ELEPHANT CONSERVATION, MANAGEMENT AND PROTECTION OF HUMAN INTERESTS

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Introduction

The Dehra Dun Shiwalik Forests are home to a fairly large number of Elephants. Since 1954, the forests have been continuously felled and or, manipulated in such a variety of ways that they can no longer be regarded as an effective home to the Elephants. Vast areas have been converted to *Eucalyptus* and other plantations or opened up to agriculture. Serious erosion has widened the "Raos" and devastating fires within the Rajaji Park have destroyed much of the edible biomass.

Fallout of Habitat degradation

Roads, power channels and rehabilitated populations have all fragmented the original forest to such a degree that the diminishing habitats and degradation of prime forest area have created a situation where beleaguered Elephants are left with less and less room for normal movement and feeding. Savannah type of woodland (as earlier seen in Golatappar, Gulrani, Motichur) has been converted into *Eucalyptus* plantation, other prime feeding areas are overrun with *Lantana* and *Parthenium*, and everywhere livestock and man are to be found in the forest from dawn to dusk. This author estimates that 60% of the habitat has disappeared within the last 46 years. With nowhere to go and an ever diminishing food supply, the Elephants are resorting to increasing crop-raiding with every season and are coming into conflict with expanding human interests. Most severe wildlife problems are associated with lands that have in one way or another been misused. Although some species occasionally increase to impressively high numbers, they tend to become serious pests at such levels. This is actually a symptom of land misuse.

Crop raiding : With a diminishing normal food supply in the forest, Elephants naturally turn to the cultivation surrounding the forests for food. Frustrated here by farmers protecting their crops they become aggressive and incidents of manslaughter are the result. The group of Elephants currently moving within the Golatappar, Barkot, Ghamandpur area numbers around 60. Splitting up into feeding parties of 12-14 members, they carry out night raids on the cultivation in Ghamandpur, Lysterpur, Laltappar, Shergarh and Chiddarwala villages. In Ghamandpur and Lysterpur alone (cultivated area 323.75 ha) crops worth nearly Rs. 40,00,000 have been destroyed in the past 2 years. A major problem has arisen on how to manage and conserve this animal and simultaneously protect human interests.

Researchers on Elephant behaviour like Sukumar (1989) in India and Douglas-

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Hamilton (1975) and Chadwick (1992) in Africa and Asia have conclusively shown that crop raiding increases to undesirable levels in degraded and fragmented habitats. When the energy cycle in a habitat is changed or interrupted, available food is suddenly decreased and Elephants began to display abnormal behaviour patterns. The entire concept of ecology is based on the principles of energy circulating in an ecosystem. Energy from the sun is converted into sugar and starch and stored in vegetation which is then consumed by herbivores turned into proteins and this is further consumed by carnivores, the carcass being consumed by scavengers which return the salts to the earth.

Habitat Management issues

In the long term, management of such groups will have to involve strictly adhering to the principles of ecology, rather than forestry, and perhaps an attempt should be made to restore the proportion of woodland : grassland : forest that existed in 1960s. The Elephants ability to alter drastically the landscape it lives in is not to be taken lightly. It has to be emphasised that the continued raising of plantations of alien species of trees must cease immediately in favour of native species of grasses, trees and shrubs, all over the Elephants habitat irrespective of whether it falls within reserved forest or national parks. This is to help to distribute the population over a wider area, and thus to reduce their concentration around cultivated areas. Since vegetation and herbivores are peculiar to a region it is incorrect to think that forest or vegetation imported from a different region will be consumed by herbivores of another. Each evolve for one another.

Dehra Dun being blessed with high rainfall, high humidity and high temperature for much of the year, all three ensure a profuse growth of a diverse range of plants, and the remaining natural forests show that nature has evolved a method to make full use of the abundant rainfall. The regeneration potential of forests and woodland under the beneficial influence of the monsoons is another factor which is of great importance. The wilderness can make a comeback if allowed to do so, and this means stringent controls on its exploitation through fire, felling and encroachments.

Fire by itself is a major agent of change and can actually improve a habitat if used carefully. By this, it is meant that areas can be fired earlier in the season rather than late, (when major conflagrations occur and are out of any control), creating avenues which slowly develop fire resistant species of grasses and simultaneously forming effective fire breaks. Major conflagrations are prevented, and young plants get a chance to colonize the area effectively. Actually our knowledge of fire ecology in a tropical forest is inadequate, inspite of fire being an intrinsic part of management.

