Human-elephant Conflict: causes, consequences and way forward

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Sri Lanka supports around 6000 wild elephants. The Sri Lankan population play an important role in the overall conservation of Asian Elephants due to number of reasons. First, the original description of the elephant in 1758 by Linnaeus was based on a specimen of the Sri Lankan sub species. Second, Sri Lankan population comprise a distinct sub species and has the highest genetic diversity, Third, Sri Lanka despite having only 1-2% of global Asian elephant range, holds 10-20% of the global Asian elephant population, at a density that is ten times higher than any of the other 13 countries in Asia where it occurs naturally.

One must turn to history in order to understand the reasons that have contributed to such a high elephant density in Sri Lanka. According to the written history, Sri Lanka's civilization is molded by two major factors, Buddhism and Agriculture. One of the main agricultural practices seen in Sri Lanka is chena cultivation, also known as shifting cultivation or slash and burn cultivation, especially, in the drier parts of the island. Here the farmer clears a plot of land, burns it, and cultivates crops for a single cropping season. The following year the farmer shifts to a different plot of land, eventually returning to the original plot after several years. This type of land use practice converts forests into secondary forests and sustains it in that state by preventing natural succession.

Studies done on feeding behavior indicate that elephants in Sri Lanka feed mainly on grasses, herbs and shrub species and avoid large trees. Further, elephants have poor digestive capabilities and to support their large bodies they need to consume about 10% of their body weight (approximately 300 kg of plant matter) per day. Plants have evolved number of adaptations to avoid been consumed by animals. These include either physical (thorns, hairs, etc.,) or chemical (various toxins and deterrents that interfere with the normal physiology of consumers, etc.,) defenses. Generally, short-lived plants such as grasses, herbs and shrub species invest in physical defenses that are energetically cheaper compared to energy consuming chemical defenses shown by long-lived trees. Therefore, megaherbivores such as elephants tend to feed on short-lived plants to avoid exposing themselves to heavy toxin loads. Elephants have overcome the physical defenses of such vegetation by developing thick and tough skin and tolerant digestive tract lining. Elephants also browse on trees that produce secondary metabolites to a lesser extent, and they also tend to feed on tender leaves or bark which has no or lower concentration of secondary metabolites. As these food plants are generally found in grasslands or disturbed habitats elephants tend to be 'edge species' occupying mostly habitats present in forest-edges or eco-tones. Therefore, mature forests have a lower carrying capacity for elephants (ca. 0.2 elephants/ km^2) while disturbed habitats that are created mostly by slash and-burn or shifting cultivation the carrying capacity can be as high as 3 elephants/km^2. Thus, chena farming in Sri Lanka has created elephant habitats for thousands of years as a byproduct of the farming practice contributing to a high density of elephants.

The role of the elephant in Sri Lanka has changed over the years from an object of reverence to an instrument of war, a beast of burden, to a conflict causing animal. At present elephant-human conflict is the main driver that is threatening the long-term conservation of Asian elephants in Sri Lanka. Even though respective governments have invested heavily to mitigate this problem (around Rs. 300 million annually), which maligns the vast majority of Sri Lanka's rural populace, to date no significant progress has been made towards finding a long-term solution to this problem.

The present strategy for management of wild elephants was conceived several decades ago based on a report drawn up in 1959 by a committee appointed to develop a plan to preserve wildlife. The report recommended that elephants should be restricted to protected areas managed by the Department of Wildlife Conservation (DWC) and a system of corridors should be established to link the protected areas to facilitate free movement of elephants. This recommendation has been based on two beliefs, that the preferred habitat of elephants is undisturbed forest and elephants undertake long-range seasonal migrations, both of which were found to be erroneous assumptions based on current research findings. Unfortunately, six decades later, we are still pursuing this strategy even though there is mounting scientific evidence to prove that both these beliefs are untrue.

In order to mitigate the escalating human elephant conflict, nearly 13% of the land area of Sri Lanka has been declared as Protected Areas (PAs) under the management of DWC, where the central focus has been conservation of wild elephants. Most of these areas before being declared as PAs, were managed by farmers mainly under a slash and burn regime. However, when an area is declared as a protected area, farmers no longer have access to these lands. Therefore, the slash and burn cycle that existed in these lands will now be replaced by another cycle called ecological succession, which will over time convert secondary forests into mature forests. Studies done on carrying capacity of different landscapes for elephants have clearly demonstrated that a secondary forest can support 15 times more elephants than a mature forest of similar extent. Therefore, the carrying capacity of the protected areas that have been set aside for elephant conservation has declined over time, due to removal of the key process that created elephant habitat in these landscapes, slash and burn agriculture. Hence, it is no surprise that elephants must come outside the protected areas to find food, especially during the dry season. These elephants invariably come into conflict with humans, especially bull elephants or bull groups that are responsible for more than 80% of the conflicts reported.

