earthen dam across the Kolans River, and the lower was constructed nearly 200 years ago, by Nawab Chhote Khan, Minister of Nawab Hayath Mohammad Khan, largely from leakage from the Upper, and is surrounded by the city of Bhopal.
- ✓ The lakes are very rich in biodiversity, particularly for macrophytes, phytoplankton, zooplankton, both natural and cultured fish species, both resident and migratory birds, insects, and reptiles and amphibians.

#### Chandertal Wetland, Himachal Pradesh

- ✓ This is a high altitude lake on the upper Chandra valley flowing to the Chandra river near the Kunzam pass joining the Himalayan and Pir Panchal ranges.
- ✓ It supports CITES and IUCN Redlisted **Snow Leopard** and is a refuge for many species like Snow Cock, Chukor, Black Ring Stilt, Kestrel, Golden Eagle, Chough, Red Fox, Himalayan Ibex, and Blue Sheep.

**Deepor Beel, Assam**

- ✓ It is a permanent freshwater lake in Assam. It is of great biological importance and also essential as the *only major storm water storage basin for the city of Guwahati*.
- ✓ It supports numerous aquafauna and that is the reason that the Birdlife International has declared Deepor Beel as an Important Bird Area (IBA) with high priority for conservation.

**East Calcutta Wetlands, West Bengal**

- ✓ East Calcutta Wetlands are a complex of natural and human-made wetlands lying east of the city of Calcutta (Kolkata), West Bengal
- ✓ *The site is world-renowned as a model of a multiple use wetland, the site's resource recovery systems, developed by local people through the ages, have saved the city of Calcutta from the costs of constructing and maintaining waste water treatment plants.*
- ✓ The wetland produces huge quantity of fresh vegetables and table fish everyday, providing livelihoods for about 50,000 people.

**Harike Lake, Punjab**

- ✓ Harike Wetland is also known as "Hari-ke-Pattan", with the Harike Lake in the deeper part of it.
- ✓ The wetland and the lake were formed by constructing the Head works across the Sutlej river in Punjab. The headworks is located downstream of the confluence of the Beas and Sutlej rivers.
- ✓ It is an important site for breeding, wintering and staging birds, supporting over 200,000 Anatidae (ducks, geese, swans, etc.) during migration.
- ✓ The Indus dolphin supposed to have become extinct in India after 1930, but largely found in the Indus river system in Pakistan, was recently sighted in the Beas River in Harike wetland area.

**Hokera Wetland, Jammu & Kashmir**

- ✓ It is located in Kashmir, back of the snow-draped Pir Panchal it is only 10 km from Srinagar.
- ✓ It is the only site with remaining reedbeds of Kashmir and pathway of 68 waterfowl species like Large Egret, Great Crested Grebe, Little Cormorant, Common Shelduck, Tufted Duck and endangered White-eyed Pochard, coming from Siberia, China, Central Asia, and Northern Europe.
- ✓ The wetland supports large variety of fishes, water birds and aquatic flora.

**Kanjli wetland, Punjab**

- ✓ It is a man made Wetland in a permanent stream, the Kali Bein, by construction of a small barrage in 1870 into a water storage area for irrigation purposes. The barrage was built by the erstwhile Maharaja of Kapurthala Raja Randhir Singh.
- ✓ The site supports a considerable diversity of aquatic, mesophytic, and terrestrial flora and .

**Keoladeo National Park, Rajasthan**

- ✓ It is a UNESCO world Heritage Site, National Park, Bird Sanctuary and a Ramsar wetland site.
- ✓ It is a complex of ten artificial, seasonal lagoons, varying in size, situated in a densely populated region of Bharatpur, Rajasthan.

- ✓ During British Era, it was primarily used as a waterfowl hunting ground. The Sanctuary is one of the richest bird areas in the world. It is known for nesting of its resident birds and visiting migratory birds including water birds. The rare Siberian cranes used to winter in this park but this central population of Siberian Cranes is now extinct.
- ✓ It was placed on the Montreux Record in 1990 due to "water shortage and an unbalanced grazing regime". Additionally, the invasive growth of the grass *Paspalum distichum* has changed the ecological character of large areas of the site, reducing its suitability for certain waterbird species, notably the Siberian crane.
- ✓ The park was a hunting ground for the maharajas of Bharatpur, a tradition dating back to 1850, and duck shoots were organised yearly in honor of the British viceroys. In one shoot alone in 1938, over 4,273 birds such as mallards and teals were killed by Lord Linlithgow, the then Governor-General of India.

