# CHAPTER 6
# SUMMARY

## Summary

Gir is one of the largest tracts of dry deciduous forests. The Gir National Park and Sanctuary (GNPS) comprising a total of 1412.1 sq. km forms a part of long stretches of forest in the Saurashtra peninsula of Gujarat. The Sanctuary extending over 1153.4 sq. km completely surrounds the National Park measuring 258.7 sq. km from all sides. The whole area stretches over a length of about 70 km from West to East and 40 km from North to South. It is also the only abode of majestic-Asiatic Lion (*Panthera leo persica*), the only gene pool in the world. This also boasts of the largest concentrations of Leopards (*Panthera pardus*) and Marsh Crocodile (*Crocodiles palustris*) apart from the other mammals, reptiles, birds and insects. The most important aspect of this forest is the fact that it has become a conducive ecosystem leading to be the best habitat for conservation of the rare and threatened keystone species-the Lion.

Gir ecosystem forms catchments of important rivers like Shetrunji, Hiran, Shingoda, Machhundri, Raval and Datardi. There are four major dams on river Hiran (Kamleshwar), Shingoda, Machhundri and Raval in the Gir National Park and Sanctuary. Among the 4 dams the Kamleshwar dam is the largest water reservoir.

In the past, parts of the area were explored for floristic and vegetational studies by Santapau (1962), Shah (1978), Bole and Pathak (1988), Chavan (1993), Kotiwar (1995), Singh and Kamboj (1996). However, detailed information regarding the vegetation and floristic composition and the ecology of the entire Gir National Park and Sanctuary is not available. The present investigation was taken up therefore with a view to develop detailed information to fill these lacunae.

A major part of the study area is composed of deccan trap with constitutive differentiates and associated intrusives of cretaceo-eocene age. Major part of the Gir area is covered by fine-grained olivine basalt. Two main types of soils noted are black- cotton, red-brown soils.

The GNPS lies between 20° 55' N to 21° 20' latitudes and 70° 25' E to 71° 15' E longitudes. The entire area is divided into 14 Ranges, 60 Rounds and 152 Beats with 37 zones. Out of three main seasons in Gir National Park and Sanctuary i.e. summer, Winter and Monsoon, a longest season is the summer. The temperature ranges between 10 and 40° C respectively. April-May are the hottest months. Monsoon is usually active between mid June and September. Eastern Gir has slightly higher temperature than the western Gir, but has much less rainfall.

The Gir forests vary widely in floristic composition, habitat, structure and are classified under the type 5A/Cla, i.e. very dry teak forest (Champion and Seth, 1968) with the following sub-types

* Dry deciduous teak forest (Type 5A/Cla)
* Dry deciduous thorny forests (Type 5/ DSI & 5/ DS2)
* Dry coastal border forests.

Each forest type represents a unique forest ecosystem to provide life supporting ecological services. Therefore field surveys to GNPS were arranged regularly for the study. We have selected 35 points located in various zones with different vegetation types. During the visits plant specimens were collected for identification, herbarium preparation and documentation in form of photograph.

In a mixed community with a number of layers or strata of vegetation the quadrates size differed for the different life forms at the same place. At ground level small quadrates (1 x 1 $m^2$) were laid while for shrubs and trees larger size (20 x 20 $m^2$) quadrates were taken. Quadrates were laid at random but throughout the entire range of vegetation. The surveyed quadrates in total covered about 18 % of the entire study area.

The present work is based on the results of more than three years of intensive and extensive study in GNPS. The total 1 life form diversity were 595 species which belonged to 384 genera and 101 families. Among the total lifeform dicotyledons contributed 519 plant species belonging to 327 genera and 83 families. In contrast, the monocotyledons contributed only 77 species belonging to 57 genera and 18 families respectively. The dominant forms are herbs with 48.57% composition, tree represents 24.87% whereas grasses being 5.21% only. The % of climbers (12.44%) is slightlyhigher than even shrubs (8.91). In zonationwise the maximum ratio for monocotyledons to dicotyledons with reference to species was reported to be 1:8.03 for zone 2 (Suraj Gadh), for family 1:5.58 in zone 6 (Sasan) and 1:6.68 for genera in zone 2 (Suraj Gadh). For overall proportion for monocotyledon to dicotyledons was recorded 1:4.61 for families, 1:5.73 for genera and 1:6.82 for species in GNPS. However, it is more or less in conformity with the similar ratio 1:1.63 of Delhi State (Maheshwari, 1963) and a corresponding ratio 1:7 for whole of India (Menon, 1979). The percentage of dicot and monocot lifeform in respective zone, the order ot dominance zones are 6, 35, 10, 32, 24, 11, 3, 31, 36, 28, 21, 4, 8, 16, 33, 22, 37, 34, 25, 13, 29, 9, 2, 26, 20, 15, 30, 5, 19, 18, 27, 17, 14, 1, 12 and 7. The maximum and minimum lifeform were noted in zone 5 (Sasan) and 7 (Amla) respectively. The familywise distribution among 101 families, 31 families are monogeneric and families with more than 15 species are Fabaceae, Asteraceae, Poaceae, Acanthaceae, Euphorbiaceae, Caesalpiniaceae and Convolvulaceae. Earlier results indicate that there are 312 rare and endangered plant taxa in Gujarat (Shah, 1978). However, in the present study 16 plants were noted to be in rare categories based on ecological

data. Such rare species included *Sterculia urens* (Roxb), *Butea monosperma* Var. lutea (Witt.) Mahes, *Wirhgtia arborea* (Dennst.) Mabb. and *Firmiana colorata* (Roxb.) R.Br. plants of *Nervilia aragoana* Gaud. and *Nervilia plicata* (Andr.) Schltr. were foundary in the Dava dungar with very restricted distribution.

