CONSERVATION ECOLOGY OF SANGAI AND ITS WETLAND HABITAT

STUDY REPORT

VOLUME II

SOCIOECONOMIC STUDY

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

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EXECUTIVE SUMMARY

It is increasingly recognized that PAs should play a role in sustaining the local communities adjacent to them since, due to the establishment of PAs, livelihood opportunities for the local communities get limited. Thus, it should be the prime objective of the park managers to allocate the resources in such a way that they meet the needs of the people surrounding the park, in a sustainable manner as well as lead to long term conservation of resources. However, over utilization of the forest resources by the local communities are the principal problem and due to competitive exploitation and extraction, depletion of the resource has been occurring rapidly. Keibul Lamjao National Park (KLNP) is the only natural home for rare and endangered brow-antlered deer, Sangai whose habitat is the Phumdi- a unique part of the habitat of the KLNP. It is the floating mass of entangled vegetation, formed by the accumulation of organic debris and biomass with soil particles, which has been concentrated in solid form. It covers approximately 2/3 to 3/4 area of the park. Its thickness varies from few centimeters to two meters. But due to over exploitation of the resources from the park in the form of vegetable collection, fishing, fuelwood collection etc. and increased human population, the park is facing consistent anthropogenic pressures which are posing threat to the habitat of endemic and endangered Sangai. There is a need to understand local people's dependence on the park as well as their perceptions and attitudes and to devise management strategies in order to solve park-people conflict in the KLNP. Thus, considering the above, the prime objectives of the study were to understand the dimensions of local people's dependence on the park, their attitudes towards conservation of Sangai as well as their acceptance of various alternative livelihood options in order to reduce their dependence on KLNP.

In order to meet the objectives of the study, the data was collected at 3 major levels i.e. village, household and park level. On the basis of the reconnaissance of the study area, 36 villages within 3 km boundary of the park were selected for the study. The villages were stratified into four clusters: northern cluster with 7 villages (542 households), western with 10 villages (704 households), southern with 9 villages (502 households) and eastern cluster

with 10 villages (927 households). Out of total 2675 households, 50 households each in the north and west, 49 households in south and 90 households in east were interviewed (n=239). Tourists (n=112) visiting the park were also interviewed to obtain information about their attitudes regarding the park.

Household survey and entry point monitoring methods were used to seek information on the social structure, economic conditions, resources extracted from the KLNP and contribution of the resources to the household income. Household survey was done during the period from November 2007 to July 2009 by means of structured questionnaires. In entry point monitoring method, entry points at 5 specific places at the boundary of the KLNP were monitored. The average weight of head loads of fodder, fuel wood, vegetables, average fish catch, their species composition and their extraction in different seasons, were measured by spring balance and the information so obtained was cross checked by questionnaire. For studying anthropogenic impacts and their intensity on the park, quadrate of 50 X 50 cm were placed on transects laid at 200-500m distance inside the KLNP. The structure and vegetation of the area were also enumerated and then were compared with controlled enclosures. By the means of pre-designed questionnaire, attitudes and perception of the people, living in the vicinity of KLNP, towards the park and the attitudes of the tourists, visiting the park, towards the conservation of Sangai, were also assessed. Ecosystem management actions and sustainable alternate livelihood options were identified by household surveys and stakeholders' workshop. For identifying the options of local livelihoods, Willingness to Pay (WTP) and Willingness to Work approaches were used. The recreational value of the KLNP was derived by using the Travel Cost method (TCM). All the data was subjected to descriptive analysis, ANOVA and Chi-square test.

In the villages around the KLNP, agriculture is the main source of livelihood of the people. But due to the submergence of the agricultural lands, people have become more dependent on fishery. The villages surrounding the park are divided into four clusters i.e. north, south, east and west. The villages in the eastern cluster have the highest area of total land holdings with them (0.98 ha) whereas the villages of northern cluster have the least land holdings

