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MITIGATION OF HUMAN - ELEPHANT CONFLICTS IN SRI LANKA

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INTRODUCTION

The basic inability of human beings and wild elephants to co- exist without some conflict was recognized in the ancient Indian treatise called "*Arthashastra*" written by Kautilia between 300 BC and AD 300 (Lahiri - Choudhury, 1991). Today, throughout Asia, elephant depreation has become a way of life. Increasing human population and incresing agricultural land use have considerably reduced the area available to wildlife in general and the elephants in particular in Sri Lanka since the turn of century. In addition, the activities of the ivory poachers and guerrillas have also tended to concentrate elephants into smaller ranges of relatively greater safety such as national parks. The obvious corollary to a decrease in a species' range is a decrease in its resource base (Croze *et al.*, 1981). The continuous contraction of the habitat available to elephants serves also to cut off certain channels of their response such as emigration and dispersion (Wastson & Bell, 1969). For a wide - ranging species like the elephant, this means that the animal's flexibility to buffer the effects of local resource depletion by moving elseshere is lost. Such a situation has led to an escalation of conflicts between man and elephant in Sri Lanka.

Ratnam (1984) in discussing the problem of crop depredation by elephants in peninsular Malaysia considers the phenomenon into three categories :-

1. where a group of elephants has been marooned by development into tiny pocket of forest which, being unable to meet the food requirements of the group, forces the animals to raid the surrounding agricultural crops.

2. where a group of elephants with sufficient useable habitat. for various reasons, still raids large adjacent development areas with a broad but unified boundary with the forest.

3. where a group of elephants with sufficient useable habitat raids a patchwork of villages, farms, orchards or smallholdings with no clearcut or unified boundary between the forest and the developed areas.

To this in Sri Lanka must be added the fourth category of crop depredations and human fatalities caused by the solitary bulls during their wanderings in search of oestrous females. The long-tern servival of the elephant in the wild in Sri Lanka will depend on how effectively the human - elephant conflicts are mitigated. The problem of elephant depredation is a complex one and there is so easy solution to resolve the problem. In Sri Lanka, man and elephant have to live together with mutual adjustment.

METHODS TO KEEP WILD ELEPHANTS AT BAY

Although it may be impossible to eliminate the human-elephants conflict totally, except by exterminating the offending animals, there is no doubt that this problem must be minimised if conservation efforts are to succed in developing countries facing harsh socio - economic realities (Sukumar, 1991). There are several methods to keep the wild elephants away from cultivated areas and according to Lahiri -Choudhury (1991), they can be divided into two catergories :-

1. Methods of combat which deal with elephants actually raiding crops, and

2. Preventive measures, which are designed to prevent elephants from such raiding.

Combative Methods :

Use of Spotlights :

Powerful car battery-operated spotlights have been found to be very effective in India (Lahiri - Choudhury, 1991) to deal with most crop raiders since elephants with a few exceptions, move away from powerful beams of light. The light must be strog and powerful to be effective. The use of torch light in fact attracts curious elephants to move towards the source (as happened in Xishuangbanna in Southern China). In the cultivated areas, a tractor or a jeep fitted with spotlights can be fairly effective in dislodging wild elephant provided the vehicle can be taken close enough to the animal. But once the vehicle is withdrawn, the elephant may come back (Sukumar, 1986).

Use of Domesticated elephants :

In India, domesticated elephants (called *koonkies*) are often used to drive back wild elephants into the forest, usually during the daytime (Lahiri -Choudhury, 1991). By using *koonkies,* a herd of about 60 wild elephants was chased away in 1980 successfully in West Bengal in NE India.

Use of fire crackers :

This is one of the most commonly used methods to chase wild elephants off cultivated areas by farmers. But elephants soon learn to recognize such psychological bluffs. Rockets that end with a bang appear to be more effective, particularly with family groups. Bamboo gun rockets have been successfully used to chase wild elephant out of cultivation in India (Morris, 1958). In the past, Wildlife Department officials in the field used to provide farmers with thunder flashes. Although these devices could not eradicate the elephant raids, they were able to mitigate the problem (Punchihewa, 1989).

Use of Loudspeakers:

In souhern India, the play back of a tape containing a jumble of noises, through loudspeakers was efective in keeping away a raiding bull elephant from a coconut farm (Sukumar, 1986). On the other hand, results of controlled experiments with tape recorded tiger calls have not been conclusive (Lahiri - Choudhury, 1991). The use ofhigh frequency sound "beepers" along with an electric fence may have potential in repelling elephants (Piesse, 1982).

Use of infrasound:

Asian elephants are known to communicate with one another using calls that range in frequency from 14 to 24 Hz (Payne *et al.*, 1985). Given that the Asian elephants can perceive calls at such low frequency better than calls at higher frequency in grassy savannahs or woodlands, over large distances (1.5 km or more), the play back of recorded distress calls of elephants could be used to drive back the wild elephants along cultivated areas. But this needs further research in identifying a frequency that is intolerable to elephants in the wild.

Use of fire arms:

Shooting with fire arms and guns over elephants may be effective in driving the animals back into th e forest. But some belligerent bulls may ignore such noises and move into cultivated areas.