#### **Kolleru Lake, Andhra Pradesh**

- ✓ It is the 2nd largest freshwater lake of India located in Andhra Pradesh.
- ✓ It is a natural eutrophic lake, provides habitat for a number of resident and migratory birds, including declining numbers of the vulnerable Grey Pelican (*Pelecanus philippensis*), and sustains both culture and capture fisheries, agriculture and related occupations of the people in the area.
- ✓ **Kolleru lake contains numerous fertile islets called lanka's**, many of the small ones are submerged during floods. The origin of unusual depression which forms the bed of the lake is unknown, but it was possibly the results of an earthquake. Therefore many ancient villages are precepted in the bed of the lake as a result of floods and earthquake.

#### **Loktak Lake, Manipur**

- ✓ It is a large, but shrinking freshwater lake and associated swamplands in Manipur.
- ✓ Thick, floating mats of weeds covered with soil ('phumids') are a characteristic feature of the lake.
- ✓ The lake is used extensively by local people as a source of water for irrigation and domestic use and is an important wintering and staging area for waterbirds, particularly ducks.
- ✓ It is Included on the Montreux Record in 1993 as a result of ecological problems such as deforestation in the catchment area, infestation of water hyacinth, and pollution.
- ✓ The construction of a dam for hydroelectric power generation and irrigation purposes has caused the local extinction of several native fish species.

#### **Nalsarovar Bird Sanctuary, Gujarat**

- ✓ It is the latest addition to Ramsar Sites (related to wetland) in India. It was declared as a Ramsar Site on 24/09/12.
- ✓ It is a natural freshwater lake (a relict sea) in Gujarat that is the largest natural wetland in the Thar Desert Biogeographic Province and represents a dynamic environment with salinity and depth varying depending on rainfall.

- ✓ *The Nal region is a low-lying area between the plains of the Central Gujarat and Eastern Saurashtra. Owing to its low lying topography, it is believed to represent a filled up sea link, that previously existed between the Little Rann in the north and the Gulf of Khambat in the south.*
- ✓ The area is home to large species of birds and an average 174,128 individuals recorded there during the winter. It is an important stopover site within the Central Asia Flyway, with many globally threatened species such as Sociable Lapwing, Marbled Teal, Sarus Crane taking refuge.
- ✓ The wetland is also a lifeline for a satellite population of the endangered Indian Wild Ass which uses this area in the dry season.
- ✓ Local communities heavily rely on the lake as it provides them with a source of drinking water and water for irrigation, as well as an important source of income from fishing.
- ✓ Migrating Bharwad shepherds populates the islands of the lake and on the banks are the Padhars, who are excellent folk dancers, artisans and boatmen.

**Point Calimere, Tamil Nadu**

- ✓ It is a coastal area consisting of shallow waters, shores, and long sand bars, intertidal flats and intertidal forests, chiefly mangrove, and seasonal, often-saline lagoons, as well as human-made salt exploitation sites in Tamil Nadu.
- ✓ The wetland is home to large number of bird species, including the vulnerable species Spoonbill Sandpiper, Grey Pelican and Greater and Lesser Flamingos.
- ✓ *The site serves as the breeding ground or nursery for many commercially important species of fish, as well as for prawns and crabs. Some 35,000 fishermen and agriculturalists support their families around the borders of the sanctuary.*

**Pong Dam Lake, Himachal Pradesh**

- ✓ It is a water storage reservoir of Himachal Pradesh created in 1975 on the Beas River in the low foothills of the Himalaya on the northern edge of the Indo-Gangetic plain.
- ✓ The avian habitats formed by the creation of the Pong Dam assume a great significance, given the site's location on the trans-Himalayan flyway.
- ✓ Hydrological values include monsoon-season flood prevention, both in the surroundings and downstream due to water regulation, groundwater recharge, silt trapping and prevention of soil erosion; electricity is generated for this and neighboring states, and irrigation water is being channeled to fertile areas of the Punjab and Rajasthan deserts.
- ✓ The site also supports large variety of fishes.

