



The Asian elephant – a symbol that once adorned flags and ancient temple grounds of royal kingdoms – is being forced out of its forest home by logging, agricultural clearance, and ill-planned development schemes.

The relationship between humans and elephants is so unique that the animal has become a sacred and beloved deity. Effigies of Ganesha, the elephant-headed god, with his plump humanlike body, are found throughout Asia in village homes and on household altars. His head is sometimes adorned with jewels. White elephants are believed by many to be the reincarnation of Lord Buddha and wars have been fought over them. In 1958, the birth of a white elephant calf was headline news in Burma: “All the newspapers in the country carried the glorious accounts of the great event”.

Still worshipped as a god and honoured as a scribe from India to Japan, this beleaguered animal is also relentlessly hunted for its ivory, leaving many populations with few, if



WWF/MARTIN HARVEY

*“I adore the elephant-faced Ganesha the Incomprehensible with sharp tusks, three eyes and a capacious belly... King of all Beings, the Eternal... blood red of hue, whose forehead is illuminated by the new moon, son of Siva, Remover of all difficulties.”*

any, male elephants. Poaching for ivory, which is only found in male Asian elephants, is severely affecting the sex ratio in some areas, notably southern India, Cambodia, and Vietnam.

The Asian elephant, *Elephas maximus*, whose ancestors originated in Africa some 55 million years ago and ranged from modern Iraq and Syria to the Yellow River in China, is now found only from India to Vietnam, with a tiny besieged population in the extreme southwest of China's Yunnan Province.

The continually growing human population of tropical Asia has encroached upon the elephant's dense but dwindling forest habitat. About 20 per cent of the world's human population lives in or near the present range of the Asian elephant. Fierce competition for living space has resulted in human suffering, a dramatic loss of forest cover, and reduced Asian elephant numbers to around 35,000 to 50,000 animals in the wild, less than one-tenth of the estimated total of African elephants. Asian elephant populations are highly fragmented, with fewer than 10 populations comprising more than 1,000 individuals in a contiguous area, greatly decreasing their chances for survival.

Both sexes are killed for their hide and meat, and increasingly for their teeth. The hide is turned into bags and shoes, and both products are smuggled to China for medical use. Some animals have even been "worked to death" in logging camps. Rare are the eight-hour (maximum) working days during which elephants hear "sweet nothings" from their *oozies* or elephant riders, as U Toke Gale, recommends in his renowned book *Burmese Timber Elephant*. Of the remaining, he advises that 12 be spent feeding; the "balance should be split-up between love-making and sleeping".

The absence of good data, and the difficulty of counting elephants that live in thick tropical forests, mean that it is almost impossible to quantify the decline in Asian elephant numbers, but it can be confidently assumed that destruction of habitat has led to a large reduction in elephant populations and resulted in a serious loss of biodiversity throughout their range. Vietnam estimates that its elephant population plunged from 1,500 to 2,000 in 1990 to between 109 and 144 in 1998.

Asian elephants live in the region of the world with the densest human population, which is growing at about 3 per cent a year. Clearance of forests for settlement and agriculture is disrupting traditional elephant migration routes and leading to violent clashes between humans and animals when hungry elephants raid crops. As a result, a once largely peaceful co-existence has turned bitter on both sides. Hundreds of people are killed by elephants in Asia every year, with up to 300 deaths in India alone. Poisoning is also a threat to ele-



Burmese timber elephants, the "forester's best friend".

phants. In 1996 in Sumatra, Indonesia, 12 elephants were found dead on the grounds of an oil palm plantation, poisoned by plantation workers who tried in vain to cover up the crime.

Until only a few decades ago, thousands of wild elephants were domesticated throughout Asia for use in battle, timber extraction, construction, transport, and in religious, cultural, and social activities. Burma (Myanmar) has around 2,800 registered working elephants in the timber industry, and perhaps another 4,000 privately owned domesticated animals. Thailand has around 3,500 unemployed elephants since the country declared a logging ban in 1989. In February 1995, Bangkok banned elephants – brought in from the countryside – from its overcrowded streets to protect them from heat exhaustion and pollution. Asian countries also use elephants for logging, tourism, transport, and tracking during scientific expeditions.

The growing conflict between humans and elephants is one of the most tragic and urgent challenges facing governments today. People living in elephant areas could be assisted in protecting their homes so that they do not turn hostile towards elephants. In some situations, compensation should be paid to villagers for loss of crops and help given to those whose relatives are killed by marauding elephants. Ways in which to minimize the human/elephant conflict need to be devised as one of Asia's highest conservation priorities.



WWF/JEFF SAYER

Through WWF-supported projects in India, Thailand, Vietnam, Cambodia, China, Indonesia, Bhutan, Nepal, and Malaysia, this problem is being assessed and solutions are being sought.

WWF has developed an Asian Rhino and Elephant Action Strategy (AREAS), whose aim is to provide a coordinated and strategic approach to WWF's work on elephants and rhinos in Asia. Under the AREAS umbrella, a major project portfolio is being developed, and funding has already been secured for a range of activities during the period 2000–2002. AREAS takes an integrated approach to conservation needs and has identified 13 major landscape units for priority action, eight of which are of particular importance for Asian elephants.

The socio-economic and political pressures that confront areas set aside for elephants have also become critical issues in Asia. A meeting, at senior (e.g. ministerial) level, of the governments of the 13 countries where Asian elephants occur would help obtain a firm commitment to conserve and manage the species across its range. Moreover, national and subregional conservation strategies should address issues such as unsustainable logging, the expansion of teak and oil palm plantations, and other development schemes.

Governments should also take steps to ensure that national and transnational companies exploiting natural resources in

elephant range comply with national legislation regarding biodiversity protection, and are accountable for implementing sound forest-use practices.

Consumers need to be encouraged to buy products from forests that are managed sustainably. For example, buyers should purchase goods made from timber that is certified in accordance with the rules of the Forest Stewardship Council (FSC). Timber and products should carry the eco-label of the FSC. Companies, producers, and countries should be encouraged to participate in the FSC. Demand for certified timber products is well established in North America and Europe, but the outreach needs to be much wider, particularly in Asia.

