

PROTECTED AREAS AND ELEPHANT
CONSERVATION IN INDIA

A. J. T. JOHNSINGH
WILDLIFE INSTITUTE OF INDIA
NEW FOREST, DEHRADUN - 248 006

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ABSTRACT

The distributional range of the elephant in India has shrunk to four discrete regional populations over the past few centuries. Although the elephant still occurs in 61 protected areas in 16 states including the feral populations in Andamans the long term survival of natural populations is likely in only ten clusters of protected areas here termed Elephant Reserves. For the south Indian populations four such reserves are identified, for central India two, north India one and for north east India three. Even in these areas growing habitat fragmentation leading to elephant range discontinuity and habitat degradation in the form of weed proliferation and lack of food plant regeneration threaten the long term survival of the elephants. Many areas are also highly vulnerable to poaching for ivory. Elephant Reserves should designate elephant as featured species and should be managed to maintain range continuity and quality and to contain poaching. Such a programme is urgently needed to plan long term conservation of elephants in the country.

INTRODUCTION

The Asian elephant once ranged over a vast area from the Tigris-Euphrates in West Asia to South East Asia. It has, however, disappeared entirely from Iran, Afghanistan, Pakistan, Java and most of China (Olivier 1978). In India too the elephant once had a much wider distribution. Precise information on the past distribution of the elephant in north India is available from the writings of Moghul emperors of the 16th and 17th centuries A.D. (Ali 1927). Sukumar (1985) summarises the details of past elephant distributions in India. Comparison of past and present distributions shows that during the last 100 years elephants have become extinct in five states : Punjab, Rajasthan, Madhya Pradesh, Maharashtra and Andhra Pradesh which indicates the drastic reduction and changes that have occurred in the range of the elephant in the period of man's great population explosion.

The elephant in India now exists in five disjointed populations, each of which again is discontinuously distributed (Daniel 1980). The elephant is presently found in 16 states including a feral population in the Andaman islands. Although in total there are 61 protected wildlife areas (national parks and wildlife sanctuaries) in these states having elephants the long term survival of natural populations of elephants is practically possible in only ten locations in the country. These are identified in this paper as Elephant Reserves (ER). This account is about the ecological and conservation status of protected areas having elephant and the suggested Elephant Reserves.

ELEPHANT HABITATS AND POPULATIONS IN INDIA

In south India the elephant population (estimated at 5750-7050, Sukumar 1985) is distributed over the forested hilly tracts of Western ghats and Eastern ghats in Tamil Nadu, Karnataka and Kerala. Nair et al (1980) have considered the south Indian population under the following eight major areas :

- a. The highly fragmented North Kanara-Malnad forests with less than a total of 150 elephants,
- b. The Nagarhole-Kakankote forests have around 300 elephants,
- c. Bandipur-Mudumalai sanctuaries and surrounding areas have 1100 to 1400 elephants,
- d. The Eastern Ghats (south) have about 2000 elephants,
- e. South of the Nilgiris the rich evergreen forests of Nilambur, Silent Valley, New Amarambalam and Attapadi have a few hundred elephants,
- f. South of the Palghat gap the Anamalais have about 1000 elephants,
- g. The Periyar plateau, south of Anaimalais have about 800 elephants,
- h. At the southern end of Western ghats in the Agasthyamalai hills a small population of about 150 elephants occur.

In March 1984 a herd of seven elephants moved from Karnataka via Tamil Nadu into the Kuppam area of Chittoor district in Andhra Pradesh. To date the population is 40 animals (Sivaganesan and Bushan 1986). This part of Andhra Pradesh has now elephants after a span of 400 years.

The central Indian population in Bihar comprises 300 elephants in three discrete populations (65 in Palamu, 200 in the heavily disturbed Singhbhum forests and 70 in Dalbhum). Orissa has 1300 + elephants (S.Choudhury et al 1985).

Along the Himalayan foot hills in the terrai and bhabar forests of Uttar Pradesh a population estimated at 750 elephants ranges over the forest divisions of Siwalik, Dehradun, Lansdowne, Kalagarh, Ramnagar, Haldwani and North Kheri (Singh 1986).

In the north of West Bengal the population is estimated to be 155. About half of this range as a distinct population to the west of Torsa river and the rest to the east (D.K.L.Choudhury 1980). In Assam three large elephant populations exist: about 1200 in the Manas Tiger Reserve (TR), 400 in Darang West and East forest divisions and 800 in the Kaziranga National Park (NP). In total in Assam there may be 3600-3800 elephants (D.K.L.Choudhury 1986), many sharing their range with Arunachal Pradesh and Bhutan. Meghalaya has some 2700 elephants, of which 2300 are found in East Khasi and Garo hills and the rest in other parts of Meghalaya (Ajay Desai et al 1987).

