Elephant

Volume 1 | Issue 4 Article 5

12-15-1980

The Status of the Asian Elephant in India

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CONTRIBUTED ARTICLES/REPORTS

THE STATUS OF THE ASIAN ELEPHANT IN INDIA*

by **J.C. Daniel**

I. INTRODUCTION

The problems facing the Asian elephant in India are a reflection of the status of environmental conservation in India. As a species able to live in a wide spectrum of vegetational types, the elephant acts as an indicator species of the condition of its biotic environment. A suboptimal habitat is unable to meet the demands made on it by a herd of elephants. In a suboptimal habitat the presence of elephants will result in further deterioration. Elephants in such habitats are compelled to seek sustenance elsewhere and come into conflict with man. This conflict has decimated their number to the point that they are now included as an endangered species (Appendix I) in the Endangered Species Act of 1973.

Unfortunately for the elephant, its optimum habit -- the moist and dry deciduous forests -- also happens to be the best suited for sylvaculture (forestry). The elephants' inability to accept human intrusions into its habitat is reflected in its behavior under stress situations. Elephants living or moving through habitats constantly disturbed and used by man react in a manner which has been termed panic behavior by M. Krishnan (Pers. comm.). This is characterized by aggressiveness towards man and destructive behavior towards the habitat. The same herd in undisturbed habitat behaves entirely peaceably towards both man and its surroundings. Panic behavior has been the main cause of conflict between man and elephants.

II. HISTORICAL BACKGROUND

The historical and present-day distribution (Fig. 1) of the elephant in the Indian subcontinent records the progressive deterioration of the environment in the Indian subcontinent. Olivier (1978a and 1978b) has compiled the available evidence on the past distribution of the Asian Elephant. Much of this information is conjectural but probably accurate. There is sufficient evidence, however, to conclude that Western Asia was very wet up to 400 - 500 B.C. and even up to the 2nd century A.D., and that elephants occurred in regions which are now semi-deserts and deserts. According to Randhawa (1945), Mathura district in Uttar Pradesh, which now has an average rainfall of 24 in., supported up to about 400 A.D. a vegetation including species which do not now exist in regions with less than 75 in. of rainfall. Since 100 A.D. there has been a progressive desiccation of Northern India, particularly that area of the sub-continent which is now Pakistan and the West Gangetic plains in India. Whether this deterioration is man-made is open to question, but the opinion has been expressed that the Rajasthan Desert of India is man-made. Precise information on the distribution of the elephant is available from the memoirs and writings of the Moghul Emperors of the 16th and 17th centuries A.D. (Ali, 1927). The Emperor Babur (1526-30) notes in his memoirs that the elephant

*This article is our compilation of two separate reports received from the author on January 11 and June 15, 1979.

