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Range-wide Status of Asian Elephants

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Introduction

As the second decade of the 21st century ticks by, Asian elephants remain endangered across their range. Although not yet extinct in any of the 13 range states, in five countries - Bangladesh, Bhutan, China, Nepal and Vietnam, the number of wild elephants in the entire country is less than 200 (Cao Thi Ly 2011; Islam *et al*. 2011; Jigme & Williams 2011; Pradhan *et al*. 2011; Zhang 2011), and in another three countries -, Cambodia, Laos and Thailand, it is less than 1000 (Khounboline 2011; Maltby & Bourchier 2011; Lohanan 2001) (Table 1). In two countries, Indonesia (Sumatra) and Vietnam, elephants have recently crossed a threshold to become 'critically endangered' (Azmi & Gunaryadi 2011; Cao Thi Ly 2011). The situation in Sumatra is of the greatest concern as the Sumatran elephant is one of four unique sub-species. Local extinctions of elephant populations have probably occurred in all range states within the last decade. However, in India, Sri Lanka and Bhutan, concurrently elephant range seems to be expanding in some areas, with elephants re-colonizing locations from which they have been absent for decades (Baskaran *et al*. 2011; Fernando *et al*. 2011; Jigme & Williams 2011). In many Southeast Asian range states exemplified by Myanmar and Cambodia, elephants are thought to be present in large areas, but no definitive data exists (Leimgruber *et al*. 2011; Maltby & Bourchier 2011).

It is a matter of great worry that there is still not a single Asian elephant distribution map based on actual on-the-ground-data such as a systematic grid survey for any country or location. The range-wide map (Fig. 1) developed by the AsESG workshop in Cambodia (Hedges *et al*. 2008) and all the range state maps presented in this *Gajah* issue are based on 'expert opinion'. While these maps are the best put together so far, none of the distribution 'data' available in any of the range states or even locations allows

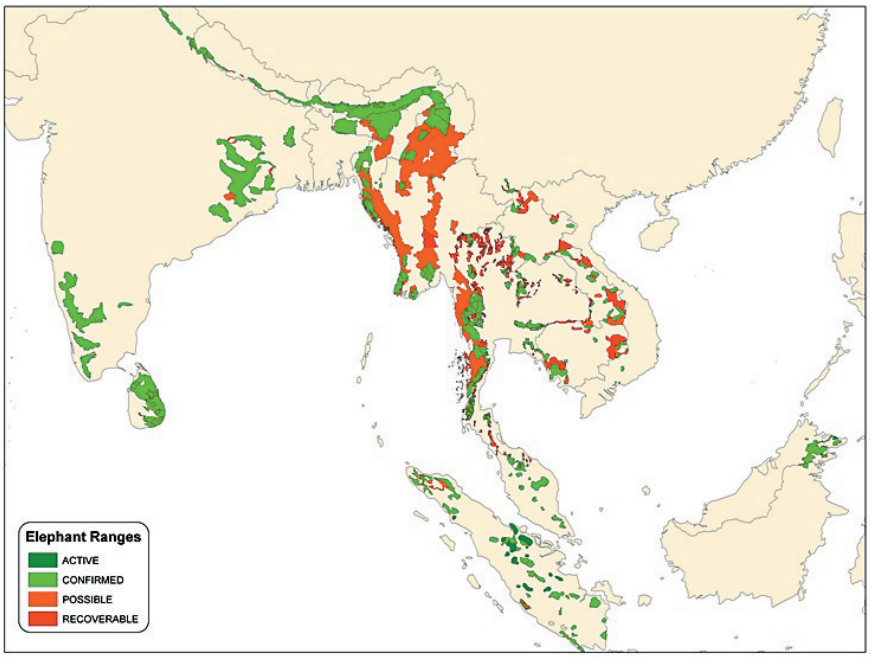

Figure 1. Range-wide elephant map (Hedges *et al*. 2008).