Because elephant herds range over such large areas, protection is extremely difficult. Large, well-managed reserves are required, but extended areas where human activities compatible with the existence of elephants are carried out, also need to be established as “managed elephant ranges”. Corridors linking reserves should be well-designed and maintained. Scientific research should also be increased in order to determine elephant numbers and distribution. In addition, elephants' social behaviour needs further study.

Regulations of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) banning trade in Asian elephant products should be strongly enforced. Strict anti-poaching measures should also be established throughout the elephant's range, along with the monitoring of vulnerable tuskers.

Support for regional, national and local elephant conservation strategies should be provided by the international community. Richer governments have a duty to give technical and financial aid to tackle urgent human/elephant problems and to ensure that there are sufficient well-trained personnel to deal with the sociological, economic and ecological problems which threaten the survival of a heritage that belongs not only to Asia but to all the world's peoples.



## Elephants and People

No other animal has had such a close relationship with people as the Asian elephant and still remained wild. Although never domesticated in the same way as the horse, it has been tamed and used as a beast of burden for thousands of years. Carved seals from the Indus Valley civilization 4,000 years ago show elephants with a cloth flung over their backs, indicating that they were trained.

Indigenous people in India and other parts of Asia probably subjugated elephants even earlier. The *Vedas*, ancient Hindu writings from between 1500 and 1200 BC, mention tame elephants. At first, they were called “wild beast (*mriga*) with a hand (*hastin*)”, a reference to the trunk. Later, they became just *hastin*, and, to this day in India and Sri Lanka, elephants are called *hasti* or *hathi*.

Elephants were also found over large areas of ancient China. Some were kept in zoos or used for riding and transport. Throughout elephant range in Asia, rulers amassed large elephant stables for use in peace and war. When Timur, King of Samarkand, attacked Delhi in 1398, his men were



Macedonian coin, with ancient goad, a spiked stick used for urging animals forward.



Pilgrims pay homage to the elephant before entering the Huong Son mountain temple complex in northern Vietnam.

nervous at the sight of the defenders' elephants. But Timur sent camels and buffaloes with blazing grass on their backs among them, causing the elephants to panic and to trample and disorganize the Indian forces. Timur marched into the city and sacked it.



Emperors and rulers throughout tropical Asia kept thousands of elephants, which they used for ceremonies, hunting, and war. Some were employed as executioners to trample the condemned.

For Asian peoples, however, the elephant has had much greater significance than merely as a beast of burden or war. It has been an inseparable part of their life and culture. Ancient Hindu works frequently refer to elephants, and there is a major work on elephant lore, the *Gajasastra*.

One of the most popular gods to this day is elephant-headed Ganesha, son of Siva, one of the principal Hindu deities, and Parvati. As the God of Wisdom and Remover of Obstacles, Ganesha is worshipped by Hindus at the start of any important undertaking. He is invoked at the beginning of books because he is said by some to have been the scribe who wrote down the great epic, the *Mahabharata*. His worship was spread through Southeast Asia by Hindu voyagers and settlers.

For Buddhists, too, the elephant has special significance. Before Gautama Buddha's birth, his mother, Maya, dreamt that a white elephant entered her side. Wise men told her it was a sign that she would give birth to a great man. The white elephant features in many Buddhist stories and has been revered for centuries in Thailand and adjoining areas: there have been bloody wars over ownership of the rare white elephants found in the wild. Even today, any white elephant captured in Thailand automatically belongs to the King.

Elephants continue to be stars of oriental pageantry. In Sri Lanka, a giant caparisoned tusker, escorted by other richly decorated elephants, carries the reputed tooth of the Buddha in stately procession at the annual Esala Perahera festival in Kandy. Many Hindu temples in south India maintain stables of elephants for ceremonial occasions. In Mysore, south India, the great autumn festival of Dussehra is famous for its parade of elephants painted with colourful designs and draped with rich cloth. Ceremonial elephants also carry the royal family and their guests at the coronations of Kings of Nepal.

In Vietnam's Central Highlands, annual elephant races are still held every spring, and in some tribal villages, graves are decorated with elephant tusks carved out of dip-terocarp trees. Laos was called "the Land of a Million Elephants" and its flag used to bear the symbol of the elephant.

Elephant procession at a religious ceremony in India.



PETER JACKSON

The Chinese predilection for animal medicines included parts of the elephant. Ivory parings were used as a diuretic and for epilepsy, osteomyelitis, smallpox, jaundice, and female sterility. Flesh was prescribed for bald spots; bile for halitosis; eyeball mashed in human milk for eye diseases; skin for injuries and ulcers; and bone as an antidote for poisons, as well as for vomiting, diarrhoea, and poor appetite.

The most practical use of elephants today is in the timber industry. Over 4,000 trained elephants help to harvest teak in Myanmar's forests. Others are employed in India and Indochina, and in 1914, they helped build the Long Beach boardwalk on Long Island, New York. Today, there are some 16,000 domesticated elephants in Southeast Asia, down from 100,000 about a century ago (Lair 1997).

In the past, elephants provided safe mounts for hunting tigers and rhinos. Nowadays, biologists find elephants ideal transport for many of their studies, because wild animals are generally not disturbed by them or their riders. Elephants also carry patrols in national parks and provide transport in

difficult terrain. For tourists, the highlight of a visit to several countries is a ride on an elephant, which can safely take them into the jungle for close-up views of wild animals.

Most circus elephants are Asian. Their skills demonstrate the control they have over their apparently unwieldy bodies. Standing on their hind legs, however, is not just a circus trick. Elephants in the wild do this to reach high branches for food.



Elephants at an "orphanage" in Sri Lanka.