(0.47 ha). Thus, the people of the eastern cluster have agriculture based economy with 37% people having agriculture as their primary source of income and on the other hand, people of the northern cluster have fishery (48%) and government jobs (16%) as their main source of income. Since the people of the eastern cluster have highest household area (0.28 ha), this enables them to rear more cattle (0.31 cattle unit/hh) whereas the villages of the northern cluster, having the least household area (0.06 ha), own least number of cattle (0.08 cattle unit /hh). The secondary sources of income are vegetable collection and fishing. Since most of the land has been submerged, the people have converted their lands to fish farms (*anthaphum i.e.* agri-cum-pisciculture) or grow vegetables in their home gardens. Maximum fuelwood collection from the park premises is observed in the western cluster (44%) which is followed by the eastr (17%), north (14%) and the southern cluster villages (6%). Maximum number of fish farms can be observed in the southern cluster (44%) followed by the eastern (37%), west (34%) and the northern cluster villages (24%). On the other hand, people owing *anthaphum* are seen maximum in north (40%). The annual income of the villages of the northern cluster are found to be the highest (Rs. 83,504) followed by the west (Rs. 71,984), south (Rs. 67,529 and the eastern cluster villages (Rs. 60,247). Higher dependency of the people on resources of KLNP and income from vegetable collection and fish farming has created heavy anthropogenic pressure on the KLNP and also makes the livelihood of the people vulnerable to environmental change. Therefore, the management must focus on the ways to meet the need of the people while maintaining the integrity of the habitat of Sangai.

Fishing was the primary source of income, which was practiced in all the villages. The results show that fishing was practiced highest in the northern cluster (48%) and least in the eastern cluster (36%). Secondary sources of income which included vegetable collection was found maximum in the western cluster (44%) followed by the eastern (30%) and the northern cluster (6%). There was no vegetable collection in the southern villages. The western cluster was more dependent on the park (36%) for fuel wood collection, followed by the northern (18%), the eastern (8%) and the southern cluster (2.04%). Fodder extraction was highest in the eastern cluster (70%) followed by the southern (42%) and the western cluster (40%). Since people of the northern cluster do not own fish farms, there was no

fodder collection here. Fishing and fodder collection was done throughout the year, the peak season of vegetable extraction was March and April while fuelwood extraction was done in the winter season i.e. November to March.

Stems, young shoots, dry leaves, whole plants and rhizomes of different plants were collected. *Zizania latifolia* was collected in highest quantity (49.5%) as fish feed and fodder for cattle which was followed by *L. hexandra* (16.2 %) and *O. javanica* (0.5%). The extraction of useful plant resources started from December-April and was lowest during October-November. Maximum extraction was in the eastern villages (12033.7 t yr^{-1}). Total fresh plant resource extracted from the park in a year were estimated to be about 47000 mt/yr. Fish catch increased from March to November i.e during the rainy season when production of fish was highest and gradually decreased during the winter season when the fish hibernate. *Monopterus albus* and *Cyprinus carpio* were caught in maximum quantity (16%). A total of 306.2 mt of fish is caught every year from KLNP. More than 35% to ca. 60% of the local people depended on the park and resources from park contributed 40% to 57% of total income. The households (436) in the western cluster are more dependent on the park (62%) for their livelihood, followed by the southern (41%), the northern (38%) and the eastern clusters (32%). Thus the anthropogenic pressure was found to be higher on the western side as dependency and extraction rates were higher. Diversity of plants was highest at the periphery (H'= 1.51) and decreased as distance increased from the Park's periphery (H'=1.30), it was negatively correlated with distance from the Park's periphery (r^2=-0.626).

About 90% of all the village clusters agreed that wildlife conservation is necessary for the future generations. More than 80% respondents from the eastern cluster agreed that Sangai has given them recognition. The northern village group (99%) agreed that national park is important for the protection of Sangai from illegal poaching. The percentage of the people who agreed that agreed that Sangai is important varied across different directions i.e. (χ^2 =10.7, p=0.013), maximum being in the eastern cluster (94%) and minimum in the western (78%). Most of the people (94%) agreed that Ithai barrage has caused damage to the park and its vicinity. KLNP is considered to be important for the villagers in the western cluster

(48%) as they obtain their income from the park only. Less people were in the favour of fencing the park (19% in east; 17% in south; 12% in north and 8% in the west), or in a complete restriction on resource extraction from the park (24% in east; 16% in south; 14% in north and 3% in the west). Majority of the southern villages (88%) agreed to control the over extraction of resources which was least in the western cluster villages (39%). The people from the western cluster were found to be more dependent on the park because as compared to the other village clusters, and many of them (52%) were agitated if the fencing of the Park was done or resource extraction were restricted in the park.

