

# **Park – People Conflict and its Management in Shivapuri National Park: A Case Study of Sundarijal Village Development Committee**

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## **Abstract:**

Shivapuri National Park, previously established as watershed management area in 1975 has been experienced with deforestation, over-grazing, water pollution and cultivation on steep slopes. Sundarijal Village Development Committee is located within and outside the park and agriculture is the main occupation of the people living inside the park area. Park-people conflict mainly crop and livestock loss was reported done by wild animals, namely wild boars, monkeys and porcupines causing significant economic losses for the poor villagers. A total NRs. 5,87,618.74 economic loss due to crop and livestock depredation was estimated. Among mammals Wild boar, rhesus monkey and porcupine were major animals for crop loss and leopard and jungle cat were major animals responsible for the livestock loss.

**Key words:** park-people conflict, Shivapuri National Park, Sundarijal VDC, crop and livestock depredation.

## **Introduction**

Shivapuri National Park, now extended and renamed as Nagarjuna-Shivapuri National Park, comprises the sub-tropical to temperate climate with sub-tropical to lower temperate vegetation. There are 2,122 flowering plants with 16 endemic species (Shakya *et al.*, 1997), 20 species of mammals, 311 species of birds, 150 species of butterflies (BPP, 1995). The park is extended 23 Village Development Committees (VDCs) in three districts Kathmandu (10), Sindhupalchowk (9) and Nuwakot (2). Sundarijal VDC is one among 57 VDCs of Kathmandu district situated at the elevation of 2200m. The VDC occupies 35 sq. km. area with villages Kune, Okhreni, Chilaune and Mulkharka (1-6 wards) lying within and Ghattekholra and Mahankal (7-9 wards) lying outside the park. Sundarijal VDC has altogether 491 households with total population 2,499 (CBS, 2001). The main occupation of the villagers is agriculture and livestock farming. The people of the villages are heavily dependent on the natural resources of the park for their daily needs such as grass cutting, firewood collection, grazing livestock, water supply, stone, sand and soil quarries. Locals have complained crop and livestock loss due to wild animals.

## Materials and Methods

A preliminary visit was done in May 2007. Nine wards in Sundarijal VDC were visited. Sundarijal, the selected research sites are with Kune, Okhreni, Chilaune (1-3 wards) and Mulkharka (4-6 wards) inside the park and Ghattekhola and Mahankal (7-9 wards) lie outside the park. Out of 491 households recorded in the VDC (CBS, 2001), 90 households were chosen. The 10 heads of the households from each ward were selected randomly. The data was collected by means of direct observation and statistical analysis methods ( $\chi^2$  – test and t – test) and a multi-structural questionnaire survey was done pertaining agricultural practices and problems with crop and livestock depredation by wild animals, resource utilization and traditional methods of deterrence. Discussions with forest officers and local farmers of the villages were also helpful. The details gathered include patterns of cultivation, number of wild pest species involved in crop damage, type of crop damage, compensation claimed by farmers and the amount sanctioned by the forest department. In this respect, wild pests like monkey, wild boar and leopard were rarely witnessed foraging in the park during the field visits. It was therefore necessary to rely on the experiences of local people, spoor, footprints, uprooted crops and other signs such as dung piles to identify crop raiding and livestock predating species. Farmers with the economic losses were asked about their crop and livestock losses in the different seasons. Estimates of percentage of total loss for the different seasons were combined to calculate the average annual crop and livestock loss. For this local units such as Ropani, Muri and Pathi were converted to Kilogram for the convenience. For example; 1 ropani= 0.0523076 Hectare, 100 Kg.= 1 Quintal, 1 Muri = 20 Pathi, 1 Pathi= approx. 3.700 Kilo).

## Results

About 10% of the total area of the VDC is under active cultivation. The average agricultural land hold by the villagers was 0.31-0.52 hectare. The agricultural systems were observed to be land extensive and generally comprised a mixture of food crops with varying growth periods including paddy (*Oryza sativa*), wheat (*Triticum aestivum*), maize (*Zea mays*), millet (*Eleusine coracana*), potato (*Solanum tuberosum*), and rooted crops such as arum (*Colocasia indicum*) and sweet potato (*Ipomoea batatas*). Livestock and poultry farming were other jobs of the villagers for their survival. Mulkharka (4-6 wards) was found to have the highest loss in crop as well as livestock depredation followed by Kune, Okhreni and Chilaune (1-3 wards) and the lowest was in Ghattekhola and Mahankal (7-9 wards). No any human attack by wild animals was recorded during the research.

