IMPACT OF LIVELIHOOD PRACTICES OF MALDHARI TRIBE ON WILDLIFE HABITAT OF GIR PROTECTED AREA

B.P. PATI*

Introduction

Gir National Park and Sanctuary is the last paradise of Asiatic Lion (*Panthera leo persica*) and a last resort to many threatened species. It falls in bio-geographic zone 4 (the semi arid) and bio-geographic province of 4-B Gujarat Rajwara. Due to rich bio-diversity and measures taken to protect this great heritage, Gir has become a very stable ecosystem with tremendous regenerating, self-supporting and self-sustaining capacity. Gir supports rich bio-diversity of 38 species of mammals, 32 species of reptiles, more than 300 species of birds, 450 flowering plant species and more than 2,000 species of insects.

Maldharis and their resettlement

Gir Protected Area (PA) has already experienced the worst period of drought, degradation, decline in wildlife etc., during past. An ecological study conducted during 1970s by Joslin (1974) and Berwick (1971) revealed startling facts about the cause of decline of biodiversity including Lion population in Gir during the 1960s. They identified the major cause as the excessive grazing pressure on Gir habitat by cattle owned by the Maldharis and peripheral villages. After considering this fact, Gir Lion Sanctuary Project was launched in 1972 and several Maldhari families and Nesses (hamlets) were shifted from Gir PA to outside and a National Park was created in 1975. During inception of Gir Lion Sanctuary Project, 1972 there were 845 Maldhari families with a human population of 4,802, cattle population of 16,852 and they were resident of 129 nesses, out of which 592 families and 74 nesses were shifted during the project. This measure not only increased the population of carnivores (including Lion, Panther etc.) and herbivores but it also increased overall habitats (Lion population from 177 in 1968 to 267 in 1990, Table 1). During the 1980s, Gir Lion Sanctuary Project was abandoned mainly due to non-availability of land required for settlement of Maldhari families.

Table 1

Lion census figure in actual Gir PA

Year	Lion population
1968	177
1974	180
1979	205
1985	239
1990	267
1995	262

Dy. Conservator of Forests, Wildlife Division, Gir National Park and Sanctuary, Sasan-Gir (Gujarat)

Change in livelihood practices among Maldharis

Before 1990, Maldharis used to sell clarified Butter (Ghee) to the local market, which is why the nutrients in the form of Butter milk, Dung, etc, used to be recycled within the Gir ecosystem. But due to commercialisation process Maldharis are now selling their milk directly to the market. They are also selling the Gobar (dung) to the local farmers by mixing fertile soil of Gir forests to increase amount of Dung manure (Singh and Kamboj, 1996). This direct selling of organic product from Gir forests without the replenishing it leads to complete break down of the nutrients cycle and degradation of wildlife habitat.

A problem identified

The figures of last two censuses indicate that there is stagnation and insignificant decreases in Lion populations in actual Gir PA. According to 1990 census there were 267 Lions in Gir Sanctuary and National Park and 262 in 1995. In this context, if we compare the present population of Maldharis and their livestock with that of pre-1972 level, it is not far behind. Now inside Gir Sanctuary there are 54 nesses with a human population of 39,000 and cattle population of 15,000 (Table 2). Sizes of nesses are not only increasing but also human and cattle population is increasing at an alarming rate. The author tried to analyse the situation in detail and also tried to assess the impact of the population growth of the Maldharis and their livestock on wildlife habitat in both qualitative and quantitative terms.

Objectives of the study

(1) To compare the status of Maldharis living in different Nesses in relation to per family cattle holding and average milk production.

(2) To assess the level and extent of degradation due to grazing of livestock in and around Maldhari Nesses.

Methodology

(1) Out of 54 Nesses, 6 representative Nesses were taken for detailed study, which is 10% of the total figure.

(2) Surveys of nesses were undertaken to estimate the actual population of the Maldharis, cattle, milk production etc.

(3) Radiating line transacts were laid out around sample nesses to calculate the extent of cattle movement by analyzing the presence of dung, number of dung pie etc.

Table 2

Demographic comparison of Gir Maldharis year 1972 and 1999

Year	Number of Nesses	Number of families	Human population	Cattle population
1972	129	845	4802	16862
1999	54	362 (undivided)	3900	15000

(4) Quadrates (1m x 1m) were laid to estimate the presence of grazing indicators (*Cassia tora*) and regeneration status of browsable species like *Zyziphus mauritiana, Z. glabrata, Z. oenoplia, Z. xylopyrus, Acacia nilotica, A. senegal, A. leucophloea, Helicteres isora, Bauhinia racemosa, Belenite egyptica* etc. Quadrat data was collected during rainy season.