WWF/ANTON FERNHOOT

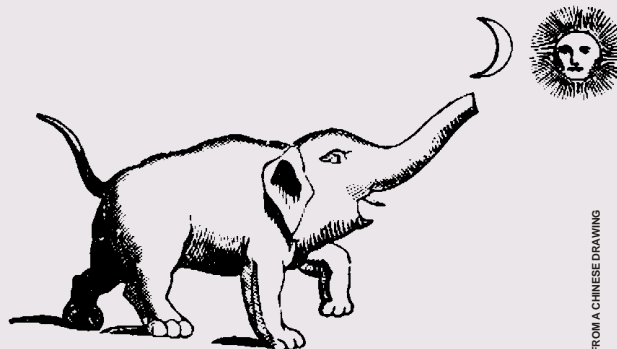
## WHITE ELEPHANT BORN IN BURMA IN 1958 EVOKES JOY

*“The story of the birth of the white elephant in Indawgyi Range in Myitkyina District is based on information gathered from oozies (rider of an elephant) and pejeiks (oozie’s assistant), forest officers and other jungle staff who happened to be there for the happy event.*

*A few days before the confinement, a forest assistant, a veterinary officer and some jungle staff arrived at the hot weather rest camp, some 25 miles west of Hopin, to inoculate some 40 elephants against anthrax. One of the officers recalled that on the 14th of March, 1958, about 22 months after Mai Su was in calf, the earth shook and trembled four times during the day in the Indawgyi area, shaking from east to west. The first tremor occurred at 7.46 a.m., and the last at 5.12 p.m. Both tremors were very violent, each lasting nearly two seconds, and caused a number of glasses, tea-cups, bottles of filtered water and Mandalay Rum to fall off the bamboo-shelf which was built into the mat-wall of the jungle bungalow where the forest officers were putting up at the time.*

*On the 16th, at about five o’clock in the evening, a tremendous noise, like the sound off a large section of earth caving in, echoed through the trees, and the forty elephants screamed in fright and stampeded down to the stream. Some of the elephant-men recalled that on that day the weather was very still and close, most unusual for this time of the year, for in the month of March frequent gusts of wind would blow from the south or the south-west.*

*The next morning, Monday the 17th of March, the jungles vibrated again at about 4.00 a.m. with the simultaneous screaming and trumpeting of some 40 elephants, but this time the uproar was not due to fright or apprehension but due to a spontaneous outburst of joy over the birth of a white elephant.*



FROM A CHINESE DRAWING

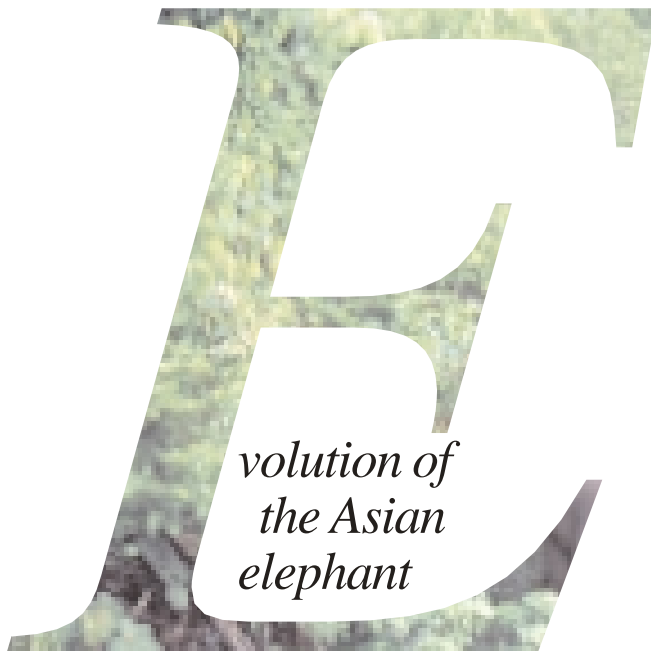
A white elephant worshipping the sun and moon.

*From Myitkyina the news was wired to the Head Office in Rangoon. It said:*

*“MAISU GAVE BIRTH TO FEMALE WHITE REPEAT WHITE CALF ON 17TH MORNING IN INDAWGYI RANGE STOP MOTHER VERY FIT STOP CALF FIT BUT ON THIN SIDE STOP EVERY SECURITY AGAINST TIGER ETC TAKEN STOP HAND-FEEDING WITH PADDDY ETC AT NIGHT STOP”*

*And soon all the newspapers in the country carried the glorious accounts of the great event. The people from nearby villages and provincial towns far and near began pouring in. People of all races and tribes came down from the hills – the Shans, Kachins, Karens, Chins, Kadus and Ganans – all decked up in their colourful national dresses as though they were on their way to a religious or a nat festival. They fed the white calf with bananas, sugarcane and cooked rice, and reverently threw at her feet silver coins of various denomination. Some elderly people from the hills fell on their knees and gave her homage, and many were near to weeping with religious fervour”.*

*by U Toke Gale, former Deputy Director of Forests and author of Burmese Timber Elephant, 1974.*



The direct ancestors of Asian and African elephants appeared about 5 million years ago in Africa. They evolved from an animal about the size of a large pig, named *Moeritherium*, which lived near Fayyum in Egypt about 50 million years ago. *Moeritherium* had no trunk, but its descendants evolved into more than 30 species of trunked animals, all long extinct. Some of them were much larger than today's elephants and they lived in North and South America as well as in Africa and Asia.

The Asian elephant evolved from a form in Africa called *Primelephas*. The family grew to more than 20 species, including mammoths, which spread into Eurasia and the Americas. Mammoths were closely related to living elephants, especially to the Asian elephant. One of the best known is the woolly mammoth, which was about the same height as the average Asian elephant – 3 m at the shoulder. It is widely depicted in Stone Age cave paintings dating back 20,000 years, and deep-frozen carcasses have been uncovered in Siberia, complete with woolly hair and stomach contents.

The Asian elephant, *Elephas maximus*, is not only a separate species from its African cousin *Loxodonta africana*, but is placed in a different genus. It is smaller, although large males still weigh up to 5,000 kg and may reach more than 3.5 m in



The Asian elephant is smaller than its African cousin. Unlike the African elephant, only males have tusks like this tusk from south India.

