

# ***ENDANGERED ANIMALS***

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## **A Reference Guide to Conflicting Issues**

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# Asian Elephant

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**Common Name:** Asian elephant

**Scientific Name:** *Elephas maximus*

**Order:** Proboscidea

**Family:** Elephantidae

**Status:** Threatened on the 1996 IUCN Red List of Mammals; Appendix I of CITES.

**Threats:** Historic threats include the capture of elephants for domestication, and the loss of habitat to expansion of agriculture and human settlement. Loss and fragmentation of habitat continue throughout most parts of the Asian elephant's range, and illegal hunting for meat, hide, and ivory is a major threat in several regions.

**Habitat:** Tropical and subtropical forests; moist and dry deciduous forests; dry thorn forests; grasslands; and montane forests up to about 2,500 m in elevation in South and Southeast Asia. The highest densities are found in regions with a variety of vegetation types.

**Distribution:** Historically, from the Tigris-Euphrates basin in western Asia eastward along a narrow coastal belt into the Indian subcontinent and continental Southeast Asia. In the northeast, elephants were distributed up to and possibly beyond the Yangtze River in China. Several islands such as Sri Lanka, Sumatra, and Borneo also had elephants. Today their distribution is fragmented among 13 Asian countries—India, Nepal, Bhutan, Bangladesh, Sri Lanka, Myanmar, Thailand, Laos, Kampuchea, Vietnam, China (only southern Yunnan), Malaysia (peninsular Malaysia and Sabah), and Indonesia (Sumatra and Kalimantan).

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## DESCRIPTION

Among land mammals, the Asian elephant is second only to the African elephant (*Loxodonta africana*) in size. An adult female stands about 245 cm in height and weighs 3,000 kg, whereas an adult male is about 30 cm taller and weighs 4,500 kg. Elephants in eastern populations are smaller than those in other parts of the range. The characteristic feature of the elephant is its trunk, which is an elongation of its nose and upper lip. The Asian elephant has a single "finger" at the tip of its trunk. Only the male of the species carries tusks (Shoshani & Eisenberg 1982; Sukumar 1989).

## NATURAL HISTORY

Of the estimated 45,000 wild Asian elephants remaining, India has the largest numbers (25,000), followed by Myanmar (5,000). Other countries

believed to have over 2,000 elephants are Sri Lanka, Sumatra (Indonesia), and Thailand (Sukumar & Santiapillai 1996).

The ecology of the elephant is strongly influenced by its very large size (Owen-Smith 1988). The Asian elephant may consume up to 2% of its body weight as dry fodder (8% fresh weight) each day (Sukumar 1989). It is a generalist feeder, eating a wide variety of plant species and parts. In tropical rain forests, elephants consume a variety of palms, lianas, fruits, and herbs; in tropical dry forests they feed mostly on grass, bamboo, and the leaves and bark of shrubs and trees. Seasonal shifts in diet are pronounced in drier tropical forests, with more browse consumed during the dry season and more grass during the wet season.

Asian elephants live in matriarchal family units consisting of one or more adult cows, their daughters, and their prepubertal sons. Family sizes average 6 to 10 individuals. Several family groups form "clans" that show coordinated seasonal movements. Males typically disperse from the family when they are 10 to 15 years old and establish their own home range independent of the natal family. The annual home range sizes of family groups vary from under 50 km<sup>2</sup> in southeastern Sri Lanka (Wickramanayake personal communication) to nearly 1,000 km<sup>2</sup> in southern India (Baskaran et al. 1995). The home range size of adult males falls in the range of 100–400 km<sup>2</sup> in southern India (Sukumar 1989; Baskaran et al. 1995). Elephants communicate through chemical signals (Rasmussen 1997) and a variety of sounds.

The Asian elephant is a polygynous species, that is, a dominant male mates with more than one female. Mating success is determined by dominance hierarchies among males and by females' choice of males, both of which are influenced by the phenomenon of musth in adult bulls (Eisenberg et al. 1971). Musth is a state of sexual arousal accompanied by physiological and behavioral changes. A bull is in musth only once a year; the length of time varies from a few days to 3 or 4 months, depending on the age and social status of the bull (Sukumar 1994).