In Arunachal Pradesh 2000-4300 elephants, possibly distinct from Assam, may occur (D.K.L.Choudhury 1986). Their foot hill habitats with semi evergreen and moist deciduous forest is broken by roads, steep river banks and human settlements and is not continuous as was once thought (Johnsingh 1986).

In Nagaland about 230 elephants occur and of these 140 are reported from Intanki Wildlife Sanctuary (WLS). Tripura may have 120-150 elephants, there are none resident in Manipur and there is no information on elephant number from Mizoram. The total elephant population in North East may be between 8700-12000 (D.K.L.Choudhury 1986). The total number of elephants in India may be between 17000 and 20000.

PROTECTED AREAS HAVING ELEPHANTS

For convenience I divide the elephant area of India into four regions :

South India:

The southern protected areas with elephants are the newly created Kalakadu-Mundanthurai TR (900 sq.km.) in Tamil Nadu; Neyyar (128 sq.km.), Peppara (53 sq.km.) and Chendurny (100 sq.km.) in Kerala (Fig.1,a). All these protected areas are in Western ghats south of Shencottah pass. This elephant population of about 200 animals is largely confined to the semievergreen and evergreen forests and form the southern most population in the country. When the rail and road traffic along Shencottah pass at the beginning of this century began, followed by human settlements and plantations, elephant migration between Ashambu hills (south of the pass) and Idukki-Periyar hills (north of the pass) cease to come to an end (pers. observ).

North of Shencottah pass the most important elephant area is Periyar TR (777 sq.km.) in Kerala. Adjacent to this on the Tamil nadu side there is Grizzled Giant Squirrel WLS (GGS WLS) (c. 400

sq.km.). Both the protected areas combined would have about 800 elephants which, however, are subjected to heavy poaching (Nair et al 1980). Further north, south of Palghat gap, there is a good net work of protected areas having elephants. In Tamil Nadu there is Anamalai WLS, (now Indira Gandhi WLS, 890 sq.km.) and adjacent to this on the Kerala side there are three sanctuaries : Parambikulam (285 sq.km.), Chimony (90 sq.km.) and Peechi - Vazhani (125 sq.km.). To the south east are situated the Chinnar WLS (90 sq.km.) and Eravikulam NP (77 sq.km.), both are used by elephants. In total this area may have 1000 elephants.

North of Palghat gap there are two viable population of elephants. One is in and around Silent Valley NP (89 sq.km.), in the semievergreen and evergreen forests of Nilambur, New Amarambalam, Attapadi and Mukurt WLS. Nearly 600 sq. km. of this fairly hilly and dense forest may have 300-500 elephants (Nair et al 1980). The largest elephant population (c. 2500) and the largest continuous elephant habitat (c. 4000 sq. km.) in South India, possibly in whole of India, is at the junction of Tamil Nadu, Kerala and Karnataka. Protected areas in this region include Mudumalai WLS (321 sq.km.), Wyanad WLS (344 sq.km.), Bandipur Tr (874 sq.km.) and Nagarhole NP (572 sq.km.). Along Moyar Valley this tract is contiguous with Biligiri Rangan Temple (BRT) WLS (574 sq.km.) at the southern end of Eastern ghats through the proposed Moyar Blackbuck Sanctuary (c. 300 sq.km.). Elephant areas north of BRT WLS although continuous upto Bannerghatta NP (104 sq.km.) near Bangalore are much degraded and do not offer long term value for elephant conservation.

North of Nagarhole there are several sanctuaries in Karnataka with elephants. They are Brahmagiri (181 sq.km.), Bhadra (492 sq.km.), Shettihally (396 sq.km.) and Dandeli (995 sq.km.). Nevertheless, the total number of elephants in these protected areas may only be around 150 (Nair et al 1980).

Central India:

In the state of Orissa several protected areas have elephants. They are Simlipal TR (2200 sq.km.), Kuldiha WLS (273 sq.km.), Hadgarh WLS (192 sq. km.), Kapilasa WLS (126 sq.km.), Chandaka WLS (230 sq. km.), Lakhari Valley WLS (118 sq.km.), Kotagarh WLS (400 sq. km.), Ushakoth WLS (285 sq.km.), Satkosia Gorge WLS North (318 sq.km.), and Satkosia Gorge WLS South (478 sq.km.) (Fig.1.b). Simlipal has about 400 elephants, Satkosia 300 and Sbirampur-Chandrapur tract around Kotagarh WLS, an area much disturbed by shifting cultivation, has 300 (S. Choudhury et al 1985). In the state of Bihar Palamu TR (767 sq.km.) has about 65 elephants, a mixture of the escapees from Sarguja maharaja's stable and the Dhalbhum forest area. Dalma WLS (193 sq. km.) has 60-70 elephants which for some months go into Midnapur area in West Bengal to raid paddy (S.Choudhury et al 1985).