Table 1. Human and elephant population parameters of Asian elephant range countries.*

Country	Area [km^2]	# Humans	# Elephants			Source
			Min.	Max.	Mean	
Bangladesh	147,570	142,319,000	300	350	325	Islam *et al*. (2011)
Bhutan	38,394	695,800	60	150	105	Jigme & Williams (2011)
Borneo	747,996	19,871,913	1200	3670	2435	Alfred *et al*. (2011)
Cambodia	181,035	13,395,682	250	600	425	Maltby & Bourchier (2011)
China	9,572,900	1,339,724,852	178	193	186	Zhang (2011)
India	3,166,391	1,210,193,422	26,000	28,000	27,000	Baskaran *et al*. (2011)
Indonesia (Sumatra)	456,167	47,728,472	2400	2800	2600	Azmi & Gunaryadi (2011)
Laos	236,800	6,128,000	600	800	700	Khounboline K (2011)
Malaysia (Peninsular)	132,723	22,656,253	1223	1677	1450	Saaban *et al*. (2011)
Myanmar	676,577	52,171,000	1181	2056	1619	Leimgruber *et al*. (2011)
Nepal	147,181	26,620,809	109	142	126	Pradhan *et al*. (2011)
Sri Lanka	65,610	20,653,000	5879	5879	5879	Fernando *et al*. (2011)
Thailand	513,120	65,479,453	NA	1000	1000	Lohanan (2002)
Vietnam	331,212	85,846,997	83	110	97	Cao Thi Ly (2011)
Total	16,413,676	3,053,484,653	39,463	47,427	43,445	

*Source for area and human population figures: Brinkhoff T (2011).

accurate monitoring of distributional changes over time, other than the complete disappearance of an entire population. It is high time that a concerted effort is made to assess Asian elephant distribution across the range on systematic grid based surveys, to provide a solid baseline.

Approximately three fourths of all wild Asian elephants are in India and Sri Lanka (Table 1, Fig. 2). Overall the status and conservation prospects of elephants in South Asia especially Sri Lanka and India appear to be better than in Southeast Asia. This is surprising, as South Asia is more densely populated than Southeast Asia (Fig. 3). It becomes even more surprising when country-wise elephant densities are considered, where the elephant density in Sri Lanka is many times greater than in any other country (Fig. 4).

Southeast Asian states such as Myanmar, Laos and Cambodia in particular may have large extents of natural habitat which are thinly populated by people but also with few elephants. In Myanmar, Cambodia, Laos and Borneo, the numbers of elephants appear to be less than the available habitat could support (Alfred *et al*. 2011; Khounboline 2011; Leimgruber *et al*. 2011; Maltby & Bourchier 2011). However, comparison of elephant densities between countries and habitats other than at a very coarse scale may not be valid given the poor quality of the data available.

Human attitudes

Across the range Asian elephants live in countries with large human populations (Table 1, Fig. 5) with approximately 70,000 people per elephant across the range. Therefore, their future will be determined by the attitudes of the people towards elephants and their conservation.

Governments

All range state governments have recognized Asian elephants as being endangered and in need of protection, which is commendable and gives hope for the species' conservation. With the exception of Sri Lanka and Sumatra, almost all the other range countries have trans-boundary

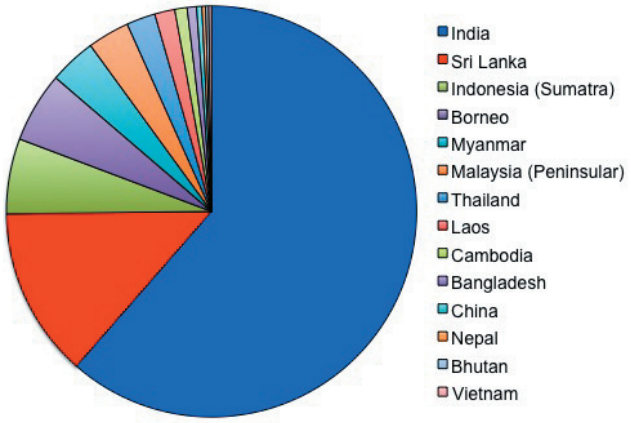

Figure 2. Portion of elephants in each range country.