**Renuka Wetland, Himachal Pradesh**

- ✓ It is a natural wetland in Himachal Pradesh with freshwater springs and inland subterranean karst formations, fed by a small stream flowing from the lower Himalayan out to the Giri river.
- ✓ The lake is home large number of fauna and species of ichthyofauna representative of lacustrine ecosystems like Puntius, Labeo, Rasbora, Channa.

- ✓ Among the bird species Crimson-breasted barbet, Mayna, Bulbul, Pheasants, Egrets, Herons, Mallards and Lapwing are the important ones. Sambhar, Barking deer and Ghorals are also abundant in the area.
- ✓ The lake has high religious significance and is named after the mother of Hindu sage Parshuram, and is thus visited by thousands of pilgrims and tourists.

#### **Ropar Lake, Punjab**

- ✓ It is a human made wetland of lake and river formed by the 1952 construction of a barrage for diversion of water from the Sutlej River for drinking and irrigation supplies in Punjab.
- ✓ The site is an important breeding place for the nationally protected Smooth Indian Otter, Hog Deer, Sambar, and several reptiles, and the endangered Indian Pangolin is thought to be present.
- ✓ The lake also supports many species of fish and local and migratory birds.
- ✓ Deforested local hills leading to siltation, and increasing industrialization causing an inflow of pollutants, are potential threats, and invasive weeds are a further cause for concern.

#### **Rudrasagar Lake, Tripura**

- ✓ It is a **lowland sedimentation reservoir of Tripura** in the northeast hills, fed by three perennial streams discharging to the River Gomti.
- ✓ The lake is abundant in commercially important freshwater fishes like Botia spp, Notopterus Chitala, Mystus spp., Ompok pabda, Labeo bata, and freshwater scampi.
- ✓ The lake is an ideal habitat for IUCN Red listed Three-striped Roof Turtle Kachuga dhongka.
- ✓ Owing to high rainfall (2500mm) and downstream topography, the wetland is regularly flooded with 4-5 times annual peak, assisting in groundwater recharge.
- ✓ Main threats are increasing silt loads due to deforestation, expansion of agricultural land and intensive farming, and land conversion for population pressure.
- ✓ Vijaya Dashami, one of the most important Hindu festivals with various sports events, attracts at least 50,000 tourists and devotees every year.

#### **Sambhar Lake, Rajasthan**

- ✓ *It is a large saline lake in Rajasthan, fed by four streams set in a shallow wetland and subject to seasonal fluctuations.*
- ✓ It is surrounded by sand flats and dry thorn scrub and fed by seasonal rivers and streams.
- ✓ The site is important for a variety of wintering waterbirds, including large numbers of flamingos.
- ✓ Human activities consist of salt production and livestock grazing.

#### **Sasthamkotta Lake, Kerala**

- ✓ *It is the largest freshwater lake in Kerala state.* It is spring-fed and the source of drinking water for half a million people in the Kollam district.
- ✓ The lake supports many freshwater fish species.

- ✓ The water contains no common salts or other minerals and supports no water plants; a larva called "cavaborus" abounds and eliminates bacteria in the water, thus contributing to its exceptional purity.
- ✓ The ancient Sastha temple is an important pilgrimage centre.

**Surinsar-Mansar Lakes, J & K**

- ✓ It is located in Jammu & Kashmir.
- ✓ It is a freshwater composite lake in semi-arid Panjab Plains, adjoining the Jhelum Basin with catchment of sandy conglomeratic soil, boulders and pebbles.
- ✓ Surinsar is rain-fed without permanent discharge, and Mansar is primarily fed by surface run-off and partially by mineralised water through paddy fields, with inflow increasing in rainy season.
- ✓ The site is socially and culturally very important with many temples around owing to its mythical origin from the Mahabharata period.
- ✓ Although the lakes support variety of fishes, fishing is discouraged for religious values.

**Tsomoriri, J & K**

- ✓ It is a freshwater to brackish lake lying at 4,595m above sea level, with wet meadows and borax-laden wetlands along the shores in Jammu and Kashmir.
- ✓ With no outflow, evaporation in the arid steppe conditions causes varying levels of salinity in the lake.
- ✓ *The site is said to represent the only breeding ground outside of China for one of the most endangered cranes, the Black-necked crane, and the only breeding ground for Bar-headed geese in India.*
- ✓ *The Great Tibetan Sheep or Argali and Tibetan Wild Ass are endemic to the Tibetan plateau, of which the Changthang is the westernmost part. The barley fields at Korzok have been described as the highest cultivated land in the world.*
- ✓ Ancient trade routes and now major trekking routes pass the site.
- ✓ The 400-year-old Korzok monastery attracts many tourists, and the wetland is considered sacred by local Buddhist communities and the water is not used by them.
- ✓ The local community dedicated Tsomoriri as a WWF Sacred Gift for the Living Planet in recognition of WWF-India's project work there.

