



# **WILD TIGER CONSERVATION ACROSS TIGER RANGE COUNTRIES**

An Appraisal of Financial Shortfalls across Tiger  
Protected Areas  
(with a focus on Priority Actions for Protection)

2022



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# WILD TIGER CONSERVATION ACROSS TIGER RANGE COUNTRIES

## An Appraisal of Financial Shortfalls



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## ABBREVIATION LIST

ASEAN	Association of South East Asian Nations
DFSC	Department of Forest and Soil Conservation
DNPWC	Department of National Park and Wildlife Conservation
DWNP	Department of Wildlife and National Park
DNP	Department National Park
GTF	Global Tiger Forum
GTRP	Global Tiger Recovery Programme
GTI	Global Tiger Initiative
GTIC	Global Tiger Initiative Council
IBA	Important Bird Area as identified by Birdlife International
IUCN	International Union for Conservation of Nature
IWT	Illegal Wildlife Trade
km	kilometre
m	metres
MH	Maharashtra
MOEFCC	Ministry of Environment, Forest and Climate Change
MP	Madhya Pradesh
MSL	Mean Sea Level
NP	National Park
NTCA	National Tiger Conservation Authority
NTS	National Tiger Survey
PA/s	Protected Area/s
SA	South Asia
SEA	South East Asia
sq. km	square kilometres
TR	Tiger Reserve
TRC/s	Tiger Range Country/s
TRHS	Tropical Rainforest Heritage of Sumatra
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
WB	World Bank
WCCB	Wildlife Crime Control Bureau
WLPA, 1972	Wildlife (Protection) Act 1972 [India]
WLS	Wildlife Sanctuary
WWF	World Wide Fund for Nature

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## EXECUTIVE SUMMARY

The status of wild tiger continues to remain endangered. Over the vicissitude of time, tiger habitats across the globe have been subjected to rapid human-induced transformation, and its historical range is now confined to “islands” in a sea of varied land uses.

The need for an effective tiger governance can be categorized into *Archetypal* (for normal and near normal situations) and *Atypical* (for conflict or depauperized habitats). To meet the existing challenges, it is important to understand the scale of financial investment required for conserving tigers across its range. The present study presents an assessment of financial gaps across tiger protected areas in range countries.

The findings present an overall scenario of tiger governance, major threats, and gaps in funding vis-à-vis the Global Tiger Recovery Programme (GTRP) based on a derived “normative template”, which has been fine-tuned for multiple forest types spread across the tiger range. The dataset for the said assessment has been structured through information received from TRCs, direct consultations, and review of the GTRP portfolio. The values for the funding gap have been presented for a uniform unit of 1000 sq. km. of tiger PA in a specific TRC.

The report also lists out possible financing strategies to meet the ascertained gap, ranging from traditional sovereign funds to complementary financing from multiple stakeholders, and structuring an innovative financial architecture for ensuring perpetuity of resources.

Tiger habitats are directly serving as life support system for millions of people, and tiger conservation cannot not be dealt in isolation anymore, but needs to be mainstreamed in the global climate change agenda, economic growth parameters, and a key indicator of human well-being.

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# CHAPTER 1: CONTOURS OF WILD TIGER CONSERVATION ACROSS TIGER RANGE COUNTRIES

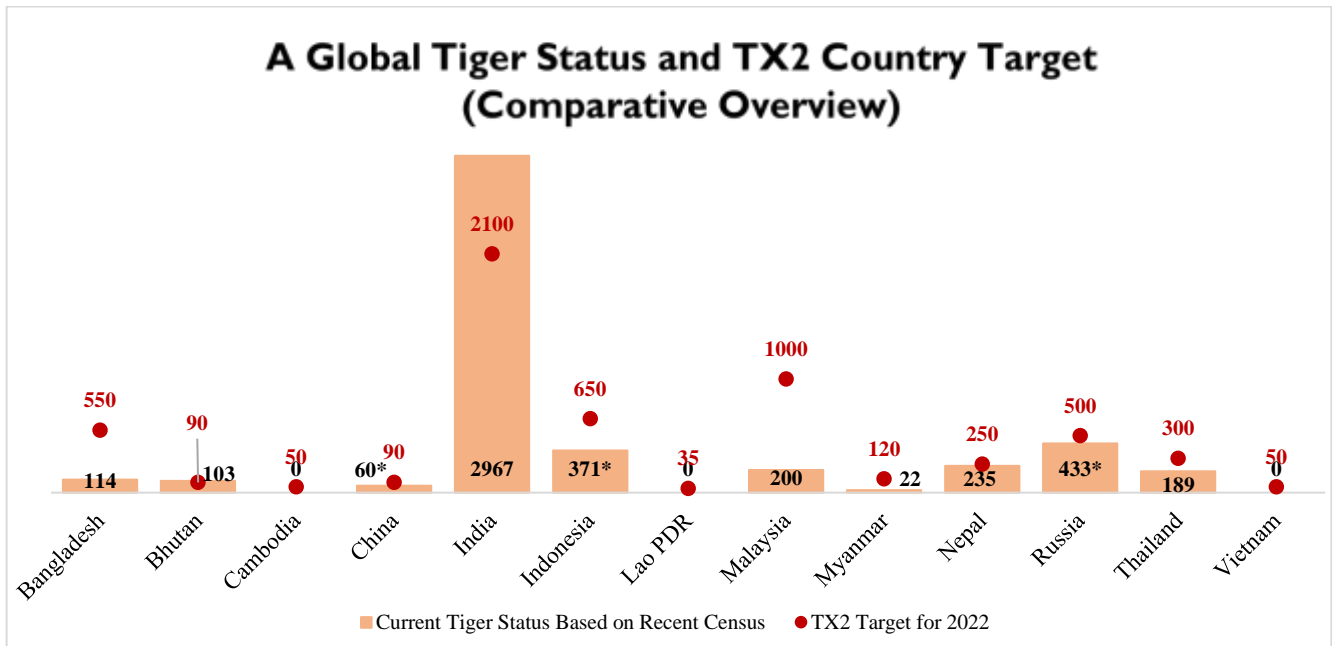
## 1. The Context: Contours of wild tiger conservation across Tiger Range Countries

Wild tiger conservation is a sovereign issue of the Tiger Range Countries (TRCs), a concept arising from the cultural ethos of these countries. The Anthropocene is marked by profound transformations across landmasses like encroachment of forest land and Tiger Range Countries are no exception to the aforementioned phenomena. The compelling developmental agenda of nations and economic geography have altered the contours of forested linkages to tiger source areas. The progression of “edge habitats” and the degradation of core forests are harsh realities demanding prioritized action to restore wild tiger habitats and ensure a viable wild tiger, sympatric carnivores and prey population.

Cultural outlook and traditions have fostered close ties between native human population and wildlife in Tiger Range Countries. Traditions apart, over the years Tiger Range Countries have made concerted efforts to safeguard their flora and wild fauna, including the endangered tiger. Based on enabling national legislations and actions plans like the National Tiger Action Plan and Tiger Conservation Plan are developed to secure the wild tiger population in protected areas.

The Global Tiger Initiative (GTI) of the World Bank, launched in 2008, facilitated a conversation amongst Tiger Range Countries and like-minded partners to strengthen the wild tiger cause. A milestone outcome of this was the St. Petersburg declaration, signed in 2010, wherein Tiger Range Countries committed to double their wild tiger numbers (Tx2) from 3200 to 7000 by 2022. A Global Tiger Recovery Program (Global Tiger Recovery Programme) was put in place for furthering Tiger Range Countries specific actions towards their committed goal, which emanated from sovereign tiger action plans (National Tiger Recovery Program-NTRP). The Global Tiger Recovery Programme implementation report of the GTI in 2012 highlighted the resourcing status of Tiger Range Countries, with a financial gap of almost 39% (~136 million USD). An earlier report on financing underlined the need for short- and long-term fund raising.

The tiger front continues to be affected by resource crunch which has aggravated in some Tiger Range Countries as a consequence of the ongoing pandemic. Although the wild tiger population remains endangered, their numbers have increased over the past decade, with the estimated population going from 3200 to 4684 during 2010-2021 (based on the most recent NTS and consultations with Tiger Range Countries). However, the wild tiger decline in Southeast Asia remains an overarching concern.



**Figure 1.1: Global Tiger Population Status and TX2 Targets**

[Source: TX2 Target for 2022 Adopted from GTI, 2010 & Tiger Figures as per the most recent country census publications]

(Note: \*Tiger Status as declared by Country Officials during Senior Officials Meeting held on 14 October, 2021)

With the phasing out of the GTI by the World Bank, the GTI Council is charged with the task of taking forward the Global Tiger Recovery Programme implementation and monitoring in Tiger Range Countries. The GTF, the only intergovernmental platform related to wild tiger conservation, is an implementing arm of the GTIC for the tiger agenda. The present report is a situational analysis of the financial gaps in wild tiger governance across Tiger Range Countries.



Format Channel of Fund Flow in Vogue: An Imperative Sovereign Process

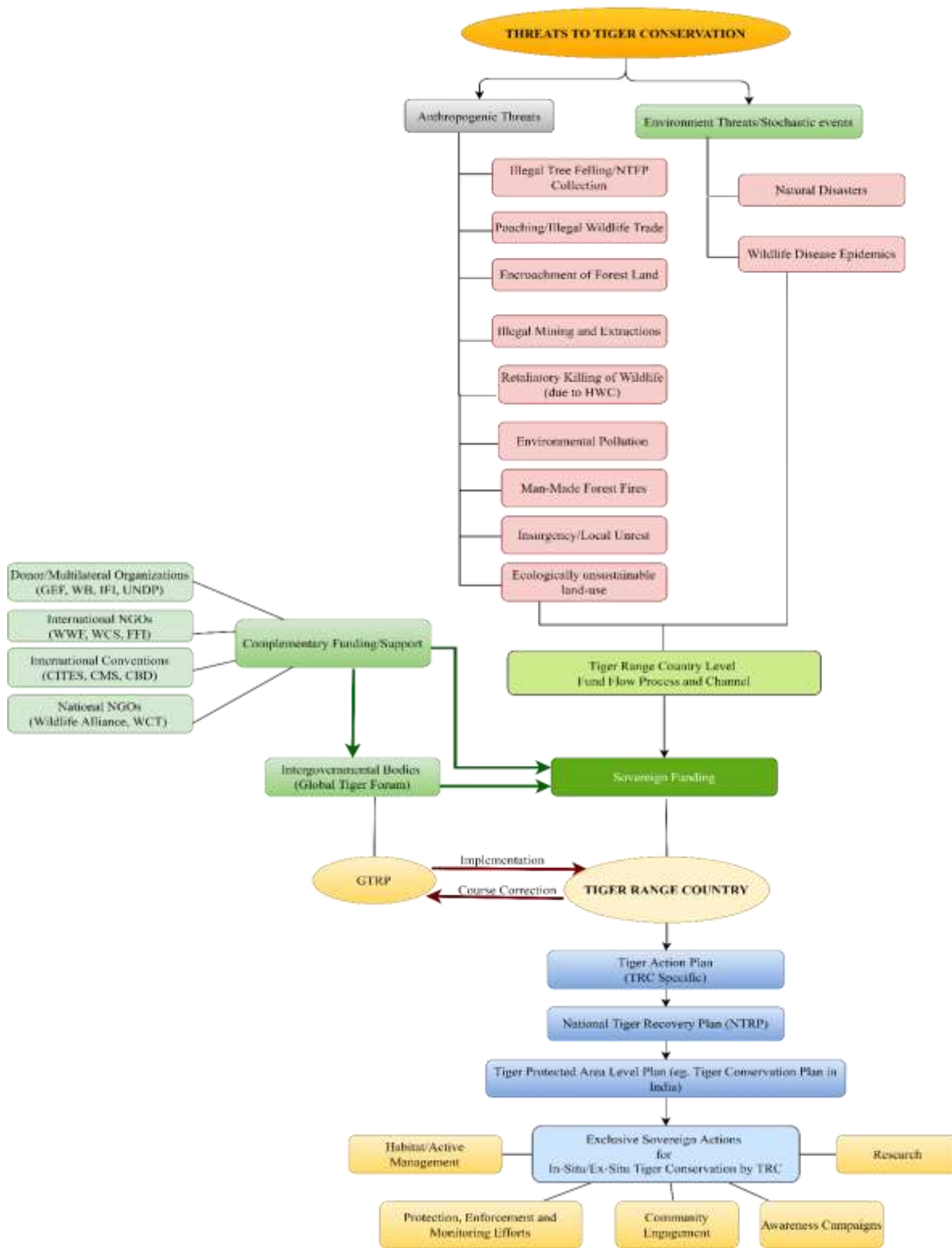


Figure 1.2: Format Channel for Fund Flow in Vogue

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## 1.1 Wild Tiger: Historical and Geographical Perspective

Tiger evolved during the Pleistocene in Asia (about 2 million years ago) (Mazak et al., 2011). As an ecological umbrella species with a terminal position in the ecological food pyramid, the species symbolizes the wellbeing of the forest ecosystem, spanning over the Indo-Malayan and portions of Palearctic biogeographic realms.

Historically, the tiger habitat ranged from Caucasus and the Caspian Sea to Siberia in the North, and Indonesia, portions of Borneo and the Philippines in the South, populating most of Asia and the Indian subcontinent. This has drastically shrunk during the last century (Knoka et al. 2018) and encompasses only thirteen countries at present, viz.

1. Bangladesh
2. Bhutan
3. Cambodia
4. China
5. India
6. Indonesia
7. Malaysia
8. Myanmar
9. Nepal
10. Russia
11. Lao PDR
12. Thailand
13. Vietnam

There are as many as 137 tiger protected areas (GTF, 2021) spread across the aforementioned range countries. The spatial presence of tigers has a wide range and its habitat is spread across several forest types (tropical rain, evergreen, temperate forests, mangrove swamps and grasslands). The tiger bearing forests contribute immensely to sustainable ecosystem services, adaptation to climate change besides the much-needed dilution effect for safeguarding against pandemics/zoonotics (Auhagen et al., 2021).

Historically, 9 subspecies of tigers were recognized (Luo et al., 2004)

Bengal tiger (*Panthera tigris tigris*)  
Caspian tiger\* (*Panthera tigris virgata*)  
South China tiger (*Panthera tigris amoyensis*)  
Indochinese tiger (*Panthera tigris corbetti*)  
Malayan tiger (*Panthera tigris jacksoni*)

Siberian tiger (*Panthera tigris altaica*)  
Bali tiger\* (*Panthera tigris balica*)  
Javan tiger\* (*Panthera tigris sondaica*)  
Sumatran tiger (*Panthera tigris sumatrae*)

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Of these 9 sub-species, 3 - marked with asterisk - have gone extinct. It has been proposed recently to group the 6 extant sub-species in two clades on the basis of molecular markers, namely Bengal tiger (*Panthera tigris tigris*), and Sumatra tiger (*Panthera tigris sondaica*). The traditional classification of 9 sub-species is being followed in the Global Tiger Recovery Programme implementation and monitoring since the same is closely linked to the national pride of Tiger Range Countries.

## **1.2 Socio-cultural milieu**

Tiger range countries have a rich tradition of protecting their wild denizens as discernible in folklore and customs which goes to the extent of dedicating a calendar year to the tiger. The TX2 goal was set up during the Year of Tiger (2012), with its target timeline culminating in the successive Tiger Year of 2022.

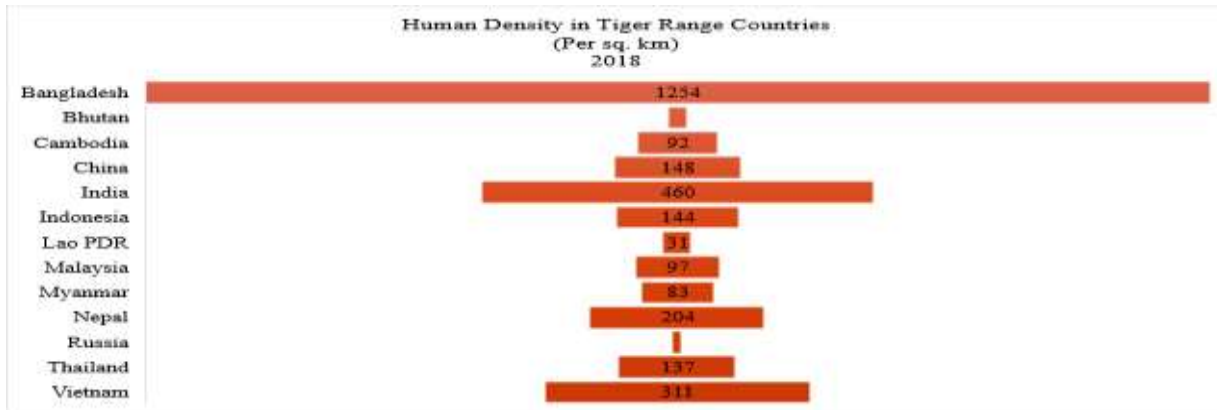
The ongoing demand for natural resources are formidable human induced stressors, which are manifold in magnitude and intensity than environmental stochastic events. This has resulted in an open-ended transformation of natural habitats across Tiger Range Countries. Several range countries also have a history of conflict, apart from ongoing conflict-like situations owing to unrest.

Conflicts – both domestic and cross-border – hamper conservation efforts in two ways viz., the decrease in oversight makes poaching and illegal wildlife trade easier, while diverting much needed economic resources to conflict management rather than conservation. Managing insurgencies and internal conflicts results in a great economic cost.

Conflicts push back conservation efforts in a much more direct way by degrading forest cover (Preece et al., 2013). The impact of “Agent Orange” led to an increased demand for timber with a negative impact on the biodiversity of Vietnam and Lao. Civil unrest has also impacted Cambodia especially in the 1970s and 1980s leading to a decline in the wild species population of flora and fauna (Preece et al, 2013). Apart from conflicts, political arrangements have also impacted wild tiger conservation. The dissolution of USSR, resulted in a proliferation of illegal lumbering in 1991 (Matthiessen, 2001, Shvidenko, 2003).

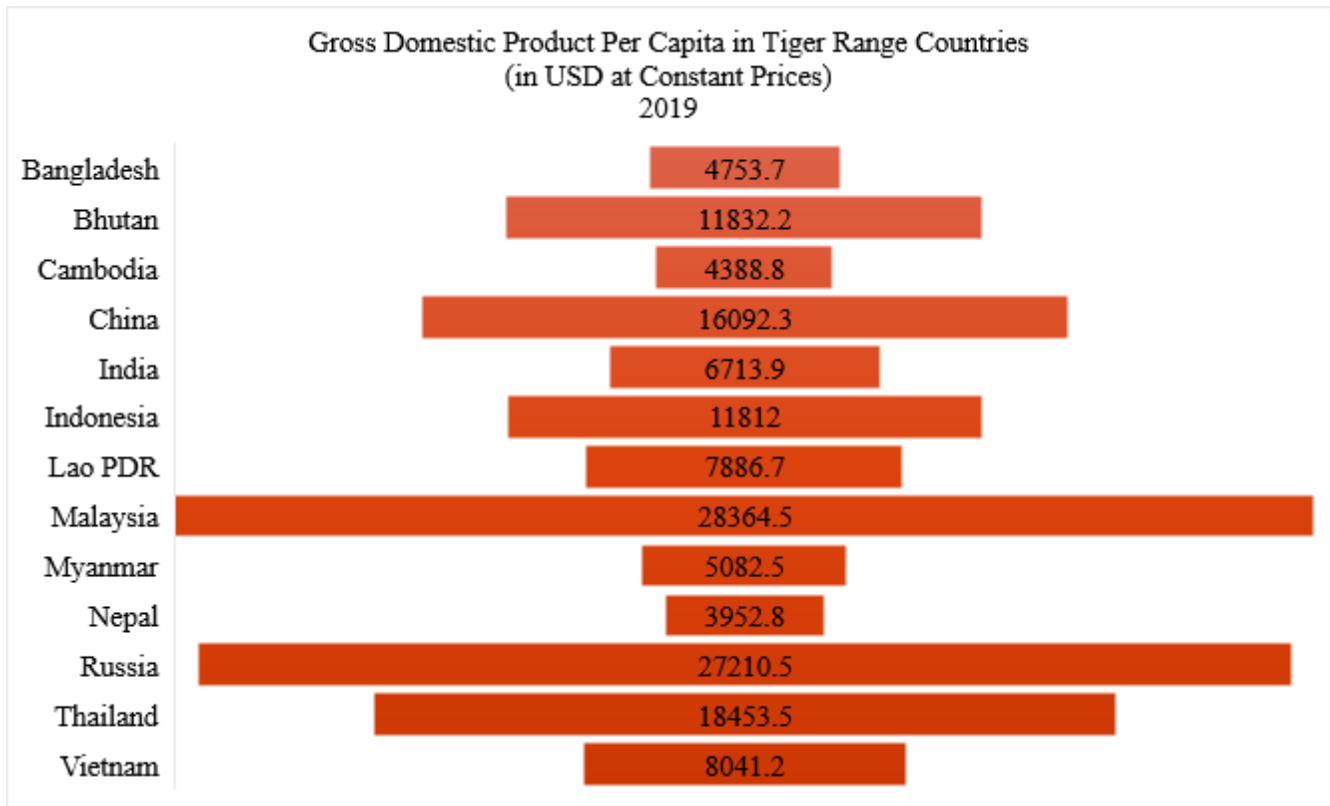
No country is an exception to the vagaries of nature and conflict, viz., India, Bangladesh, Nepal, China, Myanmar. Thus, both environmental stochastic events and anthropogenic stressors have impacted resources for wild tiger conservation.

