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The Economy and Environment Program for Southeast Asia (EPPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 10 member countries: Cambodia, China, Indonesia, Laos, Malaysia, Papua New Guinea, the Philippines, Sri Lanka, Thailand, and Viet Nam. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers.

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# Elephants And Electric Fences: A Study From Sri Lanka

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Elephants are one of the 'big five' wildlife species; their survival is one of the 'holy grails' of conservation. Unfortunately, because of their size and migratory behaviour, elephants often come into conflict with people. This is especially true in densely populated Southeast Asia. A new study from Sri Lanka looks at one strategy to address this problem - electric fences. ➡

A summary of EPPSEA Research Report 2005-RR11, *The Effectiveness of Electric Fencing in Mitigating Human-Elephant Conflict in Sri Lanka*, by L. H. P. Gunaratne and P. K. Premarathne. Address L.H.P. Gunaratne, Department of Agricultural Economics and Business Management, Faculty of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka. Email: [lhpguna@pdn.ac.lk](mailto:lhpguna@pdn.ac.lk)

# "Electric fences are not ...

➤ It found that, although electric fences do help to mitigate conflicts between elephants and humans, they do not completely eliminate the problem and do not offer a 'stand alone' solution. The study looked at why electric fences do not work and found that poor, ad-hoc decisions were a key factor determining success or failure. This implies the need for an integrated approach to solve the problem of human-elephant conflict (HEC). Such an approach should involve comprehensive land use planning and habitat enrichment along side well-planned electric fencing where appropriate.

The study was undertaken by L.H.P. Gunaratne and P.K. Premarathne from the Department of Agricultural Economics and Business Management at the University of Peradeniya, Sri Lanka. Their aim was to get information that would help shape conservation policy and so ensure the efficient allocation of scarce conservation resources.

## The Elephant Problem

The study was conducted against a background of escalating conflict between farmers and wild elephants in Sri Lanka. This situation has been deteriorating over the last five decades and is now a major social and political issue. Since the early 1900s, the elephant population has been drastically reduced to the present level of 3,500. This was primarily due to depletion of natural forests, which have been reduced by 50% in the last

50 years, and to the increase of the human population.

Today, the remaining elephants are confined to national parks and some forest pockets in the northeastern, eastern and southern parts of the island. However, given the elephants' huge food and water requirements, it is inevitable that free-ranging elephants still encroach on crop fields outside the designated park areas.

As small farmers and wild elephants compete for steadily dwindling land and water, so the conflict between them has gotten worse. Roaming elephants raid crops, damage houses and, in some instances, injure or kill people. In frustration, many farmers have resorted to killing elephants to protect themselves and their livelihoods.

## Fencing In The Problem

Electric fences have been set up to keep elephants away from farmland because the traditional ways of

keeping elephants out - such as shouting, twirling, lighting firecrackers and making loud noises - are no longer effective. To date, over 500 km of electric fence has been constructed in several parts of the island by the Department of Wildlife Conservation (DWLC) and by private companies and NGOs. In the next few years, the DWLC plans to extend the network of electric fences to several new areas in the northwest where human-elephant conflict is most intense.

However, various problems have come to light as more fences have been put in place. The initial cost of establishing electric fences is high. They also disrupt the relationship between rural communities and their surrounding forests. Furthermore, even if fences work, they sometimes merely shift the elephant problem to other areas.