North West India:

The elephant population in North-west India is confined to Uttar Pradesh which has four protected areas having elephants (Fig. 1 b). Dudwa TR (490 sq.km.) has a transient population of about 25 elephants permanently resident in the past in Nepal, Corbett TR (521 sq.km.) has about 150 elephants, Sonnadi WLS (300

sq.km.) covers the wet season range of Corbett population to the west and Rajaji NP (821 sq.km.) about 400 elephants (Singh 1986).

North East India:

In the state of West Bengal there are five protected areas having elephants. Buxa TR (750 sq.km.) has migrants from Assam and probably from Bhutan, Jaldapara WLS (116 sq.km.), Mahananda WLS (66 sq.km.), Gorumara WLS (9 sq.km.) and Chapramari WLS (10 sq.km.). In Assam Manas TR (1097 sq.km.) has about 1200 elephants and Kaziranga NP (696 sq.km.) 800 elephants. Other areas having elephants are Orang WLS (92 sq.km.), Laokhowa WLS (70 sq.km.), Barnadi WLS (26 sq.km.) and Garampani WLS (6 sq.km.).

In Arunachal Pradesh Pakhui WLS (862 sq.km.), Itanagar WLS (140 sq.km.), D'Ering WLS (190 sq.km.), Mahao WLS (282 sq.km.) and Namdapha TR (1807 sq.km.) have elephants. In Meghalaya only Balphakram NP (200 sq.km.) could give long term protection to elephant, in Nagaland Intanki WLS (56 Sq.km.) and in Tripura only Gumti WLS (349 sq.km.) has 10-20 elephants during summer. In Andamans Interviews Island WLS (134 sq.km.) has 30-50 feral elephants. Manipur and Mirozum do not have sanctuaries giving protection to elephant.

CATEGORIES OF ELEPHANT AREAS IN INDIA

Three categories of elephant areas are identified in this paper:

1. Areas which are small (< 300 sq.km.), degraded, contain less than 300 elephants and do not form part of a continuous larger elephant range (eg., Kapilasa WLS, Chandaka WLS, Lakhari Valley WLS and Dalma WLS).
2. Larger areas (> 300 sq.km.) but have less than 300 elephants and do not form part of a large continuous elephant range (eg., Kalakadu-Mundanthurai TR, Badra WLS, Dandeli WLS, Palamu TR).
3. Larger areas (> 300 sq.km.) with good elephant habitat and with more than 300 elephants. Key areas coming under this category are listed under the next section.

The twin problems of small size of the areas which would become increasingly degraded in time and small population sizes of elephant which may eventually suffer from inbreeding threaten the elephant areas and population of the first category. Increasing man-elephant conflict around these areas creates problems for the wildlife managers and people and retards other wildlife conservation programmes in the area. We have two options in these areas. Either improve the habitat in these small areas to contain the elephants within or eliminate the herds which cause problems. The former suggestion will be very difficult to be implemented. Hard decisions, however, have to be made about the future of the elephants in these areas. Culling of the form of capture for domestic use can be begun here if necessary with amendment of Indian Wildlife Act 1972.

Areas of the second category have some role in elephant conservation as these areas can be used for translocating few problem elephants from the first category areas.

Areas of the third category because of their large size and viable population of elephants are particularly appropriate for the long term conservation of elephants. But here again several problems plague them. As seen in Periyar because of the large scale poaching for tuskers the adult sex ratio has become heavily skewed in favour of females (1 male :23 females Nair et al 1986). In places like Rajaji-Corbett National Park area severe habitat fragmentation and developmental projects (Singh 1978, Johnsingh et al 1988) coupled with weed proliferation and lack of regeneration of elephant food trees particularly bamboo (Prasad 1988) threaten the viability of elephant populations.

SUGGESTED ELEPHANT RESERVES IN INDIA

Ten Elephant Reserves are identified in this paper for the long term conservation of elephant in India. Several of the suggestions for maintaining habitat continuity of elephant ranges are taken from Rodgers and Panwar (1987).

Periyar ER

Periyar TR, the adjacent Grizzled Giant Squirrel WLS (GGS WLS) and adjoining elephant areas would form nearly 1500 sq.km. of moist deciduous, semievergreen, evergreen forests with large patches of grassland and a population of 800-1000 elephants.