Most of the tiger range countries have a much-needed development agenda, which ancillary land-use practices. The GDP details of the Tiger Range Countries are depicted below along with human density, this explains not just the anthropogenic pressures on land but, the country priorities which would be more dominated by development agenda than conservation efforts.



**Figure 1.3: Human density per square kilometer in Tiger Range Countries**  
*[Source: World Bank Data Base]*

Recent reports have found that tiger-occupied tiger habitat has shrunk by as much as 41% in the last 10 years. At the same time, Asia's 14 tiger-range countries have experienced explosive growth in their human populations, which have doubled since 1965, reaching 3.2 billion in 2005. Economic growth in these countries also saw a doubling in average per-capita GDP between 1999 and 2006, leading to expanding markets fueled by increasingly wealthy consumers (Dinerstein et al., 2007, Gratewick et al., 2008). In more recent data one can categorically see human-density pressures on range countries, viz. immense human-density leading to low per capita gross domestic product (GDP). This implies lower resource allocation for conservation. Thus, there is a need for treating the latter as a “priority sector” for resource allocation owing to its enormous societal gain from its intangibles.



**Figure 1.4: Per-Capita Gross Domestic Product (GDP) of Tiger Range Countries**  
*[Source: World Bank Database]*

### 1.3 Wild Tiger Governance: Gaps in Global Tiger Recovery Programme Implementation

It is well understood that the population dynamics of wild tigers follows the concept of source-sink dynamics of the metapopulation theory.

Since tiger source areas require high degree of protection, it warrants good investments towards protection, infrastructure and state-of-the-art monitoring protocols implemented by highly skilled frontline teams. Irrespective to the geographical size of the Protected Area, empirical findings suggest that an inviolate space of 800-1200 sq. km is crucial for sustaining a viable tiger population (20 breeding tigers). This calls for an exclusive “tiger agenda” in protected areas with secured inviolate habitat spaces, complemented by an equally aggressive co-occurrence agenda in peripheral areas and beyond. Given the sex ratio and tenorial dynamics of the tiger and breeding biology/post-natal care of the tiger, such a situation supports 60-65 tigers with a fair number of interactions. This ordains the need for a high prey base in the area, which again requires sufficiency in the amount of forest, grass cover, water or other related welfare factors. The key for maintaining this ultimately points to resource availability for implementation, in which protection and enforcement take the centre stage. The movement biology of tiger warrants corridor porosity from its source areas. This necessitates envisioning actions for corridor management with a focus on human-tiger conflict and related actions to reduce chance encounters and

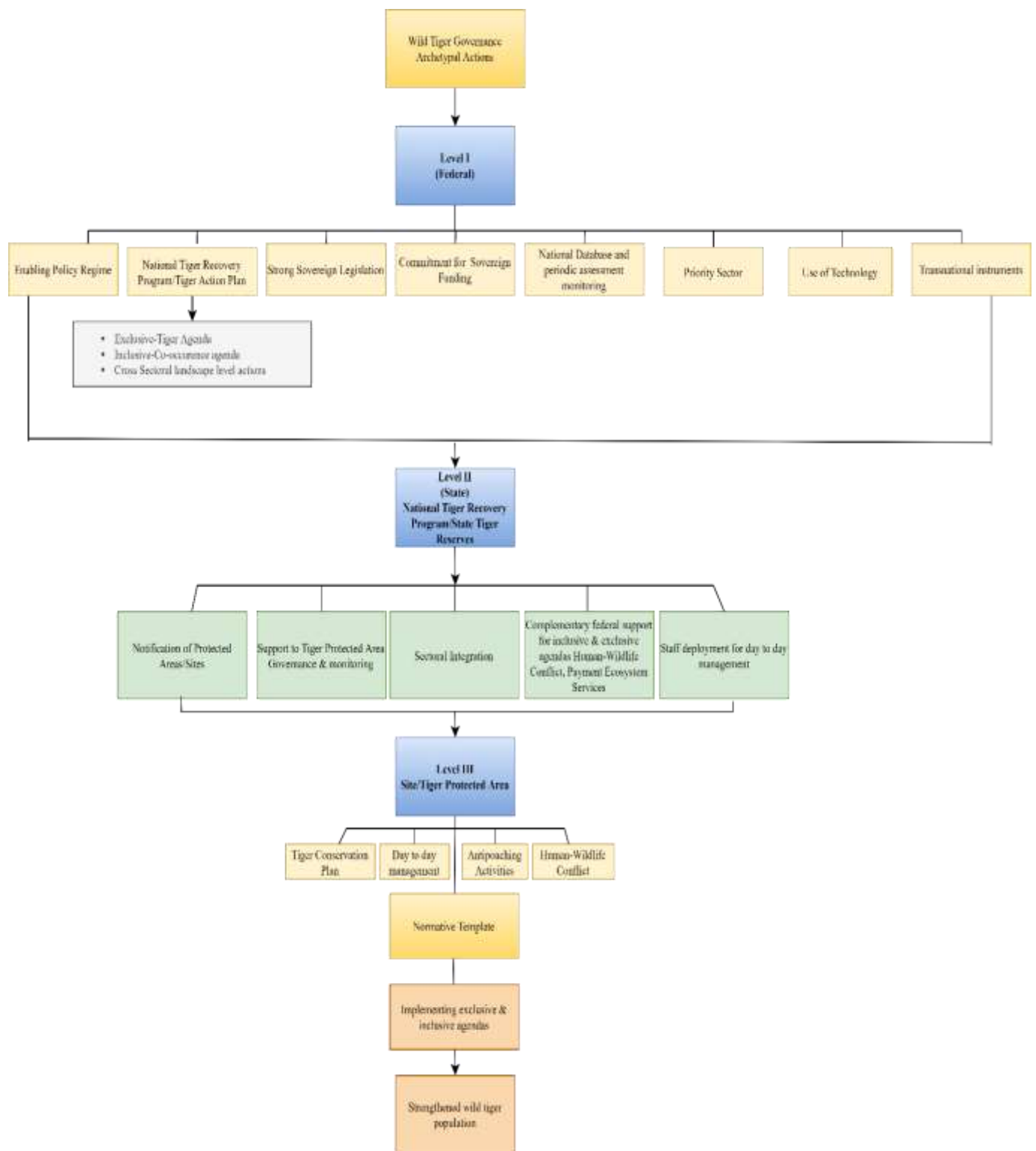
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targeted killing. Thus, the co-occurrence agenda is inseparable from the exclusive tiger agenda, both warranting high levels of investment and policy initiatives.

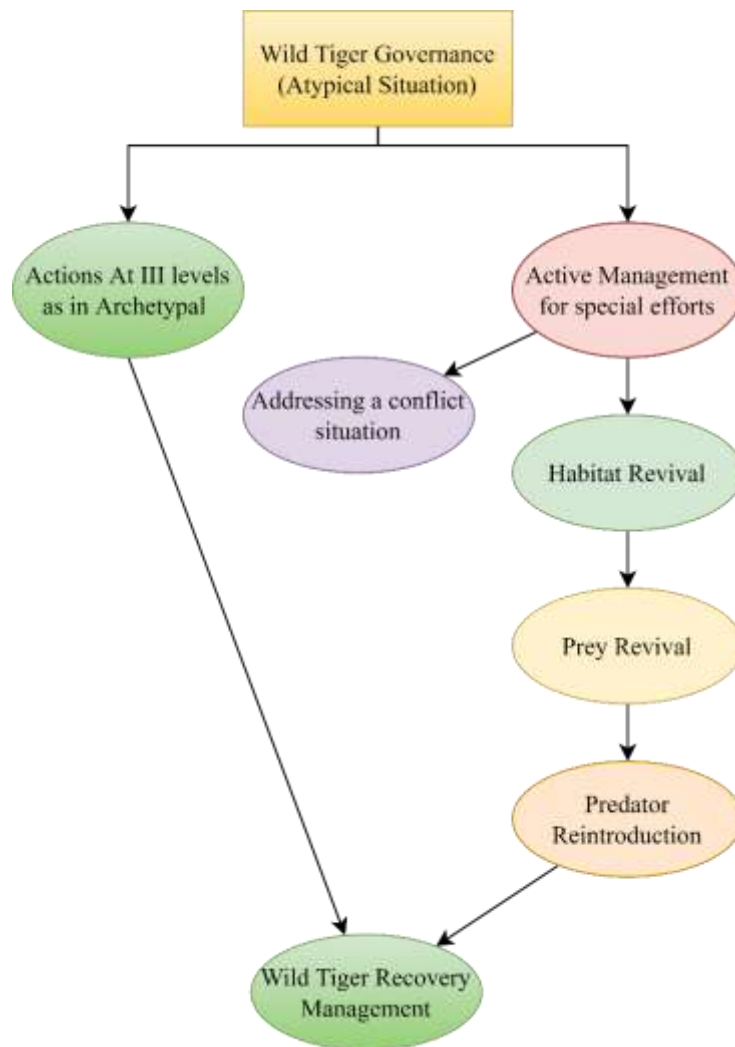
The Wild Tiger Governance is a portfolio rooted in habitat requirement, tenurial dynamics and ethological attributes of the tigers.

Broadly tiger governance may be categorized as:

1. Archetypal (for normal and near normal situations)
2. Atypical (for conflict or **depauperized** habitats).



**Figure 1.5: Archetypal Actions for Wild Tiger Conservation**



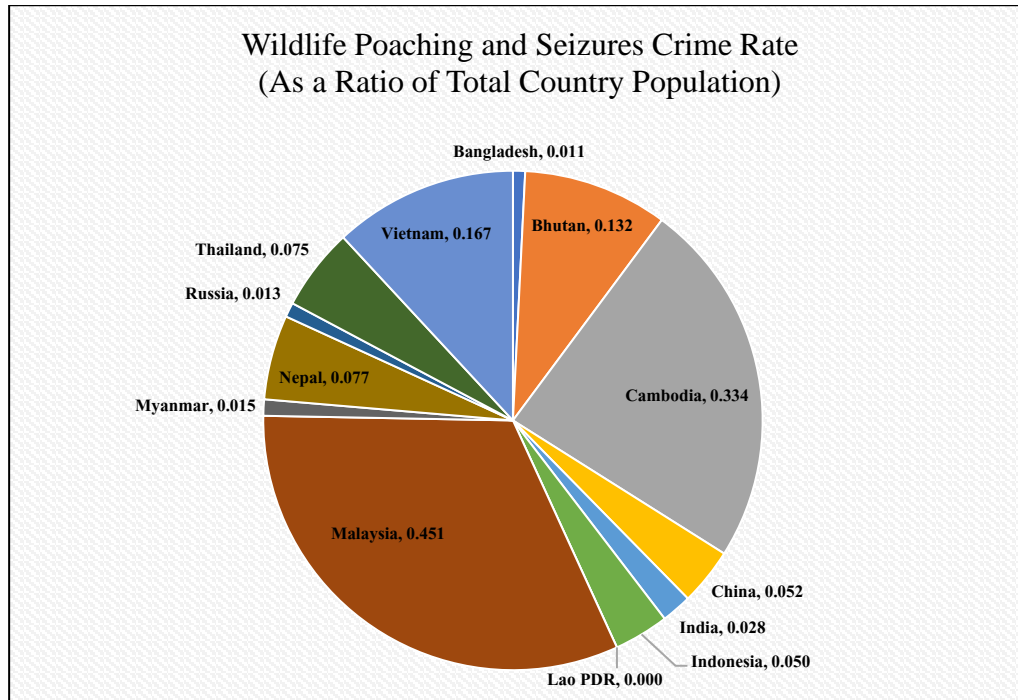
**Figure 1.6: Wild Tiger Governance in Atypical Situations**

Biodiversity maintenance is ensured by securing well-connected habitat networks which further require a combination of protection management and restoration of habitats at several scales. Primarily, three threats affect large carnivores like tigers and these are: loss and degradation of habitats (Wikramanayake et al. 1998; Miquelle et al. 1999a; Dinerstein et al. 2007); poaching fueled by demand for tiger derivatives in international markets (Nowell 2000; Newman 2004; Shepherd & Nolan 2004) and prey base depletion (Miquelle et al. 1999a) which is often exacerbated by poaching and retaliatory killing. Thus, protection and enforcement efforts requiring financial resources for sustained contribution to conservation should not be viewed as exclusionary conservation efforts as the local communities which are involved/engaged as frontline forest staff or community stewards, offer mutual benefit sharing.

Tigers are a conservation dependent species requiring addressal of the above-mentioned threats. While the tiger as a species may not go extinct within the next two decades (Sanderson et al., 2010), the current trajectory could lead it to be locally extinct, or shrink to the point of “ecological extinction”— where their numbers are too few for them to play their role as the top predator in the ecosystem. The all-



pervasive and clandestine nature of wildlife poaching makes investments in protection and enforcement infrastructure and equipment a necessity for safeguarding the tiger and prey population. The extent of wildlife crimes rate can help to capture the need for such investments in tiger conservation.



**Figure 1.7: Wildlife Poaching and Seizures Crime Rate (2019) in 13 Tiger Range Countries**  
*[Source: Wildlife Trade Portal, TRAFFIC]*

With the limited financial resources and the ever-increasing anthropogenic pressures on land, ensuring the efficient allocation of resources for area selection, and thereby maximizing conservation impacts remains of utmost importance. Selection of “priority areas” for worldwide biodiversity conservation is vital, but to a large extent still remains an unresolved exercise. Such areas aim to represent patterns and/or processes of biodiversity to be protected from threats to maintain their persistence (Funk & Fa, 2010). Thus, in this context in the present study we take a “key priority area approach” for understanding the conservation efforts for tigers in key priority sites in each of the Tiger Range Countries. This approach presents an appropriate framework for the identification of fine-scale conservation priorities within the larger-scale regions highlighted. In this context it is important to identify the source sites/priority sites, we define them as conservation units, such as protected areas, which are known to maintain a significant breeding Tiger population and are therefore considered critical to the overall recovery of Tigers within a Tiger Conservation Landscape (TCL). Ubiquitous limitations on conservation funding require efficient approaches to the allocation of time, energy, and financial resources. Subsequently, within these key priority sites, the major focus lies on enforcement equipment and infrastructure. The research begins by setting normative for protection and cost involved as a minimum requirement for tiger conservation.

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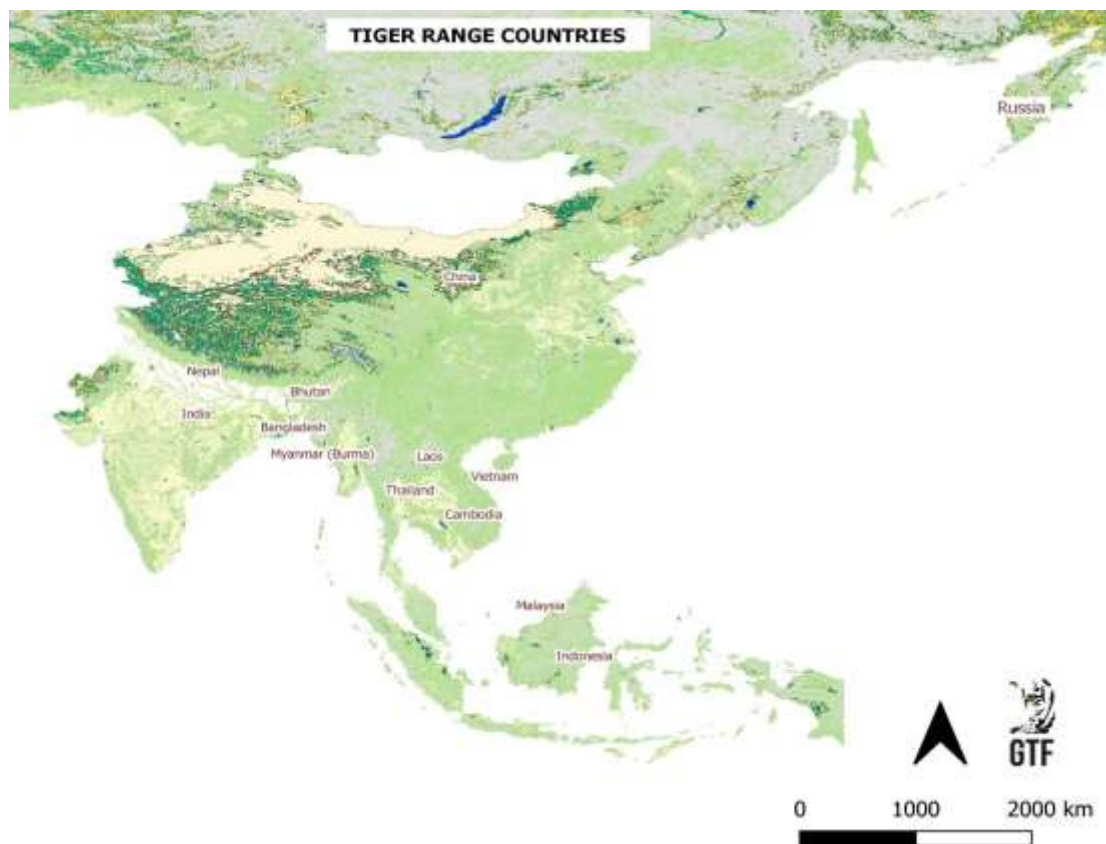
Despite intense interest, resolve, expertise, and expenditure in the realm of millions of U.S. dollars, traditional conservation approaches are proving insufficient. Significant shortfall in financial funding is a major impediment in reaching United Nations biodiversity targets. Any further considerable inadequacy of finances might lead to the global extinction of key species (Waldron et al., 2014). Already more than 60% of natural habitats have been lost during the last four decades. Lack of budgetary support is identified as the key reason behind this said loss. Funding for biodiversity conservation has slipped to the end of the priority list of many countries. It has been observed that national and international fundings for habitat conservation are significantly reduced. It is estimated that the budgetary requirement of habitats maintenance would be around USD 76 billion in contrast to 5.6 USD billion as available presently. This is creating a significant financial gap for many conservation governances. The need of the hour is an innovative financial strategy backed by sovereign commitments. Trust funds, debt-for-nature swaps, biodiversity offsets, and private–public partner-ships are the major alternative financial resources. These mechanisms basically make up the shortfall of fundings from the governments. Additionally, various communities, indigenous groups, non-governmental organizations, government at national to local levels and private sector should show their commitment towards biodiversity conservation to provide adequate finances (Coad et al., 2019).

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# CHAPTER 2: WILD TIGER STATUS ACROSS TIGER RANGE COUNTRIES AND GLOBAL TIGER RECOVERY PROGRAMME IMPLEMENTATION

## 2. Background

The status of wild tiger across its natural range in tiger range countries continues to remain endangered. The tiger population in Lao PDR, Vietnam and Cambodia is much below sub-optimal, with local extinctions. Broadly, the global wild tiger status ranges from zero to optimal. The tiger protected areas are metamorphosing as islands in a vast matrix of land use with heterogeneous unsustainability transformation. The much-needed tiger gene porosity through forest linkages is largely non-existent or non-functional, barring few landscapes in some regions. Hence, in-situ wild tiger conservation warrants a “differentiated” approach, targeted to region specific stressors which call for prioritized financial support. A time bound action strategy to secure viable tiger populations in source areas, complemented by a centrifugal landscape approach involving stakeholders is crucial.



**Figure 2.1: Indicative Map of Tiger Range Countries**

## 2.1 Wild Tiger Status in Tiger Range Countries

The optimal status of the wild tiger population is akin to the base of a pyramid, marked by stability on account of abundance of welfare factors like food, water and inviolate breeding space fostered by active management. This is a fundamental prerequisite in the life cycle of a tiger to generate a reproductive surplus. Such areas are productive in the context of the wild tiger, marked by a great turnover with large number of births, deaths and ongoing internecine interactions. A tiger source site of the said nature is invaluable for fostering the source-sink dynamics of the species, thereby contributing towards sustainability of metapopulations. The said status warrants unstinted support in the form of resources to make things happen.

In the context of resource support and efforts, a well-managed tiger protected area, where births exceed deaths, is analogous to the base of a *indicative tiger governance pyramid*, marked by stability on account of reasons stated earlier. Further ascending levels in the said pyramid maybe envisioned as situations falling short of either the tiger, co-predators, prey-base or the entire prey-predator niche, highlighting gaps in wild tiger governance. The tiger Protected Areas of range countries fall in one or more of such levels in the tiger governance pyramid as highlighted in subsequent paragraphs.

The level occupancy of a tiger Protected Area is based on a simple additive scoring emanating from its performance, vis-à-vis the Global Tiger Recovery Programme portfolio. The said scoring involves three variables, viz. core habitat status, prey base density and optimal tiger population based on earlier peer reviewed empirical findings.