Female elephants usually give birth to their first calf when they are 12 to 17 years old. Males are capable of reproducing when they are 15 years of age, though they may be excluded from mating until 20 to 25 years for social reasons. Typically, a cow produces a calf every 4.5 to 5.0 years (McKay 1973; Sukumar 1989). Mortality rates over 5 years average only 1% to 3% per annum in females and up to 6% per annum in males under natural conditions. In elephant populations where tusked males constitute a large proportion of the male segment, such as in southern India, ivory poaching may cause male mortality rates to rise to 20% per annum (Sukumar 1989). Population growth rates in Asian elephants under natural conditions do not seem to exceed about 1.5% per year. Unlike the African elephant, however, Asian elephant populations apparently do not suffer from drastic declines owing to environmental factors such as drought.

## CONFLICTING ISSUES

Since the late 1970s, the IUCN/SSC Asian Elephant Specialist Group has emphasized the decline of the Asian elephant population and the need for its long-term conservation. Based on several field studies in Sri Lanka, India, Sumatra, Thailand, and Malaysia, the Specialist Group developed an action plan for Asian elephant conservation in 1990 (Santiapillai & Jackson 1990). The plan covered the status and distribution of elephants in all 13 range countries, the primary threats to survival, and a set of recommendations for conservation action. Several countries, however, have not been able to respond adequately or rapidly enough to meet the challenges of elephant conservation.

Sri Lanka was one of the first countries to set up a system of protected areas with a focus on elephants, but they have been under great pressure from development projects such as dams and agricultural expansion. Peninsular Malaysia has an ongoing elephant conservation program that involves the capture of small herds or solitary elephants and translocation to more viable habitats. Vietnam has developed an elephant conservation plan, but it was established only after wild elephant numbers had been reduced to below 150. Myanmar set up its first elephant sanctuary in 1997 in an attempt to rescue its dwindling elephant population. In 1992 India launched a major elephant conservation program—Project Elephant—with an initial budget of U.S. \$8 million for 5 years.

About 30% of the Asian elephant's present range is included in protected area systems. Of the remaining area, a certain proportion is still under some form of protection, as in the case of Reserved Forests in India. The rest of the area is under private ownership, the control of village councils (e.g., Northeastern India), local tribes and chieftains (Myanmar, Indochina), military or rebel groups (Kampuchea), and so on. The stakeholders in elephant conservation thus include a broad cross-section of society, including local farmers and commercial plantation companies whose cultivated lands may be raided by elephants, or timber corporations (as in Myanmar) that depend on a supply of elephants for their operations. Habitat conservation and elephant-human conflicts face a number of nonbiological challenges associated with economic development, local community rights, motivations and attitudes of local residents and authorities, and lack of financial resources.

Cultural and religious factors in many Asian countries have contributed to a positive attitude toward elephants, even among local villagers who suffer from elephant depredations. In India, for instance, farmers in most areas have traditionally revered the animal as representing the elephant-headed god Ganesh. Such reverence also exists in other countries, including the Aceh province of Sumatra and in Sri Lanka. Values are changing, however, as Asian societies undergo rapid socioeconomic change.

The two main conflicting issues are (1) land development that destroys



and fragments habitat, and (2) elephant-human conflicts (crop depredation and human mortality) resulting in local antagonism toward the elephant and its conservation.

Development of land where wildlife can reside is a common theme in conservation. In the case of the Asian elephant, the issue is complex because it occurs in different contexts in the various regions. In many parts of India, such as the south and the northwest (where most of the elephant's range is government-managed Reserved Forest), the issue today is not loss of habitat per se but the threat of fragmentation from roads, railway lines, dams, and canals. Fragmentation has combined with agricultural development to reduce elephant habitat. In other parts of India, such as the northeast, considerable loss of forested habitat continues as a result of forest clearing and shifting cultivation. Here, large areas of forest are under the control of village or district councils.