Preventing further encroachments and controlling poaching are of paramount importance in this area. Tamil Nadu government should strengthen protection in GGS WLS. Assistance and monitoring by Central Government to control poaching and for preserving the habitat integrity of this area are crucial.

Anamalai-Parambikulam ER

This unit has Anamalai WLS, Parambikulam WLS, Chimony WLS, Peechi-Vazhani WLS, Chinnar WLS, Eravikulam NP and surrounding RFs such as Nelliampathy, Kodasserri, Sholayar, Malayattur, Upper Pooyankutty, Anaimudi and Kudakaadu. The total area is around 2500 sq.km. with a population of approximately 1000 elephants. Already this rich wildlife area has been disturbed by reservoir constructions and plantations. Unfortunately further plans for reservoirs, roads and tourism complexes in Parambikulam and Eravikulam loom ahead. Encroachment is a serious threat on the Kerala side. Water catchment potential of this area is a great conservation asset and this should be effectively used to counter argue the demand for releasing more land for hydel projects which bring in their wake lot of disturbances and eventual habitat degradation.

Silent Valley ER

In this roadless difficult terrain poaching and insidious encroachment are the major problems which should be contained. Physically fit and committed officers are extremely crucially important for such areas.

Nagarhole-Wynad-Bandipur-
Mudumalai - BRT ER

This area forms part of the Nilgiri Biosphere Reserve and special efforts to contain poaching, eradicate weeds, maintain habitat continuity and monitor elephant populations are needed. Moyar Blackbuck WLS should be created at an early date to maintain the continuity between Mudumalai and BRT hills. In the past the elephant population around Silent Valley ER and Mudumalai was contiguous. But developments between Doty and Gudalur in the form of settlements, tea and wattle plantations have broken this continuity. It will be worthwhile to develop a corridor to restore this continuity. Heavy poaching for ivory is a big problem in this area. For example during 1985-87 there were 26 deaths in and around Mudumalai and of these 22 were males killed largely for ivory (Ajay Desai et al 1987). Nevertheless, this area assures the best long term survival of elephants in the country.

Simlipal ER

Simlipal and its adjoining two sanctuaries, Hadgarh and Kuldiha form one elephant range. However because of encroachment in the Barsari RF between Simlipal and Kuldiha the free movement of elephant between Simlipal and Kuldiha is hampered. The encroachers need to be evicted from this belt as soon as possible.

Satkosia ER

Although Mahanadi flows between Satkosia north and Satkosia south sanctuaries elephants cross the river, especially in summer, both to the east and west of the 15 km long Satkosia gorge. Together these two areas form approximately 800 sq.km. and could form an excellent elephant habitat.

Rajaji-Corbett ER

The proposed resettlement of Gujars from Rajaji NP should be carried out as early as possible. This, coupled with some restriction on the village cattle using the Park, will considerably reduce human pressures in this area. Chila-Motichur corridor in Rajaji NP should be created and managed and the forest tract between Laldang and Sonanadi WLS (300 sq.km.) should be freed from further developments and forestry operations. Weed eradication should be taken up on priority basis.

Manas-Buxa ER

Manas TR is the key area in this suggested ER. However, creation of Ripu-Chirang WLS (330 sq.km.) to the west of Manas would maintain the continuity with Buxa. Similarly extension of Barnadi WLS from the present size of 26 to 100 sq.km. to the east of Manas would greatly enhance the conservation value of this area. It is reported, however, that the habitat continuity between Manas and Arunachal Pradesh is only through Bhutan as, inspite of the presence of Barnadi WLS, the forests on either side of Barnadi have largely disappeared on the Indian side.

Encroachment and tree felling are the key problems in Ripu-Chirang and Barnadi area. An ecological survey of the corridor area between Buxa and Manas, Manas and Pakhui WLS in Arunachal Pradesh should be taken up on a priority. This elephant area can be protected for posterity only with cooperation and coordination with Bhutan government.

Kaziranga-Karbi hills ER

Four important conservation actions are necessary for this area :

- 1 All the proposed four corridors between Kaziranga and Karbi hills across National Highway 37 which runs along the southern boundary of the Park should be included with Kaziranga at an early date.
2. The proposal of Assam Forest Department to have control over poaching and wood cutting in 33 sq.km. of Karbi hills adjacent to the Park, which serves as the flood season refuge for a part of Kaziranga large mammal population, should be implemented at an early date. Towards this although Government of India has released Rs. 4.5 lakhs (.45 million) in year 1974 the proposal has still been pending.
3. Enlarging Kaziranga NP to 940 sq.km. as planned by Assam Forest Department,
4. Creation of the proposed Mikhir hills WLS (200 sq.km.) which would give further protection to the flood season dispersal area of the elephant.