The scoring process is given below,

(Based on Questionnaire Survey)

**Table 2.1: Indicative Pyramid Scoring Scheme**

Variable	Scoring Scale
Habitat Status	Disturbed = 0, Undisturbed =1
Prey Base Density	High = 0.9, Medium = 0.5, Low = 0.1
Tiger Population Status (actual – potential tiger population)/ potential*100	Optimal (50-100) = Level 1 : (+75) - (+100) = 3 Level 2: (+50)- (+75) = 2 Level 3: (+25)- (+50) = 1  Sub-Optimal = 0.5  NIL/No tigers = 0

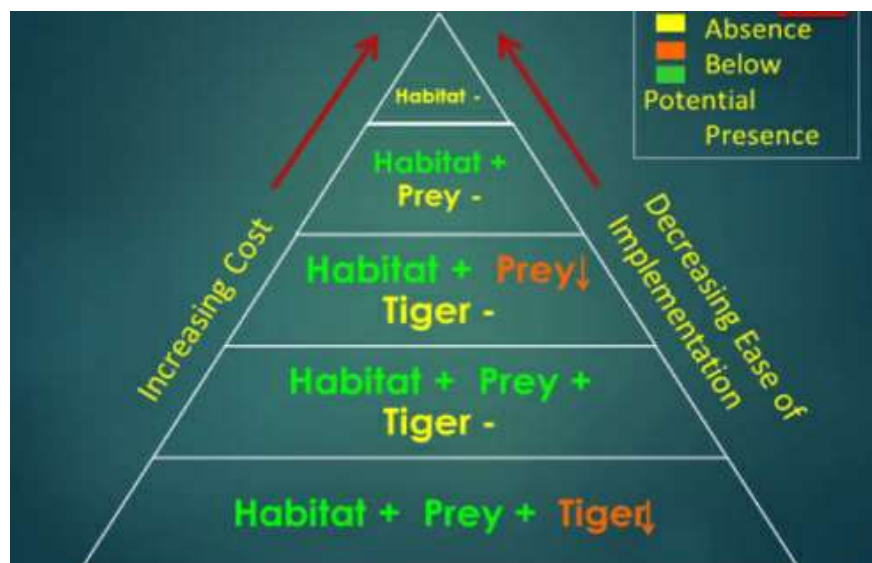
Habitat Status: Only two categories are recognized here, viz. disturbed and undisturbed, with the former getting a score 0, and latter 1.

Prey Base Density: Three categories are recognized, viz. high, medium and low with scores 0.9, 0.5 and 0.1 respectively.

Tiger Population Status: Three broad levels are recognized, viz. optimal, sub-optimal and nil.

The optimal category is further sub-divided into three levels level 1 [(+75) to (+100)], Level 2 [(+50) to (+75)], Level 3 [(+25) to (+50)], based on estimation data provided.

The sub-optimal category has been assigned a fixed value of 0.5, while the nil status connotes a zero score.



**Figure 2.2: Indicative Tiger Governance Pyramid**

### 2.1.1 Bangladesh

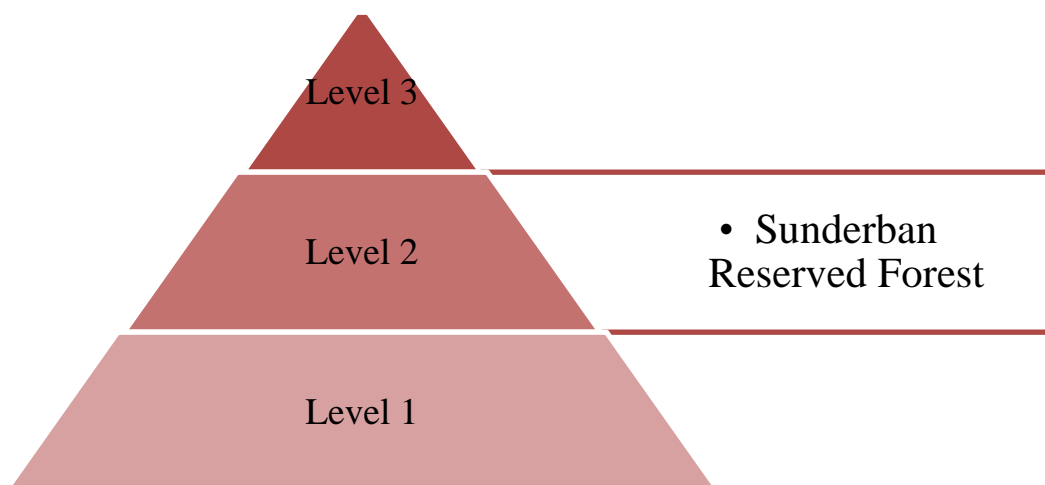
The Sundarban Reserved Forest of Bangladesh is a unique mangrove habitat to tiger, with an estimated population of 114 (2016).

Factors affecting the wild tiger status are:

- targeted killing on account of Human-Tiger Conflicts (HTC) (Reza et al. 2002a; Barlow 2009)
- poaching owing to vulnerable geographical location, with proximity to several international borders
- depletion of prey base of on account of subsistence poaching

- 
- forced forest resource dependency of locals for want of livelihood options, viz., wood and non-timber forest produce
  - proximity to human-dominated land parcels

The ecological integrity of tiger habitat is also threatened by rise in sea-level on account of climate change, apart from reduced availability of fresh water owing to diversion.



**Figure 2.3: Indicative Tiger Governance Pyramid for Tiger Protected Areas of Bangladesh**

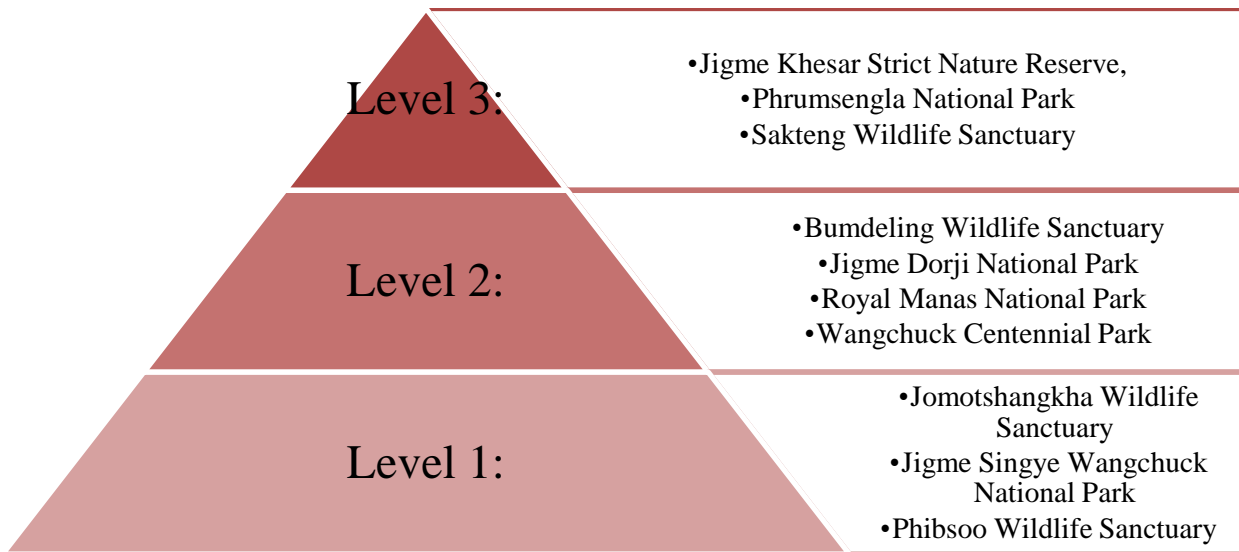
### 2.1.2 Bhutan

Bhutan has an extensive forest area. Protected Areas and corridors cover almost 35 percent of forests. The country also has the unique distinction of being one with high altitude tiger habitats.

Inaccessibility and mountainous terrain protect tiger population and the prey base to a great extent. However, human-wildlife conflict is an ongoing interface problem in many habitat patches proximal to human settlements. As many as 103 (2018) tigers have been estimated in the recent country level assessment (2018).

Factors affecting the wild tiger status are:

- illegal logging and poaching
- habitat loss and degradation
- threats due to porous borders
- forest resource dependency people and human-wildlife conflict



**Figure 2.4: Indicative Tiger Governance Pyramid for Tiger Protected Areas of Bhutan**

### 2.1.3 Cambodia

The Eastern plains of Cambodia has contiguous forest cover (>10000 sq. km), with a potential for harboring tiger and its prey. However, in the recent past the wild tiger population has been extirpated from the country.

The country is embarking on active tiger reintroduction in the Southern Cardamom National Park and Tatai Wildlife Sanctuary.

Factors affecting the wild tiger status are:

- encroachment of protected areas owing to human population pressure immigration
- demands on forest land for cultivation, with loss of more 600 sq. km from protected areas.
- poaching and illegal wildlife trade



**Figure 2.5: Indicative Tiger Governance Pyramid for Tiger Protected Areas of Cambodia**

#### 2.1.4 China

The overall status of wild tiger has been on the decline and unviable. However, the Natural Forest Protection Project (NFPP) holds promise for providing habitat supplement to the wild tiger. The country is making concerted efforts to monitor the Amur tiger movement along the Russian border, apart from declaring an area of 14600 sq. km as the Northeast China Tiger and Leopard National Park. As many as **60** tigers have been estimated in the recent country level assessment (2019).

Factors affecting the wild tiger status are:

- loss of tiger corridor in Changbai Mountain (WWF, 2013)
- demand for tiger body parts and derivatives in traditional **pharmacopeia**, reportedly sustained through captive facilities, with increased vulnerability to remaining wild tigers (owing to preference for wild body parts)
- paucity of funds for tiger conservation
- tiger vulnerability along porous borders

#### 2.1.5 India

India has the maximum number of tigers in their source areas declared as tiger reserves. The country also has unique distinction of launching “Project Tiger” in 1973, which has no parallel globally in terms of scale and efforts. Over the years, the tiger reserve coverage has substantially increased to 51 in number, from the 9 reserves of formative years. The wild tiger population as per the recent assessment (2018) is 2967, which is more than 70% of the global tiger estimate. Numerous milestone initiatives

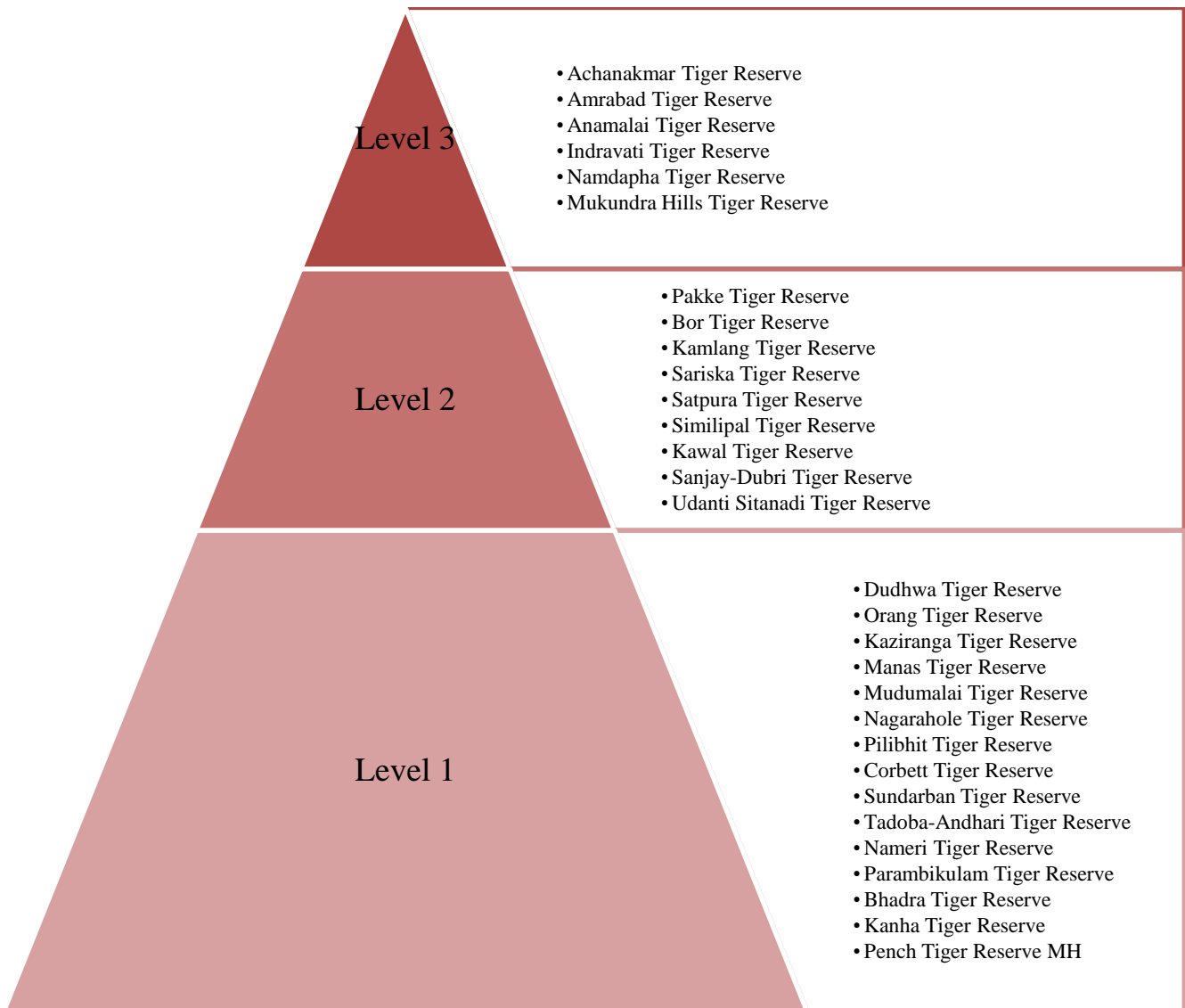


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have been taken by the country on the tiger front, which include: enabling provisions for strengthening the tiger agenda in the national legislation, creating statutory bodies like NTCA and WCCB at the Federal level, legally institutionalizing the peripheral buffer management to complement the aggressive tiger agenda in core areas through reserve specific tiger conservation plans, stepping up financial allocation for tiger, providing inviolate space in core areas, supporting community stewardship, envisioning corridor conservation with measures for addressing human-wildlife conflict, use of technology, deployment of Special Tiger Protection Force for intelligence based enforcement, refined day-to-day to tiger monitoring protocol (MSTrIPES) complemented by periodic, state of the art snapshot country level assessments and transnational engagements through **bilateral**.

Factors affecting the wild tiger status are:

- human-wildlife conflict and targeted killing
- forest resource dependency of local people
- degradation/loss of forest connectivity between tiger source areas
- urbanization and related ancillary land **use** in close proximity to tiger areas
- paucity of safeguards in heavily used infrastructure to prevent wildlife mortality
- lack of business models in tiger landscapes to benefit locals for institutionalizing community stewardship



**Figure 2.6: Indicative Tiger Governance Pyramid for Tiger Protected Areas of India**

### 2.1.6 Indonesia

The Sumatran tiger is native to Indonesia, found in several Tiger Conservation Landscapes (TCL), spread over an area of 88 000 km<sup>2</sup> (Sanderson et al. 2006). Over the years, several country levels have gone in strengthening wild tiger conservation which include active management for addressing human-tiger interface. **As many as 371 tigers have been estimated in the recent country level assessment (2016).**

Factors affecting the wild tiger status are:

- changing contours of forests owing to large-scale plantations of palm oil, rubber and timber species, with loss of corridor connectivity (Kinnaird et al. 2003; Linkie et al. 2006)
- loss of prey owing to targeted killing vis-a-vis crop depredation (snaring)

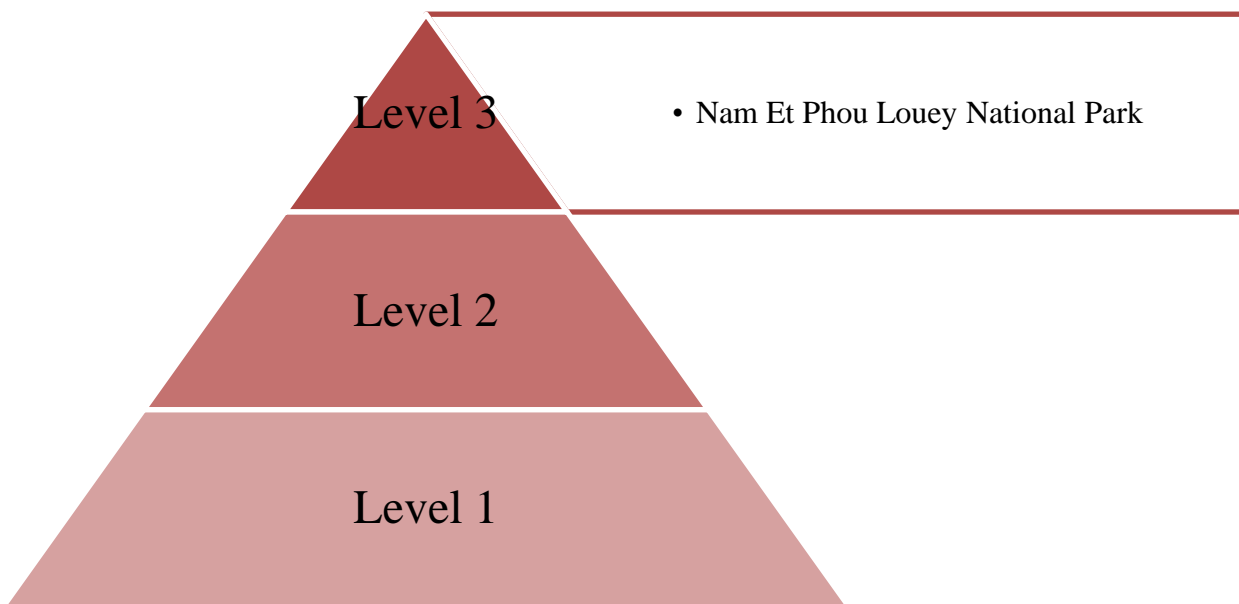
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### 2.1.7 Lao PDR

Lao is gifted with a rich biodiversity. However, the wild tiger population is locally extinct.

Factors affecting the wild tiger status are:

- habitat loss owing to extensive plantations (oil palm, rubber, fiber, other cash crops) apart from developmental projects (dams and mines)
- poaching and subsistence hunting around Protected Areas
- anthropogenic pressures due to the presence of human settlements in proximity to Protected Areas and pastoral pressure on forests
- illegal trafficking of wildlife body parts
- inadequate tiger governance
- lack of concerted efforts to phase out tiger farms, with safeguards to prevent loss of wild tiger



**Figure 2.7: Indicative Tiger Governance Pyramid for Tiger Protected Areas of Lao PDR**

### 2.1.8 Malaysia

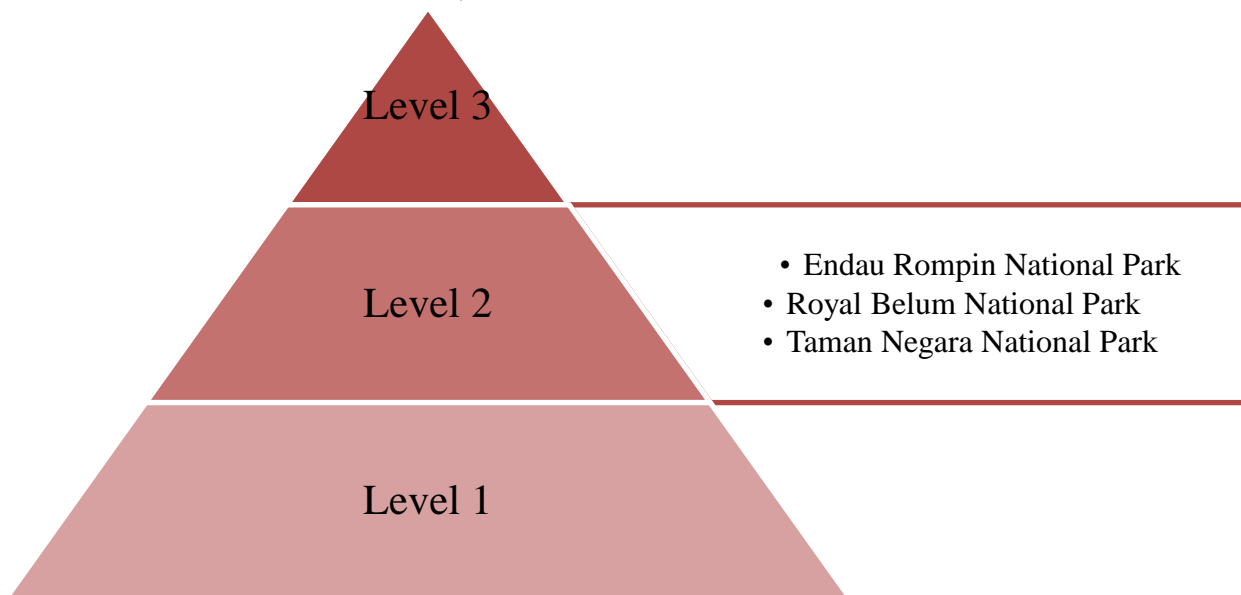
The endemic Malayan tiger has been subject to prolonged and severe population decline throughout Peninsular Malaysia since the fifty's (Kawanishi, 2015; DWNP, 2021a). The country has taken several steps to secure wild tiger populations has embarked on a set of actions to strengthen tiger governance. The Central Forest Spine (CFS) is a major initiative towards smart green infrastructure. As many as >200 tigers have been estimated in the recent country level assessment (2016).

with an estimate of >200 tigers according to 2016 National Tiger Survey.