**Upper Ganga River (Brijghat to Narora Stretch), Uttar Pradesh**

- ✓ It is a shallow river stretch of the great Ganges in UP with intermittent small stretches of deep-water pools and reservoirs upstream from barrages.
- ✓ The river provides habitat for IUCN Red listed Ganges River Dolphin, Gharial, Crocodile, many species of turtles, otters, large species of fish and more than hundred species of birds.
- ✓ Major plant species, some of which have high medicinal values, include Dalbergia sissoo, Saraca indica, Eucalyptus globulus, Ficus bengalensis, Dendrocalamus strictus, Tectona grandis, Azadirachta indica and aquatic Eichhorina.
- ✓ This river stretch has high Hindu religious importance for thousands of pilgrims and is used for cremation and holy baths for spiritual purification.

- ✓ Major threats are sewage discharge, agricultural runoff, and intensive fishing

#### **Vembanad-Kol Wetland, Kerala**

- ✓ It is India's largest brackish, humid tropical wetland ecosystem on the coast of Kerala, fed by 10 rivers and typical of large estuarine systems on the western coast, renowned for its clams and supporting the third largest waterfowl population in India during the winter months.
- ✓ Large variety of species of resident and migratory birds are found in the Kol area.
- ✓ Flood protection for thickly-populated coastal areas of three districts of Kerala is considered a major benefit, groundwater recharge helps to supply well water for the region.

#### **Wular Lake, J & K**

- ✓ Located in Jammu & Kashmir, it is the largest freshwater lake in India with extensive marshes of emergent and floating vegetation, particularly water chestnut, that provide an important source of revenue for the State Government and fodder for domestic livestock.
- ✓ The lake supports an important fishing industry and is a valuable source of water for irrigation and domestic use.
- ✓ The area is important for wintering, staging and breeding birds.
- ✓ Human activities include rice cultivation and tree farming.

### **Chapter 3. India's Forest Biome**

#### **Some Basic Definitions about Forest Cover**

- The area recorded as "forests" in the Government records is called **Forest Area or Recorded Forest Area**.
- The patches within the forest area which have little or no trees are called "**Forest Blank**".
- The cover of branches and Foliage formed by the crown of trees is called **Canopy**.
- The **percentage area of land** covered by the canopy of trees is called **Canopy density**.
- All lands which are more than 1 hectare in area and with a **Canopy density** of more than 10% irrespective of the ownership and legal status is called **Forest Cover**. This implies that a Forest Cover may or may not be a part of **Recorded Forest Area**.
- The degraded forest lands which have a Canopy density of less than 10% are called Scrubs.
- The Lands with Canopy density of 10-40% are called Open Forests.
- The Land with forest cover having a canopy density of 40-70% is called the Moderately dense Forest.
- The Lands with forest cover having a canopy density of 70% and more are called Very Dense Forests.

#### **State of Forests Report 2011**

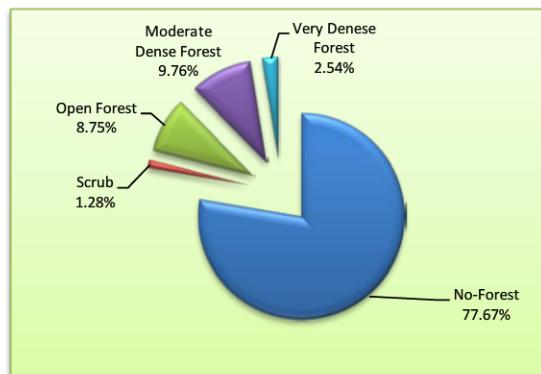
Forest Survey of India has been bringing out 'State of Forest Reports' since 1987 based on interpretation of satellite images. The latest report is the State of Forests Report 2011, released in February 2012. As per the present assessment –

- **Forest and Tree cover** of the country is 78.29 million ha, which is 23.81% of the geographical area of the country. Out of this, kindly note that **Total Forest Cover is 21.05% of the geographical area** of the country while tree cover is 2.76%.