Balphakram ER

In Meghalaya only Balphakram and the adjoining areas can give some amount of long term safety to elephants. Other areas are open to unrestricted human use and degradation. Already Government of India has spent 35 million (3.5 crore) Indian rupees to create Balphakram NP which should be extended both on the Garo and Khasi side (220 sq.km. plus 150 sq.km.).

It should be remembered that further potential Elephant Reserves could be identified in Arunchal Pradesh if a proper survey and census is made. Nevertheless, a special conservation programme for the elephant can be begun with the suggested ten ERs whose major problems are summarised in Table 1.

CONCLUSION

Over the past years it has become increasingly clear that the Asian elephant cannot be saved all over its range in India. Several factors largely stemming from the rapid increase in human population work against the survival of elephant in many parts of its range. It will be prudent, therefore, to initially strengthen conservation measures in the ten ERs suggested in this paper, possibly in the manner of Project Tiger Reserves. Fortunately five of the suggested ERs center around Tiger Reserves. Elephant Reserves in addition to giving protection to elephants would also safeguard the future of numerous other endangered species such as lion tailed macaque, hoolock, Nilgiri tahr, barasingha, wild buffalo, rhinoceros, sloth bear and tiger.

Primary conservation measures in the ERs should be the following:

1. Maintain elephant range continuity, if necessary by creating and managing corridors, improve habitat quality by eradicating weeds and promoting regeneration of browse species and contain poaching. As far as possible the entire elephant range around each ER should be considered as one unit,
2. Identify and appoint suitable wildlife trained officers for each Reserve,
3. Promote research with the primary objectives to identify the range of the population, threats to the habitat, to assess habitat quality and estimate effective breeding population size for each unit.

One action plan on these lines could be to begin Project Elephant by Government of India, if necessary with financial assistance from international agencies, which could ensure the long term survival of elephants in ten key areas.

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Table 1: Major Conservation problems of the suggested Elephant Reserves.
(0=nil, *=little, **=moderate, ***=serious, one * equals five.)

Name of ER	Encroach- ment	Habitat fragmen- tation	Poaching	Lack of food tree regeneration	weeds	Man- killing	Crop damage	score
Periyar: GGS/WLS	**	*	***	*	*	*	*	50
Anamalai - Parambikulam	**	**	**	*	*	*	*	50
Silent Valley	**	*	**	*	*	*	*	45
Nagarhole to BRT	*	*	***	*	**	**	**	60
Simlipal	*	*	*	*	*	*	*	35
Satkosia	*	**	*	*	*	*	**	45
Rajaji- Corbett	*	**	0	**	**	*	*	45
Buxa- Manas	**	**	0	*	*	**	*	45
Kaziranga- Karbi hills	*	**	*	*	*	*	*	40
Balphakram	**	*	*	**	*	**	***	60