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Factors affecting the wild tiger status are:

- fragmentation of tiger landscapes (Kawanishi et al., 2010; Shevade et al., 2017; Ten et al., 2021)
- poaching, driven by the illegal international market on tiger body parts and derivatives (Clements et al., 2010; Kawanishi, 2015; Wong and Krishnasamy, 2019)
- paucity of protection infrastructure and frontline on ground
- transformation of forest owing to large scale commercial plantations and urbanization (Shevade et al., 2017; Ten et al., 2021)



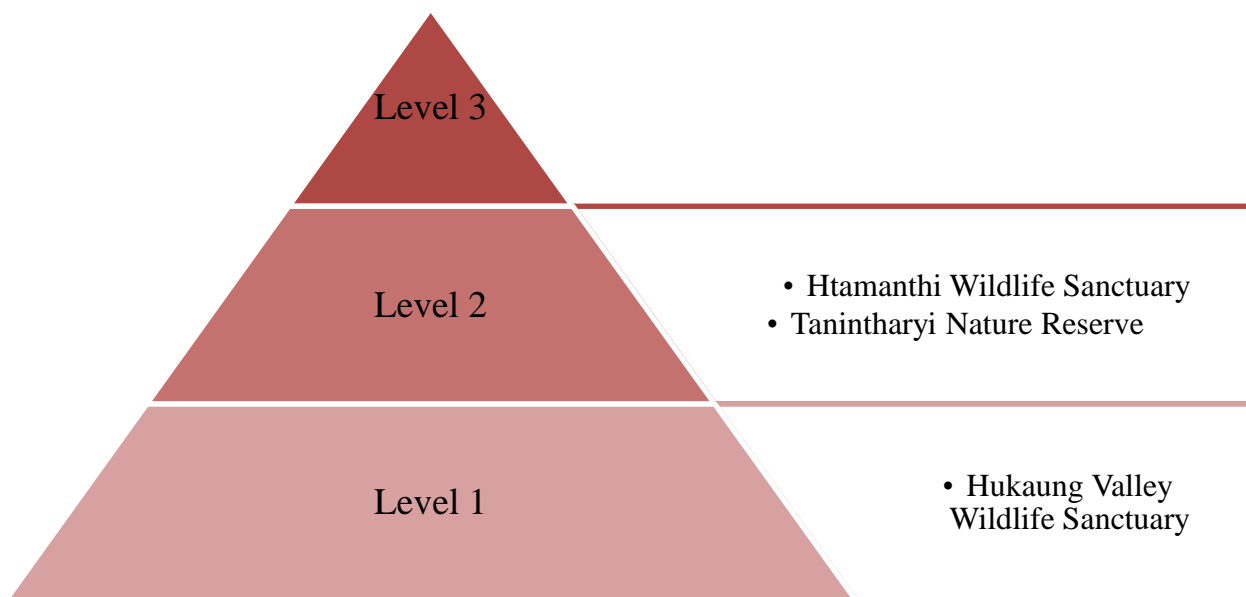
**Figure 2.8: Indicative Tiger Governance Pyramid for Tiger Protected Areas of Malaysia**

### 2.1.9 Myanmar

Myanmar has the distinction of having two sub-species of wild tiger, viz. Bengal and Indo-Chinese. However, owing to ongoing conflicts of varied intensity in the Northern areas there has been a general depletion, of wildlife in the said region including that of the tiger. Although there are no recent population estimates in the Dawna Tenasserim Landscape (DTL), presence of tigress has been camera-trapped. There is contiguity between some protected areas within the UCL (Hukaung, Hkakaborazi, and Bumpha Bum Wildlife Sanctuaries). As many as 22 tigers have been estimated in the recent country level assessment (2016).

Factors affecting the wild tiger status are:

- inadequate protection infrastructure and frontline deployment
- paucity of funding support
- poaching and illegal wildlife trade
- loss of forest owing to illegal timber logging and mining



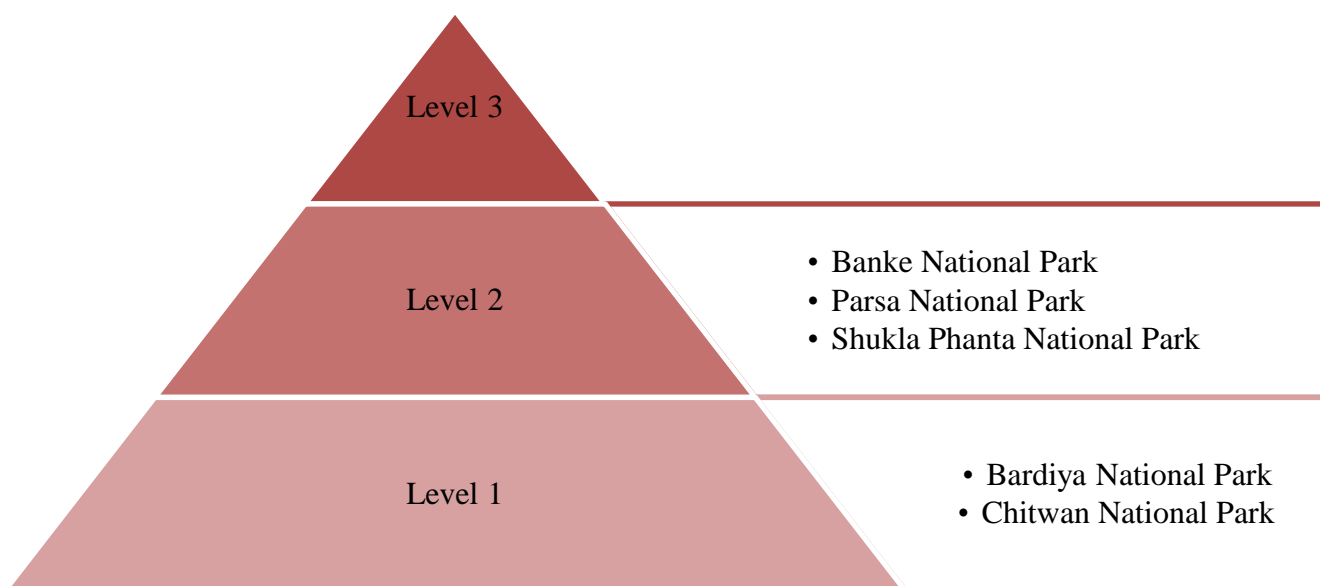
**Figure 2.9: Indicative Tiger Governance Pyramid for Tiger Protected Areas of Myanmar**

### 2.1.10 Nepal

Nepal has several milestones to its credit on the tiger front, viz. efforts towards zero poaching, improving tiger governance at the federal level by constituting a statutory body, creation of a centralized wildlife crime bureau, deployment of army in tiger source areas, innovative handling human-wildlife conflict, periodic assessment of the tiger at the country level and transnational engagements. The latest (2018) estimate of wild tigers is 235.

Factors affecting the wild tiger status are:

- habitat shrinkage and degradation due to invasive species and unsustainable land uses
- loss of prey-base owing to shrinkage of meadows and wetlands
- human-wildlife and targeted killings
- poaching and illegal trade of tiger parts and derivatives (Dhakal and Baral, 2015)



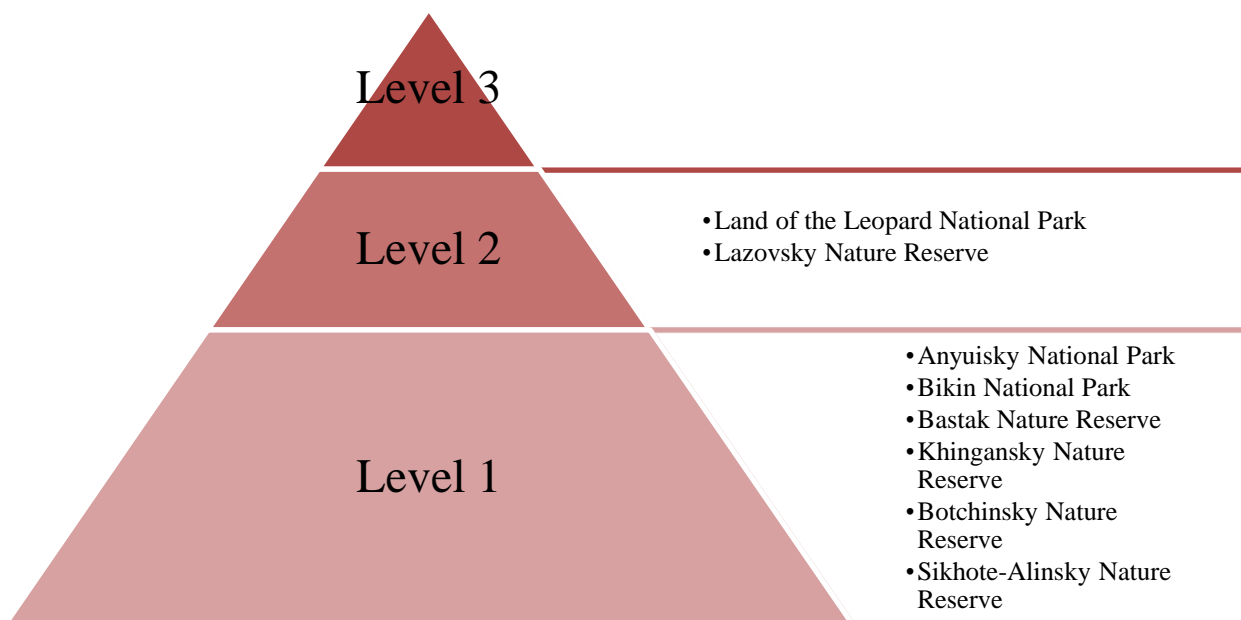
**Figure 2.10: Indicative Tiger Governance Pyramid for Tiger Protected Areas of Nepal**

### 2.1.11 Russia

Amur is the largest tiger sub-species. Unfortunately, other species are already endangered, but Amur is the only species which did not touch the edge of extinction because of good national policies especially during second half of the 20<sup>th</sup> century (1993-2003). Predominantly Amur tiger population resides in Russian far east specifically in Primorsky Region and the southern part of Khabarovsk Region. Hence majority of the Amur tigers can be saved if Russia shoulders the responsibility of the conservation. Russia is well known for its efforts to conserve the Amur tiger. The said sub-species is charismatic with its larger body size and occurs in Primorsky and the southern part of Khabarovsk regions. The latest (2021) estimated wild tiger population is 433.

Factors affecting the wild tiger status are:

- loss of prey base in tiger landscapes owing to excessive permits for hunting
- human-tiger conflict
- loss of connectivity within tiger landscape owing to ongoing projects and surface infrastructure



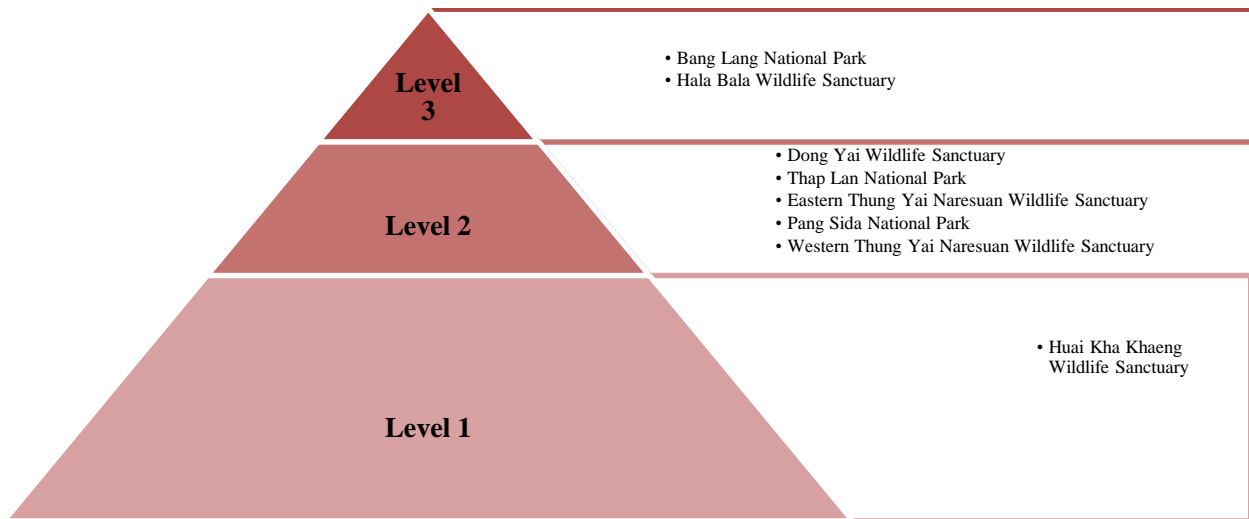
**Figure 2.11: Indicative Tiger Governance Pyramid for Tiger Protected Areas of Russia**

### 2.1.12 Thailand

Thailand has the distinction of harboring the largest Indo-Chinese wild tiger population. Several good practices are in place amidst challenges, viz. implementation SMART protocol, capacity building of frontline and actions to improve corridor connectivity between landscapes with an estimated 189-252 wild tigers as assessed in 2016.

Factors affecting the wild tiger status are:

- transboundary wildlife crime is a major threat for tigers in Thailand. Larger smuggling busts in Thailand were witnessed especially in the Thai-Myanmar border which has high intensity of illegal trade. (Lynam, 2010; Shepherd & Nijman 2008)
- there is no centralized data management system for prosecution, this makes it difficult to obtain comprehensive information about the number of prosecutions throughout the country (UNODC, 2016)
- illegal commercial trading in wildlife in Thailand is leading to high rates of poaching (Ash, 2021)
- increased human activities and large infrastructural projects are fostering fragmentation landscapes near tiger areas and corridors.
- lack of contiguity between landscapes may impact genetic viability of the wild tiger



**Figure 2.12: Indicative Tiger Governance Pyramid for Tiger Protected Areas of Thailand**

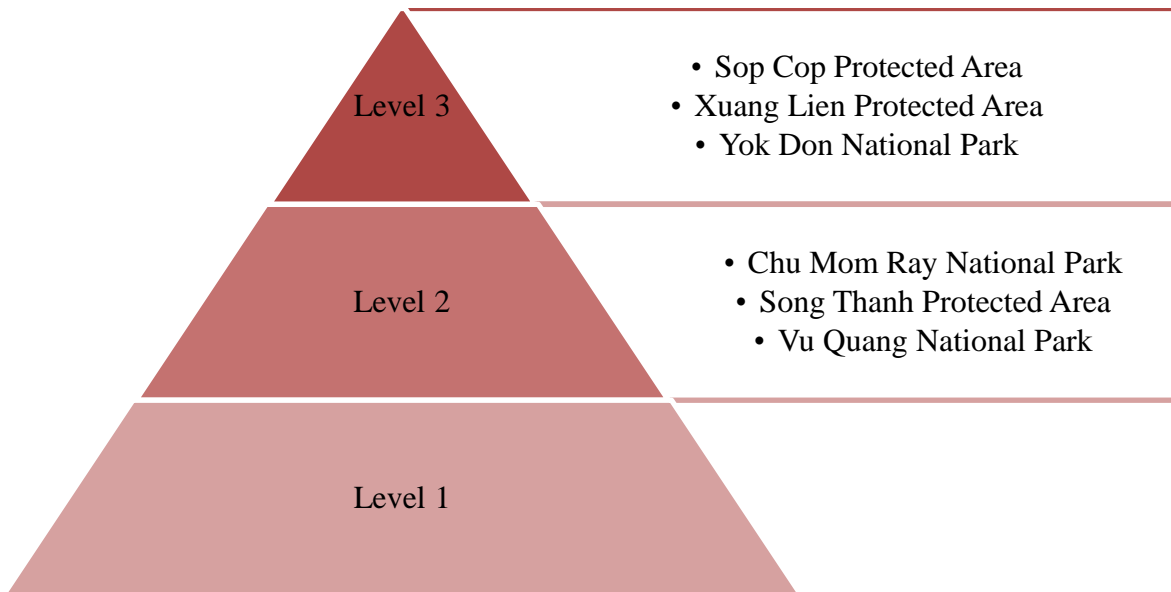
### 2.1.13 Vietnam

Vietnam is one of the three range countries in the Mekong valley where wild tigers have become locally extinct in the recent past. The Country has forest landscape with a potential for tiger recovery.

Factors affecting the wild tiger status are:

- increased anthropogenic pressure owing to human-settlements
- large-scale agricultural practices on encroached forest land with livestock pressure
- subsistence poaching, illegal logging and forest resource dependency of people
- diversion of forest areas for non-forestry purposes
- paucity of funding support and tiger governance





**Figure 2.13: Indicative Tiger Governance Pyramid for Tiger Protected Areas of Vietnam**

# CHAPTER 3: MONITORING OF WILD TIGER STATUS AND GOVERNANCE: THE GLOBAL TIGER RECOVERY PROGRAMME

## 3. Global Tiger Recovery Programme: Portfolio

The composite portfolio of Global Tiger Recovery Programme is based on the archetypal tiger governance (overarching), with differentiated actions specific to a Tiger Range Country (atypical). A good Global Tiger Recovery Programme performance results in a viable wild tiger status, as seen in the preceding chapter, the wild tiger status a major cause of concern in the Southeast Asia, based on periodic reviews at various levels along with updates from Tiger Range Countries, the Global Tiger Forum has scored the Global Tiger Recovery Programme performance, while factoring the same in PHVA of select sites (tiger protected areas) in Tiger Range Countries of Southeast Asian region. Three Vortex Version [10.8.2.0] simulation scenarios have been attempted in the PHVA process, viz.

optimal situation: connoting satisfactory implementation of Global Tiger Recovery Programme,

two suboptimal situations: low Global Tiger Recovery Programme performance with i) varied values of initial tiger population and, ii) habitat carrying capacity

### 3.1 Global Tiger Recovery Programme: Matrix for the Scoring Process

The matrix below has been constructed from the Global Tiger Recovery Programme portfolio.

**Table 3.1: The Global Tiger Recovery Programme matrix for scoring**

S No.	KPI Criteria	Normative Standards
1	Enabling Law	Dedicated legislation
2	Enabling Policy for National Funding	Committed sovereign allocation and budgetary provision
3	Policy on Donor Support	Dedicated externally aided project for tiger/protection
4	National Resolution/Policy on Corridor/SGI	Identification of corridors and resolution on SGI
5	Resolution on inclusive agenda for people	Commitment for PES, livelihood options
6	Frontline staff	Staff deployment per unit area/and salary support
7	Action Plan	Approved National Action Plan
8	Tiger Monitoring	Use of modern protocol (camera traps and GIS based inference)
9	Tiger Management Plan	Exclusive tiger plan for the site in tune with action plan
10	Use of technology	Support for technological inputs

11	Smart Patrol and Monitoring	SOP and Protocols in place
12	Protection Infrastructure	Range Stations/barriers/communication network etc.
13	Antipoaching/tiger/other wildlife body parts trafficking prevention	Effective surveillance, intelligence-based enforcement, high prosecution and conviction rates
14	In-situ prey/predator build-up and securing inviolate space	Protocols and field action ongoing
15	Human-Wildlife Interface	SOP and Compensation regime defined
16	Assessment (MEE/CA TS)	Protocols and directives in place
17	Transnational Actions	Ongoing bilateral engagement

### 3.2 Global Tiger Recovery Programme Scoring and Population and Habitat Viability Assessment Computation

The Global Tiger Recovery Programme status of 13 Tiger Range Countries, based on a combination of management scenarios, ecological status and poaching has not been compiled earlier. In addition to overarching constraints which are common to Tiger Range Countries, there are country, as well as site specific issues warranting a “differentiated” approach. The Global Tiger Recovery Programme score for each indicator was done by the same team on a 0 to 1 scale, vis-à-vis **normative**, based on updated information contained in Tiger Action Plans of individual Tiger Range Countries and KPI of the Global Tiger Recovery Programme, as provided to the Global Tiger Forum. Information relating to China and Indonesia, was obtained from respective action plans, and earlier updates provided in the ministerial meeting (2016), ancillary information was also used from literature review, poaching data and reports of Conservation Assured Tiger Standards (CA|TS).

Various ethological aspects of tiger and decimating factors (poaching, habitat degradation and the like) have been documented in the context of some Tiger Range Countries (TRAFFIC 2016, EIA 2018, Duckworth, 1998, WWF 2017). An attempt has been done to incorporate such information into the PHVA process for long-term tiger sustainability in the region. The key priority sites of Tiger Range Countries were considered for computing the habitat carrying capacity in the context of tiger, vis-à-vis the latest population figures (considered as founders for PHVA) (Simcharoen et al, 2007,2014, Kawanishi & Sunquist 2004, Lenkie 2005, Sukmasua et al 2001).

The area of key priority sites in the region range from 2000 to 14000 sq km, viz. Kerinci Seblat: 13,791 sq km (Indonesia); Huai Kha Khaeng Wildlife Sanctuary: 2,780 sq km (Thailand); Taman Negara: 4,343 sq km (Malaysia); Htamanthi: 2,150 sq km, and Hukaung Valley; 11,519 sq km (Myanmar). The computed carrying capacity ranged from 60 to 420 tigers, vis-à-vis initial populations ranging from 8 to 136 (Lenkie 2005, Simcharoen et al 2007). Large patches were not considered for computation for want of active corridor management along linkages between source sites within a landscape. (ex: Hukaung Valley - Htamanthi).

The 17 KPI of Global Tiger Recovery Programme foster in-situ protection resulting in conservation of the endangered tiger in source areas across its natural range. The global experience indicates that tiger

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responds quickly to protection [Project Tiger in India] (Jhala et al 2014, WWF 2017). In the context of tiger, “protection” has an umbrella connotation since a tiger population in its source area requires protection from several decimating factors: poaching, loss of habitat, paucity of prey base, poor habitat quality, rampant fire, forest resource dependency of people, interface problems and revenge killings.

Poaching is a serious threat for tiger conservation (Galster & Vaud 1999, Check 2006, Jhala et al 2008, Wikramanayake et al 2011) and has been investigated for incorporating policy actions (Kenny et al. 1999). Law enforcement, frontline training and capacity building, national enabling policies and transnational actions are important for long-term survival of tiger population. However, in a large number of researches, often the focus has been on habitat restoration, corridor connectivity and maintenance of prey density (Miquelle et al 2005), vis-à-vis tiger resilience and low rate of extinction. It is observed that in the event of paucity of tiger population data, selective harvesting (poaching/targeted killing) of tiger population, conflict and mortality of dispersing tiger in a fragmented habitat, negative effect due to cultural dependency on forest and ethical unrest are not given enough weightage to plan conservation policies. In such scenarios, often the data is substituted and quoted from another study site and conservation policies are brought into effect after generalization. Anti-poaching was one of the indicators for assessing the Tiger Range Countries based on their acquired Global Tiger Recovery Programme Score.