Forest and Tree cover of India in 2011		
Class	Area (km <sup>2</sup> )	% of Geographical Area
<b>Forest Cover</b>		
a) Very Dense Forest	83,471	2.54
b) Moderately Dense Forest	320,736	9.76
c) Open Forest	287,820	8.75
<b>Total Forest Cover*</b>	<b>692,027</b>	<b>21.05</b>
<b>Tree Cover</b>	<b>90,844</b>	<b>2.76</b>
<b>Total Forest and Tree Cover</b>	<b>7,82,871</b>	<b>23.81</b>
Scrub	42,177	1.28
Non-forest	2,553,059	77.67
<b>Total Geographical Area</b>	<b>3,287,263</b>	<b>100.00</b>

(\*Includes 4662 km<sup>2</sup> area under mangroves)

- Out of the 21.05% of the total forest cover, the maximum share is of Moderate Dense Forests (9.76%) which is slightly more than Open Forests (8.75%). The very dense forests in India are in just 2.54% of total geographical area of the country.
- In comparison to the 2009 assessment, after taking into account the interpretational changes, there is a decrease of 367 square km in country's forest cover.
- Fifteen states have registered aggregate increase of 5000 km<sup>2</sup> in their forest cover with Punjab leading with increase of 100 km<sup>2</sup>.
- Twelve states/UTs (mainly the NE states) have shown decrease to the extent of 867 km<sup>2</sup>.
  - Decline of 281 km<sup>2</sup> in Forest cover of Andhra Pradesh is mainly attributed to harvesting of mature plantation of Eucalyptus & other species.*
  - Decline in Forest cover of NE is particularly due to prevailing practice of shifting cultivation in this region.
- Madhya Pradesh has the largest forest cover in the country at 77,700 km<sup>2</sup> followed by Arunachal Pradesh at 67,410 km<sup>2</sup>.
- In terms of percentage of forest cover in relation to total geographical area, Mizoram tops with 90.68% followed by Lakshadweep with 84.56%.
- The total growing stock of India's forests and trees outside forests is estimated as 6047.15 million m<sup>3</sup> i.e. 4498.73 million m<sup>3</sup> inside the recorded forest area and 1548.42 million m<sup>3</sup> outside the recorded forests.



## Chapter 4. Forest Rights in India

### Government Policy towards Forests Rights in India

Before India was established as a British Colony, there was no forest policy. Each ruler of various states in India had his or her own approach to manage the forest resources in their territories. The British imposed the so called ***scientific forest management*** in India whereby their sole agenda was focussed on sustained commercial production of the timber. The formula of the forest management at that time in India was a typical European production based forestry model for, the pressure of man of forests was not as high as in current times.

In due course of time, forests were **declared state property** and the rights of the forest dwellers vis-a-vis the commercially valued species were curtailed. In some of the forest areas, there was a complete ban on the human activities such as collection of firewood, fodder, medicinal plants, bamboo etc.

In 1864, the Forest Department was established, which strongly asserted the state monopoly over forest resources and exclusion of the tribal communities from almost all kinds of rights over forest produce. This was the foundation of modern principles of Forest Administration in our country.

In 1894, the **first Indian Forest Policy** was adopted by the colonial regime. The policy viewed the forests as the potential sources for generating profits and 'stressed' on the need to preserve forests of the hilly regions. But the hidden agenda was to consolidate the state's property rights over the forests. The forest dwellers were not only denied their traditional rights but no role was given to them in the preservation of the forests. This was the beginning of marginalization of the forest dwellers in India.

Following the independence of India, the Forest Policy Resolution 1952 called for the protection of wildlife and preservation of fauna by demarcating the forests for sanctuaries and national parks. This culminated in the enactment of **Wildlife Protection Act in 1972**. The Forest Policy 1988 deviated from the economic importance for the first time and treated them as ecological necessity as source of goods for local populations.

These goods were called **Non Timber Forest Produce (NTFP)**. This policy also set the target of increasing India's forest cover to 33%.

The 1988 Forest policy paved the way for implementation of the **Joint Forest Management (JFM)** which included the involvement of local village communities and voluntary agencies in the regeneration of the degraded forests. This was for the first time in centuries that the rights of the local communities over the forest lands were specified.