We have a 3-tier forest, with a top canopy of Sal (*Shorea robusta*) 15m to 21m above the ground. There follows a middle canopy of shorter trees such as Rohini (*Mallotus philippensis*), Sandhan (*Ougeinia oogeinensis*), Kachnar (*Bauhinia variegata*) etc. followed by the shrubs and tall grasses. All work together in breaking the rainfall to a trickle which then seeps into the ground slowly, minimising erosion and maximising ground water retention. Thus many of the benefits accruing from heavy rains are retained in the soil and abundant moisture is available for the germination and growth

of plant species for much of the year. The raising of monocultural stands leaves the soil bare to the forces of erosion in wind and water. Fertility is lost, moisture is lost and the equilibrium (which is very fragile in climax forests) is disturbed, virtually irreparably. Most important of all, the food of the herbivores is found in the canopies of the cover: even the Elephant cannot reach beyond 5m with his trunk. With the removal of the understorey all important cover is lost. Felling and encroachments in forests are an administrative problem and both need to be dealt with strictly by forest officers. No degree of leniency is to be shown to offenders.

The task of increasing edible biomass in herbivore habitat has yet to be seriously being addressed in silviculture operations of the Forest Department. The emphasis must be on raising nurseries of plants which are edible by wildlife and then planting them over large tracts of forest, to restore canopy cover.

Human interests : Human interests are intrinsically tied to successful conservation programmes of the entire ecosystem, and it would perhaps help to develop programmes on the "Resources" theme. This has been successfully implemented in some African countries and in Mongolia, New Zealand and America. The survival of wildlife everywhere is entirely dependent on the human population living around it, and off it. The countries mentioned above have created programmes which permit people to make to good living off wildlife resources, simultaneously ensuring the survival of healthy populations of all species found in the ecosystem. They have accomplished this by involving the local population in wild areas on a profit sharing basis and so increasing their dependence on the local natural resources. This has helped to bring an equilibrium into place, in which there is some sort of balanced use of the available resources. In India there is a skewed use of resources. Simply put, the timber offtake is very high leaving large herbivorous populations (another resource) without food and shelter which then raid cultivation (another resource) and clash with human interests. Involving cultivators in the management scheme for the resources and ensuring that they receive some part of the benefits will result in a more balanced use and ensure long term survival of the resource base. Good economic management and ecology must go together for the successful survival of species in the long term. It is the only way to ensure the survival of this non-renewable resource.

The Rajaji Park

Work on the layout of the Rajaji Park began in early 1981 under the guidance of Shri Vijay Bahadur Singh IFS, the Additional CCF (Garhwal). A year later the boundaries of the proposed park had been drafted and finalised after detailed ground surveys, and the reports submitted to Government subsequently discussed the major contentious issues of (a) the physical barriers between separate units of Chilla Sanctuary and Motichur Sanctuary, (b) the presence of human settlements within the four areas of the proposed park, both of which were a threat to the existence of a healthy wildlife population. The park was notified to provide a continuous stretch of forest upto Corbett National Park. However the issue of the physical barriers has, over the years (since 1983 when the park was officially proposed at the meeting of the UP Wildlife Board and the proposal accepted) become a permanent one. With Government having consistently shown a distinct lack of

purpose in proceeding with the removal of the constraints and the creation of a viable National Park in this ecologically fragile area, it must now be asked, what is the future of 852 km^2 of forest which was to be given protection ? Fourteen years on, a lot has changed: traffic on the road stretch between Raiwala and Haridwar has increased over 10-fold, the population of Tehri Dam Colony in Johra has also multiplied, high rise apartments have come up between Motichur and Bhimgoda. All these together have nullified any gains which would have accrued through the creation of a corridor to help movements of Elephant. To make matters worse, the Ganges power channel is a permanent impassable barrier for all animals and the tract of Majhara land which lies between the main Ganges river and the power channel has also been completely occupied by cultivators.

With this dismal scenario, new thinking must be resorted to, to find a viable alternative which will (a) preserve and protect the Shivalik hills, their flora and fauna (b) permit controlled use of the habitat by a fast increasing human population.