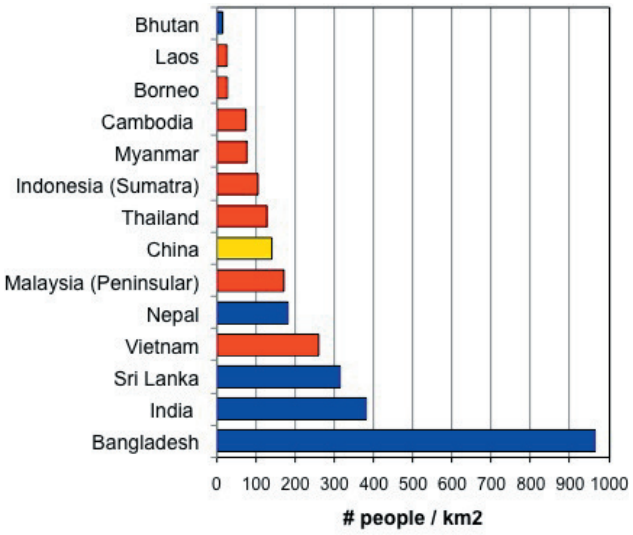

Figure 3. Human density in South (blue), Southeast (red) and East (yellow) Asian range countries.

elephant populations. While they constitute a small fragment of the country population in countries like India and Myanmar (Baskaran *et al*. 2011; Leimgruber *et al*. 2011), they are a significant fragment of the total population in Nepal, Bhutan, Bangladesh and Indonesian Kalimanthan (Alfred *et al*. 2011; Islam *et al*. 2011; Jigme & Williams 2011; Pradhan *et al*. 2011). The majority of country populations are below the minimum viable population threshold. Therefore inter-governmental collaborative management is critical for the conservation and management of Asian elephants in general and trans-boundary populations in particular.

Public

The attitude of people towards elephant conservation appears to vary significantly among range states. In countries such as Sri Lanka and India even with a high level of human-elephant conflict (HEC), people still seem to love and revere elephants and want to conserve them (Baskaran *et al*. 2011; Fernando *et al*. 2011). In contrast, in countries such as Bangladesh, Indonesia, Malaysia and Vietnam the overall attitude towards elephants appears to be less benevolent with HEC justifying the elimination of elephants (Azmi & Gunaryadi 2011; Cao Thi Ly 2011; Islam *et al*. 2011; Saaban *et al*. 2011). Countries with low HEC levels such as Bhutan, Nepal and Cambodia, appear to occupy the middle ground where HEC escalation may tip the balance towards intolerance (Jigme & Williams 2011; Maltby & Bourchier 2011; Pradhan *et al*. 2011). In most range states some communities or groups appear to have much greater affiliation towards elephants. Such differences in attitudes within and among different countries may occur due to cultural, religious and historical factors. However, it suggests that greater appreciation of elephants and greater awareness of their imperilled status can be a powerful tool for their conservation. Therefore awareness programs targeting all stakeholders and tailored to specific groups would be an important conservation measure.

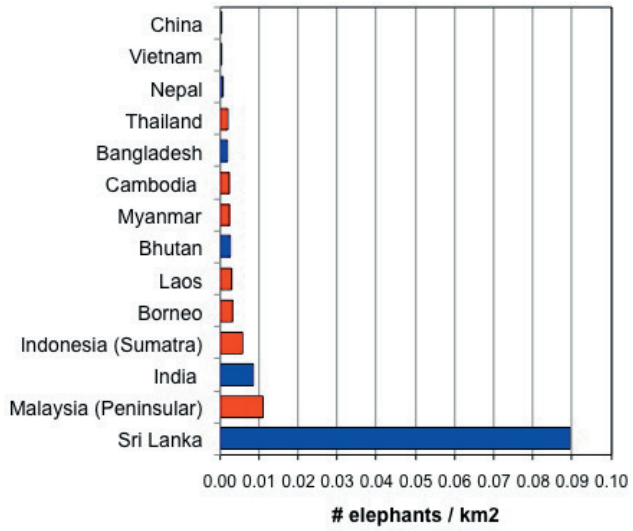

Figure 4. Elephant density in South (blue), Southeast (red) and East (China) Asian range countries.