(A) ***Analysis of demographic data and observations***

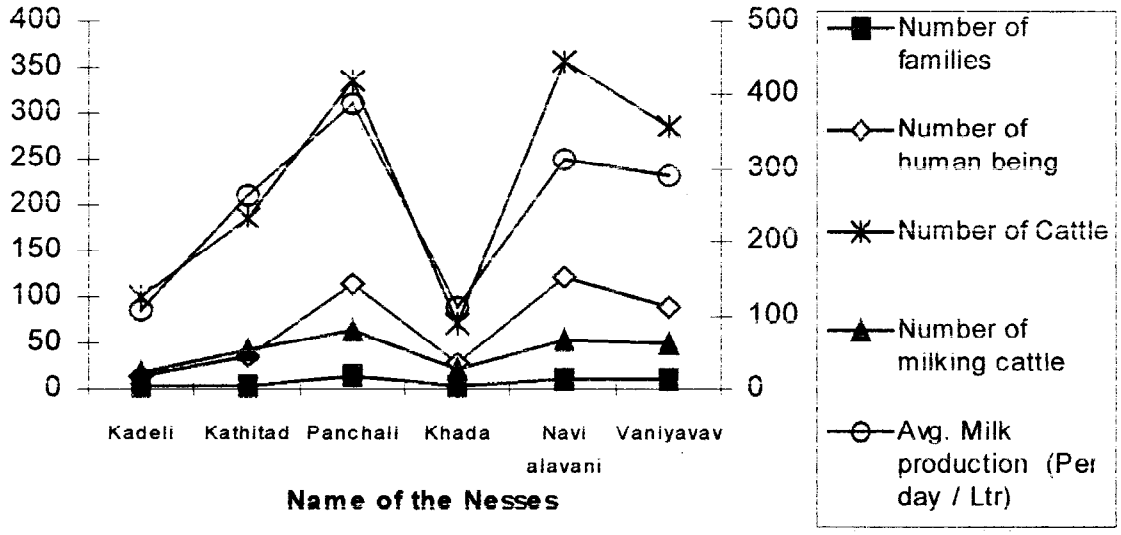
Out of 54 Nesses inhabited by Maldharis, 6 Nesses were surveyed in detail and different data about human and cattle population, number of milking cattle and average milk production/day/ness were collected and analysed (Table 3, Fig. 1).

Table 3

Dhowing the details of Maldhari families and their livestock

Name of Ness	Number of families	Number of human beings	Number of Cattle	Number of milking cattle	Avg. Milk production (Per day/Ltr)
Kadeli	3	15	101	21	105
Kathitad	3	35	185	53	262
Panchali	15	114	335	82	390
Khada	3	27	73	27	110
Navi alavani	12	122	358	65	312
Vaniyavav	10	88	285	61	291

Fig. 1



Relationship between human population, cattle population etc.

Findings

It is found out that except "Kathitad Ness" almost all the nesses have more number of unproductive cattle. It is also inferred that as the number of families increases in Nesses, the milk production and number of cattle holding per family decreases substantially. So it is clear that there is a steep competition for fodder, water, and space among the cattle and human beings when the number of families per Nesses increases.

(B) ***Analysis of Transacts and observations***

Radiating foot transect of 100 m x 10 m on all the four direction (East, West, North, South) were taken around the sample Nesses to assess the extent of grazing pressure and degradation. Transact data were collected from different distance intervals i.e. 0 m, 100 m, 200 m, 500 m, 1 km, 2 km and 4 km for presence of Dung pies. The average of all of the four transacts in different direction around the Nesses at particular distance intervals were calculated and tabulated (Table 4, Fig. 2).

Findings

1. Occurrence of dung pies near the Nesses is negligible though it is supposed that maximum occurrence should be near Nesses (upto 100 m radius). This is due to collection of dung pies by Maldharis for sale to Farmers.

2. Occurrence of dung pies after 200 m and up to 1 km is maximum *irrespective of cattle number per* Nesses.

3. There is a direct relationship between number of dung pies found in a transact and number of cattle present in a Ness. It shows indirect increase in grazing pressure on wildlife habitat when the number of cattle increases.

