

Converting dung to dollars to conserve the elephant in Sri Lanka

*The earth's a thief, that feeds and breeds
by a composture stolen from general ex-
crement.*

—William Shakespeare
(*Timon of Athens*, IV: iii)

Despite its small size (65,610 km²) and high human population density (300 people per km²), Sri Lanka is still home to about one tenth of the estimated global population of Asian elephants in the wild (c. 45,000). But the 1990s had been a decade of disaster for the elephant in the island. While the African elephant's misfortune is in its tusks, for which poachers have slaughtered it in large numbers, ivory poaching is not a major cause of elephant mortality in Sri Lanka, given that tuskers are rare (less than 7% of the males bear tusks). Elephants are being killed in the island not for their ivory, meat or hide, but mainly because they interfere with agriculture. The conflict between man and elephant is nowhere more serious than in the northwest, where between 1992 and 2001, a total of 472 elephants and 231 people perished. During the past five decades, the human–elephant conflict in Sri Lanka had claimed the lives of more than 4000 elephants in the wild. Throughout the island, the conflict between man and elephant has escalated for a variety of reasons. During 2002, on an average, three elephants were killed per week as a direct result of this conflict, and wild elephants in turn killed people at the rate of one per week. Given the rarity of tuskers in the island, the human–elephant conflict has become the most serious cause for elephant mortality in the wild.

The conservation and management of the elephant in Sri Lanka is a complex issue that requires skills and strategies to deal with its populations both within protected areas and outside, where almost 70% of the animals are found. Elephants are running out of space outside the protected areas. Agricultural expansion is gradually encroaching into wilderness areas and natural wildlife dispersal corridors, thereby forcing wildlife and people into increasing conflict over the diminishing unfenced land. While the measures we adopt to conserve the elephant must be based on science, their long-term success can only be assured if we were to exercise some common sense and incor-

porate a mixture of solutions that recognize not only the biological issues but more importantly, the cultural, social and economic aspects of the rural people who share the land with the species. As Graham Child, the one-time Director of the Department of National Parks and Wild Life Management in Zimbabwe, who guided the country to the forefront of international conservation argues, if elephants and their habitats are to survive on a significant scale, 'they must be socio-politically acceptable, economically viable and ecologically sustainable'.

Given their huge size and gargantuan appetite, elephants cannot co-exist with people in areas where agriculture is the principal land use, unless the damage they cause can be compensated. Hence, if the human–elephant conflict is left unresolved, it will only accelerate the demise of the elephant from almost all the agricultural lands outside the system of protected areas. The number of elephants that any protected area and its surrounding region can support will ultimately depend on the goodwill and tolerance of the local communities. Already disenchantment of the local communities in the conflict areas with traditional conservation efforts has antagonized them and made them less willing defenders of the wildlife that frequent their neighbourhood. Understandably, many local communities that bear the brunt of elephant

depredations are turning against the elephant because they identify the animal as the main cause of their misery. We must therefore recognize the fact that the problem of human–elephant conflict in Sri Lanka can be mitigated to a certain extent, provided the local communities can be persuaded to change their perceptions of the elephant, from that of a dangerous agricultural pest to a dependable economic asset. How can the attitudes of the farmers towards an animal that has devoured their crops, destroyed their goods and chattels, devastated their fragile economies, and decimated their people, be changed from one of intolerance to tolerance? This can only be achieved if the local communities are given the means to obtain tangible benefits from the presence of the elephant in their neighbourhood. In the rural areas where the human–elephant conflict is rife, elephants will not survive for long unless a balance is found between their value as an asset and as a liability. Non-consumptive utilization of the elephant on a sustainable basis may perhaps be the only means by which the species can be assured of a long-term future outside the boundaries of the protected areas.

Regrettably, the many workshops, meetings and symposia that were held on elephant conservation, and the number of research studies that were carried out on the ecology of the elephant, and the



Figure 1. A herd of elephants raiding crops in an agricultural area of Sri Lanka.

numerous publications that came out from such studies have not halted the killing of wild elephants in Sri Lanka. Despite much discussion, argument and debate, and despite the efforts of both government and non-government organizations, the conflict between man and elephant shows no let up. While we deliberate, elephants die.