Recommendations

The Sanctuaries complex in the Shiwaliks : Some success might be achieved if the Chilla Sanctuary is first separated from the park, and then developed as a separate entity. It can be expanded eastwards to merge into Corbett National Park keeping the Chilla-Kotdwar road as a Southern boundary. The Northern boundary can be along the watershed line. It is to be noted that there are several small settlements in this tract also.

The Motichur, Kansrao and Rajaji sanctuaries can then be managed as a single unit, with the "Core" being kept to 1-2 km width on either side of the main Shivalik ridge line. Expanding this unit is not a feasible proposition, as there are two highways bisecting the unit, i.e. Saharanpur-Dehra Dun highway in the West and the Dehra Dun-Haridwar State highway in the East. However, some thought can be given to connecting the Kansrao sanctuary to the Tirsa Reserved Forest via Golatappar (Barkot range), and also by the Song river. This may or may not become a "corridor" in the future. Some thought must also be given to habitat improvement between Kansrao and the Song river forests bordering the settlements of Shergarh, Laltappar and Chiddarwala. There has been substantial loss of crops and even life from Elephant depredation over the last few years, partly because of Elephants being reluctant to move across the highway. It may be possible to construct a long flyover from Laltappar upto Chandichowki a distance of about 3 km, supported by pillars, leaving the ground below clear of traffic to allow Elephant movement. This will ease the stress on settlements and on the habitats which can be built up through judicious planting of native flora.

Protection from Elephant depradation

Protecting human interests chiefly involves keeping Elephants away from cultivation, as this is where humans confront Elephants. Agricultural input costs have risen too much for even marginal farmers to sustain damage. And in their case, damage is usually total. A 0.20 ha field is completely devastated by 3-4 Elephants within 3 hours. Elephants have

become familiar with human activity and the accompanying noise around them, and no longer move away from human presence as they did earlier. They do not associate fear with humans. This is of course because they have come to accept the woodcutter, grass cutters, graziers with cows and buffaloes and cyclists that are in the forest every day. Intelligent animals, they have learnt that one trumpet and a mock show of aggression will scatter humans in no time. So humans come closer to them, and then one or two get killed. The Elephant loses his fear even more. So when a group gets into a crop field, no amount of noise, fire and numbers will scare them off. When they do move away, it will be after receiving a gunshot wound. It is no surprise that recently stories of electrocuted and wounded Elephants are being heard. Frustrated cultivators are resorting to these extreme measures to safeguard their crops at night. Being small scale farmers, they have to work elsewhere during the day, and cannot keep awake at night to guard their fields.

Various methods have been tried to keep Elephants off cultivation. All are successful to varying extents and all have their advantages and drawbacks.

Trenches : The simplest, effective barrier is a trench dug 1.8m deep and 2.75m wide, with intervening septa every 2.5m-2.75m of length. Anything less in width is no barrier to a large Elephant, and the author has seen a large bull Elephant stride across a 2.5m wide trench with ease. A trench of the above dimensions was dug around the authors' farm in Dehra Dun and it kept Elephants off the fields successfully for 2 years before it required to be deepened and widened. Planting *Aloe vera, Inga dulcis* or cactus on the embankment consolidates the earth further and increases the life of the trench. Disadvantages of trenching are that it takes up space - 2.75m of width for a small farmer is a lot of land - and it requires upkeep every two years. Its advantage is that it is cheap and requires no technology in support.

Electric fencing : Electric fencing is used effectively in the Southern tea, coffee and cardamom growing States. This method is used for these high value crops and has proved its efficiency. However, the wire used can be stolen, and the battery requires regular charging. This means some cost is necessary to keep the circuit going.

Sound amplifiers : In Africa, sound amplifiers have been used very effectively. These gadgets produce a subsonic sound wave which Elephants can hear and do not like, and makes them run out of its range. These gadgets also work on electric power, produced by either electricity or sunlight, and require loudspeakers on tall poles spaced about 120 m apart.

These are three effective ways to keep Elephants away from cultivation. But in the end, all fail in some way, and Elephants do cause a lot of damage which is irreversible in that season.