In recent years, efforts to prevent loss of forest or to preserve wildlife corridors have included outright purchase of land, rejection of local developmental plans by the federal government, or public interest litigation through the judiciary to halt harmful developmental projects. For example, during the 1980s a successful legal campaign by local conservation groups stopped the Silent Valley dam project in the southern state of Kerala, India. In the state of Tamilnadu, environmental clearance was denied to a project scheduled to widen a canal (which would have obstructed the movement of elephants associated with the Mudumalai Sanctuary). In the northeast, the government has purchased forest land from village councils in the state of Meghalaya and declared them a protected area.

In countries such as Malaysia (peninsular Malaysia and Sabah) and Indonesia (Sumatra), forest is being opened up at a very rapid rate for commercial plantations, chiefly rubber and oil palm. In Sumatra the lowland forests are also being cleared for resettling migrant people from the island of Java. This has resulted in considerable loss of habitat for elephants (Santiapillai & Ramono 1990) and escalation of crop depredation by elephants. In an effort to control this conflict, over 600 elephants have been captured during the past decade.

Elephant-human conflict is widespread (Blair et al., 1979; Sukumar 1989; Williams & Johnsingh 1997; de Silva 1998; Nath & Sukumar 1998). Such conflict is particularly acute in countries such as India and Sri Lanka that have large and high-density elephant populations. Economic loss from damage to cultivated crops reaches millions of dollars each year, particularly when commercial crops such as rubber and oil palm are involved. In India alone over 200 people are killed each year by wild elephants, with a large proportion of the incidents occurring in cultivated fields and settlements when elephants come at night to raid crops. Conflict occurs even in countries with small elephant populations, such as Bangladesh and Vietnam, or those with low elephant densities, such as in Sumatra and Malaysia.

The ecological reasons behind crop depredation by elephants are only partly understood (Sukumar 1989, 1995). Elephants seem to raid crops more frequently in regions where they have lost habitat or a part of their home range, where the habitat is fragmented, and where they have to traverse cultivation to reach water sources. In addition, the higher palatability and nutritive value of cultivated plants, compared with wild plants, may motivate elephants to forage in agricultural land. Adult male elephants also have a greater propensity to raid crops than do female-led family groups; this may have its roots in the evolutionary forces driving male and female behavior in a polygynous mammal (Sukumar & Gadgil 1988). All this means that a certain degree of crop depredation by elephants and conflict with people is inevitable, even when habitats are intact and rich in forage resources.

In most places people still use traditional methods, such as firecrackers and other noise-making devices, to drive elephants from their fields. These techniques have had very limited success. It is expensive to dig and maintain ditches along the forest-cultivation boundary, especially in areas of high rainfall. In recent decades, high-voltage electric fences have been used in many countries. The key to the success of electric fences is proper maintenance and innovation against an intelligent animal (Nath & Sukumar 1998). Upkeep is a serious problem in countries such as India because villagers are not interested in the upkeep of government fences. There is monetary compensation for crop losses in most Indian states, but administrative problems have caused dissatisfaction among farmers.

## FUTURE AND PROGNOSIS

The following recommendations are suggested to help overcome the conflicts surrounding land development and to promote the long-term conservation of the Asian elephant.

1. Land use policies in elephant habitat must be made clear to prevent further fragmentation of habitat or escalation of elephant-human conflicts. Development of land for crops such as oil palm, rubber, or sugar cane should not take place in areas where such plants are likely to attract elephants. Land use policies should also be pragmatic and aim at maintaining larger, intact habitats, even if this means giving up smaller, fragmented forest patches for development.
2. Future development of any kind within elephant habitat should recognize the need to maintain corridors for the free movement of elephants. Corridor areas should be legally designated or purchased. Alternatively, local residents may be provided with incentives for maintaining their lands as corridors.
3. Local communities must be involved in programs to keep elephants away from agricultural land, such as maintaining electric fencing. This might involve giving them responsibility for maintaining barriers and making provision for fuelwood, fodder for livestock, and other human needs.

4. Where levels of elephant-human conflict are low, a system of compensating farmers for crop losses is the most economically sensible option.
5. Elephant population management—including the capture and translocation of herds from fragmented patches, the capture of notorious raiding bulls, or the occasional destruction of an animal that is a threat to human life—is essential in order to minimize conflict. This would also promote relations between local residents and wildlife managers (Sukumar 1991).