### *Crop depredation*

The study revealed the rhesus monkeys and wild boars were most notorious and damaging huge quantity of crops in a single raid plus the difficulty in stopping them while raiding the crops in the field. Total loss in percentage was estimated for different crops to different wild pests for damage. Maize damage by monkey (44%), by wild boar (34%), by porcupine (13%), by rats (9%) and by birds (0%). Similarly, millet damage by wild boar (43%), paddy damage by monkey (42%) and wheat damage by monkey (40%), rooted crops by porcupine (25%) and wheat damage by birds (15%). The total loss estimated in crop damage was NRs. 3,51,618.74 and the total quantity was 19,011.4 Kg. Maize loss was the highest (43.37%) in quantity

followed millet (21.94%), wheat (15.61%), paddy (15.22%), potato (1.89%), arum (1.26%) and sweet potato the lowest (0.70%) in the VDC.

### ***Livestock depredation***

Loss of cattle and domestic birds to wild carnivores like leopard (*Panthera pardus*), jungle cat (*Felis chaus*) and black kite (*Milvus migrans*) was a very serious blow to the livelihood of a villager already under pressure by forest laws. Altogether 248 livestock and avianstock were lost during the study period. Total loss in livestock (81) and avian stock (167) was NRs 2,36,000. The loss found in goats and cattle were more nerve-racking to the villagers ahead of domestic birds. Beside these, villagers lost their guard dogs (number unknown) which per cost was NRs.1, 500 approx. The loss percentage in number was found the highest (67.35%) in avianstock followed by livestock (32.64%). The total number of domestic animals depredated by predators such as jungle cat was (99), followed by leopard (93), black kite (42) and finally by disease (14) in the VDC.

### ***Fuel wood and resource use***

The villagers collected the logs in the grass loads and later the logs were sawn in the back yard to produce building materials, furniture and agricultural tools. About 76.66% of the villagers depended upon fuel wood for cooking, 23.34% of them used bio-gas, kerosene or LP gas for cooking. The villagers were not allowed to kill the wild animals while raiding their crops in the field. In certain cases, villagers tired of chasing wild boars in the field, killed them for the meat value (number unknown). Some people relied on various wild edibles such as mushroom and edible fern (Local villagers).

### ***Chemical fertilizers in the field***

65% of the households were found using Potash, Urea; DAP with some agricultural chemicals and pesticides in their farm lands. The study reported household products, unmanaged garbage used by tourists who directly or indirectly polluted the drinking water supply.

### ***Grazing***

Almost 85% of the total sampled household heads found frequently grazing their livestock inside the park. The grazing at the inner edge of the park showed there would be more chances of disease transmission, soil erosion and siltation problems later on. The villages lack palatable and many pasturelands were converted into agricultural fields.

### ***Trail and tourism***

The villagers were compelled to trespass the park boundaries quite frequently and continuously disturbed the wildlife habitat by breaking the rules and regulations and creating noise, air pollution in the park. The indigenous wildlife loses their habitat and move out to other suitable habitat or are killed in the process (Giri and Shah., 1992).

### ***Park-People's perception***

Under the research period it was found that, park authorities had punished, imprisoned, grabbed their agricultural tools like *Kodalo*, *Hasiya* and fined the villagers for illegal works but the villagers had never been compensated or paid with the amount in spite of crop damage or livestock depredation in the VDC. The study revealed that, some NGOs through support from other INGOs, operated saving/credit programs, training on skill development. Beside these, more than 50% of locals inside the park were found complaining about the muddy roads, unemployment and worse education of their kids in the villages.

### ***Protective measures for management of Park-people conflict***

Farmers were found applying variety of traditional methods of minimizing the crop and livestock damage from small to large mammals as well as birds. On the basis of the field observations and local respondents i) people have been guarding in the hut in crop fields day and night, ii) keeping guard dogs near the crop field and livestock, iii) frightening the animals by shouting and making noise with tin cans and drums, iv) harassing the wild animals by throwing stones and using catapult at them, v) setting traps and cages in the crop fields for capturing small mammals like rats, vi) fencing the crop fields and poultry houses with metal wire for protection, and vii) stall-feeding.