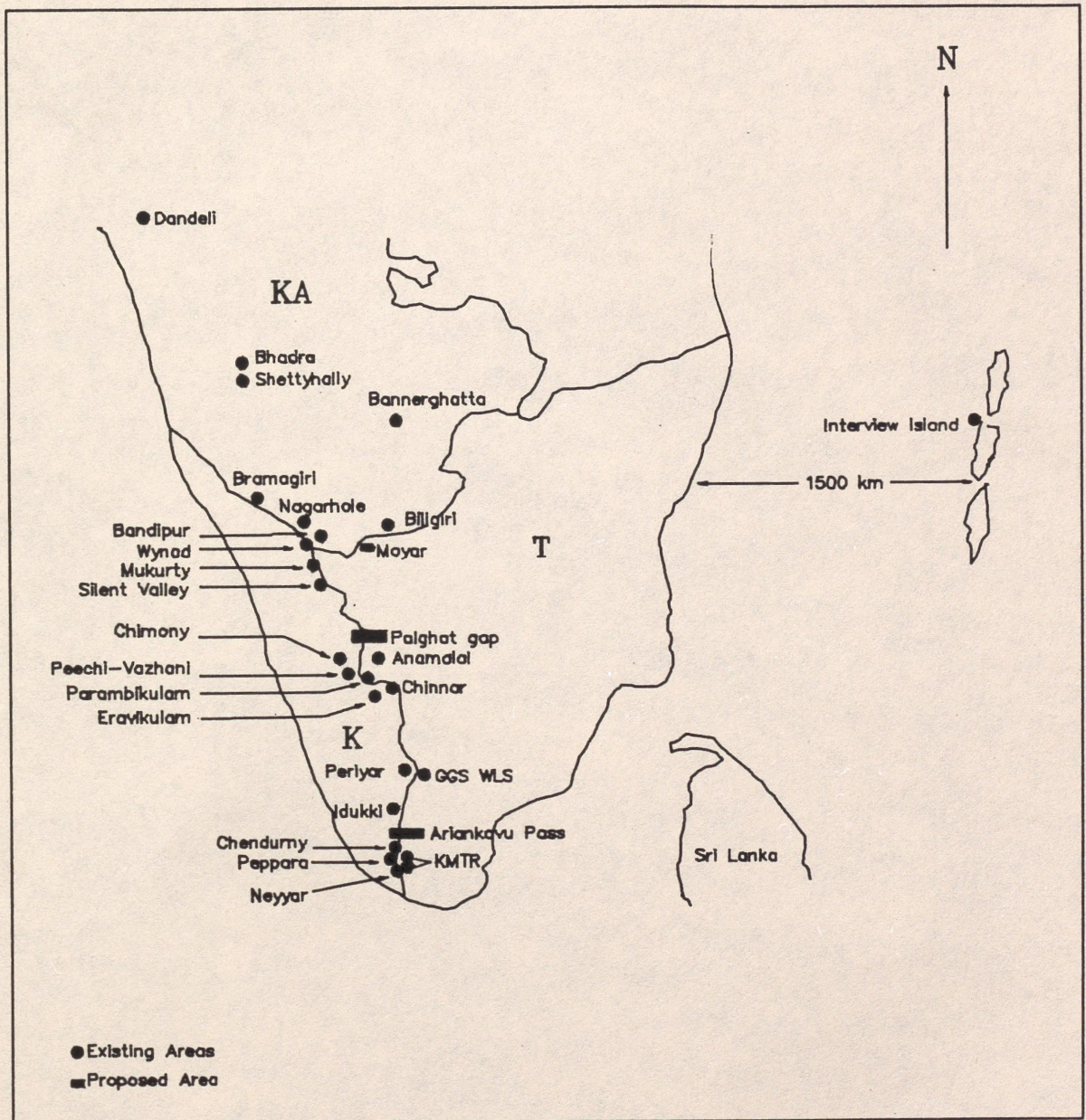


Fig.1(a) Protected areas having elephants in Tamil Nadu (T), Kerala (K) and Karnataka (KA).

