CHAPTER -IX

SUMMARY AND CONCLUSION

The Gir Wildlife Sanctuary is the only large forested area in an otherwise semi-arid region. It is the only abode of the Asiatic Lion (*Panthera leo persica*). The Gir, as it is commonly called, was a compact block of forest covering an area of over 5000 sq.km in the past, has now been reduced to an area of about 1412.13 sq.km. Due to its relative richness in natural resources like water, wood, fodder, etc. it attracts a lot of livestock from the peripheral areas, which compete with the wildlife species inside the sanctuary and national park areas, resulting in biotic pressures which stretch the natural resources to their limits.

Since the last two decades, the area in and around Gir is facing a variety of geo-environmental problems viz. drought, water scarcity, soil erosion, improper land-use, cyclone, etc. resulting in the depletion of natural resources. The shrinkage of this habitat has given rise to a unique problem of wandering of lions outside the sanctuary.

Geologically, the study area consists of Deccan Trap basalts, related differentiates, and associated intrusives. These are disconformably overlain by miliolite limestone along the southern and southwestern fringes. There are three major lava flows present, as discerned by field studies. The youngest flow consists of fine to medium grained basalt followed by

glomeroporphyritic to porphyritic basalt, while the oldest and most commonly found lava flow is of olivine basalt. All these lava flows are highly jointed, fractured and intruded by younger generation dykes ranging in composition from basic to acidic. The regional tectonism has also had an influence in the lineament configuration of the Gir.

The Gir has a highly rugged terrain interspersed with low lying flat areas and river/stream valleys. Geomorphologically, the whole area constitutes a vast zone of dissection of lava flows, which has produced a striking landscape comprising of flat topped hills, ridges, mesas, questas, conical hills, radiating spurs, multiple scarps, plateaux, pediments, pediplains, intermontane valleys and valley fills. Slope analysis has shown that 46.11% of the study area is occupied by gentle slopes, 31.52% by steep slopes and 22.37% by moderate slopes. A distinct correlation between geomorphology and vegetation has been established by these studies.

Soil studies including physico-chemical investigations of nearly 170 soil samples collected from sampling stations distributed throughout the study area have shown that the major soil type in the area is loam followed by silt loam, sandy loam, silty clay loam, clay loam, sandy clay loam, loamy sand and silty clay.

Chemical studies have revealed that the soils of the area are of good quality with a few minor exceptions here and there, and can sustain vegetal growth provided adequate moisture is available.

Soil moisture balance studies have shown that apart from the monsoon month of August, there is a moisture deficit during the ensuing winter and summer months. The moisture index for this particular area points towards a semi-arid zone despite it being a thickly forested area, thereby implying an imprint of the regional semi-arid climatic regime.

A distinct relation has been established between the various soil types and geomorphological units. Studies have also revealed that the soil type has had a definite control over forest type.

The major crisis facing the Gir area, is water availability, despite the fact that it is a forested zone. Erratic rainfall, a rough 4-5 year drought cycle, rugged terrain and the absence of primary porosity in the underlying rocks, have all combined to create paucity of water, especially between February to June each year. This scarce commodity is put under pressure by both human beings, livestock / wildlife.

In order to evaluate the quantity and quality of surface and subsurface water, various parameters like hydrometeorology, hydrolithology, hydrostructures, hydrogeomorphology, mode of

occurrence, distribution, potential and quality of water were studied critically. These studies have revealed that a major portion of the annnual precipitation is lost via runoff, thereby causing surface water scarcity. Very few rainwater harvesting structures (mainly check dams) have been constructed in this conserved zone. Though there is ample groundwater potential, this resource has not been tapped at all.

After a wholistic overview of this problem, an `Integrated Approach' for the conjuctive use of both surface as well as subsurface water resources has been suggested. Appropriate rainwater harvesting structures have also been suggested.

Gir is the only other area outside the African continent where lions are presently found. In Africa, the natural habitat of the lion is usually located in terrains which are either flat or gently undulating, which afford the lion a flat surface to chase and hunt its prey. Geomorphologioal studies in the Gir area have shown that a majority of the zone is composed of slopes of various categories, with intermittent flat areas wherein the lions are usually found. In fact, the core/national park area is extremely rugged, proving to be an inconducive habitat for the lion. As a result, the lions are usually found in the peripheral flat areas where their territory coincides with maldhari (local cattle graziers) settlements having livestock. The natural

prey located within the national park area are not easy to hunt because of the ruggedness of the terrain. The livestock in the peripheral zone prove to be a much easier kill. Studies have proved that the present habitat within the Gir area is not an ideal one. The principle behind these studies can be used as an aid for locating a second home for the lions.

The Gir Wildlife Sanctuary is the sole remaining large forested area in an otherwise predominantly semi-arid zone. The regional climatic regime has an imprint on this forest area, thereby causing several geo-environmental problems viz. erratic rainfall, a roughly 4-5 year drought cycle, water scarcity during the drier months, etc. Apart from the above mentioned problems, human interference along the peripheral zones is also one of the most troublesome and worrying aspects contributing to the problems facing this fragile ecosystem.

All the major problems viz. climate and rainfall, soil erosion, water resources, forest fire and biotic pressure including the wandering of lions outside the sanctuary have been discussed in detail, and appropriate management suggestions have been proposed.

This multidisciplinary study encompassing the fields of geology, soil science, botany and zoology, has revealed a

distinct interplay of these 4 sciences. While botanists and zoologists are commonly employed by the Forest Department, it seems that the role a geologist can play in the sustainable development of any forested/wildlife area has been sadly overlooked. It is hoped that this study will encourage the Forest Department to employ geologists in their ranks, to enable the agency to have in-house expertise to tackle varied problems like soil erosion, water management, etc.