In view of local extinctions of Tiger in the South-East region, the survival probability assumes importance, vis-à-vis the Global Tiger Recovery Programme score. Hence, priority sites of some Tiger Range Countries within the region were considered for PHVA (Vortex 10 [Version 10.8.2.0] (Lacy et al 2017), which evaluates the likelihood of species persistence for a given period into the future. The simulation was done with inputs from well-known findings on tiger ecology, mating, reproduction, mortality, immigration and harvesting. The PHVA process projects the survival chances over a period of 100 years by describing the years to extinction. Based on empirical data, it has been found that a viable population of tiger 20 breeding tigresses requires an inviolate space of 800-1000 sq km, with a buffer of 1000-3000 sq km. Given the land tenure dynamics, source-sink interactions, internecine attributes and sex-ratio of tiger, the above dispensation would result in a tiger population of 85-90 individuals within an area of 3000 sq km (Guidelines of Tiger Conservation Plan, NTCA, 2006). Keeping in mind the PHVA process (Vortex analysis), three scenarios have been depicted in the context of Global Tiger Recovery Programme, viz. scenario 1 presenting an optimal situation, scenarios 2 and 3 depicting suboptimal situations, with different values of initial populations and habitat carrying capacity for the tiger. The instant approach of factoring Global Tiger Recovery Programme scores in a PHVA has been done for the first time towards stepping up managerial efforts on a priority basis, thereby making a case for enhanced funding support.

The life history data used for Vortex modelling was based on published literature (Mazak 1981, Sunquist & Sunquist 2002, Gopal 1992) as provided in table 3.1. The natural disasters have not been taken into account in the PHVA process.

**Table 3.2: Inputs for PHVA (Vortex 10 [Version 10.8.2.0])**

Vortex parameters	Classical	Global Tiger Recovery Programme approach	
	Scenario 1	Scenario 2	Scenario 3
Age of first offspring female breeding	3	3	3
Age of first offspring male breeding	4	4	4
Maximum life span	15	15	15
Maximum number of brood/years	1	1	1
Maximum number of progeny/broods	3	3	3
Sex ratio at birth-in % males	50	50	50
Maximum age of male and female reproduction	15	15	15
% Adult female breeding	50*	40	50
% Male in breeding pool	50	60	50
% Mortality from age 0-1	50	50	50
% Mortality from age 1-2	30	30	30
% Mortality from age 2-3	5*	20	20
% Mortality after age 3	5*	20	20
First year of harvest	1	1	1
Last year of Harvest	100	100	100
Interval between harvest (poaching/targeted killing)	5	1	1
Number of females harvest after age 3	1	2	1
Number of males harvest after age 3	1	1	1
Supplementation of individual (number)	2	1	-
Supplementation year interval	5	5	-

### 3.3 Assumptions

For scenario 1, the habitat carrying capacity computation for tiger was based on an average from highly productive tiger source areas in India (large number of births and deaths, with the former exceeding the latter) like Kanha (area 2051 sq km), Tadoba (area 1728 sq km) and Corbett (area 1288 sq km). As stated earlier, based on empirical data, it has been found that a viable population of tiger 20 breeding tigresses requires an inviolate space of 800-1000 sq km, with a buffer of 1000-3000 sq km. Given the land tenure dynamics, source-sink interactions, internecine attributes and sex-ratio of tiger, the above dispensation would result in a tiger population of 85-90 individuals within an area of 3000 sq km (Guidelines of Tiger

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Conservation Plan, NTCA, 2006). Based on the same, the average carrying capacity for tiger, vis-à-vis area works out to 30, which has been considered as the initial population.

For Scenarios 2 and 3, which represent suboptimal conditions in the context of tiger status and Global Tiger Recovery Programme implementation: Initial population of 136 (carrying capacity 420) and 8 (carrying capacity 60) were used in the PHVA process. In all, two key protected areas (Scenario 2 – Hua Kha Khaeng WLS, Thailand; Scenario 3 – Htamanthi WLS, Myanmar) from the Southeast Asian region were taken into consideration. In some sites within Malaysia, camera trapping has revealed an abnormal sex ratio (more of males and few females), which may result in local extinction. Perhaps, the pronounced site fidelity of females makes it more vulnerable for targeted killings.

### **3.4 Outcome**

The Global Tiger Recovery Programme score presented two categories of Tiger Range Countries:

**Category 1:** optimal (Global Tiger Recovery Programme score  $\geq 0.6$ )

**Category 2:** sub-optimal (Global Tiger Recovery Programme score  $< 0.60$ )

Category 1 includes Tiger Range Countries, which more or less, have an optimal wild tiger status with a long-standing track record of in-situ conservation, including monitoring and country level estimations (Russia, India, Bhutan, Nepal, Bangladesh). The said countries also have source area specific tiger conservation plans, forming part of a national thought process, including macro-level mapping of habitat connectivity (corridor). Apart from such initiatives, transnational engagements with bordering Tiger Range Countries are also ongoing for strengthening tiger monitoring.

Category 2 includes Tiger Range Countries, with sub-optimal tiger status. However, several source areas in such countries have immense potential for harbouring viable tiger populations. Though corridor mapping and a landscape vision with initiatives for green infrastructure have been initiated in a few countries (with partial gene porosity at places) within the region, there is an urgent need for reviving several source areas with active management for protection and prey base buildup.

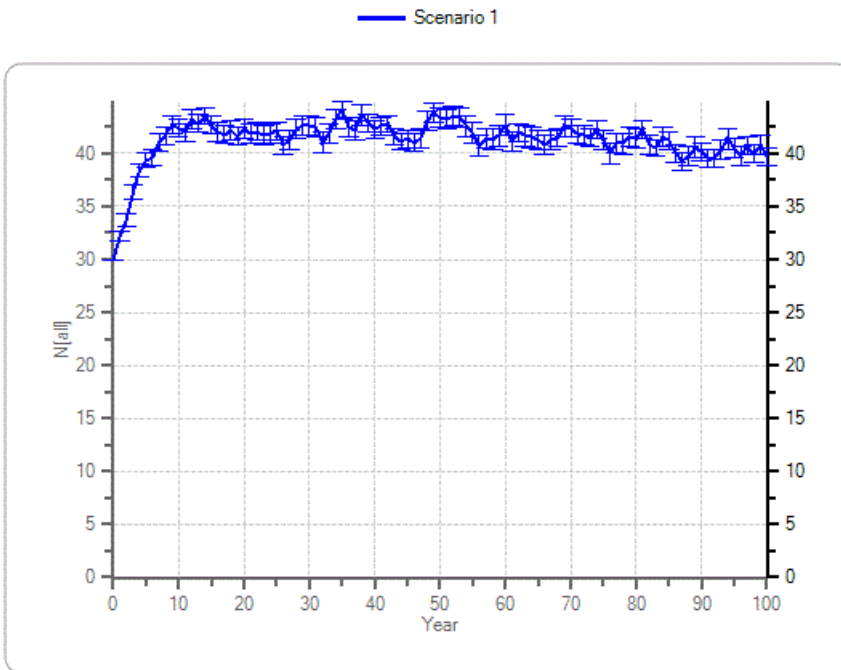


Figure 3.1

Scenario 1 Vortex result: **The probability of extinction is nil for optimal TRCs as connectivity allows a minimum of 2 individual immigration at every 5-year interval, harvesting (poaching/targeted killing) of 2 individuals at every 5-year interval, no skewed sex ratio, population below carrying capacity.**

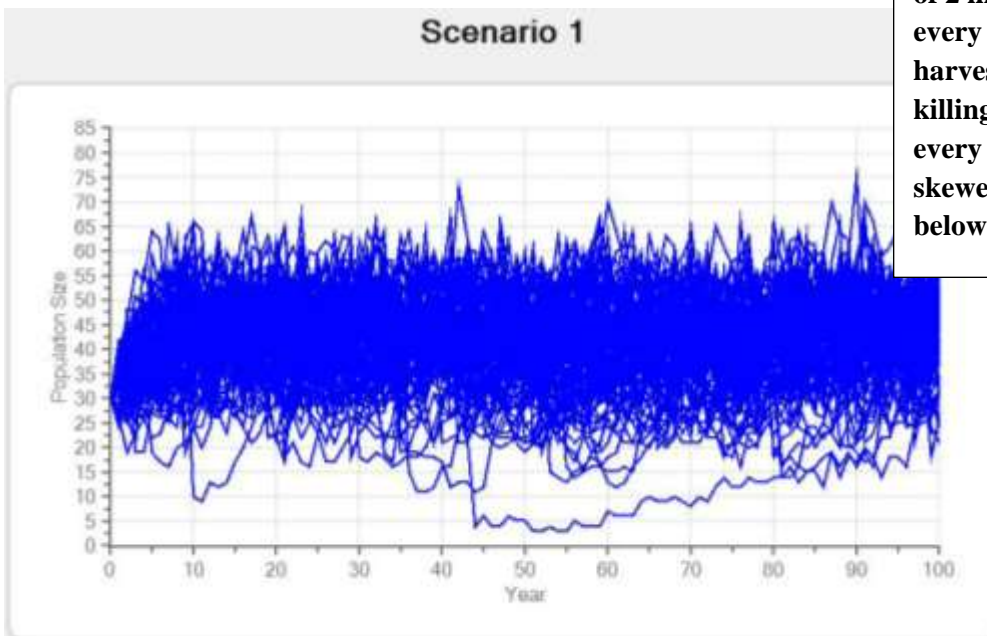
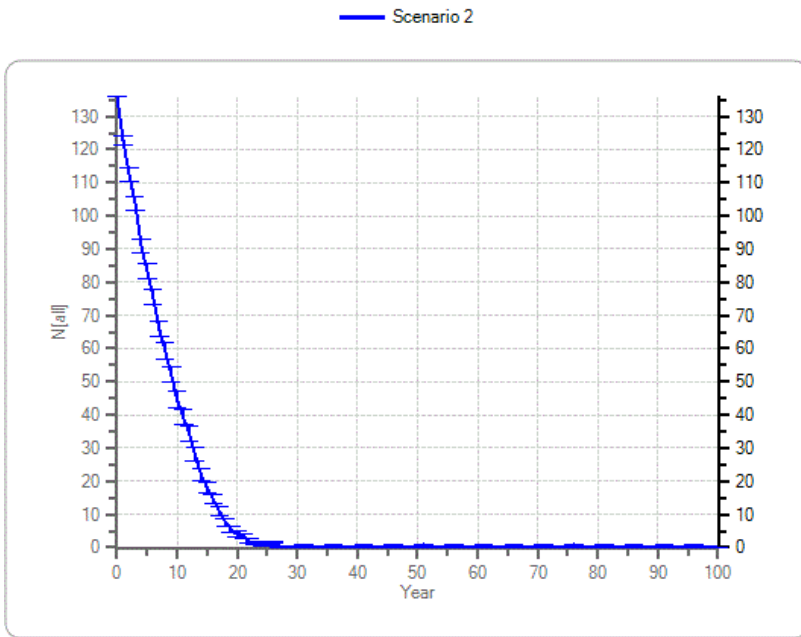
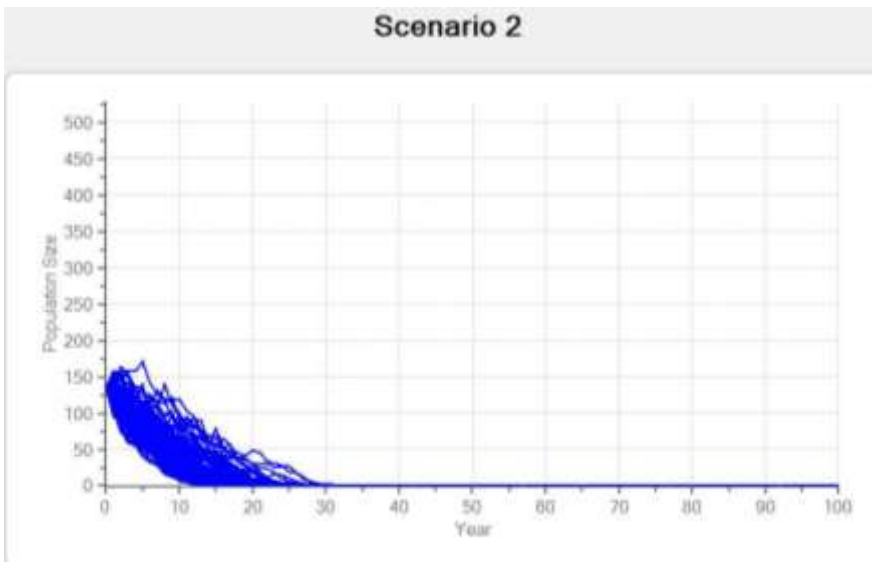


Figure 3.2



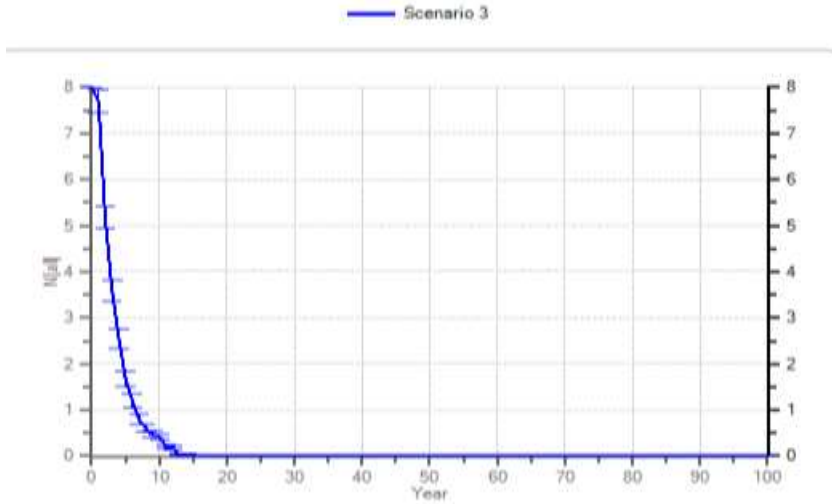
**Figure 3.3**

Scenario 2 Vortex result: **Large forests with high initial tiger population. The probability of extinction is high (extinction in 26 years) for sub-optimal TRCs as partly functional connectivity was taken into consideration hence supplementation of 1 adult male (after 4 year of age) individual at 5-year interval. Harvesting (poaching/targeted killing) of 3 individuals (2 females and 1 male after age 3) at every 1-year interval, skewed sex ratio resulted in less breeding females in the population, and**



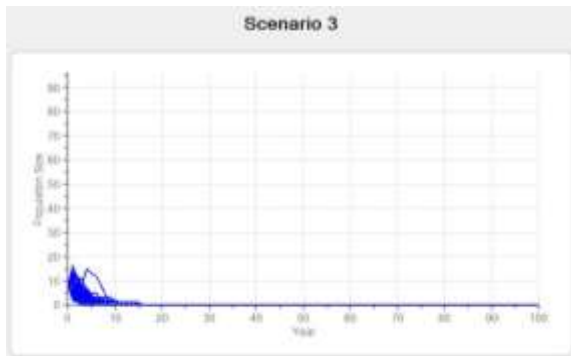
**Figure 3.4**





Scenario 3 Vortex result: **Large forests with low initial tiger population. The probability of extinction is very high (extinction in 15 years) for sub-optimal TRCs as no connectivity was taken into consideration hence no supplementation. Harvesting of 2 individuals (1 female,1 male after age 3) at every 1-year interval, no sex ratio (50% breeding female in the population), and high mortality of dispersing tigers.**

**Figure 3.5**



**Figure 3.6**

It is pertinent to add that countries falling within this category have not carried out a nation-wide assessment of tiger, co-predators and prey. Issues like paucity of sovereign funding, frontline staff and protection infrastructure have slowed down the Global Tiger Recovery Programme implementation.

The composite portfolio of Global Tiger Recovery Programme involves action at several levels to strengthen the in-situ conservation of wild tiger populations across Tiger Range Countries. For the first time, Key Performance Indicators of the Global Tiger Recovery Programme have been scored and factored into the PHVA process of selected tiger protected areas. This becomes crucial at this juncture to garner the desired support towards resources and containing trafficking of body parts and derivatives of tiger.

The tiger source areas across Tiger Range Countries falling in both categories are in varied status in the context of habitat quality, prey base and tiger density, as depicted in the “indicative tiger governance pyramid” (Chapter 2). A site which is depauperate even at the habitat level would warrant more time, effort and resources for tiger recovery. On the contrary, areas with only low tiger density for want of protection or prey revival may require less effort. Since, such conditions are resultant of a combination

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of factors ranging from transnational, national and site levels, a differentiated approach is much needed for concerted time bound tiger revival with sovereign commitments for funding. As in any governance endeavour, the tiger governance depends on commitment towards ownership and support, and the latter becomes actionable only with funds. However, tiger conservation efforts with landscape approach and prey recovery would not be enough for tiger survival if the mortality exceeds 15% of the adult female population (Chapron et al 2008), which reiterates the need for security planning and protection.

Containing trafficking of body parts and derivatives of big cats, including the tiger, is an over-arching threat for all Tiger Range Countries. Though much conversation and local actions have happened on this front, more are required. The demand in the said context needs to be eliminated, as local extinctions of an ecological umbrella species like the tiger would usher in dismantling of ecosystem service processes and carbon sequestration in tiger bearing forests.

Tiger agenda is fortunate to have considerable commitment of Tiger Range Countries and hence, the situation is not insurmountable. The Tiger Range Countries are aware of the Global Tiger Recovery Programme portfolio and need to garner resources for implementing their priority actions as responded to by them in the KPI review. The broad roadmap for strengthening wild tigers would involve actions at three levels, viz. tiger site, national and transnational. The urgent site actions for large habitats with very low prey density needs to include smaller focal areas in the form of “micro-cores”, facilitating concerted field actions related to protection infrastructure, communication, frontline deployment, active prey revival, followed by reintroduction of tiger. The normatives of Global Tiger Recovery Programme are based on ground reality and may guide the process. Such actions need to form part of a National Tiger Action Plan (NTRP) complemented by an enabling policy regime. Several tiger source areas need to be fostered as a regional network merging into a national web of larger green space. This would entail a landscape approach for engaging with many owners (stakeholders) who operate in the larger landscape area but nevertheless impact the tiger source, directly or indirectly. The stakeholders bearing the brunt of direct impact (local people) need priority involvement in the tiger agenda to ensure the desired stability based on local support and ownership. An active engagement with donors and collaborators is called for at this juncture for mutually complementary actions based on regional, national and area specific projects forming part of the Tiger Action Plan.

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## CHAPTER 4: GLOBAL WILD TIGER GOVERNANCE: A GAP ANALYSIS

### 4. Introduction

Tiger is a species of metapopulation and as indicated earlier has well-defined its land tenure sociology is characterized by a “source-sink dynamics”. Wild tiger status varies in Tiger Range Countries and call for strengthening the “archetypal tiger governance”, with a special focus on “atypical actions”. Such a portfolio is the “differentiated” approach, warranting committed investments. At the field formation level, a tiger agenda has two important components, viz. the “*exclusive*” tiger centric actions in source areas, and an equally aggressive “*inclusive*” co-occurrence agenda in areas peripheral to the source for eliciting ownership support of local people.

The gaps in wild tiger governance across tiger range countries are obvious as discernable in their tiger status. It goes without saying, governance in any context can happen only if, adequate and sustained funding support is made available for normative essential for such governance. The wild tiger governance is no exception to the said fact and cannot be expected as an ongoing outcome in nature despite varied anthropogenic and environmental stochastic stressors in action on tiger landscapes.

Based on data obtained from Tiger Range Countries and good practices happening in several range countries with viable tiger populations, the instant report has worked out the gap in tiger governance for estimating the financial resource support required for Tiger Range Country to ensure and assured path of recovery and strengthening their wild tiger populations. This has been done by standardizing a “normative template” of wild tiger governance (encompassing archetypal and atypical situations) and computing the difference between tiger investments in range countries. There are several instances of budgetary cuts and downsizing of support to field apparatus as a sequel to the ongoing pandemic. This has been taken into consideration along with the gap in tiger investment (with focus on protection/enforcement/monitoring apart from community co-occurrence agenda), to work out a consolidated country-wise financial gap in the context of wild tiger governance. The methodology and subsequent analysis are elucidated in the paragraphs below.

### 4.1 Setting Normative Standards

Globally, wild tigers thrive across several habitats ranging from high altitude sub-alpine areas to mangrove swamps. Broadly, such tiger landscapes fall in six categories (Wikramnayka et. al, 2010);

1. *Dry Deciduous Forest*: India
2. *Sub-Tropical Pine Forest*: Bhutan, Nepal, India
3. *Broadleaf Temperate Forest*: Bhutan, Nepal, India
4. *Mangrove Forest*: Bangladesh, India
5. *Rainforest/ Tropical Evergreen Forest*: Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Malaysia, Thailand, Vietnam, parts of NE India
6. *Open Woodland/Mongolian and Amur Steppe Forest*: China and Russia

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Some tiger range countries like India, have recognized tiger landscapes (five) for periodic country level assessment of tiger, co-predators, prey and habitat. In the Indian context, two more sub-classifications have been recognized for gap computation, viz. river flood plains and Eastern/Western Ghat landscapes owing marked difference in their terrain with vegetational variation.

Edaphic attributes are governed by a terrain type, which along with prevailing climatic conditions foster a forest type over an area. The floral and faunal assemblage in forest types is typical with varying levels of habitat carrying capacity in the context of the wild tiger. Thus, normative templates have been developed for each forest type to understand the gaps.