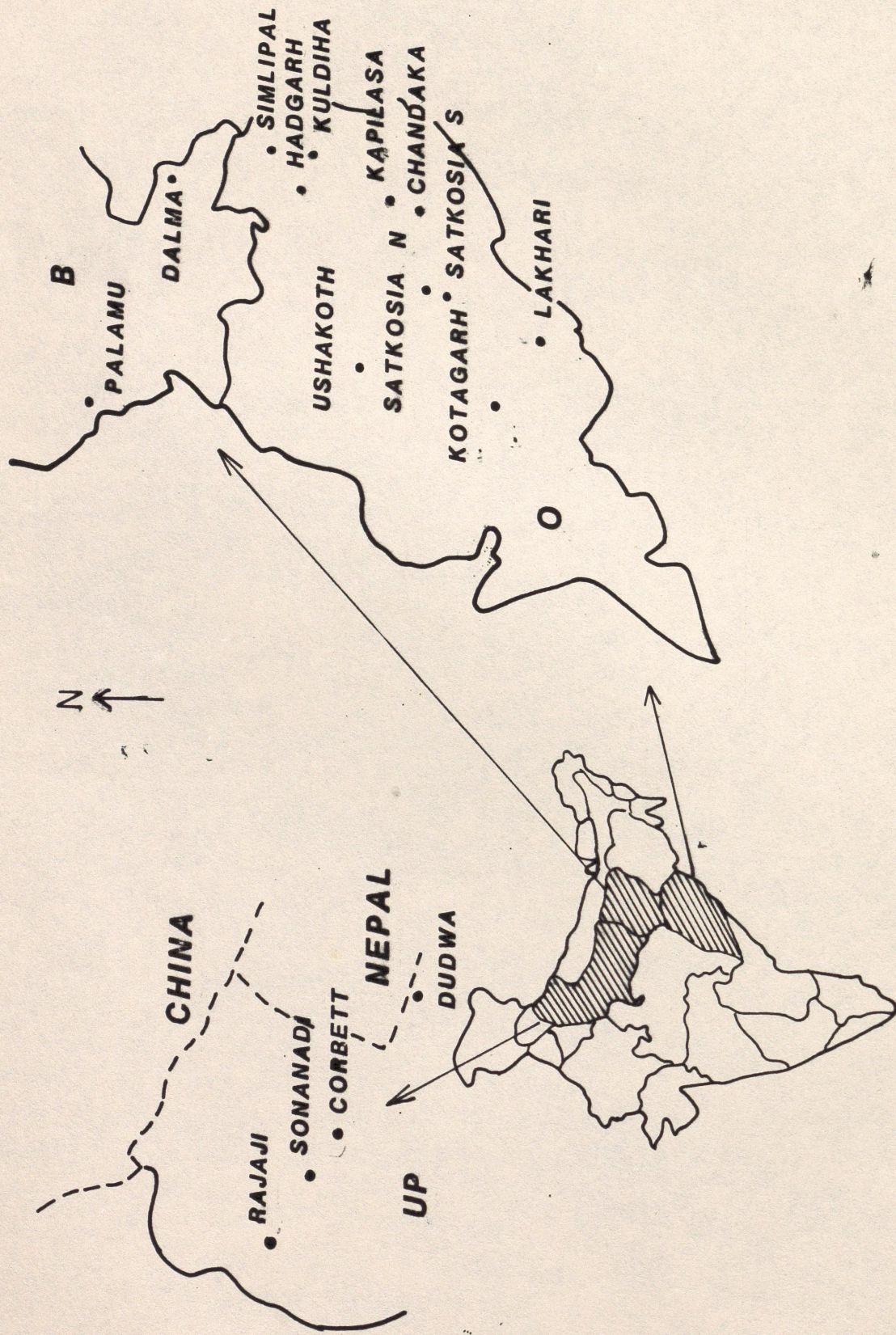
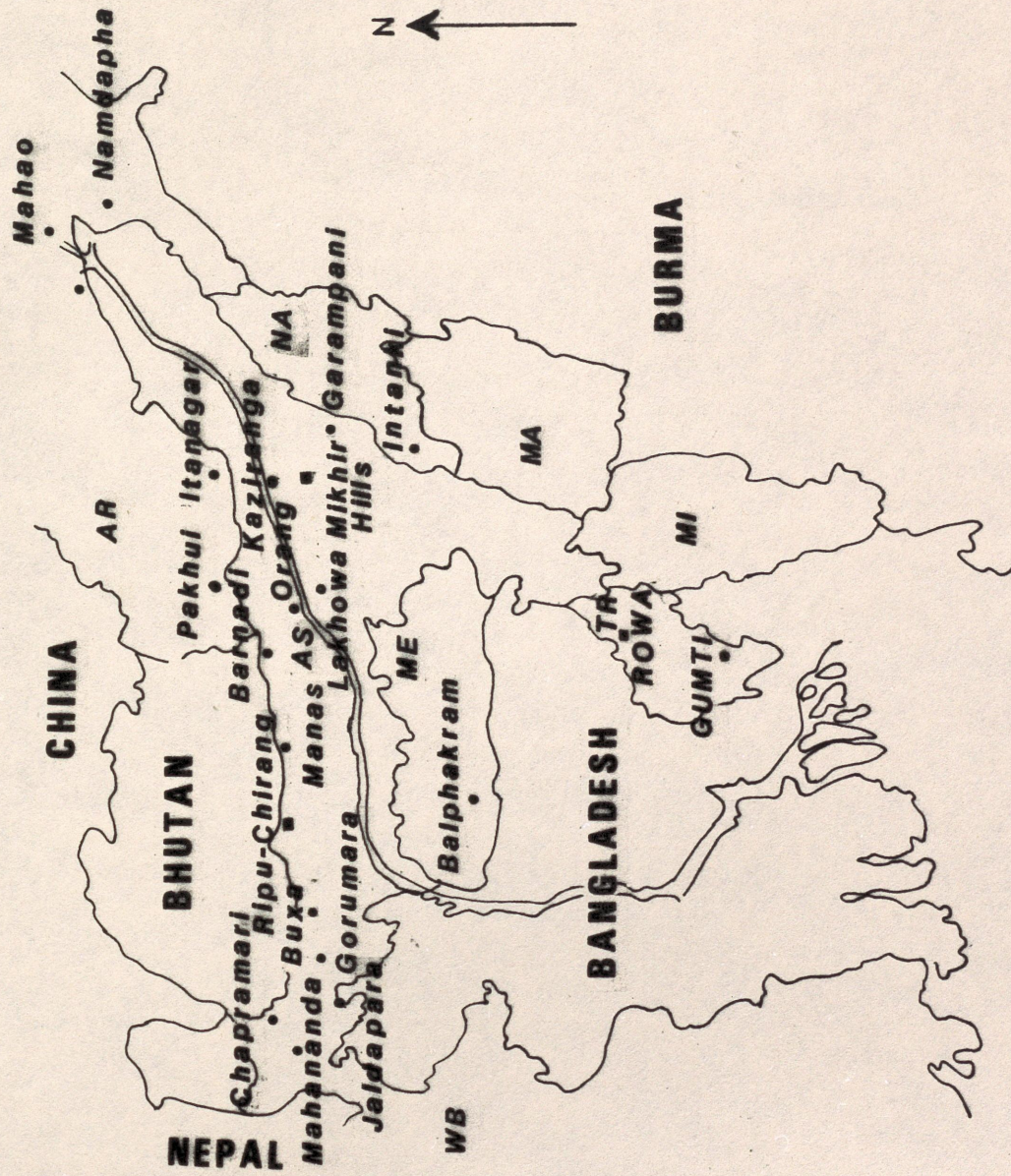