Elephant conservation measures

The core issues remains - what is to be done about the increasing population of the Elephants, in relation to its fast diminishing habitat? This is the contradiction facing all wildlife officers. Forest land is being diverted to agriculture inspite of stringent laws and the very best efforts of the government to stop this. This is a world wide phenomenon in this decade, and is because of the rising human and livestock

populations. Efforts towards increasing the population of species in fixed area national parks and sanctuaries will not yield positive results as after a point, populations of all species will decline from intra-specific competition and conflict. The life span of a species is largely determined by the degeneration of its dentition and thus its ability to process its food. As its teeth degenerate with advancing age, it is unable to efficiently use high quality food for its body growth. Essential amino acids and fatty acids are denied to it, and their absence leads to decline in vigour, including reproductive vigour. An animal at this stage does not affect the population dynamics of its species, and for the remainder of its life is feeding off the ecosystem while denying this food to younger, more vigorous members who can affect the population. It boils down to the survival of the youngest and fittest of the species. The number that survive at equilibrium may well be below that required for the survival of the species. When space is diminishing, equilibrium for all species will be temporary and will constantly change. However, it could be possible to improve upon the longevity of species survival by active intervention in the population dynamics of species within ecosystems. By this, the population of a species could be manipulated in a way that is has a larger proportion of breeding-age animals as compared to older animals, which could be culled. This will ensure a population with high genetic vigour and a better, more efficient use of edible biomass in the system. This is hypothesis assumes a very detailed knowledge of the ecosystem and its population dynamics, but is possibly one of the very few options available to ensure species survival in a diverse tropical ecosystem where there is a high degree of interrelation between the variety of resident species.

Using modern methods, efforts may be directed to controlling the increase in numbers in herds. This can be done by either permitting culling through controlled hunting as is done around the world, and using the revenue earned for the improvement of management methods, or by tranquillising females and sterilizing them permanently. This last method is painless, but has its dangers and some females will be lost from over dosage or infection. Each has its advantages, but there is really no painless way of controlling Elephants.

SUMMARY

The Dehra Dun-Shivalik belt is the North-Western limit of the vast range of the Asian Elephant. It is also a region which has been heavily populated in recent years and, this, along with highways, hydro electric schemes on the Ganga, has greatly disrupted and reduced the effective habitat and migrations of the resident Elephants. Elephant-man confrontations have increased to unacceptable levels with Elephants wreaking havoc on cultivation. The Rajaji Park area which even 16 years after notification has not been declared a National Park, has been bisected into distinct sectors by highways, power channels and settlements and it can no longer sustain the large population of Elephants using its tract. This article seeks to encourage thinking on new lines to mitigate this problem. The ideas and solutions suggested herein are entirely the author's own.

हाथियों का संरक्षण, प्रबन्ध तथा मानव हितों का सुरक्षण

कमल प्रसाद

सारांश

देहरादून-शिवालिक मेखला एशियाई हाथियों के मिलने के विस्तृत क्षेत्र की उत्तर पश्चिमी सीमा है । यही वह प्रदेश भी है जो विगत वर्षो में मानवों से घना बस गया है और इस तथ्य ने राजमार्गो, गंगा पर बनी जलविद्युत योजनाओं के साथ मिलकर यहां रहने वाले हाथियों को बहुत परेशानी में डालकर उनका प्रभावी प्राकृतावास और गमनागमन बहुत घटा दिया है। मानव हाथी भिड़न्त अस्वीकार्य सीमा तक बढ़ गई है और हाथी खेती का सर्वनाश तक कर डालते हैं । राजाजी पार्क की विज्ञप्ति निकल जाने के 16 वर्ष उपरान्त भी यह क्षेत्र राष्ट्रीय उपवन घोषित नहीं किया गया है और सड़कों, विद्युत धाराओं और बस्तियों से यह भिन्न-भिन्न खण्डों में इतना विभाजित हो चुका है कि इस क्षेत्र के लिए इसे उपयोग करने वाले हाथियों की अधिक संख्या को संभाल पाना सम्भव नहीं रह गया है । प्रस्तुत अभिपत्र में इस समस्या को घटाने की नई दिशाओं में सोचना प्रोत्साहित करना चाहता है । यहां जो विचार और समाधान सूचित किए गए हैं, वे लेखक के अपने निजी हैं ।

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