### **Discussion**

The crop and livestock depredation were found as the major problems due to wildlife in Sundarijal VDC. 8 wild pests were identified such as, 2 major (wild boar, monkey), 3 minor (porcupine rat, birds) as crop raiders along with 3 (leopard, jungle cat, black kite) as livestock/avian stock depredators. They raided the crops like maize, millet, wheat, paddy, and rooted crops such as potato, arum and sweet potato in quantity respectively. While leopard and jungle cat were the most notorious wild animals in all the wards but black kite's fear was not found in 7 - 9 wards. Leopard killed mostly the livestock whereas jungle cat and black kite fed upon avianstocks. Poudyal, 1995 found the wards 7, 8 and 9 outside the park were unaffected. Bajracharya, 2005 reported 9 pest species in Shivapuri NP and two crop raiders wild boar and monkey in Sundarijal VDC. (Ulak, 1992; Kattel, 1993; Soti, 1995 and Poudyal, 1995) identified wild boar as the main frequent crop raider and maize was the most raided crop by wildlife in ShNP. While Gurung, 2002 identified wild boar (major) and bear, monkey, porcupine, rat and birds (minor) crop raiders and raided the crops like paddy, wheat, maize, millet, potato and mustard and rooted crops in ShNP. After surveying 90 households in present research, in average, 0.31-0.52 hectare of agricultural land was hold by each household in the village which seems similar to that of (Poudyal, 1995) i.e. 0.51 hectare in Sundarijal VDC but according to Khatri-Chhetri, 1993 average holding of household in buffer zone of SWWR was 0.76 hectare. The present study revealed, the economic loss due to crop depredation was estimated Rs.3, 51,618.74 per annum whereas Poudyal, 1995 estimated total loss of Rs. 7, 58,070 per annum in the same VDC. Bajracharya, 2005 estimated the total loss of Rs. 1, 90,314.04 per annum in ShNP. Maize was the crop found in the first category of loss in all the studies. Soti, 1995 estimated the total loss in crops of Rs. 11, 59,999.45 in Kakani VDC. Gurung, 2002 estimated total loss of Rs. 5, 54,989.31 in Sunkhani VDC and the crops mostly raided by wild animals were maize, millet, paddy, wheat and rooted crops like potato, arum and sweet potato. Poudyal, 1995 reported excessive loss occurred to maize followed by millet, wheat and paddy subjected to almost negligible loss in Sundarijal VDC. Bajracharya, 2005 estimated the highest crop raided was maize followed by arum, millet, potato, paddy, wheat and sweet potato in the same VDC and estimated maize (35.29%) the highest proportion raided by monkey which is followed by wheat (30.25%), millet (16.35%), mustard (6.35%), paddy (5.92%), fruits (3.92%) and vegetables (1.92%) in Sundarijal VDC. Rooted crops like potato arum and

sweet potato were mostly abandoned growing in wards 1, 2, 3 due to attack of wild animals. Rooted crops were abandoned by farmers because of high depredation by wildlife in ShNP (Soti, 1995). In present study, the economic loss due to livestock depredation by wild pests was Rs. 2, 36,000 per annum. Bajracharya, 2005 calculated the loss of Rs. 14,000 per annum in Sundarijal VDC. The study revealed, domestic animals killed by leopard was (93), jungle cat (99), black kite (42) and remaining 14 by disease. Bajracharya, 2005 calculated that, livestock killed by leopard (12), jungle cat (9) and mongoose (4) in the same VDC. Soti, 1995 calculated the loss of Rs. 15,200 per annum in Kakani VDC of the park. Gurung, 2002 calculated total 279 domestic livestock and avian stock killed by wildlife with the loss of Rs. 48,355 per annum Bajracharya, 2005 calculated the total loss of Rs. 46,000 due to livestock depredation in ShNP and no any compensation paid to villagers. The presence of grazing and illegal resource utilization was reported in ShNP (Nepal, 2005 and Bajracharya, 2005). Kattel, 1993 recorded of using traps/snares, digging and hire hunters in ShNP.

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