Both primary (questionnaire based) as well as secondary data from peer-reviewed and grey literature have been used, apart from extensive consultations with Field Managers from Tiger Range Countries and experts. Normatives have been benchmarked for 1000 square kilometer of Tiger Protected Area to ensure uniformity.

**Table 4.1: Normative Template (per 1000 sq km) for Tiger Governance (Protection and Enforcement, Community Co-occurrence agenda) Based on Forest Types**

Broad Country Level Classification		India				India, Nepal		India, Bhutan, Nepal				Cambodia, Indonesia, India, Lao PDR, Malaysia, Myanmar, Thailand, Vietnam		Bangladesh, India		China, Russia	
Normative Template	Type of Expenditure	Dry Deciduous Forest	Cost Per Unit (in USD)	Eastern and Western Ghat Landscape	Cost Per Unit (in USD)	Delta and Flood Plains	Cost per Unit (in USD)	Tropical Broadleaf Forest	Cost per Unit (in USD)	Sub-tropical Broadleaf Forest	Cost per Unit (in USD)	Rainforest/ Tropical Evergreen Forests	Cost per Unit (in USD)	Mangrove	Cost per Unit (in USD)	Mongolian /Amur Steppe	Cost per Unit (in USD)
Tigers per 1000 sq. km (based on peer-reviewed literature)	Recurring Expenditure	100		100		100		10		10		30		30		6	
NORMATIVE ELEMENTS																	
Frontline Forest Staff	Non-Recurring Expenditure	120	6060	120	4544.6	445	4900	110	7480	20	7480	85	3900	125	4243	25	6400
GPS Device (one per Frontline Forest Staff)		120	260	120	260	445	260	110	260	20	260	85	260	125	260	25	260
Fixed Wireless		20	2700	35	2700	45	2700	20	2700	10	2700	8	2700	10	2700	10	2700
Wireless Walkie Talkie		75	280	75	280	200	280	60	280	15	280	20	280	5	280	20	280
Protection Camps		50	13600	75	23800	170	23800	60	23800	4	23800	10	120000	10	23800	15	150700
Fire Watch Tower		10	13600	40	13600	0	24500	25	13600		13600	1	30000	1	24500	1	68500
Bike/Motocycles		20	1100	30	2040	30	2040	35	2040	3	2040	3	5040	1	2040	0	0
Four Wheel Drives/Jeep		15	20400	15	20400	35	20400	15	20400	1	20400	10	30000	1	20400	20	44525
Boat		1	27200	5	27200	35	27200	2	27200	0	27200	1	27200	20	27200	7	7329.5
Trap Cage for Big Cats		1	1100	5	1100	2	1100	10	1100	10	1100	1	1100	2	1100	2	1100

## 4.2 Data Handling

Data was sampled from 90 Tiger Protected Areas, spread over 12 Tiger Range Countries as detailed below:

**Table 4.2: Data Collection and Sample Size**

Name of Tiger Range Country	Total Number of Tiger Protected Areas in the Country	Number of Tiger Protected Areas Sampled	Sample Size (in percentage)
<b>Bangladesh</b>	1	1	100
<b>Bhutan</b>	10	10	100
<b>Cambodia</b>	6	3	50
<b>China</b>	7	3	42.8
<b>India</b>	52	30	57.6
<b>Lao PDR</b>	1	1	100
<b>Nepal</b>	5	5	100
<b>Malaysia</b>	3	3	100
<b>Myanmar</b>	5	3	60
<b>Russia</b>	11	11 (13 out of which 3 are under the same administration)	100
<b>Thailand</b>	21	8	38.09
<b>Vietnam</b>	7	6	85.71
<b>Total</b>	<b>129</b>	<b>84</b>	

As stated earlier, data collation through questionnaire/perception survey and expert knowledge based on multiple consultations with Senior Officials and Experts from Tiger Range Countries. Details of consultation (including names of Senior Officials) along with questionnaires are at Appendix III. The temporal coverage spans 2020-2021, while additional information on budget cuts owing to COVID-19 pandemic was collected during consultations (along with information on unit cost of inputs relating to protection and enforcement infrastructure). Further, data has also been collated from earlier reports relating to Global Tiger Recovery Programme Stocktaking.

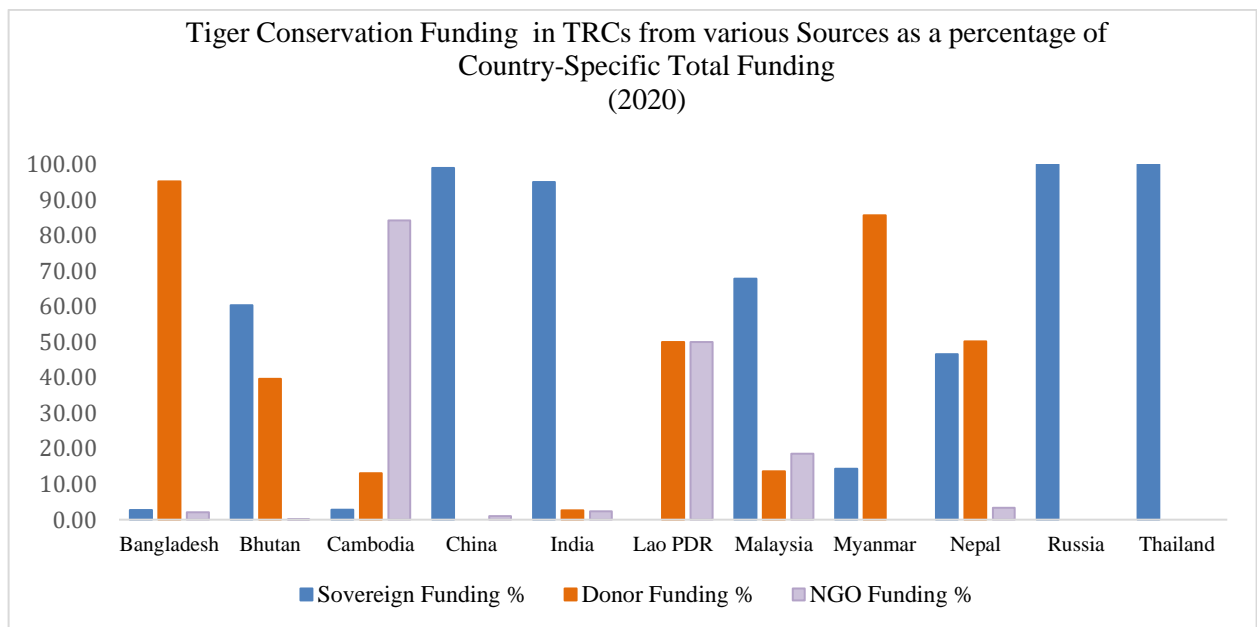
The actual expenditure included in the analysis was limited to field management and protection (tiger centric) at the source site (Tiger Protected Area, viz. law enforcement, monitoring (tiger, prey and habitat) and field management. For graphical and related analysis, the tiger protected area (was considered as the core) along with the peripheral zone influence/co-occurrence (buffer) was taken into consideration. The average value vis-à-vis the normative elements of Tiger Protected Areas from each Tiger Range Country was used to extrapolate the country-specific wild tiger funding deficit. Further, to ensure price stability for costing normative elements (unit cost of protection and enforcement infrastructure), a constant exchange rate (local currency vis-à-vis USD) has been used based on 2019 exchange rates. (Table 4.1)

Some limitations of the data include: 1) Exclusion of Indonesia owing to non-availability of data, 2) lack of financial information relating to Russia and estimate figures sourced from Non-Governmental Organization (Amur Tiger Centre), 3) data relating to China sourced from a Non-Governmental Organization (WWF-China).

### 4.3 Extant Tiger Funding: A Situation Analysis

Wild tiger conservation/ governance in Tiger Range Countries is funded from varied sources, which includes Sovereign and complementary funding as indicated below.

- 1) *Sovereign Funding*: as made available by the Tiger Range Country, emanating from its National Budgeting process
- 2) *Complementary Donor Funding*: funding from various multilateral agencies like Global Environmental Facility (GEF), UNDP, World Bank, USFWS and others, including philanthropic contributions, duly endorsed by the Sovereign Government.
- 3) *Complementary NGO Funding*: this includes funding support from various local, national and international non-governmental organizations in monetary terms, duly endorsed by the Sovereign Government



**Figure 4.1: Tiger Conservation Funding in Tiger Range Countries from various Sources as a percentage of Country-Specific Total Funding (2020)**

(Note: for sampled Tiger Protected Areas in each country)

#### 4.4 Threats to Wild Tiger: Gaps in Tiger Governance

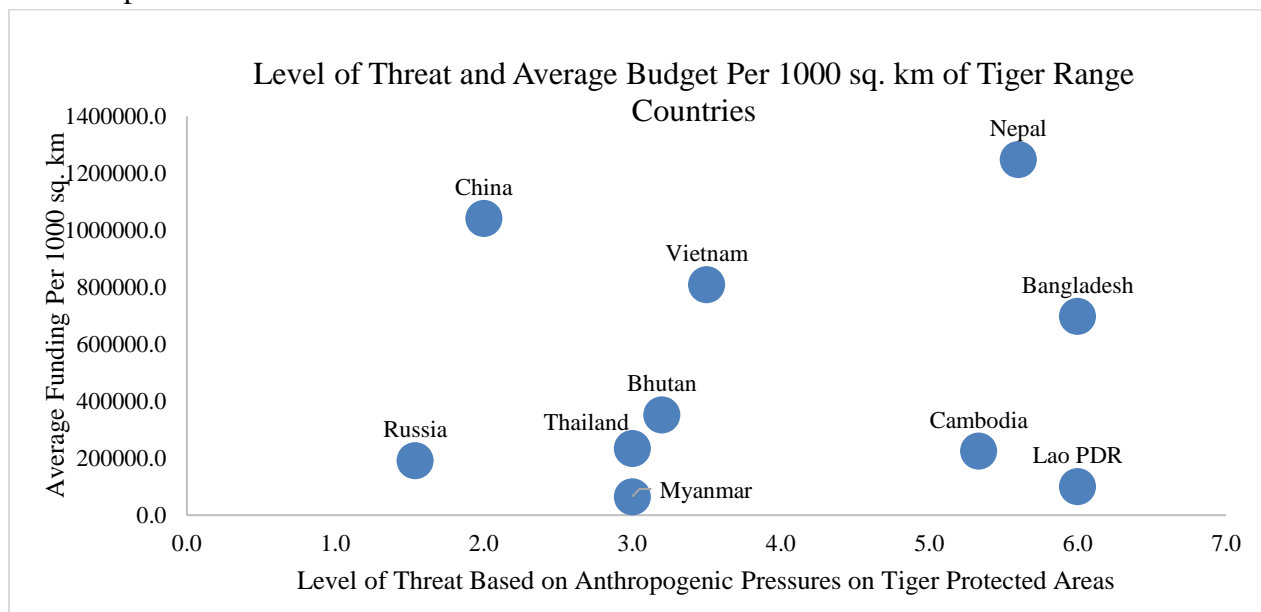
The financial gaps in Tiger funding have been computed by comparing the prevailing resource support for cardinal normative elements relating to protection and enforcement with the standardized normative template (figure 4.1). This has been computed for each Tiger Protected Area which form part the sample (Tiger Range Country-wise).

Since, protection and enforcement are overarching prerequisites in tiger field formations, the gap cost estimate as above would enable harnessing sovereign and private investment capital for the purpose.

Overarching threats and stressors to wild tigers in Tiger Range Countries are:

- Human-Wildlife Interface and Targeted killing
- Poaching/ Illegal Wildlife Trade
- Illegal logging/NTFP collection and forest resource dependency for want of livelihood options
- Forest Fires (Man-Made)
- Habitat Loss owing to varied land uses: agriculture and plantation Encroachment
- Fragmentation of Tiger Landscapes (urbanization and infrastructure)
- Local Conflict/Insurgency
- Mining
- Pollution: Water, Air or Land

A binary and additive score scheme (presence (1) and absence (0)) was used for scoring anthropogenic threats. This was normalized by considering the total number of Tiger Protected Areas sampled in a Tiger Range Country (additive score divided by number of sampled Tiger Protected Area in a Tiger Range Country). Such normalized values were graphically correlated with average values of total tiger conservation fund (USD) available in the sampled Tiger Range Country (per 1000 square kilometers). The said depiction is as below.



**Figure 4.2: Correlation between Level of Anthropogenic Threats and Average Budget Allocation (in USD) per 1000 sq. km of Tiger Protected Areas**

*(Note: for sampled Tiger Protected Areas in each country)*

*(Note: India and Malaysia have been excluded from the analysis due to paucity of data)*

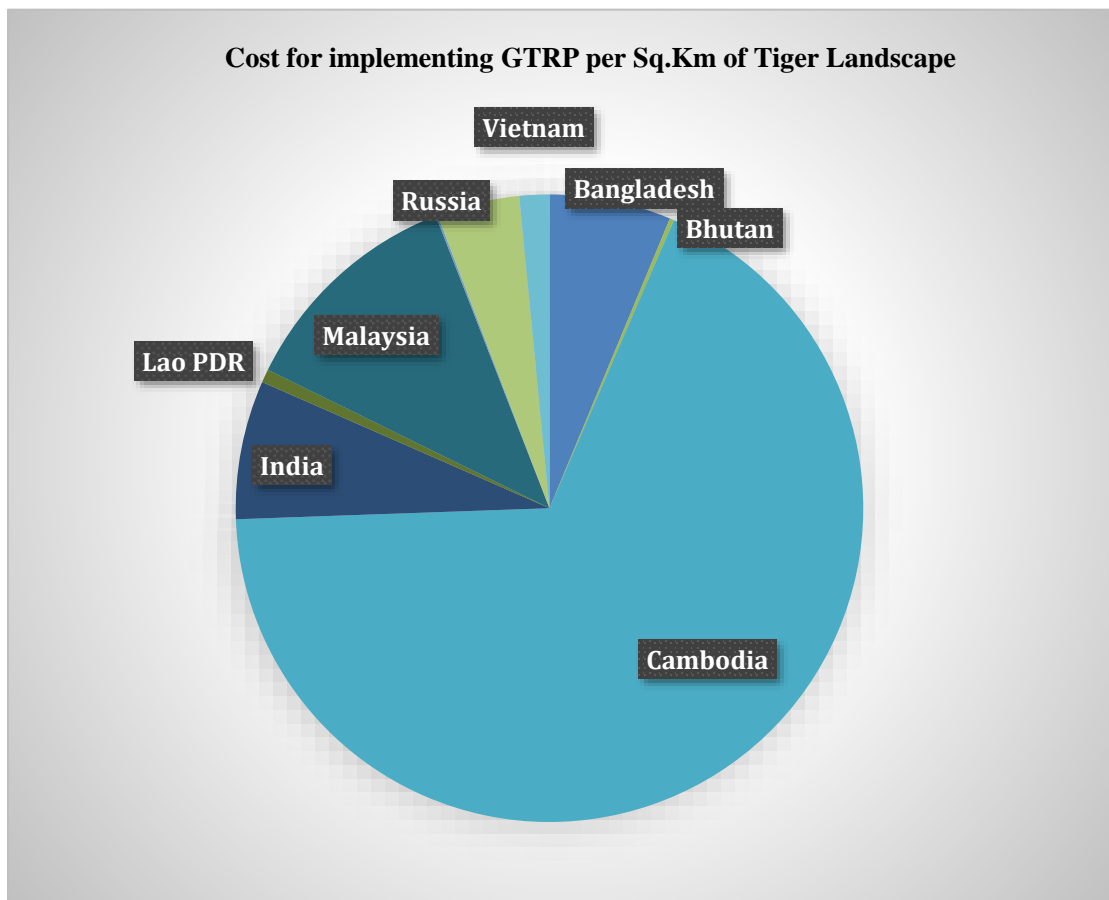


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The above graph highlights shortage of tiger funds in countries with higher levels of anthropogenic threat, including those where the tiger population has extirpated.

Implementation of the Global Tiger Recovery Programme action portfolio, read with the “indicative tiger governance pyramid” (Chapter 2), provides cost estimation in the context of Global Tiger Recovery Programme implementation (Tiger Range Country-specific). It is pertinent to recall that the Global Tiger Recovery Programme portfolio is based on archetypal as well as atypical wild tiger governance, subsuming both exclusive and inclusive/co-occurrence components of the wild tiger agenda.

The pie-chart below captures the magnitude of *funding required* per Tiger Range Country (per 1000 square kilometer of Tiger Range Country-specific tiger conservation landscape), as identified by the Tiger Range Countries for 2016-2017 (3<sup>rd</sup> Stocktaking Conference, 2019).



**Figure 4.3: Funding Requirement for Global Tiger Recovery Programme Implementation**

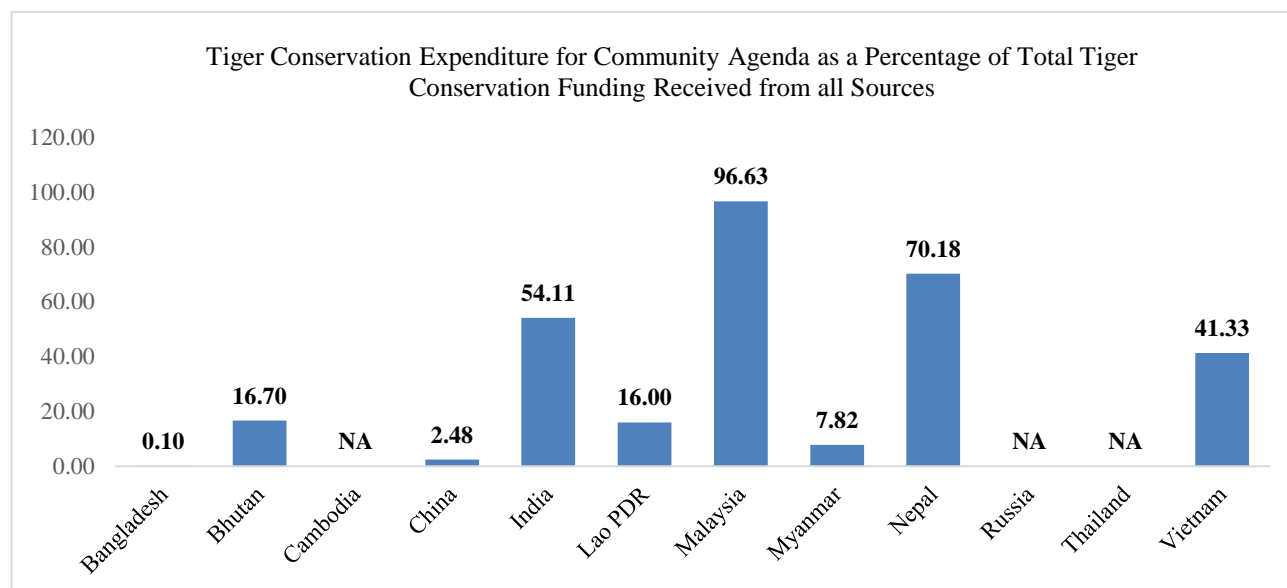
(Note: The graph shows the cost for the annual National Implementation Plans per sq.km for 2016-17 under Global Tiger Recovery Programme)

The above graph helps to re-iterate those assumptions of the “indicative tiger governance pyramid”. It is evident that with declining status of habitat, prey-base and wild tiger population, there is an increased

financial requirement to restore tiger conservation landscape. At a glance, one can deduce the impact of poor habitat quality, prey-base and extirpated tiger population in the case of Cambodia, closely followed by the Global Tiger Recovery Programme implementation cost for Malaysia.

#### 4.5 Funding for Peripheral Co-Occurrence (inclusive agenda to garner local public support)

As articulated earlier, the inclusive agenda to manage the inevitable co-occurrence of people with wild animals (including the tiger), moving to proximal Tiger Protected Areas is as important as tiger centric actions in the core. The co-occurrence portfolio is specific to a Tiger Protected Area, shaped by the prevailing socio-cultural milieu of the locale and livelihood options (Chapter 2). In general, human-dominated landscapes close to Tiger Protected Areas inevitably suffer from human-tiger interface/conflicts, with locals nurturing a grudge against tiger management, and the wild tiger earning a pest value (Sethi, 2021). This said situation is overarching to all Tiger Range Countries, warranting funding support for an ongoing sustainable, gainful engagement with local people based on micro-planning and quid-pro-quo actions. This calls for looking beyond the tiger Protected Area boundaries with a landscape approach for reaching out to local people as well as other Governmental/Non-Governmental stakeholders operating therein for factoring concerns of the wild tiger in their respective sectors (which do not have the tiger goal) (GTF, 2021). The peripheral and the macro-level engagement at the landscape scale is crucial for the present as well as the future and investment for such engagements would not only complement and safeguard Tiger Protected Areas but also, secure adaptation to climate change sustained ecosystems services and safeguard zoonotic distortions (Chapter 5).