Another management strategy pursued by DWC is to establish forest corridors between PAs managed by DWC to facilitate free movement of elephants, with the notion that this would prevent elephants from coming into human use areas and thereby reduce elephant depredations. The corridor concept was conceived in the 1950's based on the assumption that elephants migrate long distances as in the case of African Elephant. In 1959 a plan was prepared to establish a network of corridors. However, only two of these proposed corridors (Nilgala corridor between Maduru Oya and Gal Oya and Kuda Oya corridor between Udawalawe and Lunugamvehera) have been established to date. However, studies

conducted over the past two decades on elephant movement patterns by the Centre for Conservation and Research in collaboration with DWC, using either radio telemetry or satellite telemetry of a sample of more than 60 wild elephants have shown that elephant do not engage in long range migrations. Instead, they have well defined home ranges varying between 50-250 km2 in extent. Therefore, establishing long, narrow corridors to connect protected areas will not facilitate movement of elephants between protected areas. Instead, what is required is to manage the areas outside the protected areas to form a contiguous elephant habitat between PAs.

The Department of Wildlife Conservation has persisted with several other management prescriptions for the past few decades. These include elephant drives, capture and translocation or domestication of problem elephants, electric fencing, establishing elephant corridors, providing deterrents to farmers, payment of compensation for death, injury or property damage caused by elephants and habitat enrichment in protected areas. All of these management prescriptions are based on the age-old strategy of restricting elephants to DWC managed PAs that are connected by a system of corridors to facilitate free movement of elephants. Even though common sense dictates that any management action should be monitored to find out whether the desired result is achieved, these management actions have been carried out without any monitoring until recently. However, during the last two decades these management techniques have been scrutinized using the best available technology and the key outcomes of these studies are discussed below.

Elephant drives are aimed at removing elephants from a large area identified for permanent human use. The first ever drive was undertaken in 1961 to drive 14 elephants from Deduru Oya to WIlpattu National Park that proved a “dismal failure” according to Dr. R L Spittel. From that time many drives had been undertaken with the aim of driving wild elephants into nearby protected areas. A drive may take from months to years and require a great deal of manpower to cordon off the cleared area to prevent elephants from coming back. The last major drive was undertaken in 2005-2006 to clear the area identified for development under the Walawe left bank project where 225 plus elephants have been driven from the Mattala area to Lunugamvehera National Park. Post drive monitoring indicates that the drive has left behind more than 400 elephants in the Mattala area including the main culprits that cause human elephant conflict, the bull elephants that have managed to escape the cordon and continue to cause conflict. Even more alarming fact was the fate that has befallen over the herds that were driven to Lunugamvehera National Park. Faced with dwindling food resources many of the females and calves had to starve to death in the ensuing years. This is the case in many of the drives that have been undertaken by DWC in the past few years. In addition, the elephants get habituated to been driven and become more aggressive after the drive, leading to intensification of the conflict rather than mitigation. Further, the herds that are the least responsible party to the conflict are driven to death at the expense of large sums of public funds. Therefore, drives are proven to be ineffective as a management strategy to mitigate the conflict.

Capture and domestication or translocation of problem elephants into protected areas has been routinely practiced by DWC as a management strategy, when one or few elephants are causing conflict in an area. Thus far all elephants that have been captured are male elephants that are considered as crop raiders, or to have attacked humans causing death or injury. Capture and domestication has been tried a few times in the past, but has resulted in high mortality of captured elephants and therefore this practice has been abandoned. Therefore, captured elephants are now translocated to protected areas with the assumption that these elephants will stay inside those areas. In order to test this assumption, the Centre for Conservation and Research has tracked 17 elephants that have been translocated in this manner using satellite tracking. The results of this study indicate that out of the 17 animals that have been translocated to protected areas, 2 have returned to the original location, 12 have moved into other human use areas and only 2 have remained in protected areas. Further, out of the 17 elephants translocated, 5 have been killed by people while the translocated elephants were responsible for 7 human deaths. The outcome of this study clearly demonstrates that capture and translocation have failed to mitigate the conflict; rather it has only transferred the problem from one conflict area to another and in many instances, translocation has intensified the conflict in the area receiving the translocated elephant.

Use of electric fences to prevent elephants from entering human use areas dates back to 1966 and has been practiced for more than five decades in Sri Lanka. Electric fences are quite effective in managing human elephant conflict provided that they are located in the right place, built to proper specifications and maintained regularly. The DWC has deployed more than 1200 km of electric fences across the elephant range. Further, a number of non-governmental agencies have established community-based fences that are constructed and maintained with the involvement of affected communities. Many of the fences that have been deployed by DWC fail to fulfill one or more criteria listed above for a fence to be an effective deterrent and consequently elephants have learnt to breach such fences. The elephants that breach ineffective fences also tend to use that knowledge to break even effective fences, which has rendered most electric fences ineffective in managing the conflict. On the other hand, community built and maintained fences have proven to be more effective as a mitigation measure.

In areas where high human conflict takes place, the farmers are provided with “elephant thunders” (specially designed fire crackers) by the DWC to chase elephants away from their crop fields or home gardens. Studies done to determine the efficacy of such thunders in chasing elephants away has revealed that in many places farmers are using these thunders in an arbitrary manner resulting in the habituation of elephants to the use of such deterrents. In fact in many places elephants have become even more aggressive resulting in aggravation of the conflict.