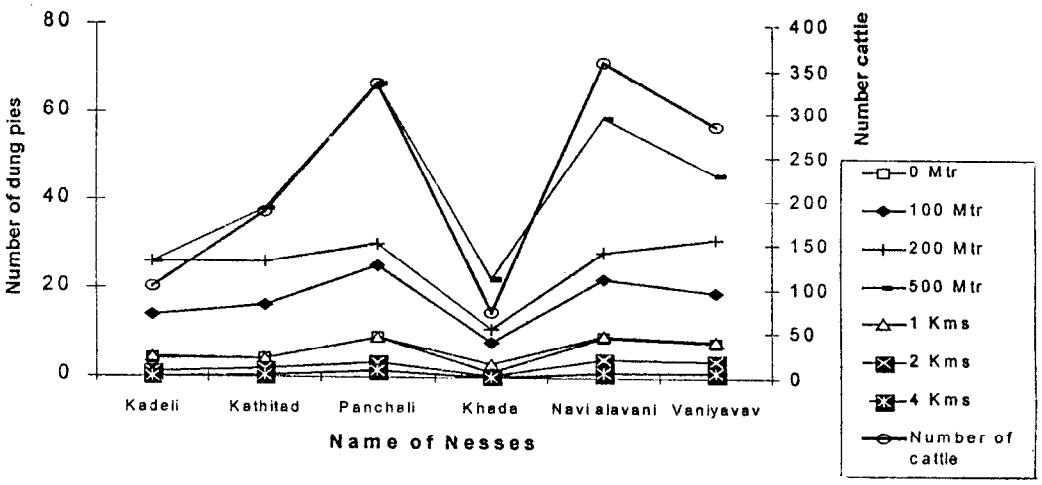
4. When number of cattle per Ness increases, then the distance and area covered by the cattle for grazing increases as in the case of Panchali, Navi alavani and Vaniyavav, where cattle move more than 4 km from Nesses.

Table 4

Occurrence of dung pies in transacts

Nesses	Average of four 100 m x 10 m transact						
	0 m	100 m	200 m	500 m	1 km	2 km	4 km
Kadeli	4	14	26	26	22	6	0
Kathitad	4	16	26	38	21	9	1
Panchali	9	25	30	67	45	17	8
Khada	1	8	11	22	15	2	0
Navi alavani	9	22	28	59	47	21	6
Vaniyavav	8	19	31	46	41	19	6

Fig. 2



Presence of cattle dung pies per transact at different distance vs cattle number

(C) ***Analysis of quadrates and observations***

1 m x 1 m quadrates (four quadrates at each interval) were laid out at different distance intervals on all the four direction of the Nesses to estimate the density of *Cassia tora* and regeneration status of different browsable species. Four quadrates are laid out in National Park (ungrazed area) area which is taken as control to know the regeneration status of browsable species. Average of all the four quadrates are calculated and tabulated for analysis and compared with the number of cattle present in different Nesses (Tables 5 and 6, Figs. 3 and 4).

Findings

1. The grazing indicator (*Cassia tora*) is found to be absent near the Nesses (0 m) it is mainly due to the complete degradation of Ness areas which shows barren ground and stones. It is due to the soil erosion by frequent and continuous movement of cattle and collection of soil by Maldharis for preparation of dung manure.

2. Occurrence at 100 m distance from Nesses also shows comparatively lower density due to excess cattle pressure and trampling of different seedling in that areas.

3. Density of *Cassia tora* is found to be maximum at 200 m, 500 m and 1 km distance from Nesses. It shows excess grazing and also compaction of soil and is directly proportional to the number cattle present in the Ness.

