

## Article

# Shared Landscapes: Optimising Conservation Strategies Using Tiger and Elephant Sympatry in India

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**Abstract:** Asian elephants (*Elephas maximus*) and tigers (*Panthera tigris*) share the same landscape in India. Elephants, which range over 239,171 km<sup>2</sup>, occupy 45.5% of the 433,261 km<sup>2</sup> habitat that tigers inhabit. Equally, at least 40% of elephant corridors are used by tigers. A shared landscape offers opportunities for careful, integrated management strategies with shared resources. The species are protected differently in India, with tiger reserves being legal entities dedicated to the protection of tigers and their habitats, and Elephant Reserves being management units with no legal standing. With additional disparities in financial supports to tiger reserves—which receive 10 times more money than elephant reserves—it is obvious that the elephant reserves are being treated inequitably. Since the two species coexist in the same landscapes, efforts to protect tigers can help to make up for elephant conservation gaps and optimise the use of conservation resources by tweaking a few management and policy practices. In addition, the overlay of tigers using elephant corridors can efficiently secure habitat linkages for both species.

**Keywords:** Asian elephants; tiger; wildlife habitat conservation; distribution range; protected area; corridor; habitat fragmentation



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## 1. Introduction

The tiger (*Panthera tigris*) and the Asian elephant (*Elephas maximus*) are India's largest terrestrial carnivore and herbivore species, respectively. Both species have reported significant global declines in their populations as well as areas of occupancy and are listed as 'Endangered' by the IUCN [1–3]. Both species are flagships of Indian conservation initiatives, having been conferred the status of National Animal and National Heritage Animal, respectively. India holds ~70% of the global wild tiger population across a range exceeding 433,261 km<sup>2</sup> and ~60% of the Asian elephant population over 239,171 km<sup>2</sup>, underlining its global significance [2–4]. Both species have fared remarkably well in the face of significant challenges including habitat loss and fragmentation, human–animal conflict, significant anthropogenic pressures such as grazing, non-timber forest produce harvesting, development pressure, and civil unrest in their ranging areas.

In India, tiger is protected under the 1972 Wildlife (Protection) Act of India, which confers the national animal legal protection against killing and destruction of its habitat. The habitats of this species are secured through a network of wildlife sanctuaries and national parks. The National Tiger Conservation Authority (NTCA), an autonomous authority constituted in India and charged with the responsibility of protecting tigers, has declared tiger reserves for the protection of the tigers [5–7]. Realising the need for larger

landscapes, the tiger reserves subsume some of the sanctuaries and national parks and also include the intervening areas (as buffers) to offer larger conservation units for the benefit of the tiger. The NTCA has, thus far, notified 52 tiger reserves in India, covering 74,725 km<sup>2</sup> and aims to improve the ecological viability of tigers and their habitat [5]. From around 1411 in 2012, the number of tigers has stood at around 3000 since 2019 [6], a tribute to the success of the programme.

Much like the tiger protection, elephants in India are protected under schedule I of the 1972 Wildlife (Protection) Act of India. As with tigers, the elephant habitats are protected under this act by a network of wildlife sanctuaries and national parks. Following the success of 'Project Tiger' in 1992, the Union Government of India initiated the 'Project Elephant' to protect elephants and their habitat. The 'Project Elephant' declared a series of 'Elephant Reserves' but unlike the tiger reserves, the large intervening spaces between sanctuaries and national parks are not 'legally protected' and do not have protection under the 1972 Wildlife (Protection) Act. Thus, the elephant reserves are simply management units without any legal mandate but formally notified by various State Governments. The elephant populations have remained relatively stable, growing from 26,000 in 2007 to 30,000 in 2017 [8]. However, this fact must take into account the long lifespan and inter-generational span of the latter as compared to the former.

India now has 31 elephant reserves spread across 76,508 km<sup>2</sup> and are an administrative category where only the protected areas within are managed by the forest department with much of the buffer and most corridors lying outside direct biodiversity management [1]. The gazette notifications of two more elephant reserves, viz. Terai Elephant Reserve (Uttar Pradesh) and Agasthmalai Elephant Reserve (Tamil Nadu), are under the process and will add about 4247 km<sup>2</sup> to the area under elephant reserves. Less than a third of the elephant reserves are part of the Protected Area network (PAs) while 30% are beyond the control of the forest administration, posing management and governance challenges of various dimensions [1].

While the tiger is undoubtedly the flagship of Indian wildlife conservation, both in terms of registering a significant growth in their numbers, through legal protection of areas and allocation of adequate financial resources, elephants have not received the same legal and financial support. While changes in tiger [2,9] and elephant [10,11] ranges as well as habitat connectivity [12,13] are well documented, little has been reported on the possible synergistic management models involving the two species. We explore the possible benefits both species may derive from such synergistic planning and even management. This article investigated species' range overlaps, similarity of conservation threats and conservation practices, and arrive at certain conservation implications of this sympatry which could be useful as a management tool.