**Figure 4.4: Maximum Expenditure in Community Agenda as a Percentage of Total Tiger Conservation Funding Received from all Sources (based on sampled Tiger Protected Areas from each Tiger Range Country)**

*(Note: for sampled Tiger Protected Areas in each country)*

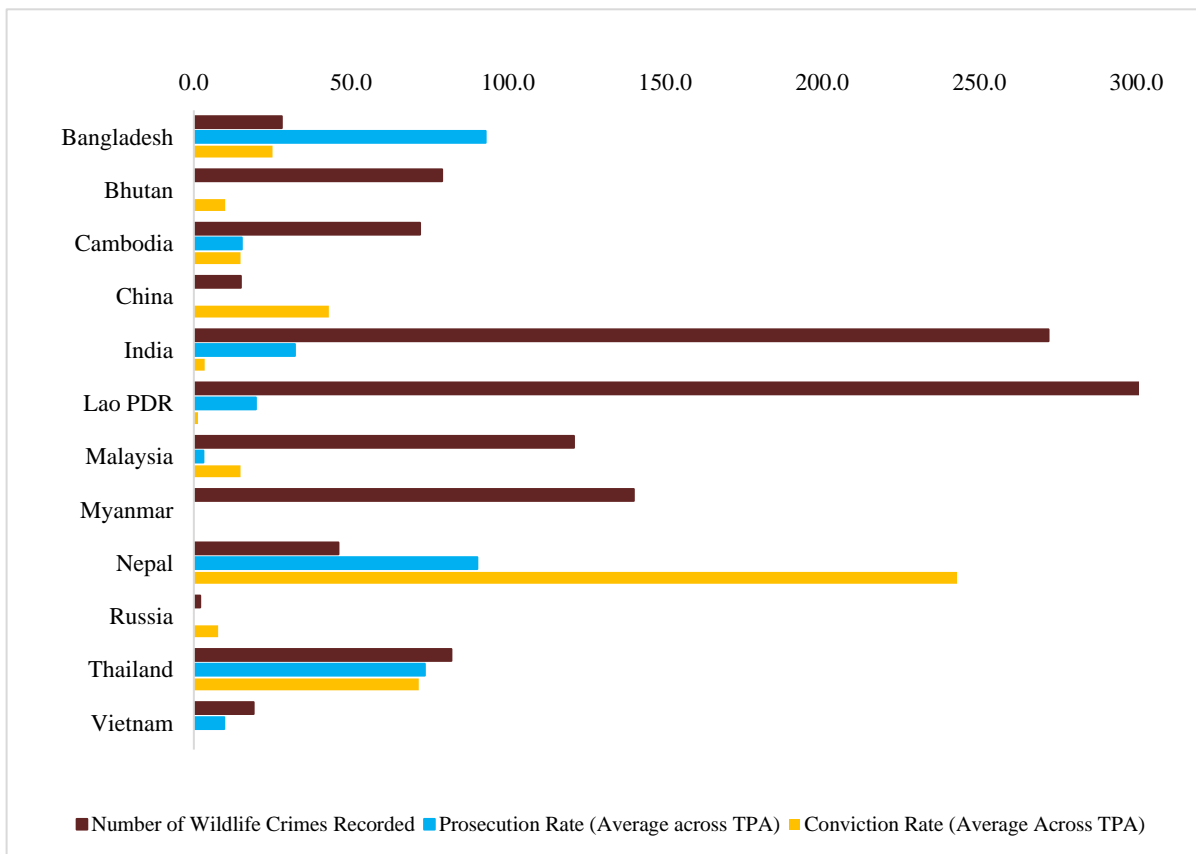
*(Note: the above excludes any funding earmarked specifically for human-wildlife conflict mitigation)*

The quantum of expenditure in community agenda is a reflection of community engagement linked to tiger conservation in Tiger Range Countries, hence, this calls for funding support to countries with negligible investment in the context.

#### 4.6 An Analysis of Gaps in Judicial System for Disposal of Wildlife Crimes

Tiger poaching and illegal trade in the body parts and derivatives of the said species, along with poaching of prey base pose a significant threat to wild tiger survival in all tiger range countries. Hence, the need for an efficient monitoring system to ensure speedy disposal of wildlife crime cases needs no emphasis. The said monitoring needs to be entrusted to a small group of tiger Protected Area staff, to avoid pendency of such cases in the courts of law.

The following analysis compares the total number of wildlife crime records with the average rate of prosecution and conviction at the Tiger Range Country-level:



**Figure 4.5: Comparative analysis of total recorded wildlife crime case, prosecution, and conviction rate (2020)**

*(Note: for sampled Tiger Protected Areas in each country)*

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The aforementioned graphs help us to understand that even with high propensity of wildlife crime records in Tiger Range Countries, prosecution and conviction rates continue to remain low. This could be attributed to lapses in presenting the case professionally, apart from slow disposal for want of monitoring. As step towards “zero-poaching”, Nepal could successfully deter wildlife crimes with highest level of conviction rate amongst Tiger Range Countries.

#### **4.7 Impact of COVID-19 Pandemic on Tiger Conservation Funding**

COVID-19 pandemic has impacted all spheres of life globally. In the context of in-situ conservation (tiger and other species), there have been instances of increased trafficking of wildlife body parts owing to slackened controls in field formations. Further, in quite a few Tiger Range Countries, there has been a downsizing of state budget for conservation actions. This has impacted several wild species including the tiger.

Investment in Protected Areas are more important at this juncture since, the floral and faunal assemblage and their interactions with sylvatic cycle safeguard distortions in zoonotic cycles, thereby fostering a much needed “dilution effect” in the context. Thus, an ecological umbrella species (tiger) safeguards the entire gamut of the ecosystem. Gains to society from the multitude of ecosystem services (including the dilution effect) and adaptation to climate change are invaluable, thereby making a prioritized case for stepping up conservation investment.

To get a more nuanced understanding about the impact of COVID-19 on tiger conservation funding, data from Tiger Range Country consultations were useless to highlight the following Tiger Range Country scenarios:

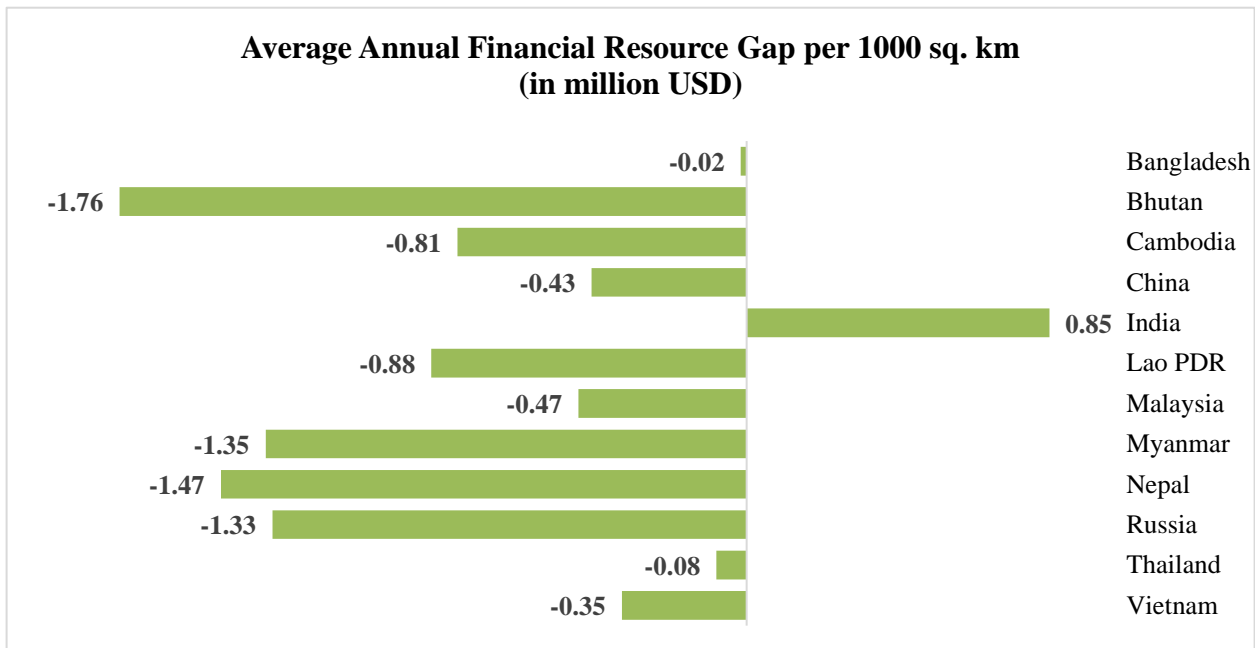
- *No Change* in tiger Conservation Funding (Nepal, Bhutan and Myanmar)
- *Budget-cut*
  - *Bangladesh* (5.2%)
  - *Cambodia* (50% budget cut in all environmental spending)
  - *India* (22% budget cut in tiger funding)
- *In Malaysia, an increase in sovereign funding has been reported* in Taman Negara and Royal Belum while, there was a decrease in allocation for Endau-Rompin.

As articulated earlier, tiger funding needs to be categorized as a priority expenditure in sovereign portfolio of tiger range countries.

## 4.8 Gaps in Tiger Funding

The prevailing investments in sampled tiger protected areas were used to compute the Tiger Range Country-level investment (per 1000 sq. km). Based on the normative template, the desired funding was computed for each Tiger Range Country (per 1000 sq. km). The difference between the desired and prevailing funding provided the gap.

It is pertinent to add, that the desired projection also, takes into consideration “atypical situations”, apart from the inseparable, inclusive community agenda with contours of a macro-level landscape approach.



**Figure 4.6: Financial Gaps**  
(Note: for sampled Tiger Protected Areas in each country)

**Table 4.3: Details about Annual Funding Requirement, Funding from all Sources to Tiger Range Countries and Financial Gap (per 1000 sq. km) and estimated Financial Gap based on Total Tiger Protected Area in the Range Country (in million USD)**

Tiger Range Countries	Average Annual Recurring Cost per 1000 sq. km (in million USD)	Average Annual Non-Recurring Cost per 1000 sq. km (in million USD)	Average Annual Total Cost per 1000 sq. km (in million USD)	Average Total Funding from All Sources per 1000 sq. km (in million USD)	Average Total Financial Gap per 1000 sq. km (in Million USD)	Total Tiger Protected Area (based on GTF Compendium 2021 and figures provided by Countries during the Survey)	Total Financial Gap in Tiger Conservation Funding in each TRC (for total Tiger Protected Areas) (In million USD)
Bangladesh	0.116	0.599	0.714	0.698	-0.016	6017.000	-0.099
Bhutan	0.546	1.564	2.110	0.352	-1.758	16396.310	-28.820
Cambodia	0.234	0.801	1.035	0.225	-0.810	17968.150	-14.558
China	0.006	1.470	1.476	1.042	-0.434	15407.32*	-6.692
India	0.338	0.702	1.040	1.889	0.849	74840.980	63.543
Lao PDR	0.172	0.811	0.983	0.100	-0.883	5000*	-4.417
Malaysia	0.512	0.922	1.434	0.963	-0.472	6007.000	-2.832
Myanmar	0.276	1.136	1.412	0.065	-1.348	14198.81	-19.135
Nepal	0.368	2.354	2.721	1.248	-1.473	5510*	-8.118
Russia	0.097	1.541	1.637	0.308	-1.329	36429.44*	-48.418
Thailand	0.095	0.224	0.319	0.234	-0.085	28544.330	-2.417
Vietnam	0.165	0.994	1.158	0.809	-0.349	8500.98*	-2.971

(Note: Figures marked with\*: Geographical area of Tiger Protected Areas as provided by the Countries during Financial Resource Mobilization Assessment Survey and rest of the Figures collated from Global Tiger Protected Area Compendium (GTF, 2021)).

*The global financial gap in wild tiger conservation funding is atleast 138.477 million USD during the year 2020, for all tiger protected areas (source sites excluding Protected Areas in Indonesia). This covers both recurring and non-recurring items of expenditure in field formations, which are a regular feature in tiger governance. Thus, the figures (gap) computed for the year 2020 may be taken as a base year value to project the said gap over a time period. The computed shortfall is almost 0.019% of the total shortfall in global biodiversity financing gap (average gap of US\$ 711 billion per year) as estimated by Deutz et al. (2020).*

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## CHAPTER 5: FINANCING STRATEGIES FOR STRENGTHENING WILD TIGER CONSERVATION

It is evident that wild tiger conservation across its range requires more funding support. The financial gap in the context is large. Since the tiger agenda is a sovereign issue of a Tiger Range Country, this situation warrants sovereign actions in financial budgeting, which maybe in the form of an exclusive umbrella species, project support, stepping up contributions in corporate environmental social responsibility or securing special donor projects. Need at this juncture is to explicitly link tiger investment to climate change adaptation (tiger bearing forest lock-up lot of carbon), attach value for green capital vis-à-vis ecosystem services fostered by tiger forests and amplify the pandemic dilution effect.

Tiger needs to be seen as an indicator of ecosystem health and its agenda needs to be categorized as a priority sector in the context of budgeting. As a sovereign issue, funding from sources other than the Government (national or international) for the tiger agenda needs to be channeled through the national funding conduits of Tiger Range Countries. Hence, such outside funding needs to ensure appropriate complementation to strengthen sovereign efforts vis-à-vis the NTRP. Many Tiger Range Countries receive a fair amount of green funding but it would be naïve to presume (as elucidated in a paragraph below), that such funds go to the tiger.

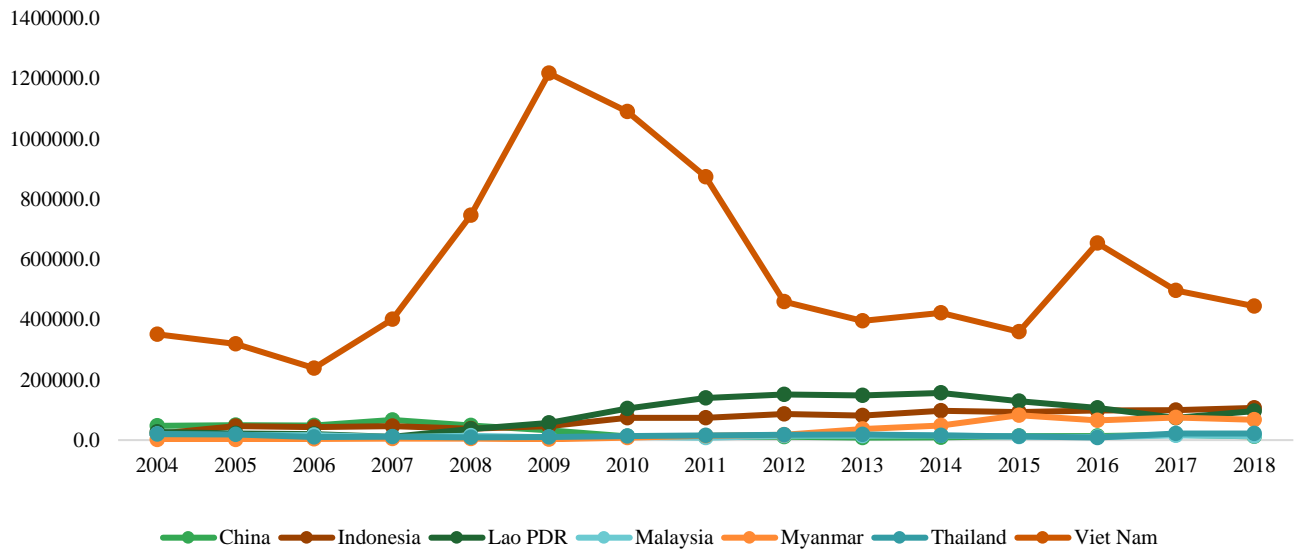
### 5.1 Sovereign Funding

The importance of sovereign funding for tiger does not require much articulation. As an important ecological umbrella species, the well-being of tiger is crucial the climate agenda as well. However, there is no centrality of tiger or any other ecological umbrella species in climate conversations, with owing to the omnibus biodiversity chapter subsuming such important thematic areas. While, logically biodiversity implies all such themes, owing to special habitat dictates of several endangered species like the tiger, special actions are called for.

No agency or donor outside the Government system can assume the funding mandate for in-situ efforts, since the latter are intricately webbed with other heterogeneity at a larger landscape scale. Thus, mutually complementary and ameliorative efforts can only be envisioned by a state agency for a holistic support to ensure sustainability of efforts while, avoiding duplication or preference for a particular thematic action. Nevertheless, funding from other sources is important, especially in scenarios with a track record of reduced national funding. The role of Government would be to blend both sovereign and non-sovereign funding to sync with the NTRP actions.

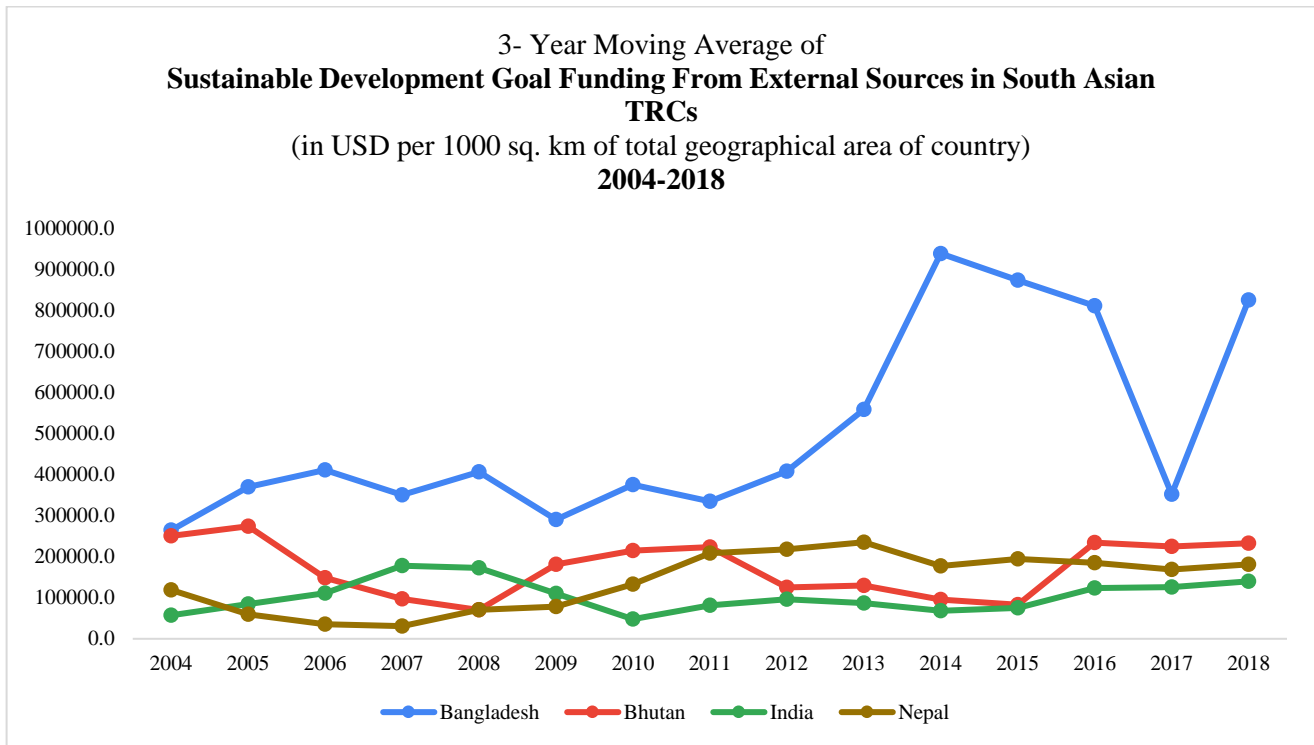
The irregular nature of funding from other sources is illustrated below, for 2004-2018 vis-à-vis the Sustainable Development Goals (SDGs) investments.

**3-Year Moving Average of  
Sustainable Development Goal Funding From External Sources in Southeast Asias  
TRCs and China**  
(in USD per 1000 sq. km of total geographical area of country)  
**2004-2018**



**Figure 5.1: Year Moving Average of Sustainable Development Funding in Each Tiger Range Country between 2004 to 2018 in US Dollars per 1000 sq. km**  
[Source: UN DESA Statistics Division]

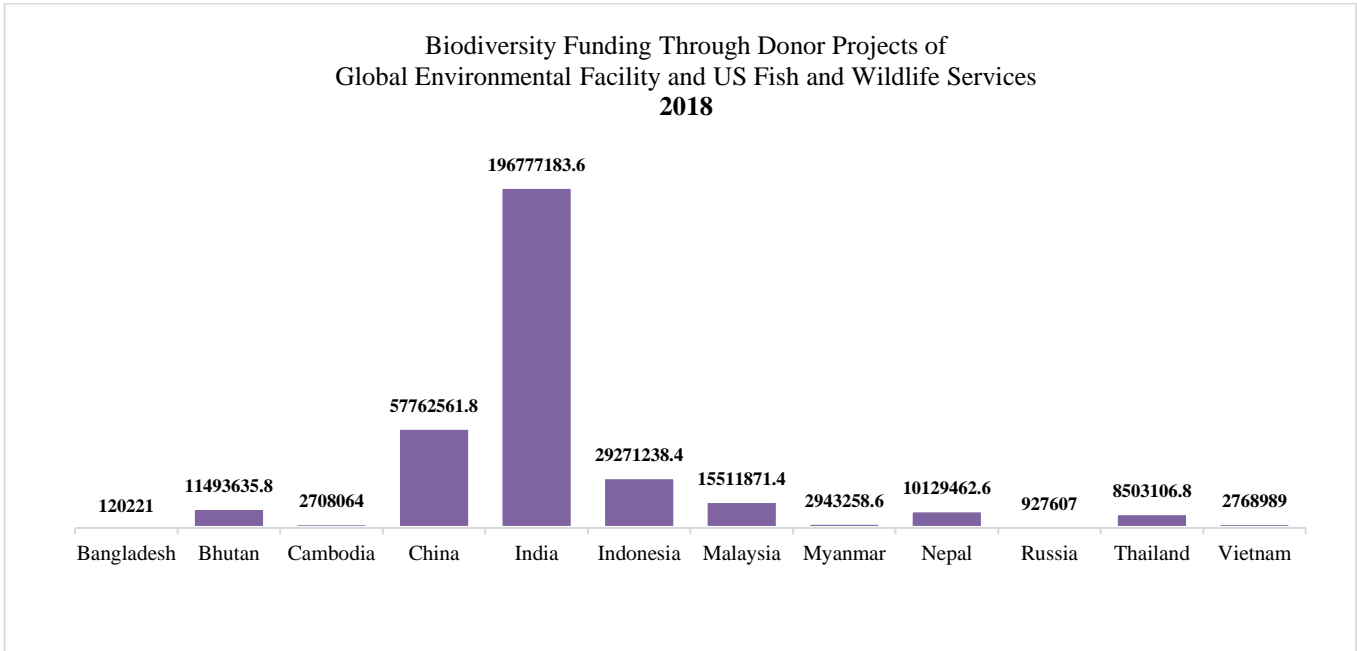




**Figure 5.2: Year Moving Average of Sustainable Development Funding in Each Tiger Range Country between 2004 to 2018 in US Dollars per 1000 sq. km.**  
[Source: UN DESA Statistics Division]

The above graphs also highlight the fact that extensive investments in various environmental agendas would not have a trickle-down effect on tiger conservation. This is glaring evident in Vietnam and Lao PDR where tigers have gone extinct despite considerable SDG funding.