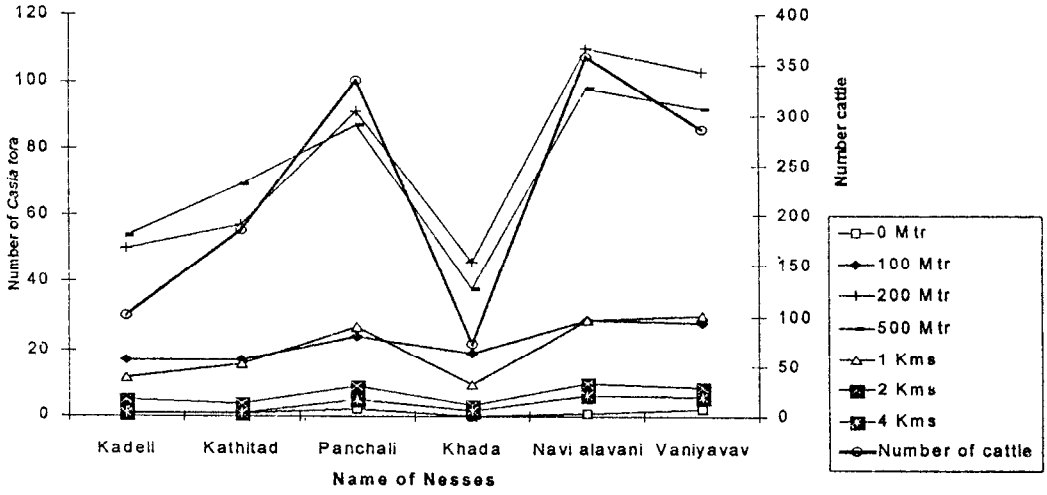
4. *Cassia tora* density decreases at 2 km and 4 km intervals but presence of *Cassia tora* at 4 km distance from Panchali, Navi alavani and Vaniyavav shows the number of cattle have direct relationship with the distance and area covered by the cattle.

Table 5

Occurrence of Cassia tora in 1 m x 1 m quadrates

Ness	Average density of *Cassia tora* (1m x 1m quadrates)						
	0 m	100 m	200 m	500 m	1 km	2km	4km
Kadeli	1	17	50	54	38	17	3
Kathitad	1	17	57	69	52	13	3
Panchali	2	24	91	87	89	31	17
Khada	0	19	46	38	32	11	5
Navi alavani	1	29	110	98	97	33	21
Vaniyavav	2	28	103	92	101	29	19

Fig. 3



Presence of *Casia tora* per quadrate at different interval vs. cattle number

5. Non or insignificant regeneration of any browsable species found near Nesses i.e. upto 200 m radius, which shows the level of degradation of a wildlife habitat. Very few regeneration of browsable species recorded in different quadrates at 500 m and 1 km distance from Ness.

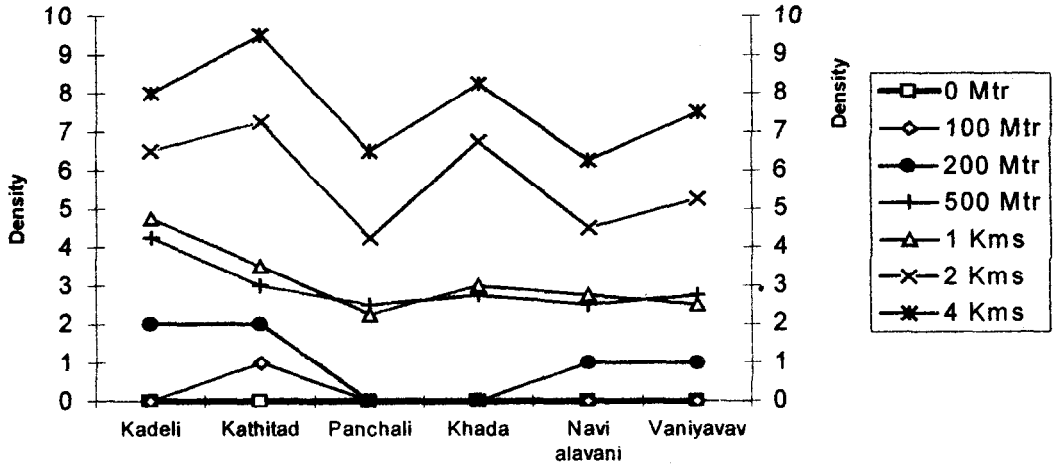
6. In comparison to the regeneration status of browsable species in National Park area (Control area which is completely protected from grazing by cattle), the regeneration status at 2 km and 4 km distance from Nesses are 30% and 19% less.