PETER JACOBSON





PETER JACKSON

Homeward bound: Indian elephants at dusk in Sonepur.

height. It is easily distinguished because its ears are much smaller and its back slightly rounded or flat, unlike the concave back of the African species. Asian elephants have a single “finger” on the upper tip of the trunk, while African elephants have a second on the lower tip; and twin mounds on the forehead instead of the African’s single dome.

### The elephant’s trunk and tusks

The Asian elephant is surrounded by legend, with its spectacular trunk the central theme. The trunk combines nose and upper lip and enables an elephant to breathe, locate scents, drink, and to seize and manipulate objects with extreme sensitivity. It is used both for gentle caresses and admonitory slaps at its young. It is not used as a weapon: a charging elephant will fold its trunk back, using its forehead as a battering ram, its forefeet to kick or trample, and its tusks to stab. Unlike the African elephant, only male Asian elephants have tusks. The females have small “tushes”, which seldom protrude beyond the lip. Some male Asian elephants do not grow tusks, but these tuskless males, known in India as *makhnas*, are often bigger than their tusked fellows. Tusks are actually giant incisor teeth, which grow throughout the elephant’s life. The longest recorded pair, which is held in Bangkok, measures 3 m and 2.74 m respectively. A shorter tusk from India, housed in the British Museum, is heavier, weighing 146 kg. The relentless poaching of elephants for ivory in recent times has meant that tusks approaching this size are no longer found.

Unlike humans and other animals, elephants have a “queue” of six molars in each side of each jaw, which move forward

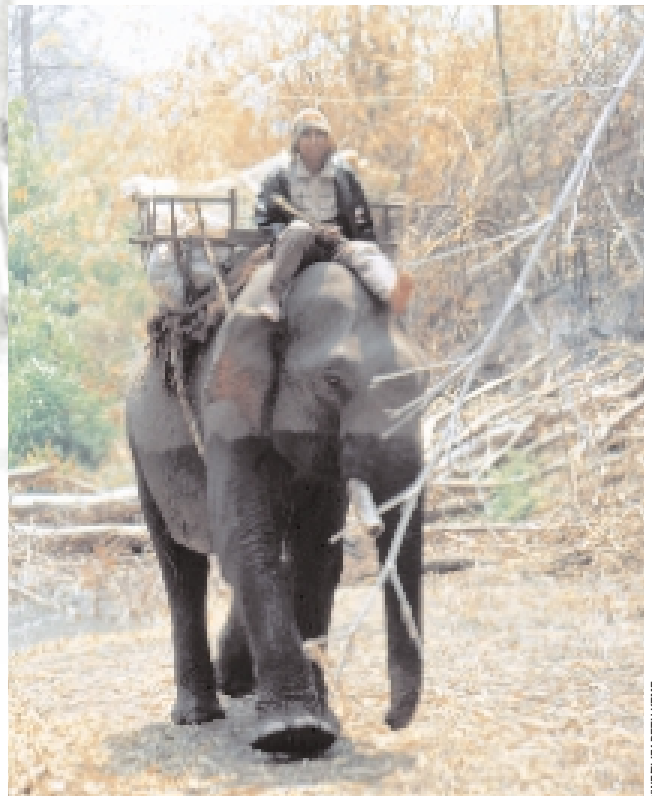
as each successive tooth wears out. With the loss of the sixth molar, when an elephant reaches its sixties, the animal is doomed because it can no longer feed. The elephant’s brain is larger than that of any other mammal at birth (35% of the adult brain weight), accounting for its learning ability, although smaller than the human brain in relation to the elephant’s size. Smell is the most highly developed sense in elephants. They can pick up surrounding scents on the breeze, and they constantly feel and smell each other with their trunks. In this way, males pick up the pheromones which identify oestrus females ready to mate. Eyesight is limited, but hearing is acute. Although elephants are known for their loud trumpeting, it was discovered recently that they also communicate with subsonic rumbles which can travel up to 5km. This discovery solved the mystery of the coordination observed in members of herds feeding at a distance and out of sight of each other.

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Asian elephant*

There may be between 35,000 and 50,000 elephants inhabiting a total land area of about 440,000 km<sup>2</sup> in Asia. The largest number (28,400) occurs in the Indian subcontinent, which accounts for 66.4% of all the wild elephants in Asia, of which India alone accounts for 57%. The Indo-Malayan subregion (Burma or Myanmar, Thailand, Malaysia, Borneo, and Indonesia) accounts for 29.3% of all the elephants, while the Indo-Chinese subregion (China, Laos, Cambodia, and Vietnam) accounts for the least – 4.3%. The downward trend shown by most of the elephant populations in Asia is due to the fragmentation of their range caused by competition with man. Only about 8 populations seem to consist of over 1,000 animals each, and these can be assured of long-term survival only as long as their habitats remain intact.

Although information on elephant range and numbers is important for the effective conservation and management of Asia's remaining elephants, much of the information concerning the numbers of wild elephants across their range has been largely guesswork, and so cannot be used as a reliable basis from which population trends over time can be determined. The exceptions are India and Sri Lanka, where, as a result of the tradition of long-term management of wild elephants, reliable estimates are available at least for some key populations. In an update of the Asian Elephant Database (AED), an attempt has been made to produce a more realistic estimate of elephant numbers through an analysis of



An efficient way of transporting goods in Vietnam's Central Highlands.



ELIZABETH KEENE

Elephants are still used for logging and transport in Asia. This is a logging camp in Vietnam near the Lao border.

the data quality currently available from a variety of sources. Although some information on elephant numbers in Asia is based on ground surveys, a large bulk of it cannot be regarded as reliable. Aerial surveys of elephants are not feasible in the dense and tangled vegetation of the tropical rainforest.

Ground surveys comprise methods such as: (i) total counts by recognition; (ii) registration of individuals; (iii) water-hole counts; (iv) sample counts; and (v) dung counts (Ramakrishnan et al. 1991). However, much of the information on elephant numbers in Asia has been collected through entirely qualitative observations, such as sightings of elephants, their dung or tracks, and information from the guards and rangers and other experienced field staff. Data of this nature are classified as informed guesses. In many instances, there is absolutely no information on the recent status of elephants, as no work has been carried out.