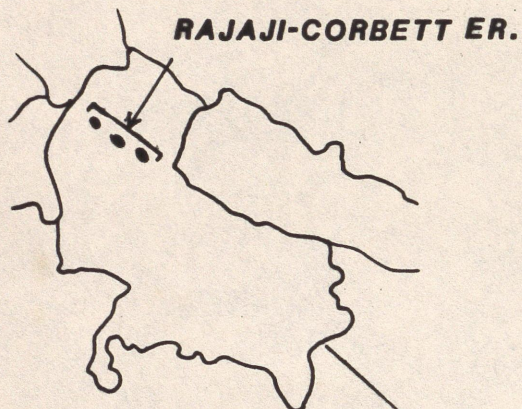
FIG 1(b). PROTECTED AREAS HAVING ELEPHANTS IN ORISSA (O), BIHAR (B) AND UTTAR PRADESH (UP).



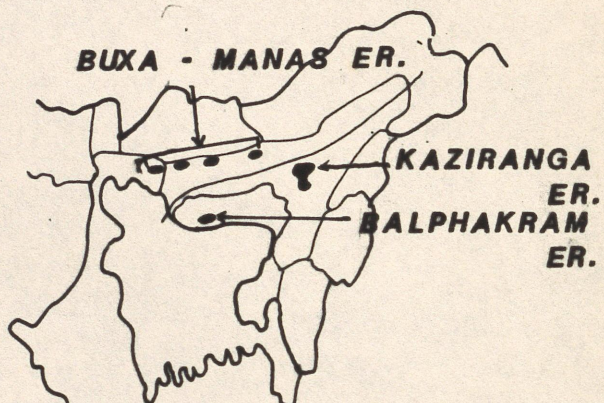
- AS ASSAM
- AR ARUNACHAL
- MA MANIPUR
- ME MEGHALAYA
- MI MIZORAM
- NA NAGALAND
- TR TRIPURA
- WB WEST BENGAL

Fig 1 (c) PROTECTED AREAS HAVING ELEPHANTS IN NORTH EAST INDIA. -PROPOSED AREAS

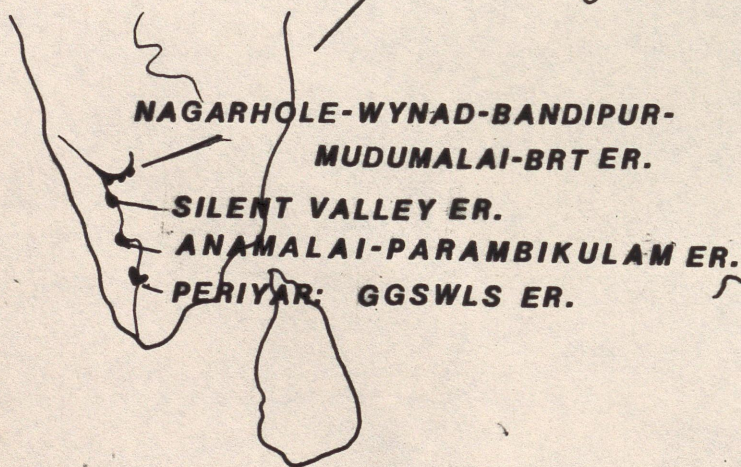
NORTH WEST INDIA



NORTH EAST INDIA



SOUTH INDIA



CENTRAL INDIA



FIG 2. SUGGESTED ELEPHANT RESERVES (ER) IN INDIA.