Table 6

Regeneration status of browsable species 1m x 1m quadrates

Ness	Average density of Browsable species from four 1m x1m quadrates at following intervals							
	0 m	100 m	200 m	500 m	1 km	2 km	4 km	National Park
Kadeli	0	0	2	4.25	4.75	6.50	8.00	9.5
Kathitad	0	1	2	3.00	3.50	7.25	9.50	9.5
Panchali	0	0	0	2.50	2.25	4.25	6.50	9.5
Khada	0	0	0	2.75	3.00	6.75	8.25	9.5
Navi alavani	0	0	1	2.50	2.75	4.50	6.25	9.5
Vaniyavav	0	0	1	2.75	2.50	5.25	7.50	9.5

Fig. 4



Average regeneration density of browsable species

Conclusion

Irrespective population of human and cattle in Nesses, there is a significant degradation of habitat within 1 km radius of Nesses. The level of degradation and area under degradation is directly proportional to cattle population. When the number of cattle and human population increases, it directly affects the milk production and cattle holding per family.

Acknowledgements

The author is thankful to S/Shri S. Vijayan, Rajan Singh and B.S. Mehra for their help in field observation. Special thanks to Shri Kautilya P. Bhatt for help in analysis of data in computer and preparation of graph.

SUMMARY

Gir National Park and Sanctuary is devoted to the Conservation of the Asiatic Lion and as a result of protection measures, now it also maintains a rich bio-diversity of flora and fauna. The Sanctuary still has a sizeable population of Maldharies although a considerable number of their families was shifted elsewhere during the project period. Formerly the Maldharies traded in ghee, but now they have taken to milk selling obtained from cattle maintained and grazed by them inside the Park. They also sell dung mixed with soil as manure. The study analyzes the impact of this change of livelihood practice by Maldharies. The study shows that owing to increase in cattle and human population, as well as change in the mode of earning livelihood by Maldharies there has been considerable degradation in this habitat. It is significant within 1 km radius from their Nesses. Regeneration in 2 km and 4 km distance is 30% and less than 19% respectively. The increase has also affected milk production and cattle holding per family.

गीर रक्षित क्षेत्र के वन्य प्राणि प्राकृतावास पर मालधारी कबीले की आजीविका अर्जन रीतियों का प्रभाव

बी०पी० पति

साराशं

गीर राष्ट्रीय उपवन और अभयारण्य एशियाई सिंह की शरणस्थली है । वहाँ किए गए संरक्षण कार्य के परिणामस्वरूप इसमें बहुत सी अन्य संकटग्रस्त पशुपक्षी, पेड़-पौधों की जातियों की सम्पन्न जैवविविधता भी बन गई है । अभयारण्य में अब भी माधारियों और उनके पशुओं की काफी संख्या विद्यमान है हालांकि परियोजना काल में उनके काफी परिवार पशुओं सहित वहां से अन्यत्र हटा दिए गए थे । पहले मालधारी घी बेचने का व्यापार करते थे, परन्तु आजकल वे सीधे बाजारों में जाकर दूध बेच आते हैं । साथ-साथ गोबर में मिट्टी मिलाकर उसको खाद बनाकर भी बेचते हैं । प्रस्तुत अध्ययन में मालधारियों के इस आजीविका अर्जन में हुए परिवर्तन से प्राकृतावास पर पड़े प्रभावों को बताया गया है । अध्ययन से पता चलता है कि मानवों और पशुओं में संख्या वृद्धि तथा मालधारियों का आजीविका कमाने का ढंग बदल जाने से प्राकृतावास का व्याह्रास बहुत बढ़ गया है । नेसों से । किलोमीटर के घेरे के अन्दर यह कुछ ज्यादा ही मात्रा में हुआ है । 2 किमी और 4 किमी की दूरी तक के क्षेत्रों में पुनर्जनन क्रमशः 30% और 19% से भी कम है । पशु संख्या वृद्धि का कुप्रभाव दूध उत्पादन और प्रति परिवार पशुओं की संख्या पर भी पड़ा है ।

References

Berwick, M.A. and S.H. Berwick (1971). The ecology of Maldhari grazier in the Gir forest - A report, Yale University, USA.

Joslin, P. (1974). Factor associated with declined of Asiatic Lion. *The World of Cats Vol-I. Ecology and Conservation* (R.L. Eaton, Ed.). WWS, Winston, Ore. pp. 127-141.

Sharma, D. (1996). Ecology and management of Lion and ungulate habitats in Gir. *Ph.D. Thesis,* Saurashtra University, Rajkot, April 1995. 178 pp.

Singh, H.S. and R.D. Kamboj (1996). *Bio-diversity conservation Plan for Gir* Vol-I, II, Forest Department, Gujarat State.