- But the **Wildlife Protection Act** of 1972 had already criminalized the forest people and taken away their traditional NTFP and fishing rights, while poaching could never be effectively stopped.

ct over Forest Rights and tribal revolts

The permanence settlement of 1757, the forest act of 1865 and 1878 and the forest policy of 1894 were one of the root causes of rebellions and revolts of the indigenous communities in India. These revolts began from 1794 and continued till 1920s. The target of these rebellions was the new land and forest policies which left them devoid of their traditional rights over forests. But the rebellions were crushed ruthlessly and British kept bringing fresh areas under state control, formulating new laws for legitimizing the property rights transferred from communities to

### Forest Rights Act 2006

In 1990, a Joint Forest Management Circular was released by the Government of India, which recommended the involvement of village communities, voluntary agencies in the regeneration of the degraded forest lands. However this circular had no force of law behind it.

However, the **Forest Act 2006** marked a real water shade in the history of the forest communities in India. For the first time, the Government of India via the **Scheduled Tribes and the Other Forest Dwellers (Recognition of Forest Rights) Act 2006**, admitted that '*forest rights on the ancestral lands and their habitat were not adequately recognized in the consolidation of state forests during the colonial periods as well as in Independent India resulting in Historical injustice with the scheduled tribes and other traditional forest dwellers, who are integral to the very survival of the forest ecosystem*'.

*This Forest Rights Act 2006 provides the following:*

- ✓ Tenurial Security and access rights to forest dwellers
- ✓ Right to hold and live in forest land under individual or common occupation for habitation or for the self-cultivation for livelihood.
- ✓ Right of ownership access to collect, use and dispose of minor forest produce that has been traditionally collected within or outside the village boundaries.
- ✓ Other community rights such as on fish and water bodies.
- ✓ Rights of settlement and conversion of forest villages into revenue villages.

As per this act, **Gram Sabha plays pivotal role** in ensuring the rights of the forest dwellers, decision making, planning and management for Joint Forest Management.

### Defining a Forest Village and a Revenue Village

#### Forest Village

As per the Forest Act 2006, "forest villages" means the settlements which have been established inside the forests by the forest department of any State Government for forestry operations or which were converted into forest villages through the forest reservation process and includes forest settlement villages, fixed demand holdings, all types of *taungya settlements*, by whatever name called, for such villages and includes lands for cultivation and other uses, permitted by the Government.

#### Revenue Village

A Revenue Village is a small administrative region in India, with defined borders, that is recognized by the District Administration. One revenue village may contain many hamlets.

*In the rural areas the smallest area of habitation, viz., the village generally follows the limits of a revenue village that is recognised by the normal district administration.*

The revenue village need not necessarily be a single agglomeration of the habitations.

Thus, a revenue village has a definite surveyed boundary and each village is a separate administrative unit with separate village accounts. It may have one or more hamlets. The entire revenue village is one unit.

#### A Revenue Village versus a Hamlet

Normally in India, the 'village' is taken to mean the revenue village administrative unit. However due to immense variation in the sizes of revenue villages in different states, larger revenue villages can contain several hamlets spread over a large area.

### Impact on Lives of Forest Dwellers living in Forest Villages

The most significant difference in living standards of the tribals living in forest and revenue villages in India is that the tribals of the Forest villages have lived in the state of insecurity and bondage. The dwellers of Forest Villages can't access various schemes of the state and central governments which are implemented on the basic level of revenue villages. Over 60 years after Independence, the residents of 'forest villages' and other settlements and unsurveyed villages in forests remain deprived of access to most development programmes due to the land on which these are located continuing to be recorded as 'forest'.

- ✓ Whereas officially there are an estimated 2500 to 3000 Forest Villages, unofficial estimates suggest their number to be over 10,000.
- ✓ As no agency other than forest departments can undertake any development work on forest land, most of these settlements remain outside the jurisdiction of any local government, and their residents in some states cannot obtain even domicile certificates (as only the revenue department can issue these, but it does not have jurisdiction over forest land) or even voting rights.

Due to their residents lacking any legal rights over the land, they are treated like 'non-citizens' ever vulnerable to eviction or displacement without entitlement to compensation or rehabilitation.