On the average, 70 people die annually because of Human-Elephant Conflict (HEC.) Further, elephants also cause damage to crops and property, resulting in heavy economic losses. Such losses in lives, property or revenue intensifies the conflict, as those who are adversely

affected by wild elephants will in turn retaliate against elephants in a aggressive manner causing injury and death to wild elephants (nearly 400 wild elephants die annually due to HEC). In order to alleviate the conflict DWC has introduced a compensation scheme for those who are affected by wild elephants. Currently compensation is being paid for death (Rs. 100,000), injury or property damage caused by elephants. The possibility of introducing a crop insurance scheme has been explored but has not been implemented successfully.

More than 50% of the wild elephant population range outside the DWC protected areas. The reason is the progressive reduction in the carrying capacity of these protected areas as they are undergoing succession towards mature forests. Therefore, DWC has undertaken habitat enrichment programs in several protected areas with the intention of enhancing their carrying capacity for elephants. These include rehabilitation of abandoned tanks within protected areas to increase the water availability as well as cultivating food plants. However, since elephants require large quantities of food (around 300 kg of plant matter per day), growing food for elephants is not a viable option, as this would require converting thousands of hectares within protected areas through intense habitat management practices similar to slash and burn agriculture. Further, these practices will have to be conducted indefinitely, which will require a huge investment.

Based on the facts presented above, it can be concluded that the present strategy pursued in managing wild elephants in Sri Lanka has many flaws as it has failed to give due consideration to the growing body of research findings on the Asian Elephant in Sri Lanka. Therefore, it is no surprise that in spite of heavy investment by the National Government, HEC continues to escalate in Sri Lanka, claiming lives of both humans and elephants and causing heavy economic losses as most of the investments on agriculture in the areas inhabited by elephants have failed to accrue the full range of benefits. Therefore, the time has come to explore other management options, especially for the elephants that range outside PAs as they are the ones that cause conflict.

One of the management options is to attract elephants that are ranging in human use areas in to protected areas by increasing the carrying capacity of the PA network through intensive habitat management. However, the scale of habitat management required to sustain the entire wild elephant population within PAs makes it economically impossible. Further, all PAs cannot be converted to elephant habitats, as this would be detrimental to many other species that require undisturbed mature forest.

Alternatively, the elephants that are ranging in areas set aside for human use should be culled or captured for domestication. This will result in the reduction of current wild elephant population by at least 50%; this will seriously compromise the long-term survival potential of the wild elephant population. Further, culling elephants is not a viable option due to two reasons. First, culling elephants as a management policy is unacceptable in Sri Lanka for socio-cultural and political reasons. Second, even though the continued killing of elephants by farmers can be interpreted as a form of culling, it has not resulted in the alleviation of the conflict. Capture for domestication is also unacceptable given the environmental attitudes

(as evidenced by the huge public outcry against the illegal capture of baby elephants in recent times) and the endangered status of the Asian elephants. Further, this would require domestication of several thousand elephants, which makes it an impractical alternative.

Therefore, the only remaining viable option is to allow elephants to access areas outside the PA network by efficiently managing the HEC. This would require a landscape level approach to elephant management, based on the large body of scientific evidence that has been gathered over the past two decades. Based on the ranging patterns, the wild elephant population can be grouped into three categories, elephants occupying PAs managed by Department of Wildlife Conservation, elephants occupying PAs managed by the Forest Department (FD), and elephants occupying human use areas. The elephants that range in the human use areas, which comprise of about 30% of the wild elephant population, are the ones that are responsible for HEC. Currently, PAs managed by the FD are largely excluded in the management of elephants as evidenced by construction of electric fences along the boundary between some of the FD managed and DWC managed PAs to prevent elephants from entering PAs managed by FD. However, these fences are rendered ineffective as elephants occur on both sides of the fences, as they do not recognize administrative boundaries but only ecological boundaries. Therefore, PAs in the elephant ranging areas should be managed as a single entity for elephants irrespective of whether they are being managed by DWC or FD.

The elephants that range in the human use areas can be further classified into elephants that range in areas that are used temporarily by humans, mainly for shifting cultivation and elephants that are in areas that are used permanently by humans for settlements or cultivation. The former can be used as Managed Elephant Reserves (MER's) where humans will use the area during the wet season for shifting cultivation that can be protected with temporary electric fences and during the fallow season the fences are taken down allowing elephants to use these areas. Long term studies done by Centre for Conservation and Research shows that such a coexistence model is possible in many areas, especially in the southern region of Sri Lanka, if carefully planned and managed. The elephants that are ranging in permanent human use areas should be translocated to MER's or PAs, which will mitigate the conflict appreciably. Further, conflict-causing elephants should be translocated to specially designed elephant holding areas to prevent them from returning back or moving to other permanent human use areas.

A National Policy on Elephant Conservation and Management was drawn up incorporating all these ideas and outlining a new strategic approach to solve HEC. The Cabinet of ministers approved this policy in 2006. Even though nearly ten years have elapsed since the formulation of this policy, no steps have been taken by DWC to translate this policy into a comprehensive action plan with a timeline of implementation. Instead, they are persisting with a failed management strategy, which amounts to repeating the same mistakes and expecting different results.