## 2. Methodology and Approach

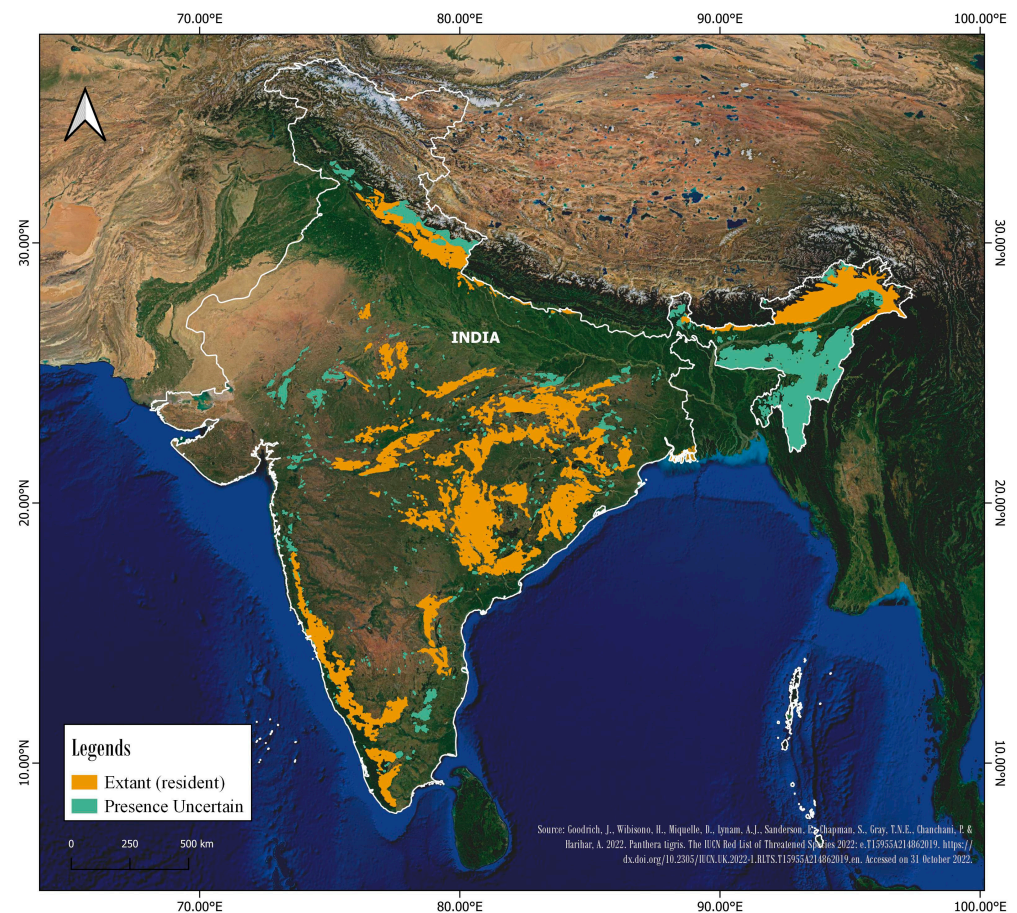
Global distributions of both species were sourced from the IUCN Red List database [2,3] and clipped to include Indian boundaries only. The extant distribution ranges of both species were considered for analysis and discussion. Data used for boundaries of protected areas, elephant reserves and tiger reserves were sourced from notification gazettes and government websites [14,15].

The study analysed the extent of habitat intersections/range overlaps of the two species, and the status of prevalent legal protection afforded to them. The range maps generated for tiger (Figure 1) and elephant (Figure 2) were used to investigate the range intersection for both species and area covered by legally protected habitats. Range overlap or the area of cohabitation, were calculated from range intersections in respective landscapes. For example, range overlap for both species in southern landscapes were the calculated intersections of the tiger range in Western Ghats tiger landscape and elephant range in southern elephant landscape (Zone) (Table 1). Percentage overlap of elephant landscapes with tiger landscapes were calculated as percentage area of the elephant landscape inhabited by tigers and vice versa (Table 1). Annually cumulated data were used for analysing annual

or decadal changes in protected area notifications, area of legally secured habitats, etc. All analyses and mapping were performed using QGIS 3.22.5 [16] (with plugins as NNJOIN, RAT, etc.) and MS Excel.

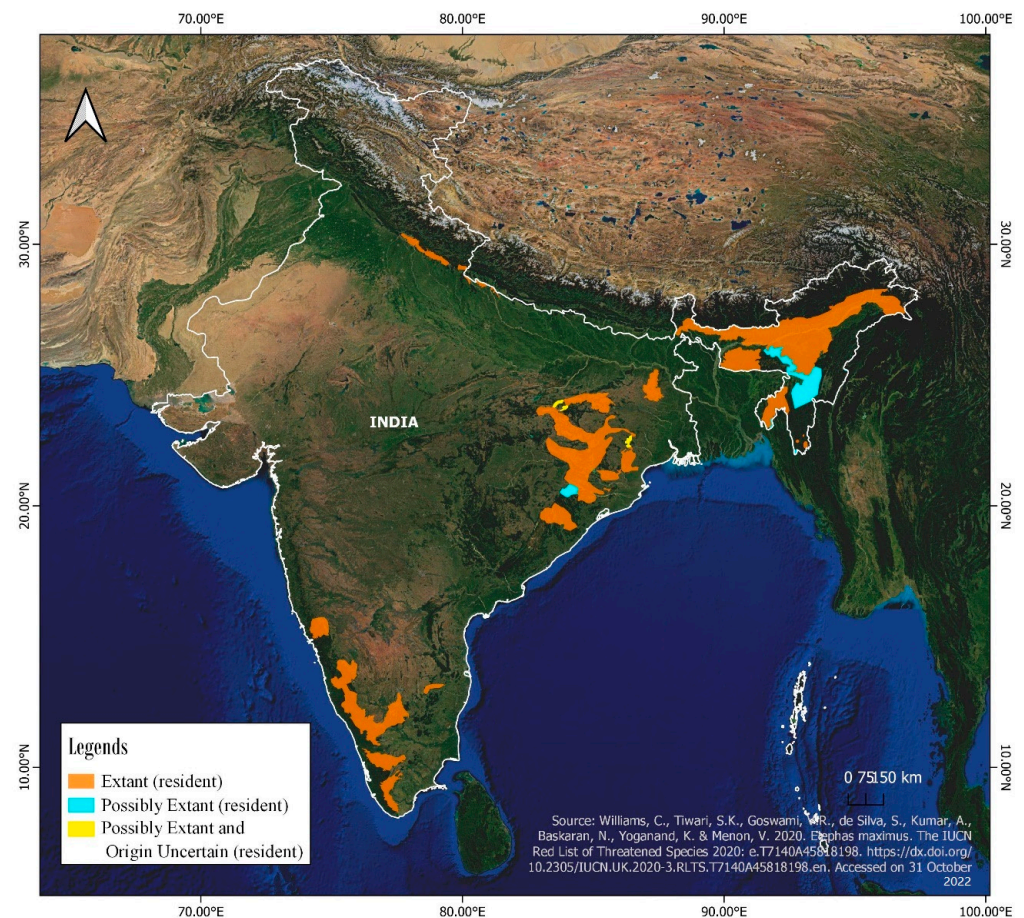
**Table 1.** Details of ranging areas and overlapping extant ranges of elephants and tigers in India (EZ: elephant landscape (Zone); TL: tiger landscape).