But not everything about elephant conservation in Sri Lanka is doom and gloom. There are some encouraging new developments. Three enterprising Sri Lankans are trying to reconcile elephant conservation with the welfare of the human communities. They have already demonstrated through their innovative, eco-friendly projects that there are indeed ways in which the rural people who suffer elephant depredations can derive tangible benefits from the presence of the elephant. Their projects are designed to utilize sustainably an end-product of the elephant that no one, so far, seems to have cared about – the dung.

An adult elephant on average can produce up to 200 kg of dung per day. Three innovative projects, all self-funded, plan to tap this resource to demonstrate that the elephant can indeed be an asset rather than a pest to farmers in conflict areas. One project, the brainchild of Thusitha Ranasinghe (Maximus Pvt Ltd) deals with the manufacture of paper from elephant dung. It was started in 1997 and has successfully produced and marketed what is known as 'pachyderm' paper. With the exception of toilet paper and chocolate

wrappers, the 'pachyderm' paper can be used to manufacture a variety of items such as notebooks, cards, badges, boxes, albums, and other stationery which have proven extremely popular with both locals and foreign tourists who care about the environment. The second project concerns the transformation of 'pachyderm' paper by Ranjan Rajaratnam, CEO, Badu Pvt Ltd into such up-market, value-added products as lamp-shades and greeting cards. The 'pachyderm' paper used in the manufacture of lamp-shades, given its characteristic texture as a result of the fibrous nature of the elephant dung, provides a soft but bright light, ideal for homes. These items have become so popular that they are regularly exported to the West and therefore are an important source of foreign exchange. The third project, designed by S. Wijeyamohan, a wildlife biologist at the Vavuniya Campus, University of Jaffna, produces biogas from elephant dung for use as a cooking fuel by the rural people in conflict areas.

Biogas produced from elephant dung has a dual purpose: it can be used as a deterrent against crop-raiding elephants through night-time burning along the periphery of home gardens, given that wild elephants are known to avoid firelines set in the forest. While burning firewood as a deterrent will only promote further destruction of our already diminished forests by people gathering fuelwood, the use of biogas on the other hand, would obviate this need to collect

firewood from the forest. Another by-product of the biogas project is the residue, which is a high-quality fertilizer for use in organic farming. Mushroom-growers are well aware of the value of horse dung as a substrate for their fungus cultures. The elephant being a non-ruminant, like the horse, its dung could be used to grow mushrooms. Wild mushrooms grow on elephant dung in the wild. Elephant dung has also proved effective against mosquitoes. Dried dung, if burnt, helps keep mosquitoes at bay.

It must be emphasized that elephant dung alone cannot be a panacea for the ongoing human–elephant conflict in Sri Lanka. Although the use of elephant dung for the benefit of the rural poor is unlikely to eradicate the conflict, it will certainly go some way towards changing the perceptions of the people and their hostility towards the elephant. Elephant dung can contribute towards conserving its producer – the island's largest land mammal. Conservation of elephant in Sri Lanka is inextricably linked to the welfare of the rural poor and the socially disadvantaged, who are struggling to survive in areas frequented by potentially dangerous wildlife. Elephant conservation is not only about the survival of Sri Lanka's terrestrial megaherbivore; it is also about dollars, diversity, and people's welfare too.

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RESEARCH NEWS

Sequencing of the malarial parasite genome reveals potential drug targets to combat malaria

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Malaria remains a serious endemic disease in more than 100 countries in Africa, Asia, Latin America and South America¹. Almost forty per cent of the world population is at the risk of malarial infection. Each year, 100 million people experience malarial illness and there are reports of 1–2 million deaths per year. The mortality rate is between 20 and

50% in patients with severe and complicated disease.

Human malaria is caused by any of the four protozoan species of the genus *Plasmodium*, viz. *P. vivax*, *P. falciparum*, *P. ovale* and *P. malariae*. *P. vivax* is responsible for the majority of malaria cases worldwide, and *P. falciparum*, which is susceptible to chloroquine, causes the

majority of malaria-related fatalities². The problem of chloroquine resistance in *P. falciparum* is increasing in intensity and has spread to almost all *P. falciparum*-infested areas.

The malarial parasite is required to alternate between its vertebrate and invertebrate hosts to complete its life cycle. Transmission of malarial parasite