

Executive Summary

Medicinal plants constitute a major segment of the flora, which provides raw materials for use in the pharmaceuticals, cosmetics, and drug industries. More than 9,000 plants have been established and recorded for their curative properties and about 1500 species are known for their aroma and flavour. Medicinal plants are used at the household level by women, at the village level by medicine men or tribal shamans, and by the practitioners of classical traditional systems of medicine such as Ayurveda, Chinese medicine, or the Japanese kampo system. Indian subcontinent is enriched with about 45,000 plant species of which nearly 18,000 are flowering plants. This vast degree of diversity is correlated to the greatly divergent ecosystems and altitudinal variations.

Medicinal plants are increasingly becoming economically important due to the growing demand for herbal products in the domestic and global market. According to the data compiled by the International Trade Centre, Geneva, India is ranked second amongst the exporting countries, after China, with an annual export of 326 000 tonnes with a value of Rs 45.95 million (about US\$ 1.4 million) during 1992-95. In India, the collection and processing of medicinal plants and plant products contributes a major part each year to the national economy, as a source of both full and part time employment.

Global trade for medicinal plants at an annually increasing rate is a major threat to the sustainability of these resources and eventually to the biodiversity. Though India has a rich biodiversity, the growing demand is putting a heavy strain on the existing resources. To strengthen the medicinal plant resource base in India, a UNDP Country Cooperation Programme assisted Sub-programme on "Medicinal Plants Conservation and Sustainable Utilisation" has been approved and initiated in December, 1999. The Medicinal Plants Conservation Network (MPCN) was created out of the need to formalise this pioneering conservation effort, and to link the conservation programmes to the needs of users. A number of Medicinal Plants Conservation Areas (MPCAS) have been established across different ecological regions of southern India by the State Forest Departments of Karnataka, Kerala and Tamil Nadu. MPCAs represent the in situ component of the conservation programme. The main aim of MPCA is to conserve the medicinal plants in its natural habitat and preserve its gene pool. These sites have an average area of 200 hectares with wide topographical and altitudinal variations.

The main aim of the project entailed establishment of two MPCA of 200 ha. each at Bharoal - Sakwar comptt. No. 136 and Kuha comptt No. 1107 falling under the jurisdiction of Forest Project Division, Thane F. D. C. M. Limited and to develop strategic long term conservation plan

The sub-objectives of the project were:

1. To conduct vegetational surveys using GPS (Global Positioning System) through various observation techniques in GIS Domain

2. To evaluate medicinal plant of AYUSH & RET (Rare, Endangered and Threatened) species on the basis of species composition, species density and plant morphology.
3. To identify floral 'hotspots' (areas rich in species) and 'coldspots' (areas poor in species) of medicinal RET & AYUSH species
4. To inventorize plants with reference to species richness with special emphasis on medicinal and economic value, RET and endemic species status
5. To Inventorize species of local use valued as ethno-medico resources
6. To identify of ecologically disturbed areas through disturbance gradient analysis.
7. Development of strategies for In-Situ Conservation of RET & Medicinal Plants
8. To inventorize Avifauna, Butterflies and other faunal attributes.
9. Mapping of the attributes which are spatially map- able.

The sub-objectives ancillary to the above mentioned sub-objective that are to be fulfilled by the FDCM, Thane post completion of project are:

1. To prepare Micro plan Protocol as a project learning
2. To promote ex-situ conservation and multiplication
3. To propose sites of seed banks, arboreta and Mist Propagation facility.
4. To promote education and awareness towards Medicinal Plants Conservation.
5. To facilitate technique of re-introducing Medicinal Plants in other adjacent areas where they are absent but were formerly present.
6. To create means of livelihoods for the local communities through conservation know-how.

Vegetational survey was carried out using Belt transect where transects and quadrats of different sizes has been laid for trees (10 x 10m), shrubs (5 x 5m), climbers and herbaceous plants (1 x 1m) depending upon their micro and macro habitats. Quadrats were laid at equal distance along the pillars marked by the staff of the FDCM. Certain areas in both the plots were inaccessible hence those areas were left out during demarcation of the quadrats. 200 quadrats for each category were laid down at equal distance on both the plots. GPS coordinates has been taken for each quadrat.