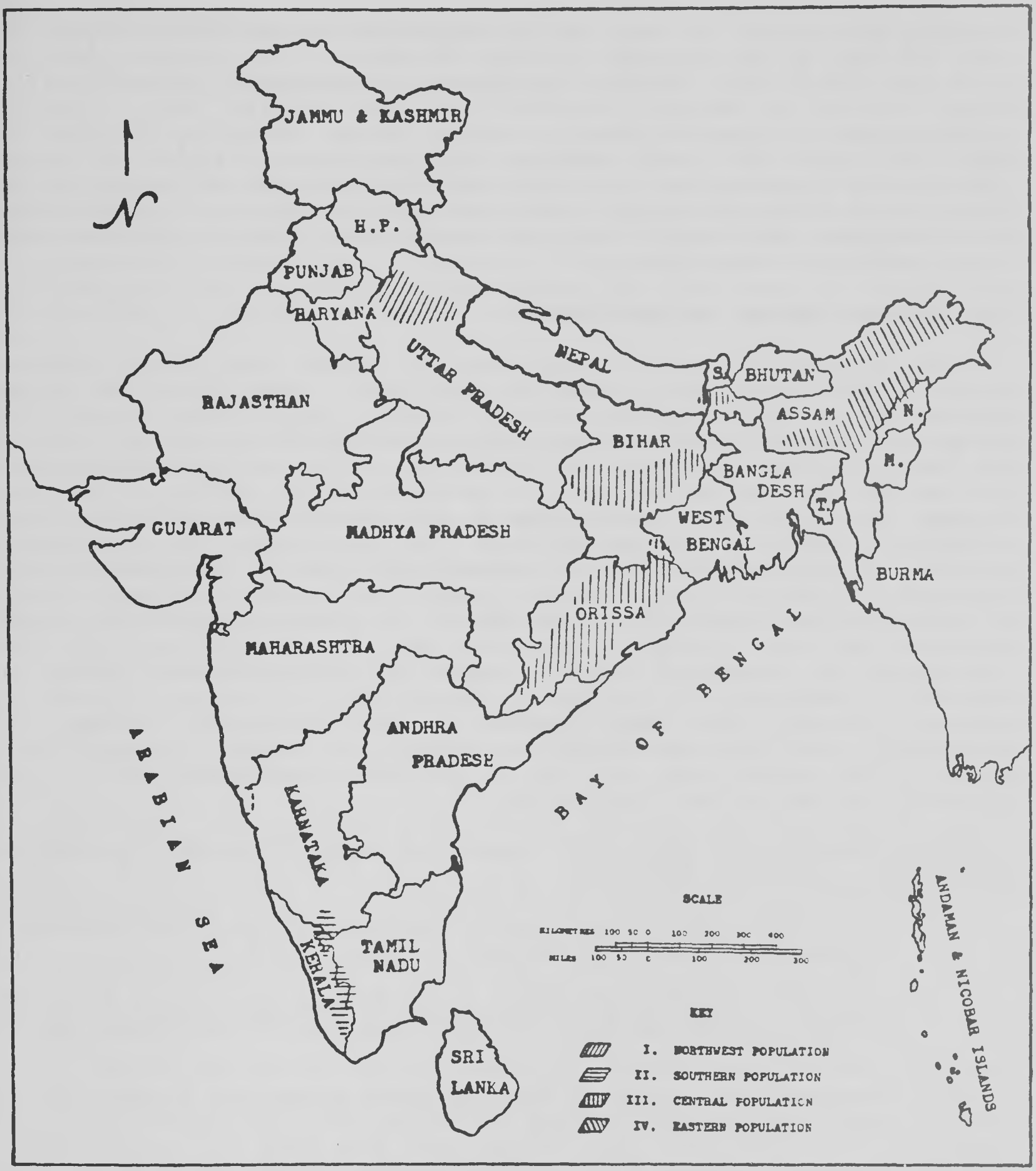

Figure 1. Known distribution of Elephas maximus indicus in India as of 1979. Estimated population: 13,500 elephants. Abbreviations: H.P. = Himachal Pradesh; M. = Manipur; N. = Nagaland; S. = Sikkim; T. = Tripura. Data compiled by J. C. Daniel. Drawn by Sherri L. DeFauw.

"inhabits the district of Kalpi and the higher you advance thence towards the east, the more do the elephants increase in number". His grandson Akbar who ruled from 1556 to 1605, describes an elephant capturing hunt in the forests of Narwar, and his son Jehangir (1605-1627) describes a similar hunt in Dohad in the Panchmahals. Kalpi (26° 39'N, 77° 54'E), Narwar (25° 39'N, 77° 54'E) and Dohad (22° 50'N, 74° 16'E) represent the westernmost distribution of the population in the peninsula in the 16th and 17th centuries and thus provide an indication of the extent of loss of habitat up to that period. Presently there are no elephants west of 84° longitude in the Central Peninsula and none north of 16° latitude in Western India.