Tiger and Elephant Extent	Ranging Area (km <sup>2</sup> ) (% of Total Range)	Range Overlap (km <sup>2</sup> )	% Overlap with	
			Tiger Landscape	Elephant Zone
Southern EZ	53,090 (22.2)	39,546.8	74.5	
Western Ghats TL	60,278 (13.9)			65.6
Central EZ	80,619 (33.7)	45,742.7	56.7	
Central India and Eastern Ghats TL	281,666 (65.0)			16.2
North-Eastern EZ	99,201 (41.5)	18,423.0	18.6	
North-East hills and Brahmaputra TL	54,092 (12.5)			34.1
North-Western EZ	6262 (2.6)	4999.2	79.8	
Shivalik–Gangetic TL	34,360 (7.9)			14.5
Sundarbans TL	2865 (0.7)			0
Total EZ	239,171	108,711.7	45.5	
Total TL	433,261			25.1



**Figure 1.** Distribution map of *Panthera tigris*: The map depicts the extant (resident) and probable distribution ranges of *Panthera tigris* as per Goodrich et al. [2].





**Figure 2.** Distribution map of *Elephas maximus*: The map illustrates extant ranges of Asian Elephants [3].

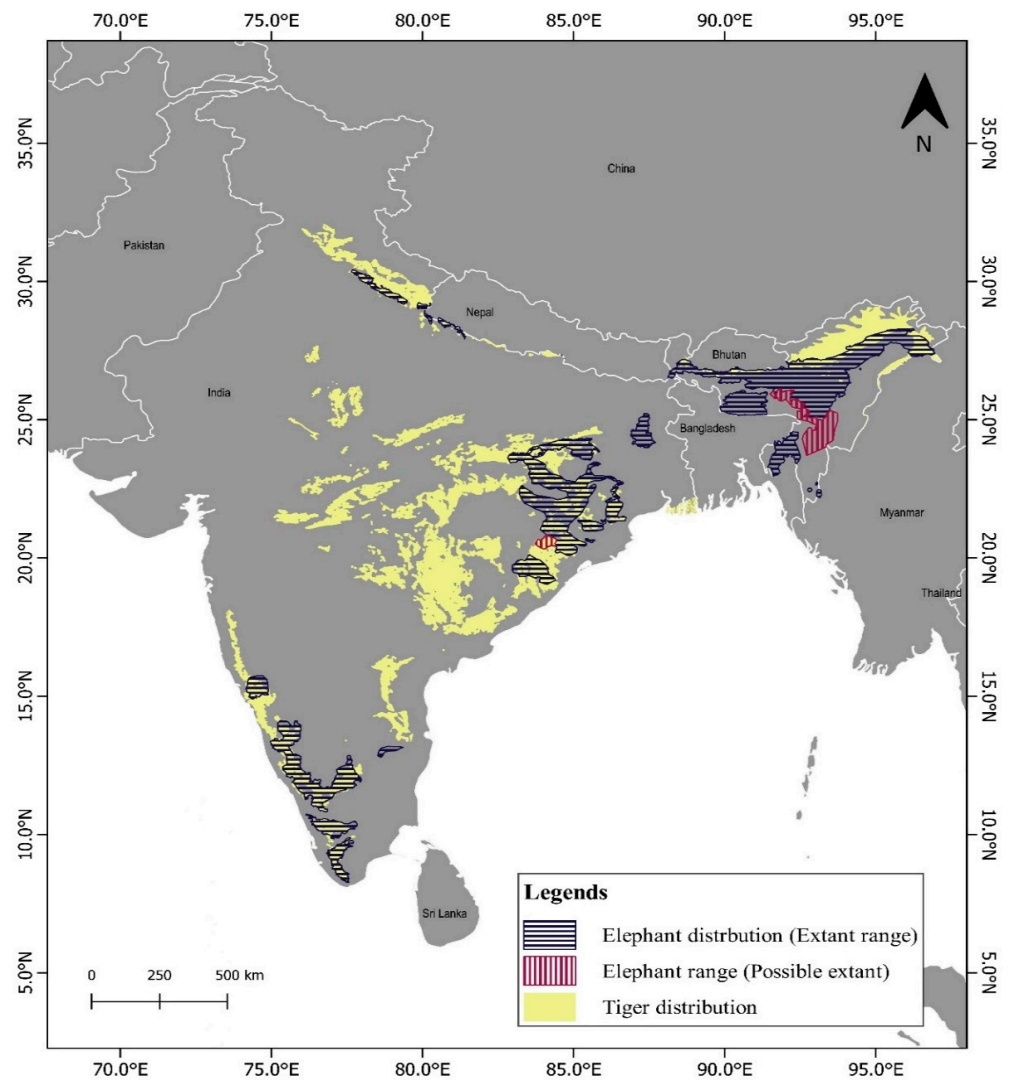
### 3. Results

#### 3.1. Range Overlaps of Asian Elephants and Tigers in India

According to the recently updated IUCN range map, the tiger, in India, covers 13.18% (433,261 km<sup>2</sup>) of the country's landmass (Figure 1) which is 36.75% of its global extent. The Indian tiger range is spatially distributed over five landscapes, viz. the Central India and Eastern Ghats (1033 tigers), Western Ghats (981 tigers), Shivalik hills–Gangetic plains (646 tigers), Sundarbans (88 tigers) and, the North-East hills and Brahmaputra valley (219 tigers) [5].