The ecological data of tree species in GNPS the dominant species are *Tectona grandis* L.f. (24.22%), *Zizyphus mauritiana* Lam. (20.42%), *Diospyros melanoxylon* Roxb. (19.50%), *Aegle marmelos* (L.) Corr. (19.47%), *Wrightia tinctoria* R. Br. (19.22%), *Acacia catechu* (L.f.) Willd. (18.36%), *Acacia nilotica* (L.) Willd. ex. Delile. (17.45%), *Terminalia elliptica* Willd. (17.17%), *Soymida febrifuge* (Roxb.) A. Juss. (16.64%), %) and *Butea monosperma* (Lamk.) Taubert. (16.12%). Similarly, domant shrubs are *Barleria cuspidate* Heyne. ex. Ness. (26.66%), *Capparis sepiaria* L. (21.00%), *Lantana camara* L. (20.43%), *Helicteres isora* L. (19.00%), Capparis *decidua* (Forssk.) Edgew. (18.91%), *Carissa congesta* Wight. (18.71%), *Securinega leucopyrus* (Willd.) Mauell-Arg. (17.51%), *Calotropis gigantea* (L.) Ait. (17.49%), *Duranta repens* L. (15.66%) and *Zizyphus nummulaia* (Burm.f.) Wight & Arn. (15.16%), dominant herb species are *Pavonia zeylanica* (L.) Cav. (75.43%), *Evolvulus nummularius* (L.) L. (57.24%), *Leucas cephalotes* (Koenig. ex. Roth.) Spreng. (56.38%), *Crotalaria medicaginea* Lam. (28.05%), *Impatiens balsamina* L. var. *cocciinea* Hk.f. (26.39%), *Cassia tora* L. (26.36%), *Curcuma inodora* Blatt. (25.08%), *Barleria prionitis* Linn. (23.93%), *Biophytum candolleanum* Wight. (21.57%) and *Desmodium repandum* (Vahl.) DC. (21.14%), dominant climber species are *Cocculus hirsutus* (L.) Theob. (80.74%), *Acacia pennata* (L.) Willd. (80.26%), *Hemidesmus indicus* (L.) Schult. (72.84%), *Abrus precatorius* L. (71.14%), *Asparagus racemosus* Willd. (62.14%), *Ceropegia bulbosa* Roxb. (60.63%), *Cocculus pendulus* (J.R. & G. Forst.) Diels. (59.73%), *Cissus repanda* Vahl. (59.43%), *Celastrus paniculata* Willd. (56.65%) and *Mucuna prurita* Hook. (56.43%) and dominant Grass species includes *Themeda cymbaria* Hack. (84.86%), *Heteropogon contorutus* (L.) P. Beauv. ex. R. & S. (82.16%), *Chloris barbata* Sw. (79.71%), *Eragrostis japonica* (Thunb.) Trin. (76.18%), *Eragrostis ciliaris* Link. (74.96%), *Dimeria orinthopoda* Trin. (70.29%), *Chloris dolichostachya* Lagasca. (66.86%), *Aristida adscensionis* L. (59.14%), *Apluda mutica* Linn. (56.57%) and *Sorghum halepense* (L.) Pers. (54.57%) respectively.

For different diversity indices on comparison of species number diversity index the maximum taxonomical diversity found in the zone 6 (Sasan) and minimum taxonomical diversity found in zone 12 (Vankidas). The dominant tree species with refence to IVI are *Tectona grandis* L.f. (47.58), *Zizyphus mauritiana* Lam. (42.48), *Anugeissus latifolia* (Roxb. ex. DC.) *Wall* (42.38), *Ficus benghalensis* L. (40.78),

*Sterculia urens* Roxb. (40.48), *Azadirachta indica* A. Juss (40.47), *Hymenodictyon orixense* (Roxb.), *Mabb* (40.32), *Ramarindus indica* L. (40.02), *Manilkara hexandra* (Roxb.) *Dubard* (39.85), *Ixora brachiata* Roxb. (39.75) and *Dalbergia sissoo* Roxb. (38.76) respectively.

Comparison with earlier reports, Santapau (1962) and Bole and Pathak (1988) noted total 396 plant species, similarly Chavan (1993) reported 330 plant species, Singh and Kamboj (1996) and Kotiwar (1995) noted total 449 and 431 lifeform diversity. The present study enumerated total 595 plant species in GNPS. The life form of GNPS comprised of Herbs 48.420%, Tree 24.87%, Shrubs 8.57%, Climbers 12.61% and grasses 5.21% respectively.

The rich flora of GNPS is under heavy anthropogenic pressure. Other factors such as over-population, over-grazing, socio-economic status have disturbed the entire Gir ecosystem.

In GNPS based on present data the main factor affecting plant biodiversity is over-grazing. The results clearly demarcated that the abnoxies weeds are more in east side when compared to the west side. The abnoxies weeds are - Parthenium hysterophorus L., Lantana Camara L., Xanthium indicum Koen, Argemone maxicana L., Achyranthus aspera Linn. and Ageratum conzoides L. indicating heavy grazing in the area. For better management of biodiversity seeral suggestions were marked for GNPS for ultimate goal of conservation of Keystone species - the Gir Lion.