III. ELEPHANT HABITAT AND DISTRIBUTION

The elephant habitat in India (Fig. 1) ranges from climax evergreen forests to dry thorn forest, swamps and grasslands. Among these, the optimum habitats are the moist and dry deciduous forests. The evidence obtained from surveys of elephant populations and habitats throughout the present range of the species in India indicates loss of habitat as the main cause for concern. The data was obtained on the basis of census surveys by members of the Asian Elephant Specialist Group and through a questionnaire circulated to forest officials in charge of elephant habitats. The questionnaire was particularly effective in obtaining information on vegetation types of elephant habitats, alterations in habitat over a period of years (two decades) and their effects on populations and causes of elephant deaths. In almost all cases the opinion expressed was that elephant populations were on the decline. All four populations are threatened but the degree of decline varies. There is, however, a uniformity of the causes endangering the elephant in all the habitats covered. The basic reason is loss of habitat, through (a) cultivation, both legal and illegal encroachment, (b) change of composition of forest by the sylvacultural practices of government departments, and (c) loss of habitat through man-made construction.

The elephant in India now exists in four disjointed populations distributed generally as follows:

A. A North-West India (Uttar Pradesh) population in the forest divisions of Dehra Dun, Bijnor, and Nainital Districts of U.P.

B. A Southern disjointed Population in the Western Ghats in the States of Karnataka, Kerala and Tamil Nadu north and south of the Palghat gap at latitude 12°N.

C. A Central India population discontinuously distributed in Southern Bihar, West Bengal and Orissa.

D. An Eastern population discontinuously distributed in North Bengal, Assam and other states in Eastern India. It is possible that the peripheral elements in the east are shared with Burma and Bangladesh.

IV. DETAILED DESCRIPTION OF POPULATIONS

A. Elephant in North-West India (Uttar Pradesh)

Comparative figures on this population are available, as it was first censused in 1966-67 and approximately a decade later in 1975 and 1976. The maximum numbers in the 1967 and 1976 censuses were approximately 400 and 525, respectively, which would indicate a stable population and normal growth. However, drastic changes in the habitat in the Indian and Nepal distribution of this population, which will be discussed later, lead to the conclusion that conditions are not as normal as they appear and that there is presently a concentration of animals which the available habitat may not be able to support.

1. Status:

The last count in May 1976 gave the following distribution of elephants in Uttar Pradesh:

Siwalik forest division (2), West Dehradun F.D. (20), East Dehradun F.D. (11), Lansdowne F.D. (192), Kalagarh F.D. (54), Ramnagar F.D. (9), Haldwani F.D. (74), Corbett National Park (128), Dudwa National Park (25). The number in parenthesis is the number of animals in each Forest Division.

Lansdowne Forest Division and Corbett National Park offer the best habitats. In the opinion of V.B. Singh, (1978), Chief Wildlife Warden, Uttar Pradesh and Co-ordinator of the Elephant Task Force for North India, the survival of the elephant in U.P. depends on the preservation and development of these two habitats.

2. Factors affecting the status of the elephant in the U.P. are:

a) Loss of habitat:

In the decade 1966-76, 165,000 acres, or approximately one-third of the 415,000 acres of the most suitable elephant habitat, have been converted into monoculture plantations. The destruction of prime habitats has resulted in the elephant moving into areas with less suitable food potential. This scattering effect has resulted in more contact with man, leaving the impression that the elephant population has increased.

The large-scale clearing of forests in Nepal along the Indian border has resulted in the remnant Nepal population moving into India. The herd in Dudwa National Park is an example. The composition of the forests in the Park makes them presently unsuitable as elephant habitat.

b) Effect of man-made construction:

(1) Chilla-Rishikesh Power Channel: The Gohri and Laldhang forest ranges in Lansdowne division, which have the best elephant habitats, are being destroyed by overuse because the seasonal movement of elephants has been prevented by the construction of a power channel parallel to the Ganges. The construction of the power channel also denies access to the Kunao and Chilla Chaurs or grasslands bordering the Ganges, the summer grazing grounds of the elephants.

The channel, by blocking seasonal migration, has effectively fragmented the population by denying access to the herds in the Doon Valley (E & W Dehradun and Siwalik forest divisions).

(2) Ramganaga Reservoir, Corbett National Park: The filling up of the reservoir has drastically affected the entire pattern of seasonal movement of herds between the National Park and adjoining reserve forests as traditional routes have been blocked. Large herds have now taken to or are compelled to stay permanently in the Park and this is reflected in the damage to the Park habitat.