The range of the Asian elephant range in India spreads over the north-eastern, central, north-western and southern elephant landscapes also called elephant zones. The elephant, as per IUCN, is distributed over ~239,171 km<sup>2</sup> in India, (Figure 2) which is ~52% of its total global range. More than 41% of the elephant's range is in the north-eastern landscape followed by the central and southern landscape. Only 2.6% of its total range is located in the north-western landscape making its north-western range quite small. As per the latest estimates these landscapes sustain ~30,000 wild elephants—highest in the southern zone (14,612), followed by North-Eastern India (10139), Central India (3128) and North-Western India (2085) [17].

Elephants use 45.5% of the tiger range, while tigers occupy 25.1% of the estimated elephant extent (Table 1, Figure 3). The overlap between the ranges of Asian elephant and tigers in India is a sprawling 108,712 km<sup>2</sup>, with varying degrees of overlap across the regions (Table 2, Figure 3). In North-Western India, the proportion of elephant zone that overlaps with the tiger landscape is the highest (79.8%), while the overlap of tiger landscape with the elephant zone is the least (14.5%) among all the regions. The highest overlap of tiger landscape with elephant zone was in the southern part of the country.



**Figure 3.** Overlapping habitats of elephants and tigers in India. The illustration was prepared using tiger and Asian elephant range extents as per IUCN assessments [2,3].

**Table 2.** Zone wise details of overlapping extant ranges of elephants and tigers in India.

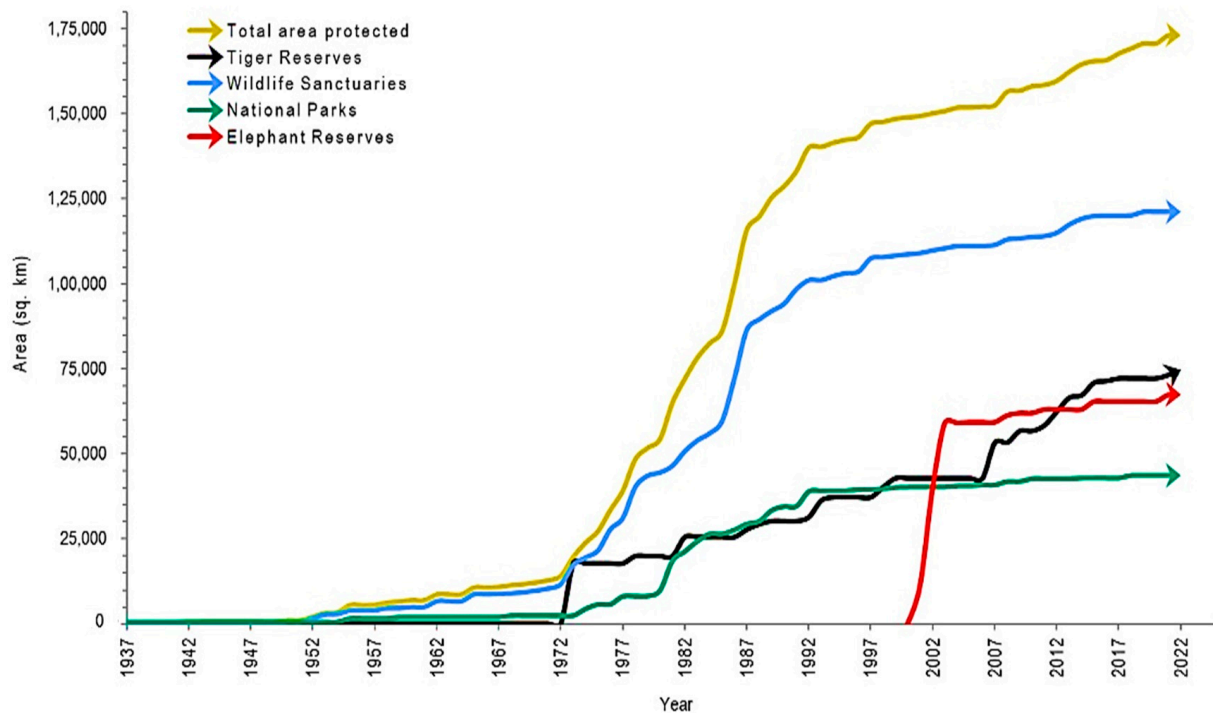
Asian Elephant Landscapes (Zones)	Area (km <sup>2</sup> )				
	Tiger Landscapes				
	Western Ghats	Central India and Eastern Ghats	North-East Hills and Brahmaputra	Shivalik–Gangetic	Sundarbans
Southern	39,546.8	-	-	-	-
Central	-	45,742.7	-	-	-
North-Eastern	-	-	18,423.0	-	-
North	-	-	-	4999.2	-
Total overlap	108,711.7 km <sup>2</sup>				

### 3.2. Protected Area Network Overlap between Tiger and Elephant Distribution

Currently, 5.26% (173,054 km<sup>2</sup>) of the Indian land mass is conserved and managed as a network of national parks, sanctuaries, community reserves and conservation reserves—the categories of protected areas [15] defined under the Wildlife (Protection) Act of 1972.

