CHAPTER XI

SUMMARY AND CONCLUSIONS

The present investigation mainly dealt with the structural aspects of forest ecosystem located within the district territory of Ranchmahal in Gujarat State, India. The account presented in this thesis covers various aspects such as species composition, forest profiles, abundance and frequency of occurrence of the various perennial species. Importance value index for the various species has been also calculated. Based on these and other factors, the community structure at various locations has been compared. The study was conducted at 12 selected locations. The observations recorded have been tabulated and have been presented in Chapters I through VIII. Throughout these Chapters, the forest structure has been described to give the idea of diversity, in species composition, standing biomass and storage of energy, organic matter and moisture in the major components of the plant species. Both qualitative as well as quantitative approaches have been made. Finally, a Chapter on impacts of biotic factors on forest structure at various locations has been presented to enable us to compare the influence of human population and livestock pressure. Data obtained for various locations for the various selected parameters have been compared and
discussed in Chapter X. Details as has been already reported earlier need not be repeated here. Some of the salient features of the work embodied in this thesis have been briefly summarized as under:

The vegetation of the areas investigated in Panchmahals forests presents a greener appearance only after the rains when majority of annuals and ephemerals grow in abundance. The landscape otherwise except the dense stands of trees remains parched and dried up with scattered perennial scrub vegetation for most part of the year.

The environmental factors operating in the area seem to be responsible for the poor representation of the plant species in the different habitats. The extreme climate combined with heavy biotic disturbances never allows the vegetation to develop fully into a climax. The sandy and gritty substrate at various spots possess soil with little moisture content and organic matter. This feature combined with depleted nutrient elements in soils help in exerting as adverse influence on the sparse vegetation.

The low lying areas support luxurient vegetation because of the moisture present in such areas which is available to the various plant communities growing in and around these habitats.

Variation in distribution of species was recorded from place to place. The study records the species
composition of 12 different locations. There are 93 perennial species coming under 40 families in the whole of Panchmahals. Besides, Chapter III also deals with data on species abundance, density, frequency and distribution pattern of species. In general the following species showed the maximum mean frequency percentage viz. Tectona grandis (84.42%), Holarrhena antidysenterica (84.60%), Butea monosperma (74.17%), Anogeissus latifolia (52.5%), Wrightia tinctoria (44.17%) etc. The density and abundance were found to be higher for above mentioned species. As regards the Importance Value Index (IVI), the maximum values at all locations were found for Tectona grandis and Holarrhena antidysenterica respectively. From data of community coefficient the vegetation pattern in Narukot and Dangaria were found to be most similar whereas the least similarity was found in communities at Santatal and Belwada. Besides this, the sampling of vegetation revealed that in most of the regions, trees are mixed with shrub communities. Looking to the diversity of species, nearly 33 tree species and 18 shrub species were observed on various line intersects in whole Panchmahals. The study of forest profiles indicates that the forest at Kadana, Panam Dam, Dalwada and Savagadh is shrub in structure. On the other hand Narukot, Ashhala and Santatal have still reserved good tree communities. Except these three locations, shrubs seem to dominate all the forest profiles surveyed.
Estimation of standing vegetational biomass reveals a great deal of variation from place to place. This variation in biomass clearly indicates the unequal conditions of the forests. Sometimes the root biomass is more than shoot portion. It may be an indication of damage to shoot portions. In high level vegetation, the roots give less biomass if the soil is shallow and rocky e.g. Achhala. The energy estimation at all locations reveals that the maximum value of energy storage in forest biomass was found at Achhala whereas its minimum value was recorded at Chakali.

Study of organic matter and water content in the vegetational components at different locations gives an idea of availability of various materials and plants uptake and synthesis abilities. Data on moisture and organic contents of the standing crop of primary producers studied at various locations indicate variation between different communities at different locations. For example, the moisture level in vegetational biomass of Dalmada was observed to be 62.9% whereas what observed in samples collected from Achhala was 49.5%.

The deterioration of forest structure is often due to biotic factors. The impact of human population and cattle grazing on forests is severe. The forest at Pavagadh and Ghoswada is much damaged. The undergrowth or the ground biomass is very low at Achhala due to 'grazing'. Fodder collection, fuel collection and minor forest produce
collection also depleted the forests.

The present forest of Panchmahala is very poor if we compare it with past forests. The forests have shrunk to patches in depressions or on hilly slopes.

Finally, it may be mentioned here that, in the spirit of International Biological Program which has begun its activity in 1964 with the specific objectives of developing a world study on the biological basis of productivity and suggestion by Likens and Bormann (1972) for the better management of our natural resources. Study of Panchmahala forest initiated in 1978, by now has completed several aspects such as avifauna (Verkey - Osman, 1980), mammals (Joy, 1980), nutrient cycling, soil and litter fauna (Patil, 1980), ground vegetation (George, 1980) along with the present study on forest structure, standing biomass and phytosociological relations. Additional information on primary production, microbial activity, role of microfungi, etc. have still to be gathered. In that sense, the present work is far from complete and is only a small component of a total complex ecosystem. Nonetheless when all these studies are integrated and interpreted, they will provide a sound basis for policy makers. The study further hopes to provide information for a compartmental ecosystem model to indicate storage and fluxes of matter and energy among the various compartments of Panchmahala forest ecosystem.