(3) Paper Mill at Chilla: When the paper mill is completed and situated on the left instead of the right bank of the Ganges, it will destroy the Chilla Sanctuary, with its Kunao and Chilla grasslands, as a viable habitat for the elephant and other wildlife.

The situation of the northern population is thus critical.

B. Elephant in South India (Karnataka, Kerala and Tamil Nadu)

Two disjointed populations occur, one in Karnataka, Kerala, Tamil Nadu, north of the Palghat Gap in the Western Ghats and the other in Kerala - Tamil Nadu, south of the Gap. Both populations face rapid fragmentation through large-scale loss of habitat.

1. Status

Karnataka (formerly Mysore): The elephant in Karnataka has been the object of intensive study by scientists of the Indian Institute of Science, Bangalore. V.K. Nair and M. Gadgil (1979) report on a status survey in the five basic elephant habitat types in Karnataka; namely, North Kanara, Crestline of the Ghats, Malnad, Mysore plateau and Kollegal hills, east of the Ghats range.

North Kanara, the northernmost range of distribution of the elephant, and the Crestline and Malnad provide classic examples of what can be expected to happen to elephants in India if timely action is not taken. Except for a herd of 30 to 40 elephants which form a compact breeding population in the Bhadra Wildlife Sanctuary in the Malnad area, the elephant population in these three habitat types has been isolated and pocketed through heavy encroachment by cultivation and loss of habitat to plantation and hydroelectic project reservoirs. The elephants, numbering less than 50 in North Kanara, 50 in the

Crestline and about 40 in the Malnad, not including the herd in the Bhadra Sanctuary mentioned earlier, have passed the point of no return and will probably disappear within the next decade.

Mysore plateau and the Kollegal Hills hold the only sizeable population of elephant in Karnataka, particularly in the Bandipur and Nagarhole sanctuaries, which share their elephants with the Wynaad in Kerala, and Mudumalai sanctuary in Tamil Nadu, with considerable seasonal migration between the three states. Approximately 1,500 to 2,000 elephants are found in this complex.

Tamil Nadu: Except in Mudumalai sanctuary, where the warden recently undertook a detailed census of elephants, information on population status is not available. The Mudumalai sanctuary count, though useful, cannot be considered separately from the elephants in adjoining Karnataka, Kerala, mentioned above. At the recent meeting of the southern task force at Trivandrum, the opinion was expressed that the total population would be in the region of 2,000 animals (Anonymous, 1978).

Kerala: A census by sight-records only, carried out throughout the forests in Kerala by the Forest Department in collaboration with the Forest Research Institute in May 1978, provided a count of 2,243 animals in 15 forest divisions covering 7,145 km. The highest concentration was in Periyar Wildlife sanctuary; 588 animals or approximately a quarter of the total population counted. The data unfortunately are incomplete as returns were not received from four divisions (Pillai, 1978; Vijayan, 1978).

Southern Population: It is believed that the total population in the South may not be less than 5,000.

2. Factors affecting elephant population in South India:

These in no way differ from factors considered under the northern population but are being recapitulated.

a) Loss of habitat: Clearing for cultivation and forest plantations are the main reasons for the disappearance of the elephant from most areas in the South, particularly in North Kanara, a situation which is likely to be repeated elsewhere.

b) Overcrowding: Density figures in the Bandipur and Periyar sanctuaries appear to be more than the sanctuaries can sustain unless the animals are able to move out seasonally. Even now the sanctuaries are perhaps being utilized to an extent that they may not be able to recoup annually.

c) Man-made constructions: The vast forest areas which are submerged by hydroelectric projects and the forest areas lost to human rehabilitation programmes have proved disastrous to elephants. The Tungha and Badra reservoirs in Karnataka are responsible for fragmentation of a continuous habitat and for pocketing and destruction of elephants. The Kabini reservoir cuts the main migratory route between Nagarhole and Bandipur sanctuaries. At Theppakadu in Mudumalai, the tourist complex blocks the main trek route. The

Moyar dam, if constructed, will destroy good elephant habitat in the Mudumalai sanctuary complex.