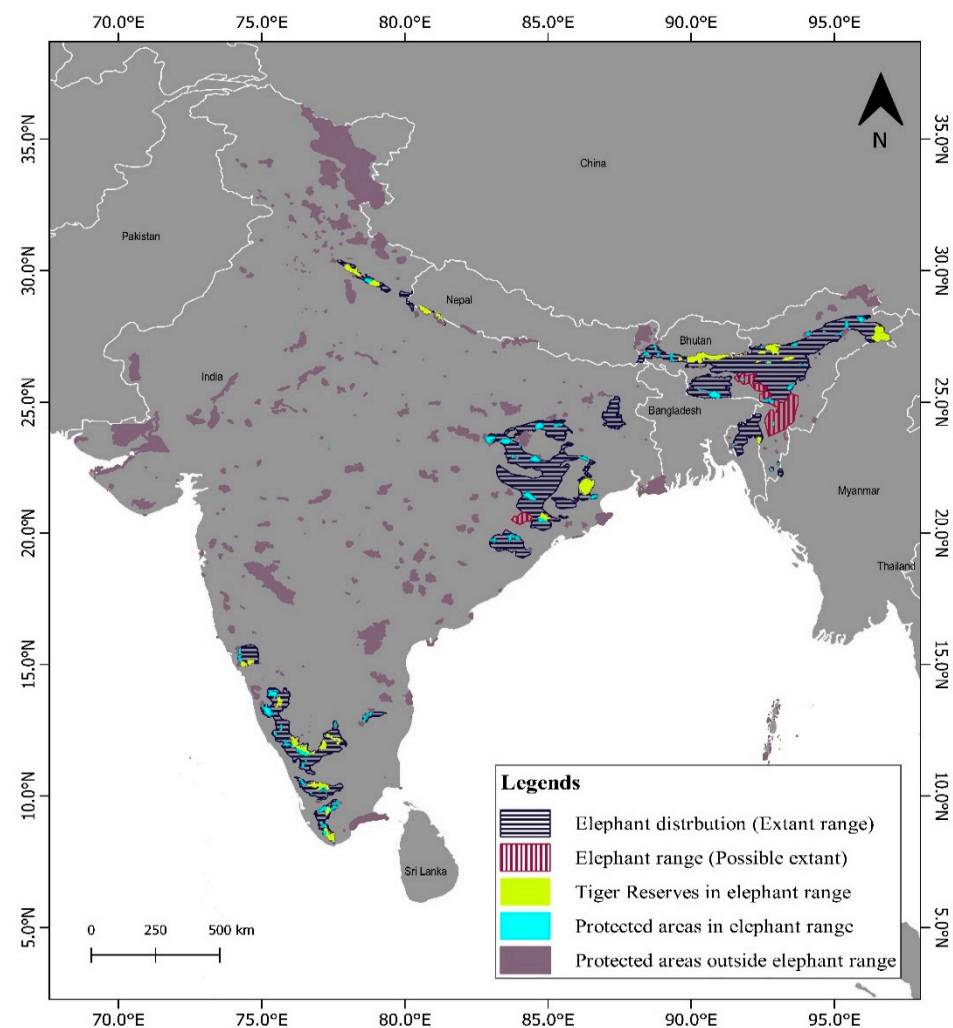
Moreover, 74,725 km<sup>2</sup> is notified as tiger reserves [14] which encompass some of the above mentioned protected areas, other categories of forests (territorial, protected forests, forests under state forest corporations, etc.) and revenue land in its core and buffer zones.

It is evident that the total area legally secured for the conservation of wildlife and its habitats increased after notification of the 1972 Wildlife (Protection) Act (Figure 4). Under the aegis of Project Tiger of the Government of India, tiger reserves were first designated in 1973–1974, and registered a gradual rise in their coverage after 2005 with a surge in prioritisation of tiger conservation in the country.



**Figure 4.** Depiction of changing legal protection of wildlife habitats in India before and after enactment of WPA (1972).

Elephant reserves, unlike tiger reserves, are not legal entities under India's Wildlife (Protection) Act of 1972. Currently, 31 notified elephant reserves (two more are under the process of notification) cover 76,508 km<sup>2</sup>, that includes 17,970 km<sup>2</sup> (23.4%) under protected areas [18]. However, out of the total elephant range in India, i.e., 239,171 km<sup>2</sup>, only 12.2% (29,071 km<sup>2</sup>) of the area is a legally protected area, and an additional 4.96% (11,862 km<sup>2</sup>) is a buffer of tiger reserves (Figure 5).



**Figure 5.** Map showing location of tiger reserves and protected areas in elephant range in India.

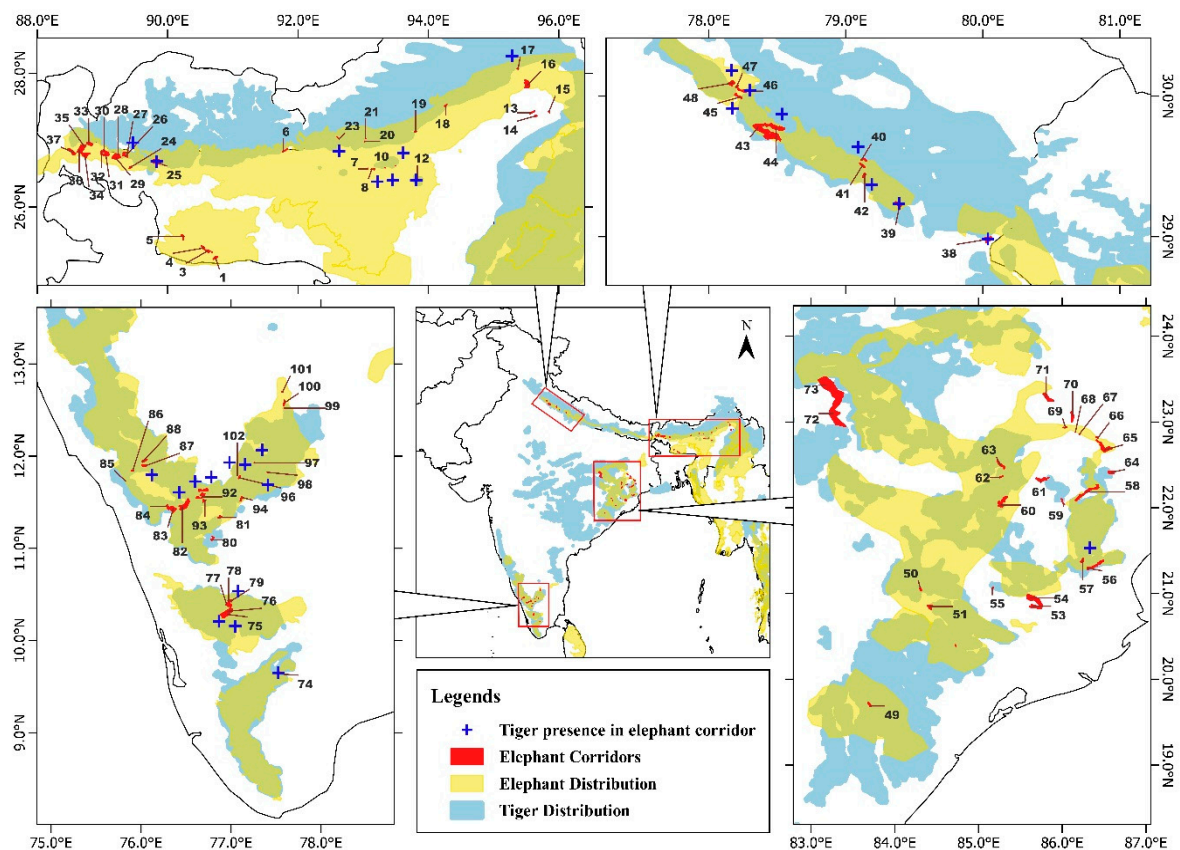
### 3.3. Elephant Corridors and Overlap with Tiger Distribution