The status of the elephant varies considerably across its range in Asia. While there are viable elephant populations in countries such as India, Sri Lanka, and Myanmar, the prospects for the long-term survival of elephants in Vietnam, Laos, and Cambodia are bleak. Decades of internecine war and uncontrolled poaching of elephants for ivory in these countries have led to great reductions in the number of

elephants. The problem is further compounded by the fact that elephants migrate great distances across national boundaries; hence, management decisions arrived at in one country may have serious repercussions in another. In Sri Lanka, civil unrest has led to the mass movement of displaced people into hitherto uninhabited areas of elephant range, thereby contributing substantially to the escalation of conflict between man and elephant. Government-planned resettlement programmes in Indonesia and Vietnam have also led to fatal clashes between elephants and humans.

### **Distribution**

The present distribution of the Asian elephant covers only a fraction of its former extensive range, and includes 13 countries, stretching from the Indian subcontinent in the west to Indochina in the east. Asian elephants inhabit a land area of about 440,000 km<sup>2</sup>, of which only about 130,000 km<sup>2</sup> (30%) are declared as "protected". Elephant populations in Asia are mainly small in size and highly fragmented.

The Asian elephant is known to have become extinct in Syria and Mesopotamia in the first half of the first millennium. Its demise was hastened by hunting for its ivory (Scullard 1974). Since then, the elephant has been extirpated from west Asia, a major part of the Indian subcontinent, substantial areas of Southeast Asia, and almost entirely from China. The domesti-



cation of the elephant around 4,000 years ago, and its regular capture in large numbers in the past, no doubt played a major role in the decline in the range and number of Asian elephants in the wild. However, since the turn of the century, loss of habitat in the face of an expanding human population has been the major cause of the decline. Historically, there was a strong ecological relationship between elephants and floodplains, but human activities in low-lying areas have had an adverse impact on elephants (Olivier 1980). As human settlements replaced elephant habitats along river valleys and floodplains, the elephant was pushed into the more inaccessible forested hills. Today, even such remote areas have been encroached on by man. This fierce competition for living space has resulted in human suffering, a dramatic loss of forest cover, and the reduction of elephant numbers (Kemf and Jackson 1995). Loss of habitat forces elephants into agricultural areas, where they come into conflict with man.

While there are an estimated 300,000 to 600,000 African elephants (*Loxodonta africana*) distributed across a land area of 5.9 million km<sup>2</sup> south of the Sahara, the Asian elephant is much more rare. The Asian elephant was placed on Appendix I of the Convention on International Trade in Endangered Species of Flora and Fauna (CITES) in July 1975, long before the African elephant was similarly listed in 1989. In 1997, at the 10th meeting of the Conference of the Parties to CITES, three African countries proposed that their elephant populations be transferred to Appendix II. This was approved, subject to a series of conditions.

## INDIAN SUBCONTINENT

India has the largest number of Asian elephants in the wild, distributed mainly in four distinct geographically separate regions: northwestern, northeastern, central, and southern. The government of India estimated that between 23,500 and 27,000 wild elephants occur in India (average 25,250), ranging over 200,000 km<sup>2</sup> (Dey 1996), but a more recent (1999) analysis of the existing data indicates that the number could be anything between 19,090 (definite) and 29,450 (speculative) animals, or probably about 24,270 animals. About one-third of the present population of wild elephants in India face the prospect of elimination in the not too distant future (Lahiri-Choudhury 1988).

### Northern India:

The moist forests along the foothills of the Himalayas in the state of Uttar Pradesh hold between 750 and 1,000 elephants, of which about 613 animals occur in the Rajaji and Corbett

national parks (Johnsingh 1992; Khan 1995). Among the important elephant areas are the Corbett and Rajaji national parks and the Landsdowne Forest Division (Singh 1978). The habitat is fragmented by an irrigation canal and recent human settlements, including an army cantonment (Johnsingh et al. 1990). An important conservation measure recommended by Johnsingh et al. (1990) is the retention and protection of the Chilla-Motichur and Rajaji-Corbett forest corridors to ensure the movement of elephants from Chilla and Motichur to the Ganges, and within the proposed Rajaji-Corbett National Park

### Northeastern India:

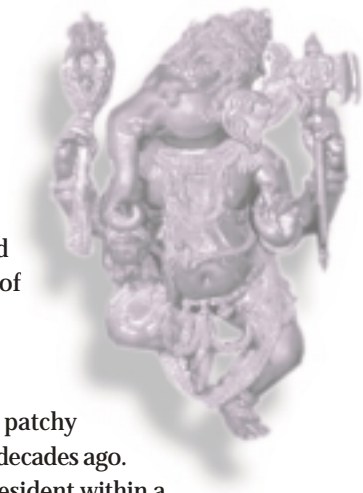
There are between 7,200 and 11,300 elephants in northeastern India. One large population of 3,800 to 5,800 animals ranges along the Himalayan foothills from northern West Bengal eastwards through Assam and Arunachal Pradesh to the border of Myanmar (Lahiri-Choudhury 1986). The vegetation includes moist deciduous and evergreen forest. Key conservation areas include the Manas Tiger Reserve and Nandapha National Park. South of the Brahmaputra River, another large population of nearly 2,000 elephants inhabits the alluvial floodplains of Kaziranga National Park and the Nagaland hills. A third population of about 1,400 elephants occurs in the Garo and Khasi hills of Meghalaya, and is under severe threat from habitat loss due to extensive shifting cultivation (Williams and Johnsingh 1996). Small, scattered populations are also known from the Jaintia Hills, Cachar, Tripura, Manipur, and Mizoram.

### Central India:

The elephants in this region, numbering between 1,500 to 2,000, (Shahi and Choudhury 1986) are largely confined to the states of Bihar and Orissa. Some researchers have put the estimates as high as 2,500 to 3,500 (Menon et al. 1997), but even they note: "No reliable data are available on populations structure for making judgements on the status of the population." In recent years, elephants have also been moving into Madhya Pradesh and southern West Bengal, where they have been coming into serious conflict with people. A number of sub-populations of elephant were identified following an extensive ground survey carried out from 1989 to 1991.