Majority of the tourists agreed that the park is important for the protection of Sangai (60%) and encouragement to tourism (93%) will also help to conserve it. 37% of the tourists agreed on fencing the park for the protection of Sangai. However, 61% of the tourists also supported habitat improvement for better conservation of Sangai. 56% of the tourists were satisfied by the management of the park by the forest department. From the views of the respondents from all the village clusters, it can be concluded that majority of the people are aware about the loss of habitat of Sangai, but since they are dependent on the resources from the park they give preference to fulfilling their needs. Thus, a proper solution is needed for harnessing the positive attitudes of people towards Sangai.

When the respondents were asked to respond regarding their willingness to accept compensation for denied access to the park, 42.1 % were willing to accept some form of compensation and 21.9% preferred to be allowed to extract resources, while 9.1 % were not interested in receiving any compensation**.** Almost 66 % of the respondents in the western villages were ready to accept compensation and none of the respondents were willing to not accept any compensation. The maximum number of people who did not want any compensation for foregoing access to the Park was in the East (16%). The maximum number of people who preferred to have continued access to Park resources were in the South (48.9%) followed by those in the North (28%) and the least in the (2.4%). Among all the four options given to the people, compensation for lost access to the Park was the most preferred (42.1%) followed by the option of continued access to Park resources (21.9%).

Monetary payment (48.4%) was the most preferred mode of compensation, followed by the employment (43.5%), fish farms (14%), business (13%), looms (10.7%) and fishing gears (7.7%). The northern cluster villages expected the highest amount of monetary (Rs. 56,250) of compensation while the western villagers expected the lowest (Rs. 25,133). The results also show that large numbers of villagers were engaged in agriculture, fisheries and animal husbandry but in order to improve the economic condition, tourism (82.1%) emerged as the most preferred alternative livelihood option. The annual flow of tourist to KLNP was estimated to be about 5,780 (92% local tourists) in which 50% of the visits were recorded in the months of June and July (festive season) and 23% in December-February (recreation value). Travel Cost method was used to derive the recreation value of the park by using the data from the survey. The economic benefit from the recreation use was estimated to be 20, 71,933 per annum. The livelihood alternatives proposed by the people were examined on scale of 0-3 for their feasibility on the basis of five criteria i.e. economic, social and cultural, environmental, technological and political. The feasibility analysis show that handloom was the most feasible livelihood option (score 5.12) followed by service providers (3.44) and fishery (3.37). Tourism and government services came at score 3 whereas carpentry was the least feasible livelihood option (1.56). However fishery is considered as a good economic option but it scored low feasibility (1.75). Although the local people revealed their preference for tourism as the most preferred livelihood option, the prevailing dismal law and order situation and the lack of proper infrastructure in the tourism sector do not give it a high score on feasibility.

Conserving the habitat of the KLNP is crucial for the long term survival of the critically endangered Sangai. However, the people from surrounding areas of the park are dependent on its resources for their livelihoods and basic amenities and a ban on resource extraction from the KLNP (by virtue of its being a PA) will lead to a hostile attitude among the local communities. Therefore, along with the PA conservation and protection to the habitat of the Sangai, the park management also needs to focus on developing sustainable livelihoods for the local people and involve them in PA conservation. It has been observed that the political situation in Manipur does not permit proper protection to the park. Thus, with no clear policy on alternative source of livelihood and no direct conservation-development

linkages, the Park protection faces a bleak future. The study reveals that people are willing to improve the condition of the park and help in conservation of Sangai provided they are given adequate compensation for their dependence on the park. The existing PA system in India allows for involvement of local communities in resource management. The conservation initiatives in KLNP should try to address the socio-economic condition of the local villagers specifically unemployment and poverty, by increasing output from their existing assets, by facilitating the provision of other assets through alternative livelihood options and by developing the stakes of local people in conservation of Sangai. Thus, by continuous participation and involvement of local people and other stakeholders in conservation activities, anthropogenic pressures on the Park can be reduced and the habitat secured for the long term conservation of the Sangai.