We also looked at the well-established elephant corridor network of India [13] with tiger presence or usage. Corridors are ‘linear two dimensional landscape elements that connect two or more patches of wildlife (animal) habitats that have been connected in historic times’ [19]. The corridors have gradually become constricted and reduced to narrow and short passages with growing human population in the country. An analysis of data shows that almost 40% of all elephant corridors in India have tiger presence. Tiger presence was recorded in the corridors as follows: ~91% of north-western, ~62% of southern, ~30% of north-eastern and only 4% of central elephant zones in India (Figure 6, Table 3).

**Table 3.** Details of tiger presences in elephant corridors (\* see Appendix A for further details).

Elephant Landscape (Zone)	Total Elephant Corridors	Elephant Corridors Tiger Presence *
North-Eastern	37	11 (29.7%)
North-Western	11	10 (90.9%)
Central	25	01 (4%)
Southern	29	18 (62.1%)





**Figure 6.** Map showing elephant corridors and presence of tigers in India (Appendix A).

#### 4. Discussion

Large animals are consistently among the most threatened species and are at greater risk of extinction than smaller species [20,21]. Tigers and Asian elephants face similar threats of habitat fragmentation and loss, poaching and retaliatory killings, across its range in India [2,3]. Natural forest loss and fragmentation are irreversible in nature in the short term, and pose a direct impact on both species, especially elephants. In India, the forest cover declined alarmingly by 21.49% between 1930 and 1975 and further deteriorated by 3.19% between 1975 and 2013, leading to forest loss in all the four elephant landscapes of the country. The southern landscape faced the highest forest loss (13,084 km<sup>2</sup>) followed by the north-eastern (10,188 km<sup>2</sup>), central (5614 km<sup>2</sup>), and north-western (4030 km<sup>2</sup>) landscapes in the past eight decades [22]. However, forest cover has witnessed marginal improvement in few states of the southern landscape [23]. Forest degradation and fragmentation impact the elephant's ecological and biological needs while impeded corridors limit elephant movement and seasonal local migration [12]. Elephant corridors in India have risen by 25% in a decade (2004–2015) reflecting habitat loss [13].

The ever expanding area of protected tiger habitats has considerably contributed to the improvement of tiger habitats and population status of the species. The effectiveness of management and governance of the tiger reserves improved significantly after the amendment of the 1972 Wildlife (Protection) Act in 2006 leading to several reforms in the approach of tiger conservation primarily bringing about the formation of the National Tiger Conservation Authority [6]. This has further reinforced the protection of the species in the wild through increased targeted habitat coverage and fortified legal bases. Additionally, this has also provided protection to many sympatric species.

Although the total area of notified elephant reserves has increased since 2002, the number and extent of protected areas within the elephant reserves has not expanded much.



The increasing reserve areas and its current legal coverage as protected wildlife habitats had a negative relationship ( $r = -0.579$ ). This implies a stagnation of the protected areas within an expanding elephant reserve. This contrasts with an increasing interest in the protection of elephant corridors by scientists and civil society which have been increasingly imposed on governments by judiciaries. For example, a public interest litigation case for the securement of an elephant corridor, the Madras High Court endorsed an order of the Tamil Nadu state government to notify the Sigur elephant corridor, and this decision was further upheld by the Supreme Court of India in October 2020 which ordered the removal of 39 illegal resorts from the elephant corridor in the Sigur plateau landscape. In December 2018, the National Green Tribunal of India asked the Ministry of Environment, Forests and Climate Change to declare all elephant corridors as eco-sensitive zones under the Environment (Protection) Act of 1986. In August 2022, the Uttarakhand High Court recently advised the Ministry of Environment, Forest and Climate change to consider declaring the elephant corridors in the Jim Corbett National Park and Ramnagar Forest Division in Uttarakhand state. Several government measures have also yielded increasing protection of elephant corridors.

Habitat loss and fragmentation can be arrested by declaring areas as protected [24] but elephants require much larger areas than what is afforded by Indian PAs to fulfil their ecological needs. In the approximately 700 national parks and sanctuaries, 96% of the PAs are less than 1000 km<sup>2</sup> and only 0.3% of PAs are larger than 5000 km<sup>2</sup> [25]. The area and extent of most of the PAs is inadequate for elephant conservation due to requirement of large home range sizes—between 550–700 km<sup>2</sup> for female clan in tropical deciduous forests in Southern India and between 188 to 407 km<sup>2</sup> for different male and female clans in North-Western India [26,27]. Despite this limitation, the importance of PAs cannot be ignored as they offer safeguards against habitat degradation and fragmentation [24] which are major threats for elephants [13]. Tiger reserves are the focus of much of India's conservation effort, ~55% of which comprise protected areas (core area of tiger reserves are national parks and sanctuaries). The budget allocated by the Government of India for tiger reserves is about 10 times the budget for elephant reserves. In the last six years (2017–2023), the average budgetary outlay for Project Tiger was USD 3.81 ± 0.9 million while it was a paltry USD 0.38 ± 0.052 million for Project Elephant (<http://www.indiabudget.gov.in/> accessed on 26 July 2022). Thus, the tiger reserves are better maintained and managed to contribute to protection of larger landscapes [9,28] as manifested from meagre forest loss of approximately 0.3% and 0.5% inside and within 10 km around the boundary of tiger reserves [28,29]. Consequently, tiger reserves augur well for conservation of biodiversity, including elephants, in overlapping ranges.