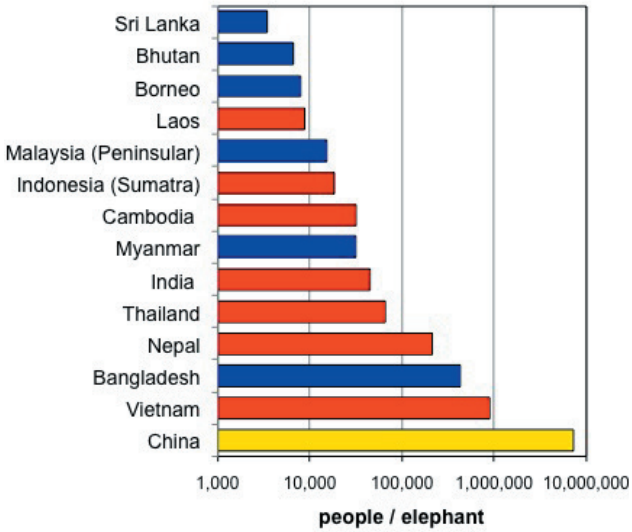

Figure 5. Number of people per elephant in South (blue), Southeast (red) and East (yellow) Asian range countries. Note: logarithmic X-axis.

The role of captive elephants

Across the range, captive elephant numbers appear to be decreasing with their role as work animals being increasingly supplanted by machines. However, their use in tourism is on the increase and may sustain the demand for captive elephants. Unfortunately captive breeding of Asian elephants appears to lag behind with the notable exception of the Pinnawela Elephant Orphanage in Sri Lanka. As a result, captive populations are still largely maintained by wild captures, both legal and illegal, which is of great detriment to the conservation of the species

The role of captive elephants in temples, zoos, circuses and work animals as ambassadors fostering the love and appreciation of elephants among people is an interesting if controversial aspect we need to examine closely. Through direct personal contact and interaction with people, such elephants could play an important role in the larger picture of elephant conservation. Standing next to an elephant in real life, touching it and perhaps feeding it a banana, will leave an indelible impression on a child, no amount of TV documentaries or observing wild elephants on safari can compare with. In that context, annual 'elephant festivals' such as in Laos and Vietnam (Cao Thi Ly 2011; Khounboline 2011) where captive elephants gather annually and people interact with them on a personal level may be something every range country should adopt. However, there is no argument that most captive elephants in range countries can and should be managed much better than is the current case, with more attention to their care, physical and psychological well being, and social needs.

Habitat loss and fragmentation

Large-scale loss

Across the range, habitat loss due to conversion of natural habitat to permanent settlements and cultivation represents a major threat to Asian elephants. Such habitat loss appears to be extreme in parts of Southeast Asia, especially in terms of conversion of natural habitat to large-scale commercial agriculture (e.g. palm oil). There is an ever increasing threat of such changes across the range also including South Asia. In general, conversion of natural habitat to large-scale agriculture primarily results in habitat loss.

When extensive habitat changes that exclude elephants occur in a short time span, what happens to the elephants that used to occupy such habitats is unknown. The general attitude of developers, conservationists and governments appears to be that those elephants will move to 'other areas' and adapt. In some instances management and conservation agencies even attempt to move entire populations to other areas by elephant drives and capture-translocation as a 'conservation measure'. However, as demonstrated by research in Sri Lanka (Fernando unpublished data) there is a very strong possibility that such habitat loss and forced eviction of elephants from their home ranges results in their death. If we are to address habitat loss, we need to determine the impact of such large-scale development and management on elephants, based on pre and post monitoring of elephants subject to them. Such information can guide development to minimize detrimental impacts on elephants, help minimize resultant increase in HEC and compel those causing HEC to take responsibility for its mitigation.

Small-scale loss

Conversion of habitat occupied by elephants to small-scale agriculture and settlements, often by illegal encroachment of state land occurs across the range and is especially evident in states such as Sri Lanka and Indonesia (Fernando *et al*. 2011; Azmi & Gunaryadi 2011). Although the amount of habitat loss by an individual encroachment is small, what it lacks in extent it makes up in numbers, with hundreds to thousands of such encroachments occurring annually in areas with elephants in most range states. Such habitat conversion while adding up to a significant loss of habitat has an even greater impact through habitat fragmentation. In most instances such small-scale 'development' occurs insidiously and is widespread, leading to fine scale habitat heterogeneity with an intricate jumble of natural (elephant) and human (settlements and cultivations) habitat.