Situation: Some sections of the southern population can be considered as irrevocably lost. The population as a whole is vulnerable.

C. The elephant in Central India (Bihar, Orissa and West Bengal).

The Central India Task Force has been able to survey in detail status in two of the States, Bihar and West Bengal.

1. Population Estimates:

Bihar	(a) Palamau . . .	40
	(b) Singhbhum . . .	200
	(c) Dalbham . . .	70
		310

West Bengal (a) South Bengal 2 or 3 solitaries (Ayodha Hills)

(b) North Bengal 150

Orissa . . . . . 2,000? (unsubstantiated estimate)

2. Status:

a) Bihar

Palmau: The elephant range covers an area of about 1,000 sq km holding a variety of forest types. The core area of distribution lies within the Palamau Wildlife Sanctuary, now a Project Tiger area. The habitat is safe, but the elephants do extensive damage to cultivation adjoining the forest.

Singhbhum: Main Singhbhum Tract: Three forest divisions, Saranda, Kohlan, and Porabhat hold approximately 140-150, 40-50 and 30-40 elephants, respectively. The best habitat is in Saranda division, and there is, so far, little interaction with man.

Dalbhum Tract: The population is now fragmented in two -- the Dalma Hill Sanctuary, north of the Subarnarekha River, holding about 50 elephants and the Ruam-Mosaboni area, south of Subarnarekha, approximately 20. Some of the Dalma Hill Sanctuary elephants move into West Midnapore and Bankura Forest Divisions of West Bengal in October-December to raid paddy fields.

b) West Bengal

South Bengal: There are no resident elephants, except for a few isolated animals in the Ayodhya Hills in Purulia. Animals move into the area during the post monsoon season from Bihar.

North Bengal: Two populations, West and East of the Torsa River, now more or less permanently separated, occur. These also are now in the process of fragmentation.

The population west of the Torsa is now fragmented into a group, 10 in number, living in Tondu Range. Another 10 elephants are pocketed in the Titi Reserve Forests and a larger group of about 50 animals in the Nepal Kurseong area of the original range.

The population east of the Torsa still occur in a compact group in the Buxa Division and Nilpara Range of Cooch-Bihar Division and occupy the eastern border of Assam also.

c) Orissa: Sixteen forest divisions cover 20,000 sq km and still remain comparatively undisturbed. A population of 2,000 elephants is estimated.

3. Factors affecting elephant population in Central India

a) Bihar

Palamau: Crop damage by elephants to the extent of about Rs. 100,000 per annum remains a serious problem.

Singhbhum: The Saranda Forests, the best elephant habitat, cover an estimated 2,000 million tons of iron ore, the largest single deposit in Asia. The ore is being mined and already Sasangda Plateau, a preferred habitat of the elephant, has been destroyed. A dam is proposed at the foot of the Saranda hill to store the polluted (iron oxide and alumina) water of the Koina River, which has been already destroyed as a habitat for the crocodile (C. palustris) and fishes. A new steel plant is also proposed. A forest development corporation has been formed which annually fells 2,000 hectares on the upper slopes and replants with a monoculture of teak, completely changing the composition of the habitat.

Dalhbhum: Crop damage in adjoining areas of West Bengal remains a serious unsolved problem.

b) West Bengal

South Bengal: Crop depredation by elephants from Bihar remains the main problem.

North Bengal (east of Torsa River): The forests of Eastern Nepal adjoining West Bengal have been cleared and brought under cultivation. Elephants venturing into their former range in that country are shot.

The Garubathan forests in Kalimpong Division, the dry season range, are being converted to plantation crops. A barrage across the Teesta River and flood protection embankments on the Reti River have cut off traditional migration routes. Heavy encroachment into forest lands has resulted in conflict of interest; many elephants have been killed, and 20 to 25 people have

been killed annually. The population of elephants was reduced by half in the brief period of four years.