Traditionally, India has conserved species by increasing the coverage of national parks, sanctuaries, community reserves and conservation reserves which are protected areas that have sanctity within the Wildlife (Protection) Act of 1972. There have also been several policy documents and committee recommendations of the Union Ministry which in the past have suggested securing elephant landscape that lies outside such zones by rationalising elephant reserve boundaries for human use with Let-go, Slow-go and No-go zones [1]. A third mechanism has been tried out in the state of Meghalaya where a Wildlife Trust of India project with the Garo Hills Autonomous District Council (GHADC)—an institution set up under the sixth Schedule of the Constitution of India, has set up a slew of Village Reserve Forest for elephant corridor and habitat conservation which lies outside the purview of the 1972 Wildlife (Protection) Act [30–32]. These 42 km<sup>2</sup> of habitat have used particular traditional and hereditary protection mechanisms such as availability for sacred groves and the administrative provisions of the GHADC in order to manage community land for elephants and indeed for the gibbon and certain bird species. However, the efficacy of these to provide linkages to the low density source and sinks of tigers in the region has not been tested out.

Therefore, we suggest a few measures that would improve the conservation of both the species by encouraging multi-species conservation in tiger landscapes:

- (A) In tiger reserves where tigers and elephants co-exist, introduce elephant conservation and management measures as well, which would allow existing management and monetary resources in the reserves to also support elephant conservation. This would require specific management measures that may not be addressed in current schemes as habitat management, food requirements and security needs from threats as the poaching, snaring, etc. of elephants differ from tigers. Tiger reserve management plans will then need to be reanalysed on the basis of elephant management measures to look at additions or changes required. One such successful co-management example is in Kaziranga Tiger Reserve (Assam, India) which has recovered the one-horned rhinoceros' (*Rhinoceros unicornis*) populations in the protected area [33].
- (B) It is suggested that in cases where states have proposed elephant corridor management in areas where tigers are present, these be considered as linkages between sources and sinks of tiger populations, and thus management measures here be calibrated for both species.
- (C) It is recommended that in North-Eastern India where the protected area coverage is low and both elephants and tigers co-exist in several areas, the concept of community protection using traditional rights and autonomous council rights be viewed for protecting landscapes for both species.

All this is even more relevant with the projected changes in climate, thereby leading to temperature and water imbalances that would, for example, alter Asian elephant distribution in the Indian subcontinent [34]. The projections indicate loss of habitat in the human-dominated regions, such as Central-Eastern (Eastern Ghats) and the Southern Western Ghats of India and in the relatively flat areas of the Himalayan region [34]. Hence, probabilities of elephant range overlapping with much more areas of tiger ranges in future are high, which demands for designing an effective protected area network to secure both the keystone species. We recommend scientifically designing multiple-species protected areas/reserves to support viable populations and reduce extinction risks for these two species.

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## Appendix A

**Table A1.** List of elephant corridors and tiger presence records. ('+' signifies tiger presence).

ID No.	Elephant Zone	State	Elephant Corridor	Tiger Presence
<b>North-Eastern</b>				
1	North-Eastern	Meghalaya	Baghmara—Balpakram	

Table A1. Cont.

ID No.	Elephant Zone	State	Elephant Corridor	Tiger Presence
2	North-Eastern	Meghalaya	Siju—Rewak	
3	North-Eastern	Meghalaya	Rewak—Imangre	
4	North-Eastern	Meghalaya	Imangre—Nokrek	
5	North-Eastern	Meghalaya	Ranggira—Nokrek	
6	North-Eastern	Assam	Bornadai—Khalingduar	
7	North-Eastern	Assam	Kukurakata—Bagser at Amguri	
8	North-Eastern	Assam	Kaziranga—East Karbi Anglong at Deochur	+
9	North-Eastern	Assam	Kaziranga—Karbi Anglong at Haldibari	+
10	North-Eastern	Assam	Kaziranga—Karbi Anglong at Kanchanjuri	+
11	North-Eastern	Assam	Kaziranga—Karbi Anglong at Panbari	+
12	North-Eastern	Assam	Kalapahar—Daigurung	+
13	North-Eastern	Assam	Upper Dihing E—Upper Dihing W Block at Bogapani	
14	North-Eastern	Assam	Upper Dihing E—Upper Dihing W Block Golai-Pawai	
15	North-Eastern	Assam	Kotha—Burhidihing	
16	North-Eastern	Assam; Arunachal Pradesh	DIÇÖering—Dibru Saikowa	
17	North-Eastern	Arunachal Pradesh	DIÇÖering—Mebo at Sigar Nalah	+
18	North-Eastern	Assam; Arunachal Pradesh	Dulung—Subansiri	
19	North-Eastern	Arunachal Pradesh	Durpong—Doimukh at Khundakhuwa	
20	North-Eastern	Arunachal Pradesh	Pakke—Papum at Seijosa Nullah	+
21	North-Eastern	Arunachal Pradesh	Pakke—Papum at Longka Nullah	+
22	North-Eastern	Arunachal Pradesh	Pakke—Doimara at Tipi	
23	North-Eastern	Arunachal Pradesh	Pakke—Doimara at Dezling	+
24	North-Eastern	West Bengal	Nimati—Chilapata	
25	North-Eastern	West Bengal	Buxa—Ripu at Sankosh	+
26	North-Eastern	West Bengal	Buxa—Titi (via Beech and Barnobari TE)	+
27	North-Eastern	West Bengal	Buxa—Titi Via Torsa TE	
28	North-Eastern	West Bengal	Titi—Rethi	
29	North-Eastern	West Bengal	Titi—Rethi via Dumchi	
30	North-Eastern	West Bengal	Rethi—Central Diana	
31	North-Eastern	West Bengal	Rethi—Moraghat	
32	North-Eastern	West Bengal	Moraghat—Central Diana	
33	North-Eastern	West Bengal	Chapramari—Kalimpong (Mal Block)	
34	North-Eastern	West Bengal	Apalchand—Gorumara	
35	North-Eastern	West Bengal	Apalchand—Kalimpong (via Meenglass TE)	
36	North-Eastern	West Bengal	Apalchand—Kalimpong (via Sylee TE)	
37	North-Eastern	West Bengal	Apalchand—Mahananda	
38	North-Western	Uttarakhand	Kilpura—Khatima—Surai	+
39	North-Western	Uttarakhand	Fathehpur—Gadgadua (Nihal Bhakhra)	+
40	North-Western	Uttarakhand	South Patlidun—Chilkiya (Mohan—Kumeria)	+
41	North-Western	Uttarakhand	Chilkiya—Kota (Sunderkhal)	+