Most of central India's elephants inhabit Orissa, estimated to have between 1,492 and 1,707 elephants, inhabiting an area of 9,500 km<sup>2</sup> (Singh 1995). They, however, face severe threats to their habitat from degradation, shifting cultivation, mining, and replacement of natural forest by monoculture plantations. The three major elephant habitats are Simlipal Tiger Reserve, Satkoshia Gorge, and Ushakothi-Khalasuni, which account for about 757 elephants and seem to have some measure of security.





### **Southern India:**

Elephants occur in the hill forests of the Western Ghats and adjacent Eastern Ghats in the states of Karnataka, Kerala, and Tamil Nadu (Nair and Gadgil 1978; Nair et al. 1980; Sukumar 1986, 1989). Between 9,640 and 15,150 elephants are found here, distributed as a series of at least 10 distinct populations. The largest population, conservatively estimated at 4,000 – 4,700 animals, inhabits the Nilgiri Hills and Eastern Ghats. Sizeable numbers are also found in the Anamalai Hills (800–1,000) and the Periyar Tiger Reserve (1,166). Elephant densities in places here are amongst the highest in Asia and are comparable to those of the African bush elephant. Nagarhole National Park, Bandipur Tiger Reserve and Mudumalai Sanctuary in the Nilgiri, and Periyar Tiger Reserve have densities in the range of 1 to 3 elephant per km<sup>2</sup>. The diverse vegetation types (evergreen forest, deciduous forest, and thorn scrub) available to elephants within a relatively small area are no doubt important factors in supporting such high elephant densities. The main threats to the habitat come from developmental projects such as dam building, tea and coffee plantations, agriculture, railway lines, and roads.

### **Nepal:**

It appears that between 62 and 200 elephants may occasionally occur in Nepal, many of them migratory animals from India. It is likely that Nepal only supports between 41 and 60 resident elephants in the wild. In the early 19th century, elephants occurred across the entire lowland terai region (Jerdon 1874): their decline began at the turn of the 20th century. The use of elephants for royal hunts was probably a major factor in the reduction of the wild population (Smith and Mishra 1992). According to Smythies (1942), up to 315 animals were used in the 1930s in a single royal hunt in what is now Royal Chitwan National Park. Expansion of agriculture along the sub-Himalayan tract in recent decades has been the principal threat to the survival of elephants in Nepal. Between 30 and 40 years ago, when much of the terai of Nepal was covered by forest, the area was unsuitable for humans owing to the prevalence of malaria. In the 1950s, under the anti-malaria programme, the government of Nepal eradicated vast areas of forest, which attracted people from the hills to move in and cultivate the land. As a result, most of the elephants were extirpated in Nepal. According to Smith and Mishra (1992), three populations of elephants occur in Nepal: the elephants in the Sukla Phanta Wildlife Reserve and Royal Bardia National Park in the west, and those in the Dharan and Jhapa reserves in the east, part of a larger population extending into India. The central population, in the Parsa Wildlife Reserve and Bara Forest Reserve District, is small and geographically isolated from the other two, and confined to Nepal's borders. However, ten Velde (1998) reports that the number of elephants

dispersing into Nepal has declined drastically since 1992, owing to loss of forest habitat.

### **Bhutan:**

Elephant distribution in Bhutan is patchy and is a fraction of what it was a few decades ago. About 60 to 100 animals might be resident within a few protected areas, including the Royal Manas National Park and the Phipsoo Wildlife Sanctuary. Bhutan shares its elephants with the neighbouring Indian state of Assam and also West Bengal (Santiapillai and Jackson 1990).

### **Bangladesh:**

Most of Bangladesh's wild elephants are found in the Chittagong Hills bordering Myanmar and India (Santiapillai and Jackson 1990). There could be a minimum of 195 elephants in the wild, and probably as many as 239 (Anwarul Islam 2000, pers. comm.). The range of the elephants in Bangladesh includes the Chittagong Hills, Sylhet, Mymensingh, and Cox's Bazaar. Elephants are known to move between Bangladesh and the neighbouring forested areas of Arakan Yoma in Myanmar, and Assam, Meghalaya, Mizoram, and Tripura states in India. Elephant habitat in Bangladesh is being converted into monoculture teak plantations.

### **Sri Lanka:**

The decline in elephant numbers (by almost 65 per cent since the turn of the 19th century) is largely due to the expansion of agriculture brought about by the need to feed a growing human population. With the implementation of the river diversion programme (Accelerated Mahaweli Development Programme or AMDP), about 364,200 ha of lowland forest were developed for agriculture, of which 260,000 ha were prime elephant habitat (Ishwaran and Punchi Banda 1982).

Although four new national parks (comprising an area of 185,350ha) were created to accommodate the elephants that were displaced from the AMDP area, the incidence of human – elephant conflict has escalated in recent years, for a large proportion of the existing elephant range lies outside the system of protected areas. During 1997, about 126 wild elephants were lost as a result of human–elephant conflict (a rate of about 2.4 elephants per week). Current recorded levels of mortality would indicate that about 6 per cent of the animals in the wild are dying annually, while the maximum recorded rate of increase for elephant populations is about 5 per cent: this suggests that the current mortality rate is sufficient to reduce the overall size of the population (Thouless 1994). Furthermore, more adult males are being killed in human–elephant conflicts. A recent estimate puts the number of elephants in Sri Lanka to be between 3,160 and 4,405.