## Evaluating The Fences

The effectiveness of five electric fences was evaluated, all in areas that

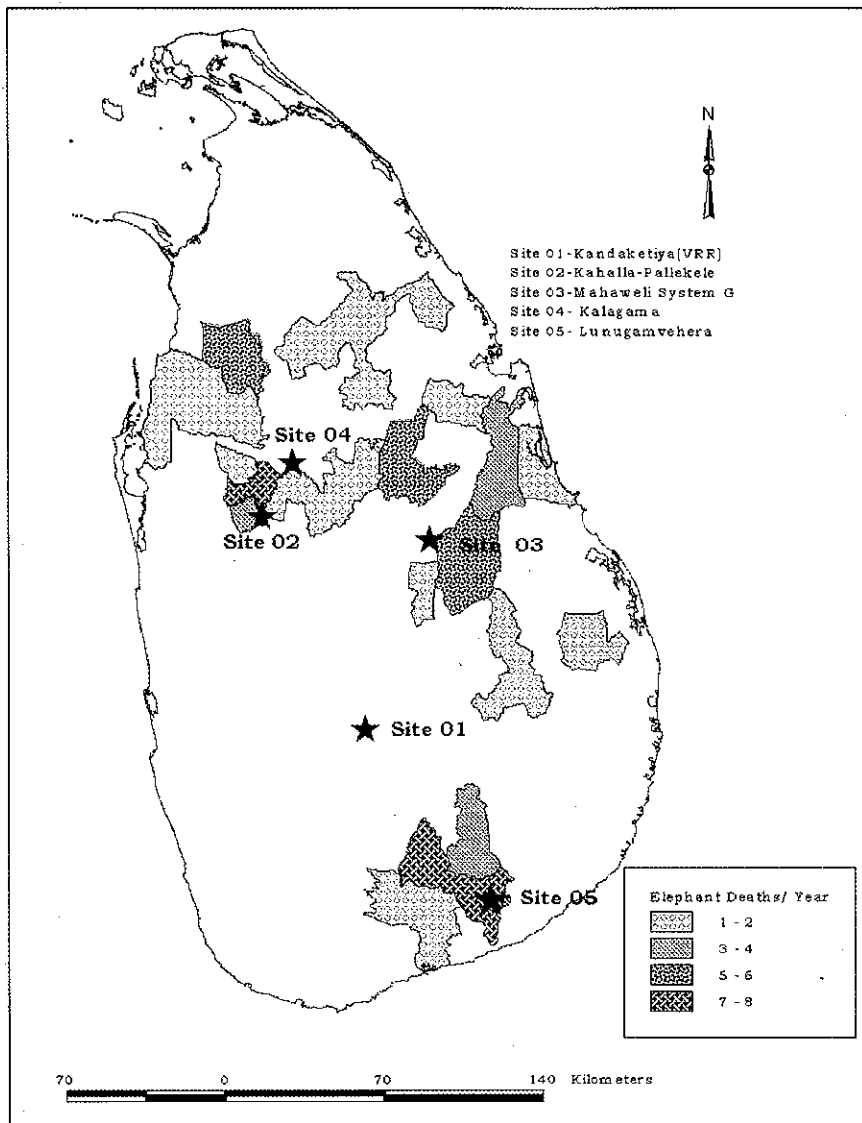
Year	Human deaths by elephants	Number of elephants killed
1991	32	32
1992	22	90
1993	60	103
1994	55	113
1995	57	94
1996	47	130
1997	54	164
1998	53	148
1999	81	107
2000	63	150
2001	34	151

# a 'stand alone' solution"

have experienced elephant-human conflict. They were: the Kandeketiya fence near the Victoria-Randenigala-Rantambe Sanctuary; the Herathgama fences near the Kahalla-Pallekele Sanctuary; the fence around Mahaweli System G; the Kalagama fence at the Balaluwewa-Kalawewa Sanctuary; and the fence in the Lunugamwehera National Park. These study areas were representative of the different fencing strategies used in Sri Lanka and included fences that gave partial or full protection to wildlife areas and farms.

From each of the fenced areas selected for the study, information was collected from field plots that were both protected and not protected by fencing. Data was collected from land near different sections of each of the fences, in order to see whether the protection provided by each fence varied along its length.

A structured questionnaire was used to survey households. The questionnaire gathered general household, agricultural and land ownership information. Data were also collected about the damage elephants caused and how the animals' impact had been mitigated by the construction of electric fences. People were asked for their opinions on what would make electric fences more effective. Details were also gathered on the electric fences



themselves and their maintenance.

Questionnaire data was supplemented by information received from key informants and secondary sources.

## Do The Fences Work?

Overall, it was found that, although electric fencing does help mitigate HEC, it is not capable of completely eliminating conflict. In each survey area, a number of technical as well as socio-economic

factors affected levels of success.

Technical failures mainly affected the early fences and included incorrect spacing and placement of wires, power failures and problems with supporting posts. Other problems resulted from failure taken into account elephant behaviour and distribution patterns. For example, in some cases, it was found that electric fencing had split the elephant population and that the remaining

elephants raided farmland more often than they had before fencing.

A social factor that affected the success of electric fences was whether the local community supported the project in their area. Community support was critical in several ways. Labour is required to establish a fence and this was usually drawn from local communities. However, the most important way in which communities helped was by providing support to maintain fences. Another important observation was that electric fencing was sometimes seen as a 'last solution'; this meant that no one was interested in setting up any other barriers, such as vegetative fences, to provide a second line of defence.

## **Making The Fences More Effective**

According to local people, electric fences will be more effective if combined with other mitigation measures. Among the suggestions made by them were establishing corridors between forest areas to deter migrating elephants from invading

human settlements and enriching the elephants' habitat by planting fodder trees in the forest.

One problem is the destruction of fences by illegal timber fellers and illicit liquor producers. Such activities can be policed by well-organized community-based groups. Community organizations thus have a useful role to play protecting and managing any electric fences in their vicinity.

## **What Should Be Done?**

The findings of the study show that a thorough appraisal is needed before electric fences are established and that adequate resources should be invested in their construction and maintenance. Local people should be involved in a fence's planning and construction. They should also be supported so that they can play a role in maintenance and protection. Appraisals should pay attention to present land use patterns, the degree of habitat fragmentation in surrounding areas, elephant behaviour (population size, migratory

pattern etc.) in nearby reserves, and local peoples' priorities and perceptions of the elephant threat.

A successful strategy to deal with the elephant problem must be much more far-reaching than it is at present. Such a strategy should include a comprehensive land use planning exercise where elephant habitats (i.e., park areas) are grouped and interconnected by elephant corridors. The elephants' habitat should then be enriched and fenced. Cost effectiveness should be the prime criteria in shaping any strategy. For example, in some situations the translocation of aggressive elephants may cost less than fencing. Electric fencing should be seen as part of such a long-term, holistic approach, not a stand-alone solution.

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