Preventive Measures:

Common sense:

Gamini Punchihewa (1989) asked some Veddas in the Gal Oya Scheme the most important question as to how they managed to save their crops despite their small number vis-a-vis the density of wild animals in the area. To this question, one villager replied,

"Those days a few people existed and in stretch of land, we cleared the jungle, and prepared the land for *chenas* (shifting agriculture), we put our stockade fence, and we always avoided elephant paths. If we did come across them, we fortified these vulnerable points with giant jungle logs. We kept watch from the heights of trees..... Today most of these so called farmers come from towns, they do not keep watch but sleep and only when they awake do they know what had happened to their crops" (Punchihewa, 1989). It was also observed that most of the reported incidents of elephant damage came from colonists who were settled from towns or urban areas.

Use of Repellants :

Chemical repellants have been used as barriers, but without much effect so far (Lahiri - Choudhury, 1991). The problem is that chemicals may not persist for a long time under wet conditions. However in Sumatra, the Dutch planters even tried to hang rags soaked in human urine as a repellant against wild elephants raiding the oil palm plantations. More recently, in Zimbabwe a series of tests was conducted on free-ranging elephants to evaluate the effectiveness of a Capsicum-based aerosol as an elephant repellant, and the results indicate that it is an effective short-term repellant, up to 100m (Osborn & Rasmussen, 1995).

Changes in land -use pattern :

The most sensible option is not to plant palatable crops along the periphery of elephant reserves. Suger cane, oil palm, rubber and pineapple plantations in the vicinity of reserves having wild elephants will inevitably act as supermakets for elephants. Having established such plantations in or along elephant habitats, it would be naive to believe that they would escape the notice of the elephants.

Use of Buffer-zones :

Seidensticker (1984) recommended the establishment of "wide buffer zones" which lack any cover between the cultivated area and the natural forest. These zones, to be effective as barriers to elephant movement, should have zero appeal to the elephants. Although the idea is good, certain bulls can cross these areas into the cultivated fields.

Trenches :

To be effective, the trench has to be at least 2 m deep, 2 m across at the top and 1.8 m across at the base. However, under wet conditions, some "EAE" (Elephant Arse Erosion) can occur, often resulting in a reduction of the effective depth of the trench (Blair & Noor, 1981). The effectiveness of the trench can be improved by either strengthening the walls with concrete (expensive) or by growing

thorny vegetation along the inner-trench edge. A further improvement in the effectiveness of the trench can be made by erecting an electic fence along the inner-trench edge. But these efforts will be expensive. Alternately, s hallow trenches 1.2 m deep and 1.2 m wide can be used provided they are covered with a layer of bamboo matting which presents a psychological rather than a physical barrier. The elephants in India, feeling the bamboo mat with their trunks find it unstable and avoid treading on it. They havean instinctive sense about what surface will bear their weight (Lahiri - Choudhury 1991). The traditional elephant - proof trench, if well constructed and maintained, can be useful in minimising elephant depredations. But its usefulness must be weighed against the cost of its construction and maintenance. In Malaysia, trenches did reduce the extent of elephant damage to oil palm plantations, but usually not significantly enough to warrant their high cost (Blair & Noor, 1981).

Log fence :

In especially vulnerable areas, log fences (15 to 25 cm diameter) wrapped in barbed wire have been used in Malaysia along trenches. But these operations are very expensive and involve the extraction of suitable timber from the forest.

Electric fence :

In Peninsular Malaysia, the use of non-fatal electric fence has been found to be most effective in containing elephant depredations in oil palm plantations (Blair & Noor, 1981). The fence essentially consists of 2 strands of high tensile high carbon galvanised steel wires through which an energizer (operated either by a battery or solar panel) passes every second an electric pulse of 5,000 volts, which is non-lethal because of its very short duration (3/10,000 th of a second). It appears to be the cheapest and most effective from of all physical barriers (Lahiri-Choudhury, 1991). In one instance in Peninsular Malaysia, the fence was paralleled by elephants' footprints and dung that the electric shock had on occasions literally "knocked the shit" out of the elephants (Blair & Noor, 1981). But it is difficult to fool elephants. The tuskers have an advantage in that the ivory does not conduct electricity and so the tusks can be used to dislodge the fence or insulators. Constant maintenance is the key to the success of electric fences.

Translocation :

Pocketed elephants responsible for crop depredations can be rounded up *en masse* and either captured and moved to another safe area or driven to a new area (elephant drive). But in most cases, such translocated animals are known to have returned to their former habitat. One of the successful translocations was that in

Sumatra where a herd of 70 elephants was driven from sugar cane plantation to the way Kambas Game Reserve in 1984/85 (Santiapillai & Suprahman, 1985).

Selective removal of male elephants:

Given the fact that much of the crop depredations is caused by lone bull elephants, Sukumar (1989, 1991) argues that their removal will reduce depredation and save human lives to a far greater degree than the elimination of elephants from family herds. If only a few (less than 10 animals) bulls are causing crop depredations, then it is indeed sensible to remove them from the area of conflict. However, in Sri Lanka, the elephant is discontinuously distributed in small, local populations (or demes) and if all the crop rading bulls were to be captured and domesticated, then it would lead to a significant reduction in the genetic variation in the population and will also help accelerate the demise of several small, local populations of elephants. Removal of elephants should be the last resort of the management authority after all other options have failed. The policy of capturing a few chronic crop raiding elephants may be justified in the short-term, and undeniably has beneficial secondary consequences in providing a few animals to improve the genepool of elephants in captivity but such a policy should not become an institutionalised practice accepted as routine, in the present state of ignorance concerning the validity of assumptions on which it is based.

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