## INDO-MALAYAN SUBREGION

### Myanmar:

Myanmar has one of the largest remaining populations of Asian elephants in the world. According to a survey carried out by the Wildlife Division of the Forest Department in 1990/1991, there are no less than 4,639 elephants in the wild. However, Myint Aung (1997) speculates that there could be at least 5,000 elephants in the wild. They represent the most economically important species in the country (Myint Aung 1994), given that elephants are the backbone of Myanmar's timber industry. They are widespread in Myanmar, since roughly half the country is still forested. They are particularly abundant in the teak and bamboo forests, where at least 13 populations have been identified, and their range covers about 115,600 km<sup>2</sup> of habitat (Myint Aung 1994). The five main areas of elephant abundance are: (i) Northern Hill Ranges; (ii) Western Hill Ranges; (iii) Pegu Yoma (central Myanmar); (iv) Tenasserim Yoma (bordering Thailand); and (v) Shan State (?) (Eastern Yoma). Elephants are still being captured in the wild to augment the domestic stock. Current annual offtake is around 120 animals. The illegal trade in live elephants, ivory, and elephant hides across the Thai-Myanmar border has become a serious conservation problem (Ye Htut 1996).

### Thailand:

Thailand has lost virtually all its lowland forests in the heart of the country to agriculture and settlement, and the elephants are now confined to the hill forests (Kemf and Jackson 1995). The decline of elephants in Thailand parallels that of its forest cover, which shrank from 80 per cent to 24 per cent between 1930 and 1990. Today, between 1,300 and 2,000 elephants are estimated to occur in Thailand (Srikrajang 1992). Within the past two decades, the elephant population may have declined by almost 50 per cent. Over half of the estimated number of elephants are found in the north and west in the Tenasserim hill range along Thailand's border with Myanmar, where the forests are very diverse and have a high carrying capacity for elephants. The four major protected area complexes in this region offer the best hope for the elephants in this region. They are: (i) Om Koi-Maetuen-Mae Ping reserves (3,400 km<sup>2</sup>) in the northwest; (ii) Huai Kha Khaeng-Thung Yai-Sri Nakarin-Erawan reserves (7,800 km<sup>2</sup>) in the west (with an estimated 300–500 animals) (WWF 1998); (iii) Maenam Pha Chi-Kaeng Krachan reserves (2,967 km<sup>2</sup>) along the border with Myanmar; and (iv) Klong Naka-Klong Saeng-Khao Sok reserves (2,281 km<sup>2</sup>) (Dobias 1987). In the Petchabum Mountains to the north, a small population (c. 200–300 animals) is estimated to inhabit a mosaic of temperate and tropical forest types. The important protected area complex for elephants includes: (i) Phu Kradung-Nam Nao-Phu Khieo reserves (2,870 km<sup>2</sup>); and (ii) another

small area (848 km<sup>2</sup>) just north of it. A third area where elephants occur is the Dangrek range of mountains along the border with Cambodia. At the western end of the range, the complex of Khao Yai-Thap Lan-Pang Sida reserves (5,250 km<sup>2</sup>) offers good habitats for elephants. Dobias (1985) estimated that Khao Yai National Park supported elephants at a density of 0.15 per sq km (or about 225 elephants). The existing protected area network covers some 25,000 km<sup>2</sup> but accommodates only 50 per cent of the wild elephants (Dobias 1987).

### Peninsular Malaysia:

Published information points to the presence of a large number of wild elephants in Peninsular Malaysia until the arrival of the colonial powers and the introduction of firearms and the large scale conversion of forests to other land uses (Khan 1994). There is also evidence to show that elephants were exported to Java from the states of Kedah and Johore in 1651 and 1682 respectively (Burkill 1966). In the 19th century, elephants were found throughout Peninsular Malaysia. They were common in Johore, Pahang, and Negeri Sembilan. The establishment of rubber and oil palm plantations brought the elephant into direct conflict with man. It was considered



a pest by plantation authorities and was shot in large numbers. Today, the elephants occur mainly in a number of small, scattered groups in the central and northern states of Pahang, Trengganu, and Perak (Khan 1994; Stuewe 2000, pers. comm.). According to the Department of Wildlife and National Parks, there are between 800 and 1,200 elephants in Peninsular Malaysia, but some scientists say the numbers are actually lower (Santiapillai 1998, pers. comm.).

#### **Borneo (Malaysia and Indonesia):**

The island of Borneo has a small but unique population of elephants, whose origin remains obscure. Although not yet confirmed by DNA analysis, some taxonomists accord the Bornean elephant separate subspecific status (*Elephas maximus borneensis*) on the grounds of anatomical traits such as a small skull and very straight tusks (Davis 1982). Today, the elephants are limited to the central and eastern parts of Sabah and the northwestern tip of Kalimantan, with the bulk of the single population being found in the Malaysian state of Sabah (Sale 1996). During the past two decades, several major portions of the former range of elephants have been lost in Borneo as a result of extermination or wholesale displacement by large-scale agricultural schemes. At present,

there are five main concentrations of elephants in Borneo, viz.: Tabin Wildlife Reserve (1,200 km<sup>2</sup>); Lower Kinabatangan Wildlife Reserve (787 km<sup>2</sup>); Demakot Forest Reserve (550 km<sup>2</sup>); Danum Valley Conservation Area (438 km<sup>2</sup>) in Sabah; and Ulu Sembakung Nature Reserve (5,000 km<sup>2</sup>) in Kalimantan. The present elephant population in Sabah is estimated to be about 1,000 animals, which inhabits a total area of 2,975 km<sup>2</sup> (Andau et al. 1996). Given the remoteness of the area and the difficulty of the terrain, the elephant population in Borneo, estimated to be between 1,000 and 1,500 animals, represents one of the most important populations in Southeast Asia, provided its habitat remains intact.

#### **Sumatra (Indonesia):**

Prior to about 1900, when agricultural settlement in Sumatra prompted a substantial degree of deforestation, most of the island was covered in primary forest. Presumably up to that time, the elephant was more or less continuously distributed across the whole island. Elephants were sufficiently numerous for the Acehenese kings to capture them and train them with the help of Indian mahouts. In the mid-1980s, the elephant was distributed in 44 small, distinct populations on the island of Sumatra (Blouch and Haryanto 1984; Blouch and Simbolon 1985; Santiapillai and Suprahman 1985). A large human population and conversion of forests to oil palm and rubber plantations have almost squeezed the elephant out of the provinces of North Sumatra and West Sumatra (Santiapillai and Widodo 1992). Only 15 populations are believed to consist of over 100 elephants each. By the mid-1990s, the total population was estimated to be between 2,800 and 4,800 (Tilson et al. 1994). There are 28 conservation areas totalling 48,448 km<sup>2</sup> identified in Sumatra, not all of them representing prime elephant habitat. The home ranges of 17 out of the 44 populations are within these protected areas, and they account for a maximum of 2,500 animals (Santiapillai and Widodo 1993). However, deforestation and conversion to plantations have been so rapid in the past few years that any information on the number and size of elephant populations and the areas they use may be out of date (Stuewe 2000, pers. comm.).