### Conversion of Forest Villages into Revenue Villages

The 1990 Circular of Ministry of Environment and Forests (MOEF), Government of India had for the first time mandated the conversion of forest villages into revenue villages and settlement of other old habitations. But this circular was lacking legislative backing. Section 2F of the Forest Rights Act 2006 reiterated the MoEF's 1990 guidelines, and enabled the residents of all 'forest villages' as defined above, many created by the forest departments themselves in the past to ensure availability of bonded labour for forestry operations, to get their villages/settlements converted into revenue villages.

### Conclusive Note

We see that 60 years after the independence, the tribals of forests in India get the rights over their land. In first half of 2010, Surma, a tribal village housing around 360 *Tharu* tribe families, in Uttar Pradesh witnessed to become the first tribal village in a forest reserve area to be converted into a revenue village. This means tribals will now get all the constitutional rights given to a citizen of India.

### Issue of rights over Non-timber Forest Produce: The Maharaj Muthoo Committee

In Recent years, the **Forest Certification** has emerged as a voluntary market driven mechanism in support of the Sustainable Forest Management. The certification has its origin in the customer's choice in favor of the products labelled to have been forest origin. So, the Certification and Eco-labelling are the new mantras to enhance the product positioning for a premium price on one hand and ensuring better forest management practices on the other hand.

In this context, the MOEF had constituted a National Working Group / Governing Body to frame the policy guidelines for forest certification for timber and **Non-timber forest products**. Initially the Government created three committees and later these committees were mixed up and a single 'National Forest Certification Committee' for the development of Certification Criteria, Certification Process and

Accreditation Criteria & Process towards Forest Certification of timber, Non-timber Forest Products was created. **The chairman of this committee was Prof. Maharaj Muthoo.**

#### **T Haque Committee on Minimum Support Price for non-timber forest produce (NTFP)**

A Committee was constituted under the Chairmanship of Inspector General of Forests (NAEB), MOEF for evolving a mechanism for Minimum Support Price to the collectors of Non-Timber Forest Products (NTFP's). The committee submitted its report and recommended the future course of action. In August 2010, the Government set up another high-level committee to examine introduction of minimum support price (MSP) for non-timber forest produce is considering a national cooperative revolution similar to Operation Flood to empower tribals collecting sal seeds, gum kariah and other minor forest produce. Chairman of this committee was Mr T Haque.

This committee was to recommend introduction of a competitive multi-pronged system to empower tribals who do not get even minimum wages for collecting minor forest produce (MFPs). The committee was considering a national-level mechanism similar to National Dairy Development Board (NDDB), which had triggered Operation Flood and revolutionized milk production in India.

#### **Issues of Minor Forest Produce**

The forest products can be generally divided into two parts viz. Major Forest Produce and Minor Forest Products.

- ✓ The Major Forest Products comprise Pulpwood, Sandalwood, Social Forestry that includes Fuel and Timber.
- ✓ The Minor Forest Products include the items such as tamarind, curry leaf, *Tendu Patta*, gallnut, Cane, Soapnut, tree moss and now Bamboo also.

#### **Control on collection of Minor Forest Produce**

- ✓ In India, many states such as Gujarat, Maharashtra, and Rajasthan have given liberty to the tribals for collection of the minor forest products.
- ✓ In states like Tamil Nadu, collection of Minor Forest Produce is leased out to scheduled caste and scheduled tribes Cooperatives societies such as LAMPS at a concessional rate of 10% less than the price fixed under the Tamil Nadu Forest Department Code.
- ✓ Kerala has also given right to collect Minor Forest Produce at concessional rates.

#### **Scheduled tribes and Other Traditional Forest Dwellers (Recognition of Forest rights) Act, 2006**

- ✓ Government of India has assigned the ownership of minor forest produce to the people living in and around forests for the purpose of collection, processing, trade and marketing through national level legislation named as the Scheduled tribes and Other Traditional Forest Dwellers (Recognition of Forest rights) Act, 2006.
- ✓ This will help the forest dependent people to improve their economy, and will also enhance contribution of forests towards achievement of Millennium Development Goals (MDGs) Goal 1: Eradicate extreme poverty and hunger

**Minor Forest Produce : Conflict of legislation**

There are two acts viz. Indian Forest Act (IFA) and Forest Rights Act (FRA) which come in conflict over the definition of Minor Forest Produce. IFA was enacted in 1927 and the section 68 of this act deals with the power to compound offences.