Checklist survey was used for Butterflies in this study. Distance sampling technique was used to record the avian fauna

The site at Bharoal - Sakwar comptt no. 136 was surveyed for 11 months between April 2015 to February 2016 for 57 days. A total of 228 species have been recorded. The vegetational diversity is represented by 67 families. Abundance, frequency and density were worked out for the recorded species. Among tree species *Wrightia tinctoria* (Roxb.) R. Br. is most abundant with 622 individuals followed by *Terminalia crenulata* Roth. with 505 individuals, *Schleichera oleosa* (Lour.) Oken with 247 individuals, *Tectona grandis* Linn.f. with 217

individuals and *Butea monosperma* (Lamk.) Kuntze with 179 individuals. Among shrub species *Carvia callosa* (Nees.) Bremek is most abundant with 1504 individuals followed by *Eranthemum roseum* (Vahl) R. Br with 1298 individuals, *Neuracanthus trinervius* Wight with 1058 individuals, *Leea asiatica* (Linn.) Ridsdale with 816 individuals and *Dioscorea bulbifera* Linn with 474 individuals. Among herb species *Curculigo orchioides* Gaertn is most abundant with 411 individuals followed by *Phyllanthus urinaria* Linn. with 265 individuals, *Amorphophallus commutatus* (Schott) Engl with 233 individuals, *Cassia tora* Linn. with 193 individuals and *Impatiens minor* (DC.) Bennet with 183 individuals. Of the total 228 species 4 were Common, 16 were Occasional, 188 were Infrequent, 6 were Low Risk, 3 were Vulnerable, 3 were Endangered and 8 species were seen in regeneration only.

70 species of Birds and 45 species Butterflies of have been recorded.

The site at Kuha comptt No. 1107 was surveyed for 11 months between April 2015 to February 2016 for 58 days. A total of 233 species have been recorded. The vegetational diversity is represented by 71 families. This is depicted in graph 1. 26 families are represented by single species, 17 families by 2 species, 8 families by 3 species, 9 families by 4 species, 3 families by 5 species, 1 family by 6 species, 1 family by 7 species, 1 family by 8 species, 1 family by 9 species 1 family by 10 species, 1 family by 14 species, 1 family by 15 species and 1 family by 29 species. Abundance, frequency and density were worked out for the recorded species. Among tree species *Terminalia crenulata* Roth. is most abundant with 571 individuals followed by *Tectona grandis* Linn.f. with 547 individuals, *Schleichera oleosa* (Lour.) Oken with 473 individuals, *Wrightia tinctoria* (Roxb.) R. Br. with 259 individuals and *Bombax ceiba* Linn. with 191 individuals. Among shrub species *Carvia callosa* (Nees.) Bremek is most abundant with 1734 individuals followed by *Eranthemum roseum* (Vahl) R. Br with 1375 individuals, *Leea asiatica* (Linn.) Ridsdale with 604 individuals, *Thespesia lampas* (Cav.) Dalz. & Gibs. with 552 individuals, and *Dioscorea bulbifera* Linn with 434 individuals. Among herb species *Curculigo orchioides* Gaertn is most abundant with 371 individuals followed by Linn. *Rungia pectinata* (Linn.) Nees with 172 individuals, *Sida rhombifolia* Linn. with 165 individuals, *Cassia tora* Linn. with 164 individuals and *Amorphophallus commutatus* (Schott) Engl with 154 individuals. The species recorded at Shirsad were categorised into different status category in the same manner as those at Mandavi. Of the total 234 species recorded, 5 were Common, 15 were Occasional, 202 were Infrequent, 6 were Low Risk, 3 were Vulnerable and 3 were endangered.

48 species of Birds and 44 species Butterflies of have been recorded.

Recommendations have been made for Management Plans, Protection, Tending Operations, Awareness Creation, capacity Building of staff and communities and prospects for the development of medicinal plants.

The final deliverables of this project are:

- a. A detailed Final Report

- b. Digital Photo Gallery/ Repository
- c. Detailed Plot Mapping in GIS Domain with attributes
- d. Web-Based Internet Portal of the 2 MPCAs: <http://mpca-fdcm-thane.com>
- e. Framework for Micro- Plan for Long term conservation of medicinal plants
- f. Brief note on ex situ techniques for conservation of Medicinal Plants conservation of medicinal plants

Wildlife and We Protection Foundation