The future of this population is bleak.

D. The elephant in Eastern India

The populations in Assam and other States in Eastern India are still to be surveyed. In a preliminary note, the regional co-ordinator, Lahiri Choudhury (1978), estimates the population in the hill states as:

Garo Hills	600 - 700
Khasi & Jaintia Hills	400
Mikir Hill & N. Cachar	800
	1,900

Discussion: The reduction of elephant natural habitats due to encroachment by man can be grouped into three major categories:

1. Loss of habitation to cultivation

This is the main area of conflict between man and elephant and in the long run will be the major cause for the extinction of the elephant over most of its range in India. Some examples would illustrate this point: The district of North Kanara, the northernmost range of the elephant population in South India, was largely under forest cover but with the eradication of malaria now has extensive enclaves of cultivation fragmenting the existing forest area. The majority of the elephant herds were pocketed in small islands of forests surrounded by cultivation and in the course of time destroyed (Nair & Gadgil, 1979).

In North Bengal, in a period of four years (1974-78) the population was reduced from 250 to 100, through controlled shooting, poaching and capture. Since 1967 vast areas of standing forests have been brought under cultivation, destroying elephant habitats and blocking migration routes essential for the health of both the elephant and its habitat (Choudhury, 1978).

A similar situation has developed in Assam and other areas of Eastern India, where a slash-and-burn method of cultivation known as Jhuming is practiced. The best forest lands have been either handed over for cultivation or encroached. In such forest divisions, deforestation may involve up to 20% of the total area. Controlled shooting and capture are natural corollaries of such offical and unofficial encroachment (Asian Elephant Specialist Group Questionnaire 1977).

2. Change of composition of the forest

A recent development in forestry practice in India which is bound to have grave repercussions not only on elephants but also on forest ecology as a whole is the organization of forest development corporations; the corporations are commercially oriented and are replacing existing forests with monoculture plantations of commercially important species.

In the habitat of the northern population, 165,000 acres or approximately one-third of the prime elephant habitat was converted into monoculture plantations in the decade 1966-76 (Singh, 1978). Similarly in the Bihar sector of the Central India population 2,000 hectares of the best elephant habitat are being replaced annually with monoculture plantations (Shahi, 1978).

3. Alteration of habitat by man-made constructions

Dams of hydroelectric projects and dams for agricultural purposes constitute another major cause of habitat destruction. A total of 851 sq km of a forest area of 7,500 sq km has been submerged in the habitat of the southern population in Karnataka (Nair and Gadgil, 1979). The submerged areas were part of the best elephant habitats.

In the Corbett National Park in Uttar Pradesn, the filling-up of the Ramganga reservoir has affected seasonal movements by blocking traditional migration routes. Another instance of the prevention of seasonal migration in the range of the northern population is the construction of a power channel in the Lansdowne division which has also permanently segregated two sections of the populations (Singh, 1978).

In addition to the loss of habitat, the information reveals that the majority of animals shot under control programmes and all the animals that are poached are tuskers. In a population in which only a percentage of the males are tusked, this selective culling is certainly detrimental to the species.

V. PROPOSED ACTION PLANS OF THE ASIAN ELEPHANT SPECIALIST GROUP:

A breakdown of the action plans into the four elephant populations mentioned above is outlined:

A. Population in the North-West

A continuous monitoring study on the elephant in the forests of Uttar Pradesh, particularly in the Lansdowne division and in Corbett National Park will be planned on a priority basis.

The government of Uttar Pradesh will be requested to consider providing access routes to the Ganges in the Chilla area and for shifting the proposed paper pulp factory to the right bank of the Ganges to prevent destruction of the Chilla Sanctuary.

B. Population in the South

A project to translocate, or take into captivity by traditional methods or tranquilizer gun, herds which are certain to be destroyed if left in their present habitat.

Identify and bring to the attention of the concerned governments, trek routes of the different populations and delineate corridors for permanent protection.

Organize a synchronized census in the three States of Karnataka, Tamil Nadu and Kerala, using the facilities and organization of the State Forest Departments.