Since there is an ambiguity of definition of the "Minor Forest Produce" on these two acts, this particular section has led to harassment of the tribals by the forest officers.

Previously the Government had said that it was going to amend the Section 68 of the Indian Forest Act (IFA) 1927 and the main purpose of this amendment is to end the harassment of tribals and ordinary people by local forest officials.

Amendment to the Indian Forest Act 1927 was approved recently. It was necessary because forest officers implicated tribal in false cases to harass them went into the forest act raised the limit to which fines for relatively minor offences can be compounded from 50 rupees to 1000 rupees.

It can put an end to the encroachments on forest properties which harm the interests of tribal's.

The current issue is that The definition of MFP in the IFA need to be aligned with the definition given in the FRA. Lack of alignment leads to denial of access to MFP on the ground. Further, ownership of the Gram Sabha, particularly with respect to high value MFP like bamboo and tendu, needs to be ensured. Sensitization of Forest Department officials in this regard also becomes essential.

**Minor Forest Produce and PESA**

Panchayats (Extension to Scheduled Areas) Act (PESA) authorizes the States give the Gram Sabhas power to regulate and restrict the following:

- ✓ Sale/consumption of liquor
- ✓ Ownership of minor forest produce
- ✓ Power to prevent alienation of land and restore alienated land
- ✓ Power to manage village markets, control money lending to sts
- ✓ Power to manage village markets, control money lending to sts and mandatory executive functions to approve plans of the village panchayats, identify beneficiaries for schemes, issue certificates of utilization of funds.

It is ironical that 60 per cent of India's forest area is in 180 districts of the country which have a very substantial tribal population and 250 million people depend on forests for their daily livelihood. 75% of MFP comes from 6 States of MP, Chhattisgarh, AP, Odisha, Jharkhand and Maharashtra, the States affected by Left Wing Extremism (LWE). Earlier the planning commission had also asked stressed to implement Panchayats Extension to Scheduled Areas (PESA) Act, 1996 sincerely to allow the tribals their natural right over the minor forest produce.

**Current Issues: MFP**

- ✓ For numerous forest dwellers across India, particularly people from Scheduled Tribes, Minor Forest Produce (MFP) has significant economic and social value.

- ✓ Now the challenges are MFP resource depletion, progressive loss of ownership/control of the people, issues related to efficiency and transparency of the State MFP agencies, deficient marketing, unremunerative pricing, little or no local value addition and inequitable value sharing among the stakeholders.

#### **National Forest Commission (NFC)**

- ✓ A National Forest Commission (NFC), the *first of its kind ever* was constituted earlier. This National Forest Commission had submitted its report on 28 March, 2006.
- ✓ The Commission took a view for long-term betterment of Forests and wildlife in India as well as safeguarding the interest of forest dependent communities and also maintained the national commitment for ecological security of the country as mandated in National Forest Policy.

#### **Bamboo as a Minor Forest Produce**

- ✓ Bamboo was recognized as a Minor Forest Produce way back in 2006, now its selling rights have been given to villages Bamboo was given the status of a *minor forest produce* (MFP) in the Forest Rights Act, 2006 (Scheduled Tribes and Traditional Forest Dwellers [Recognition of Forest Rights] Act).
- ✓ After that there has been a campaign for its selling rights . The Act, which seeks to redress a historical injustice to Adivasis, apart from entitling them to land ownership, also gives communities rights to collect, use and sell bamboo as an MFP.
- ✓ The recent statement is related to the recognition of right of the Gram Sabha to sell and issue transport passes for bamboo within their community.

#### **Minimum Support Prices for MFP**

- ✓ Please note that the **Dr. T. Haque committee** had looked into different aspects of Minor Forest Produce (MFP) management in fifth schedule areas which has recommended for fixation of Minimum Support Price (MSP) for 14 MFPs in its final report.
- ✓ These are Tamarind, Mahuwa flower, Mahuwa seed, Tendu leaf, Bamboo, Sal Seed, Myrobalan, Chironji, Lac, Gum karaya, Honey, Seeds of Karanja, Neem and Puwad.
- ✓ To operationalize the MSP for selected MFPs, the Planning Commission has suggested for Central Price Fixation Commission for MFP as an autonomous body under the Ministry of Tribal Affairs. All primary collectors including tribal and people living in and around the forests involved in the MFP collection will be benefited.