## **INDOCHINA**

#### **Laos:**

Laos was once known as Lane Xang or “the Land of a Million Elephants” (Olivier 1978; Sayer 1984). There must therefore have been a substantial number of elephants both in the wild and in captivity in Laos. About 53 per cent of the country is still forested (FAO 1999), but the forests along the Vietnam border, where the elephants occur, are still recovering from the saturation bombing and defoliation campaigns carried out by the US during the Vietnam war. Although elephants are distributed over a wide geographic area in Laos, their

Elephant training school in Chiang Mai, Thailand.



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overall distribution remains discontinuous and patchy (Phanthavong and Santiapillai 1992). In 1988, the number of wild elephants in Laos was estimated to be between 2,000 and 3,000 (Venevongphet 1988). Today, it appears that the number has declined, but no one knows how steep the drop has been. There could be as few as 950 animals, most of which occur in the south, below the 16°N latitude (Lair 1998, pers. comm.). With the imposition of a total ban on logging in Thailand on 10 January 1989, Thai timber barons moved their operations into Laos and Cambodia. Poaching is widespread, and elephants are killed for their ivory, especially by Vietnamese crossing the border (Santiapillai 1993). According to the system of protected areas proposed by Salter and Phanthavong (1989), 4,731,887 ha of forestland should receive some measure of protection. Of these, elephants are known to inhabit a total of 2,585,946 ha (Phanthavong and Santiapillai 1992). Recent surveys have confirmed widespread elephant presence, but at low densities, in southern Laos, adjacent to Cambodia's Virachey National Park.

#### **Cambodia:**

In 1992, Cambodian forestry officials estimated the number of wild elephants to be between 1,500 and 2,000 (Chan Sarun 1998, pers. comm.). But today it is likely that only between 200 and 500 animals are left in Cambodia. (WWF AREAS Proposal 1988) (Desai 1998, pers. comm.) Elephant habitats are being threatened in Cambodia as a result of indiscriminate logging practices (see *Threats to the Asian Elephant*, page 18). Although it is very likely that significant numbers of wild elephants still roam Cambodia's largely unsurveyed northeastern provinces, the distribution is less certain there than in Laos. Recent systematic interviews covering most other parts of Cambodia indicate that significant populations of wild elephants still remain in the southwest, in the Cardamom and Elephant ranges, near Bokor and Kirirom national parks.

With the recent political stability, effective fieldwork in almost all of Cambodia is now possible for the first time in more than three decades. However, this stability comes after a seven-year transitional period during which the country's forests suffered from fragmentation due to logging and the effects of excessive hunting and illegal wildlife trade. Efforts to control these threats have been initiated only recently. In January 1999, Cambodia's Prime Minister, Hun Sen, issued a 17-point declaration cracking down on illegal logging and establishing a Forest Crime Monitoring Unit.

#### **Vietnam:**

At the turn of the century, Vietnam had a substantial population of elephants both in the wild and in captivity. Wild elephants were distributed almost contiguously along the

border with Laos and Cambodia. But since then elephants have declined both in range and number, as a result of serious destruction to their forest habitats and hunting for ivory. In the 40 years between 1943 and 1983, total forest cover shrank from 43.7 per cent to 23.6 per cent, a decline of 50 per cent. As recently as 1960, about 65 per cent of the area south of the 17th parallel was forested. By 1987, the forest cover had declined to 21 per cent (Vo Quy 1987). Some scientists estimate that Vietnam's natural forest cover is now around 10 per cent (Vo Quy 2000, pers. comm.). Estimates of the number of wild elephants in Vietnam vary considerably. The earliest information available on elephant numbers is based on the data gathered between 1975 and 1980 (Khoi 1988; Do Tuoc 1989). Subsequently, Khoi and Do Tuoc (1992) collected more data. It appears that since 1990, the population of elephants in the wild has been declining steadily from about 1,500–2,000 animals to 250–400 animals in 1994 (Dawson 1995). Today, the elephant population in Vietnam is estimated to number between 109 and 144 individuals (Do Tuoc 1998), and according to Flora and Fauna International (FFI), the upper limit of the numbers could be as low as 135 (Momberg et al. 2000). There is a severe shortage of male elephants in Vietnam owing to illegal hunting for ivory, which escalated after 1989, during Vietnam's economic reform or "open policy". In 1991, Vietnam's Forest Protection Department confiscated 250–300 kg of ivory (Do Tuoc 1998). The elephants' last stronghold in Vietnam is on the Lao and Cambodian borders. Conservationists have expressed concern over the country's advanced plans to construct a new national road from Hanoi to Ho Chi Minh City, most of it along the Lao and Cambodian borders. This controversial route, part of it along the former Ho Chi Minh Trail, will bisect key protected areas and fragment further important elephant habitat both inside and outside reserves and national parks.

#### **China:**

Until about the 10th century AD, the Asian elephant was widely distributed across much of China, as far north as the Yellow River (Olivier 1978). Elephants were so numerous in the Yangtze river valley that considerable numbers of animals were hunted for their ivory (Laufer 1925). In a country such as China, where for more than 70 centuries the human population has been engaged in tilling the land, agriculture has always been the most important form of human activity, exerting the greatest impact on the land (Zhao 1986). One of the consequences of the rapid increase and spread of the human population in China has been the near extinction of the elephant. Today, an estimated population of 250–300 animals is confined to the tropical moist forests of the Xishuangbanna Nature Reserve in the southern part of Yunnan province, bordering Myanmar and Laos (Santiapillai et al. 1994). The current stronghold of the elephant appears