Table A1. Cont.

ID No.	Elephant Zone	State	Elephant Corridor	Tiger Presence
42	North-Western	Uttarakhand	Malani—Kota (Ringora Bijrani)	+
43	North-Western	Uttarakhand	Rawasn—Sonanadi (via Bijnor)	
44	North-Western	Uttarakhand	Rawasn—Sonanadi (via lansdowne)	+
45	North-Western	Uttarakhand	Chilla—Motichur	+
46	North-Western	Uttarakhand	Motichur—Gohri	+
47	North-Western	Uttarakhand	Motichur—Barkote and Rishikesh (Tinpani)	+
48	North-Western	Uttarakhand	Kansrau—Barkote	+
49	Central	Odisha	Kotgarh—Chandrapur	
50	Central	Odisha	Tal—Kholgarh	
51	Central	Odisha	Nuagaon—Baruni	
52	Central	Odisha	Buguda—Central	
53	Central	Odisha	Aswakhola—Sunajhari	
54	Central	Odisha	Anathpur—Aswakhola (via Jiridimal Maulanhanja)	
55	Central	Odisha	Kahnejena—Anantapur	
56	Central	Odisha	Baula—Kuldiha	
57	Central	Odisha	Similipal—Satkosia	+
58	Central	Odisha; Jharkhand	Badampahar—Karida East	
59	Central	Odisha; Jharkhand	Badampahar—Dhobadhobin	
60	Central	Odisha; Jharkhand	Karo—Karampada	
61	Central	Jharkhand	Anjadbera—Bichaburu	
62	Central	Jharkhand	Ankua—Ambia	
63	Central	Jharkhand	Raibera—Pulnanuru (Leda—Bera)	
64	Central	Jharkhand	Dumriya—Nayagram	
65	Central	Jharkhand; West Bengal	Dalapani—Kankrajhor (Ghatsila—Kankrajhor)	
66	Central	Jharkhand; West Bengal	Jhunjhaka—Banduan (Dalma—Banduan)	
67	Central	Jharkhand	Dalma—Asanbari	
68	Central	Jharkhand	Dalma—Rugai	
69	Central	Jharkhand	Dalma—Chandil	
70	Central	Jharkhand; West Bengal	Chandil—Matha	
71	Central	Jharkhand; West Bengal	Mahilong—Kalimati	
72	Central	Chhattisgarh	Surguja—Jashpur	
73	Central	Chhattisgarh	Tamorpingla—Jashpur	
74	Southern	Tamil Nadu	Srivilliputhur—Saptur	+
75	Southern	Tamil Nadu; Kerala	Vazhachal-Anaimalai (via Ryan)	+
76	Southern	Tamil Nadu; Kerala	Vazhachal-Anaimalai (via Sholayar)	+
77	Southern	Tamil Nadu	Anaimalai Between Siluvaimedu—Kadamparai	+
78	Southern	Tamil Nadu	Anaimalai at Waterfalls Estate	+
79	Southern	Tamil Nadu	Anamalai at Punachi	+
80	Southern	Tamil Nadu	Anaikatti North—Anaikatti South	
81	Southern	Tamil Nadu	Jaccanaire slope—Hulikal Durgam (Gandhapallayam)	

Table A1. Cont.

ID No.	Elephant Zone	State	Elephant Corridor	Tiger Presence
82	Southern	Tamil Nadu	Mudumalai- Nilambur (via O'valley)	+
83	Southern	Kerala	Nilambur Kovilakam—New Amarambalam	
84	Southern	Kerala	Nilambur—Appankappu	
85	Southern	Kerala	Periya at Pakranthalam	
86	Southern	Kerala	Kottiyur—Periya	
87	Southern	Kerala	Tirunelli—Kudrakote	+
88	Southern	Karnataka	Begur—Brahmagiri	
89	Southern	Karnataka	Kaniyanpura—Moyar	+
90	Southern	Tamil Nadu	Moyar—Avarahalla	+
91	Southern	Tamil Nadu	Kalmalai—Singara and Avarahalla	+
92	Southern	Tamil Nadu	Avarahalla—Sigur	+
93	Southern	Tamil Nadu	Kalhatti—Sigur at Glen Corin	+
94	Southern	Tamil Nadu	Talamalai—Guttiyalattur	+
95	Southern	Karnataka; Tamil Nadu	Chamrajnagar—Talamalai at Mudahalli	+
96	Southern	Karnataka	Chamrajnagar—Talamalai at Punjur	+
97	Southern	Karnataka	Edayarhalli—Doddasampige	+
98	Southern	Karnataka	Edayarhalli—Guttiyalattur	+
99	Southern	Karnataka; Tamil Nadu	Bilikkal—Javalagiri	
100	Southern	Karnataka; Tamil Nadu	Tali—Bilikkal	
101	Southern	Karnataka	Karadikkal—Madeswara	

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