Make an in-depth study of the ivory trade and its economic implications as a cottage industry and handicraft.

Actively support studies on elephants being undertaken by the Indian Institute of Science, Bangalore at Bandipur and Kerala Forest Research Institute at Periyar.

C. Population in Central India

1. Bihar

Request the appointment of a high-level committee to examine and suggest suitable measures concerning the proposed dam in the Saranda area and consider prohibiting strip mining in the area.

Request the State government to permanently protect the soil-moisture regime of the area by placing areas above 600 m under "protection working circle" in the working plan of the area.

Establish a continuous monitoring study of the Dalma Sanctuary.

Organize crop protection measures on a continuous-study basis in the areas of crop damage in Orissa and contiguous areas of south Bengal.

2. West Bengal

Request that the establishment of a sanctuary in the forest divisions of W. Midnapore, Bankura and Purulia be undertaken on a priority basis.

Request on a high priority basis the establishment of an "elephant preserve" in the Garuhathan area which would cover a continuous stretch of habitat from the bhabar at 1,000 to the alpine above 8,000 feet.

Request construction of ramps on the Teesta and Reti River embankments to restore traditional migratory routes.

Demark and permanently protect corridors to permit seasonal migrations which would prevent pressure on habitats and adjoining built-up areas.

3. Orissa

It is proposed to survey elephant habitats in the last quarter of the year and suggest conservation measures.

D. Population in the East

A survey of habitats and populations has been planned for the near future (from the date of this paper) and conservation measures will be proposed on that basis.

VI. SUMMARY

The elephant is an apex animal able by its size and its interaction with its habitat, particularly in its quest for food, to influence the direction of development of its biotic environment. It has been one of the causes of change in its ecosystem. Such a function is no longer acceptable in an environment managed by man where the process of change has been accelerated.

As noted earlier, the range of the elephant has shrunk considerably through the ages. However, this process was accelerated as industrial revolution in the latter half of this century brought a mechanised commercial culture into the countries of its occurrence. The tools used by man in a region decide its future, and the tools of an alien culture now in use for gathering natural resources for commerce and to meet the needs of an ever-increasing human population have destroyed a natural, slow-moving ecosystem. The elephant has become in the process too large an animal to find sustenance and living room in a shrinking world of nature.

The problem facing the elephant and its ecosystem in India is uncontrolled increase of human population and the demands on the natural resources for the needs of this population. The human population of the Indian subcontinent was 251 million in 1921. In 1971 the state of India alone had a population of 547 million. Population projections estimate 734 million for 1986, 872 million for 1996 and 945 million for the year 2001. This projection assumes that the birthrate will drop from the present 35.6 per thousand to 25.7 in 1996 - 2001. Conditions in India do not support this assumption.

The demand for forest produce both for industry and fuel to support an increasing population has been rising rapidly. In many parts of India firewood remains the sole source of energy. The demand increased from 8 million cubic meters in 1967 to 24 million cubic meters in 1976. Firewood's position among India's energy resources can be gauged from the fact that in 1970 India used 51.35 million tons of coal, 15.31 million tons of oil and 122.76 million tons of firewood, or twice the amount of coal and oil (Anon. 1978).

Data available on the numbers in each of the populations discussed above are given in Table 1 below.

TABLE 1 ESTIMATED NUMBERS OF ELEPHANTS IN INDIA AS OF MAY 1979

Population		Estimated numbers of elephants
I.	Northwest India	Less than 500
II.	South India	5,000
III.	Central India	3,000
IV.	Eastern India	5,000
	Total	13,500

Except in the case of northwest India and the population north of the Palghat Gap in south India and in some sectors in central India, the figures are very approximate indeed and are not based on accurate field surveys.

The elephant occurs in states which have the highest human density per square kilometer, Kerala (549), West Bengal (509), Bihar (324), Tamil Nadu (317) and Uttar Pradesh (300). The elephant and its ecosystem face severe pressure as the human population keeps increasing. The elephant is unlikely to be exterminated, but it will be much reduced in numbers and restricted to a few national parks.

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