Usually elephants continue to remain in such fragmented areas, leading to frequent encounters and conflict between elephants and people. This results in much suffering for both for decades and the ultimate elimination of elephants. Assessment and monitoring of such habitat changes, the impact on elephants and their response, and changes in HEC is difficult given the temporal and spatial scale, and insidiousness of such change. However, if we are to address elephant conservation and HEC mitigation effectively, such information is essential. It will allow stronger lobbying of authorities to prevent encroachment and unplanned development, and make encroachers aware of their role in causing HEC.

Human-elephant conflict

HEC is perceived widely as the main threat to Asian elephants. Across the range, activities to mitigate HEC are undertaken by people, and governmental and non-governmental agencies. Although a large number of 'mitigation techniques' have been developed and tried, few if any have been adequately assessed (Fernando *et al*. 2008). In range states with high levels of HEC such as Sri Lanka and India, governments spend significant funds on mitigation efforts (Baskaran *et al*. 2011; Fernando *et al*. 2011).

Across the range HEC is observed to be on the increase and is becoming a major concern of people, governments and conservationists. Obviously lessons could be learnt from countries, which have grappled with this issue, if information on the successes and failures is gathered and made available. Therefore monitoring and documentation of the effectiveness of HEC mitigation methods across the range is of great importance.

A very important aspect of assessing the effectiveness of HEC mitigation is that it is almost entirely from the human point of view. Actions such as elimination or capture as HEC mitigation measures are undoubtedly successful but at the cost of the elephants. While elimination is no longer practiced, live captures were sanctioned as mitigation measure in Indonesia till recently (Azmi & Gunaryadi 2011), which clearly made a significant contribution to the current 'critically endangered' status of Sumatran elephants. HEC mitigation activities such as capture-translocation, elephant drives, chasing elephants and range restriction by electric fences are widely practiced across the range. The impacts of such activities on elephants are not so obvious and the responses of elephants to them remain largely unknown. Research in Sri Lanka through GPS monitoring of elephants suggests that HEC mitigation activities may have severe detrimental impacts on elephants, and increase and cause wider spread of HEC (Fernando unpublished data). Recently initiated GPS monitoring of capture-translocation of elephants in India (pers. comm. A. Desai) and Malaysia (pers. comm. A. Campos-Arceiz) appear to suggest that the patterns observed in Sri Lanka are not unique. Monitoring the impact of HEC mitigation activities on elephants and their response should be a primary objective and responsibility of conservation authorities and conservationists, if we are to mitigate HEC without killing off all the elephants.

Elephant habitat and protected areas

Across the range the main approach to elephant conservation and HEC mitigation is the 'restriction of elephants to protected areas'. However in most countries the number of elephants and extent of elephant range outside protected areas greatly exceeds that within them. The extensive spatial occurrence of HEC in range countries bears testimony to this, as HEC occurs outside protected areas. One of the main reasons why limiting elephants to protected areas has failed is that the optimal habitat for elephants is not undisturbed forest but habitat with an intermediate disturbance regime (Fernando & Leimgruber 2011). Such habitat is mostly found outside protected areas. Research on elephant ecology based on GPS tracking of elephants and assessment of habitat and resource use is essential if we are to better understand their needs. Such efforts are a priority across the range if we are to conserve the Asian elephant.

Conclusion

In conclusion, the overall conservation status of Asian elephants across the range has remained static over the past decade or so over a larger part and lost ground in some states. Awareness of the endangered status of elephants appears to be increasing, especially among authorities. Across the range, HEC is gaining momentum and poses a serious threat to the survival of the species. HEC mitigation is entrapped in a web of archaic beliefs and traditions and is ill equipped to face the mounting challenge. The key to successful conservation of Asian elephants is robust scientific data that can guide development and conservation. It is high time we made obtaining that information a priority.

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