Looking more closely at the external donor funding for biodiversity conservation (Global Environmental Facility and USFWS), we see that funding is skewed towards countries with rich biodiversity, implying a major portion of the donor funding getting limited to a select few countries and their few earmarked protected areas.



**Figure 5.3: Biodiversity Funding Through Donor Projects of Global Environmental Facility and US Fish and Wildlife Services (2018)**  
*[Source: GEF and USFWS]*

## 5.2 Conservation Financing from Other Sources

Protecting our ecosystems is a complex challenge, but an achievable one. Biodiversity is in severe decline due to a combination of conflicting private and public interests, incoherent policy and governance, and insufficient financing. Although no less than US\$143 billion is spent on biodiversity every year globally, this is far below the estimated US\$824 billion needed to protect and restore nature (Biofin, 2021).

The biodiversity finance landscape is changing. Both domestic and international financial flows have grown and the range of financing instruments, providers and delivery mechanisms now available is significantly wider than ever before. Finance solutions provide strategies and means to effectively unlock and direct multiple sources of finance toward national and local biodiversity finance plans and projects. They can be used alone or in combination to structure new products that can increase the impact of biodiversity interventions. Sources of financing flows can come from national and international public revenues (taxes, grants), short- and long-term private capital (bank lending, bonds), or combinations of both (public guarantees, public-private partnerships), and delivered through various public, private and blended institutions.

A detailed overview of all potential funding mechanism has been summarized in the table 5.1:

**Table 5.1: Summary of Alternative Funding Mechanism available for Tiger Conservation**

Name of Financial Instrument for Tiger Conservation	Definition and Operating Mechanism	Tiger Range Country (using the Financial Instrument)
Biodiversity offsets	Measurable conservation outcomes resulting from actions designed to compensate for significant residual biodiversity loss arising from project development after appropriate prevention and mitigation measures have been taken. Offsets can, for example, deliver biodiversity benefits (e.g., reforestation) through a transaction, where offset sellers (e.g., a conservation NGO) sell offsets to developers (e.g., a mining company) who seek to compensate the residual biodiversity loss. Offsets have been established in the agriculture, forest, construction, manufacturing and mining sectors.	India, Indonesia, Thailand, Vietnam
Wetland banking	Measurable conservation outcome resulting from a trading system (or market) where offset credits are tradable units of exchange defined by the ecological value associated with verifiable changes and management of a natural wetland habitat. A mitigation bank is a wetland, stream, or other aquatic resource area that has been restored and preserved for the purpose of providing compensation for expected adverse impacts to similar ecosystems nearby.	
Bioprospecting	Bioprospecting is the systematic search for biochemical and genetic material in nature in order to develop commercially-valuable products for pharmaceutical, agricultural, cosmetic and other applications. The rationale is to extract the maximum commercial value from genetic resources and indigenous knowledge, while creating a fair compensation system that can benefit all.	Bhutan, India, Indonesia, Thailand,
Biosafety fee	The fee charged to the importer of biological material into a country. It can be used to recover the expenditures of the national agency mandated with preventing alien invasive species (AIS), health threats and other agricultural pests from entering certain geographical areas. Mostly used in island states. It can also be part of an import duty or fee.	India, Thailand
Carbon markets	Carbon markets aim to reduce greenhouse gas (GHG) emissions cost effectively by setting limits on emissions and enabling trading of emission units (instruments representing emission reductions). Carbon markets can include emission allocation credits as well as emission reduction credits such as carbon offset credits. In various carbon markets, forest or agricultural based offset credits may be used to offset industrial emission.	Thailand, India
Compensation for planned environmental damage	Financial or other compensation paid by companies, private individuals, or governments for planned environmental damage as part of infrastructure or project development. Compensation levels and forms of compensation are usually determined by law and can be fixed amounts, calculated relative to investment or company sizes, or based on remediation costs and economic damages.	Vietnam, India, Thailand
Conservation or wildlife themed items	Special commercial products featuring wildlife are sold at an extra price to costumers and the extra revenues are channeled to environmental causes and projects illustrated by the product/item, mostly related to conservation and the protection of wildlife. Examples include, license plates, special ringtones and screensavers (mobile communication), gifts sold at zoos, etc.	Indonesia, Thailand, India, Malaysia

Corporate and corporate foundations' donations	Corporations provide support to organizations implementing sustainable development including nonprofits through direct-giving programs, private foundations, and/or public charities. As well, companies can also offer their employees' time by encouraging employee volunteerism. A foundation can be established as part of a company's corporate social responsibility (CSR) strategy and be funded via the allocation of a percentage of accrued profits, an endowment or other means.	Thailand, India, Malaysia, Indonesia, Vietnam
Corporate social responsibility tax	Special form of government taxation that requires (usually large) companies to spend a percent of their profits every year on corporate social responsibility (CSR) - usually through financing NGOs or paying into government social investment funds. This solution has been piloted in only a few countries (e.g., India, Seychelles), with limited documented evidence of its effectiveness relative to other approaches.	Thailand
Corporate sustainability	The integration of sustainability thinking and practice in business operations helps companies live up to their responsibilities as global citizens and local neighbors and can significantly strengthen business resilience and profitability. Effective corporate sustainability can offer clear business benefits for sustainability, cost-effectiveness and supply chain risk management.	Bhutan, India, Indonesia, Thailand, Malaysia
Ecological fiscal transfers	Intergovernmental fiscal transfers redistribute tax revenues across government levels-from national and regional to local jurisdictions-according to agreed principles and priorities. Integrating ecological services means including conservation indices (e.g., size/quality of protected areas) in the fiscal allocation formula-thus rewarding investments in conservation and incentivizing the expansion of protected areas, forests or other natural capital.	India, Malaysia
Enterprise challenge and innovation funds	Funding instrument that distributes grants to profit-seeking projects on a competitive basis. Challenge funds can mitigate market risks, while spurring innovation to fight poverty and reduce environmental degradation.	India, Thailand
Environmental risk insurance	Insurance schemes that cover against environmental liabilities (i.e., the financial risk associated with environmental pollution and contamination) in exchange for a premium. In addition to preventing future expenditures and thus reducing business risks, they can provide contingent resources for immediate remedial action in the event of an environmental disaster.	India
Fees, penalties, and management expenditures for Environmental (and Social) Impact Assessments	Environmental (and Social) Impact Assessments (EIA) are conducted to evaluate the environmental and social risks of a development project including mining, hotels, and other large infrastructure projects. Performance bonds are one among such EIA, under which the resources from the surety can be quickly deployed to save or recover critical environmental assets and can be accessed even in case of bankruptcy.	Vietnam
Green banks	State or donor-sponsored financial entity that works in partnership with the private sector to increase investments into green businesses and markets that are underserved by commercial finance. The backing from a government (or donor) guarantee the Bank can catalyze private investments and introduce new financial products.	India, Indonesia

Green bonds	Green bonds can mobilize resources from domestic and international capital markets for climate change adaptation, renewables and other environment-friendly projects. In its simplest form, a bond issuer (public or private) will raise a fixed amount of capital, repaying the capital and accrued interests over a set period of time. Sovereign bonds and forest bonds are being issued to finance biodiversity related activities.	India, Indonesia, Thailand
Lotteries	Governments and civil society groups using lotteries as a means of raising funds for benevolent purposes such as education, health, historic preservation and nature conservation.	
Mobilization of private donations	Nature and conservation receive large number of resources from private donations and philanthropies. Different fund-raising strategies and marketing campaigns are used by non-governmental organizations and conservation societies to raise funding from private citizens including memberships, fundraising events, etc.	Malaysia, Thailand, Vietnam
Pasture (and grazing) fees	Fees for access to rangelands on public lands including in Protected Areas. Fees and permits are used to regulate usage and avoid overgrazing and rangeland degradation.	Vietnam
Payment for Ecosystem Services	Beneficiaries/users of an ecosystem service, such as water regulation, make a direct or indirect payment to the provider of that service in exchange for service provision and maintenance.	Bhutan, Thailand, Malaysia, India, Vietnam, Indonesia
Penalties and other compensation for unplanned environmental damage	Compensation paid by a company and/or individual condemned for an environmental crime and/or unintentional damages to the environment. Prevalent environmental crimes include illegal wildlife trade, illegal waste, manmade disasters and spills, etc.	Bhutan, Vietnam, Thailand
Promotion of sustainable tourism	The promotion of sustainable tourism through an enabling legal framework and direct or indirect incentives. Responsible travel to natural areas can provide an <b>alternative source of income</b> for the conservation of protected areas and the welfare of local communities.	India, Malaysia, Thailand, Indonesia, Vietnam
Remittances	Private transfers from a migrant worker (i.e., living in a foreign country for one year or longer) to a receiver (often but not limited to family) in his/her country of origin. When remittances are not used to respond to immediate consumption needs, they can be saved and invested at the benefit of the local economy/ community/ environment of the worker's country of origin.	Vietnam
Social and development impact bonds	A public-private partnership or performance-based financial tool that allows private (impact) investors to provide upfront capital for traditionally public projects that deliver social and environmental outcomes. If the project succeeds, the investors are repaid by the Government (Social Impact Bonds), an aid agency, or other philanthropic funder (Development Impact Bonds) with capital plus interest. Where social and development impact bond where resources are linked to a conservation outcome it is known as conservation bond.	Bhutan
Sovereign wealth funds	State owned investment funds capitalized from balance of payments surpluses, foreign currency operations, royalties on extractive industries and other transfers and economic rent. Available resources are generally invested in capital and equity markets. their investment policies can be oriented towards sustainable standards and practices. Similarly, the distribution of annual transfers may be earmarked to the environmental-particularly if the sovereign fund is capitalized from natural resource royalties.	India

Sustainability standards and certification	Voluntary, usually third party-assessed, norms and standards relating to environmental, social, ethical and food safety issues, adopted by companies to demonstrate the performance of or the sourcing of their products. They include eco-labels, organic and fair-trade certifications.	Indonesia, Thailand, India
Taxes, fees and royalties in the forestry sector	Taxes, fees, royalties and other charges on the extraction, transport and/or use of forests and forestry activities. Following the user-pays principle (and polluter pays), these levies help to capture the benefits of production services from nature and internalize the true cost of ecosystem degradation by influencing the price of the "consumed" natural capital.	Indonesia, Thailand, Vietnam, Malaysia
Trade finance	Broadly defined as the set of financial instruments that support foreign trade transactions, trade finance includes letters of credit, factoring, export credit and insurance.	
Trust funds	Legal vehicle (trust) that supports biodiversity by mobilizing, blending, and overseeing the allocation of financial assets. It is a country-driven solution that should feature a clear focus, a rigorous project approval and implementation process, solid monitoring and evaluation frameworks, and strict control over asset/financial management and investment.	Indonesia, Thailand, Malaysia

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### 5.2.1 Conservation Trust Funds

A conservation trust fund is an independent legal entity and an investment vehicle which helps to mobilize funds from multiple sources, manage the same and allocate these financial resources for biodiversity conservation and related sustainable development interventions. The advantage of conservation trust funds is that they provide strategic focus and predictable allocation of resources to projects. Their legal structure is wherein donors transfer the control of financial assets to a trustee who manages these assets on their behalf. The governance structure of the Trust has a Board, an administrative wing or secretariat, technical advisors and internal and external auditors. As a financing tool conservation trust funds (CTFs) can play a crucial role in ensuring an effective financing for both short and long-term projects in conservation. Over the years, CTFs have become a robust biodiversity financing mechanism which provides long term financing for conservation and recently also for natural solutions to mitigation and adaptation to climate change as well as sustainable development. They have also served as catalysts for the creation of new partnerships with private businesses for the conservation and sustainable use of biological resources.

These funds may be further divided into:

- Endowment funds: An endowment fund is an investment fund established to make consistent withdrawals from invested capital. In many of these funds, the principal is invested, and investment income is used to finance specified activities of projects. An example of an endowment fund is the Bhutan Trust for Environmental Conservation.
- Sinking funds: A sinking fund is designed to disburse both principal and investment income over a fixed period of time, which is usually long and covers the entire period over which funding is to be provided for activities or projects identified by the fund and/ or its donors.
- Revolving funds: A revolving fund is created to ensure sustained availability of finance by facilitating inflows from various sources on a regular basis. For instance, inflows from special taxes levied regularly to pay for conservation programmes can be used to replenish the capital of the fund and provide a steady source of revenues to finance specific conservation activities. An example of revolving fund is Thai Energy Efficiency Revolving Fund.

### 5.2.2 Green Bonds

Green Bonds have emerged as a new source of environmental financing since 2007. The functional strategy behind the evolution of green bonds is that investments are made in identifiable environmental assets which generate revenues that can be used for making interest payments and returning principal to the investors. The main advantage of the structure is that it provides a direct mechanism to fund environmentally oriented projects which generate benefits and in turn cash flows that go back to the investor. The World Bank and The European Investment Bank issued the first green bond in 2007. By the end of 2014 about USD 53.2 Billion green bonds were outstanding. However, these green bonds just constitute a small fraction of the global bond market.

Despite seeming as an innovative financial mechanism for conservation, most of the green bond investments have been made in renewable energy projects. Some of the major issues in devising a strategy for investment in conservation is the challenge of putting an economic value to ecosystem services. Although several studies (IIFM 2015, TEEB) have made an effort to quantify ecosystem services, there is less clarity on execution of such cash flow models. Therefore, it may be premature to consider green bonds as a mechanism for financing tiger conservation.

### 5.2.3 Private Sector Investments in Conservation

The numerous ways in which private sectors may bring in investments in conservation are depicted in Figure 5.4



**Figure 5.4: Possible Funding Mechanisms for Corporate/Business House**

In countries like India, the mandatory Corporate Social Responsibility (CSR) regulation which mandates that corporates should invest a portion of profits for identified socially beneficial activities. It presents an opportunity for meeting funding gaps for conservation and livelihood projects. Apart from fulfilling mandatory and voluntary social commitments, industries can support conservation by incorporating sustainability measures in their production cycle/resourcing etc. Corporate houses can accentuate business models, that increase profitability, provide quality assurance and create an effective marketing mechanism for products derived from sustainable forestry practices.

The Wildlife Business Councils (WBC) (formed through industry consortium) may be a valuable tool for identifying common areas of investment interest and can lead to pooling of resources from different partners.



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WBCs may be tasked to strategize, identify and catalyze implementation of a series of deliverables with “Wildlife in general and Tiger in particular” as the focus. The following guides the WBC approach:

- To raise awareness of business leaders of the importance of biodiversity conservation for the long-term survival of businesses;
- To champion with national and global policy makers biodiversity inclusive and friendly business policies.
- Identify mechanisms for collaboration between the industry and conservationists resulting in the launch of an organized and more structured partnership with them. This could include creating working groups to define and scope the win-win potential of this partnership.
- For the conservationists, facilitate access to technical, managerial and planning skills available within the industrial sector. For the industry, create sustainable business practices and approaches (e.g., greening the supply chain), improved coordination for locating industries (zoning issues), defining the nature and scope of industrial support for conservation including livelihood/job opportunities and improving the corporate image.
- Building on the CSR opportunities in support of conservation.

Private sector funding can come from three sources viz. corporates, foundations and investors. Tiger Range Country will need to put in place a policy framework to support participation by international private investors apart from international multilateral and bilateral donors. This calls for a need to develop new business and financing models for tiger conservation. There is a need to create appropriate business models for providing sustainable livelihoods to the local population. This may be done by setting up a venture capital fund, to provide seed capital and growth capital to incubate small and medium enterprises engaged in agro-forestry, eco-tourism and woolen textiles. Such activities can be supported by global branding of tiger landscape produce, partnerships with global retail chains such as Walmart, Tesco, Amazon etc. and offtake arrangements with large food and textile companies.

#### **5.2.4 Environmental CSR**

Environmental Corporate Social Responsibility is a self-regulation of international private entities to contribute towards societal and environmental concerns. Some Tiger Range Country have institutionalized normative in the said context which is important for a tiger landscape.

#### **5.2.5 Blockchain Technology/Crypto Currency**

The funding model of *Rebalance Earth* is interesting. It focuses on growing carbon offsetting market to create a new flow of wealth, called ecosystem services. The organization uses carbon offset as a mechanism to fund the umbrella species protecting biodiversity of local areas.

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Similarly, a Tiger Coin is an innovative tool to protect big cat species. The “TYGR Wildlife Conservation LLC” has launched a revolutionary charitable digital token, supporting organizations conserving the tiger.

A variety of alternative Tiger Conservation Funding mechanism can be used to fill the financial deficit in tiger conservation efforts, which should form a component of the sovereign tiger **funding pool**.

## **EPILOGUE**

Wild tiger agenda across Tiger Range Country requires adequate and sustained funding support for Global Tiger Recovery Programme implementation. There is a big gap in terms of financial support to the wild tiger which requires prioritized bridging. Over the vicissitude of time, as a sequel to ongoing global landscape transformations, the tiger is no longer an **arithmetic** of any one single government department. Rather, a multi-sectoral approach operating at a macro-tiger landscape level is warranted to address protected areas, general forests, rural interface areas and **urban-scapes**. This entails envisioning a landscape approach for engaging with several stakeholders operating in a tiger landscape with varied land uses warranting tiger filters. Such an engagement requires, considerable investment both in tiger Protected Area and beyond, with an overarching masterplan and monitoring architecture identified within the governance system in vogue. No single agency or donor maybe in a position to sustain such an effort, but an enabling policy regime of a Tiger Range Country, legitimizing the approach can support creation of a regional trust fund for obtaining assured complementary support to sovereign funding in the long-run.

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## APPENDIX I: A List of Tiger Protected Areas in 13 Tiger Range Countries

Country	Name of the Tiger Protected Areas	Year of Establishment	Forest Type
<b>Bangladesh</b>	Sundarban Reserved Forest	1997	Tidal Mangrove
<b>Bhutan</b>	Bumdeling Wildlife Sanctuary	1994	Broadleaf and Alpine meadows
<b>Bhutan</b>	Jigme Dorji National Park	1974	Broadleaf and Alpine meadows
<b>Bhutan</b>	Jigme Khesar Strict Nature Reserve	1993	Temperate Broadleaf
<b>Bhutan</b>	Jigme Singye Wangchuck National Park	1995	Subtropical Broadleaf
<b>Bhutan</b>	Jomotshangkha Wildlife Sanctuary	1974	Tropical
<b>Bhutan</b>	Phibsoo Wildlife Sanctuary	1993	Subtropical
<b>Bhutan</b>	Phrumsengla National Park	1998	Alpine, Subtropical Broadleaf
<b>Bhutan</b>	Royal Manas National Park	1966	Tropical Monsoon
<b>Bhutan</b>	Sakteng Wildlife Sanctuary	1993	Temperate Broadleaf, Alpine Meadows
<b>Bhutan</b>	Wangchuck Centennial Park	2008	Broadleaf, Mixed Coniferous
<b>Cambodia</b>	Bokor National Park	1993	Lowland Evergreen Rainforest
<b>Cambodia</b>	Botum Sokor National Park	1993	Evergreen Rainforest
<b>Cambodia</b>	Central Cardamom Mountains National Park	1999	Lowland Evergreen
<b>Cambodia</b>	Phnom Aural Wildlife Sanctuary	1993	Semi-evergreen
<b>Cambodia</b>	Phnom Samkos Wildlife Sanctuary	1993	Lowland Evergreen Rainforest
<b>Cambodia</b>	Southern Cardamom National Park	2016	Tropical Rainforest
<b>China</b>	Changbaishan Mountain National Nature Reserve	1960	Temperate, Sub-polar Broad-leaf
<b>China</b>	Huangnihe National Nature Reserve	2012	Broadleaf Mixed
<b>China</b>	Huanglianshan National Nature Reserve	2003	Broadleaf Evergreen
<b>China</b>	Hunchun National Nature Reserve	2001	Broadleaf Mixed
<b>China</b>	Muling Japanese Yew National Nature Reserve	2009	Temperate Mixed Coniferous
<b>China</b>	Suiyang Laoyeling National Nature Reserve	2014	Broadleaf Mixed
<b>China</b>	Wangqing National Nature Reserve	2013	Coniferous, Broadleaf Mixed
<b>China</b>	Xishuangbanna National Nature Reserve	1986	Tropical Broadleaf
<b>India</b>	Achanakmar Tiger Reserve	2009	Tropical Moist
<b>India</b>	Amrabad Tiger Reserve	2014	Deciduous
<b>India</b>	Anamalai Tiger Reserve	2007	Shola Grasslands, Tropical Evergreen
<b>India</b>	Bandhavgarh Tiger Reserve	2007	Moist Deciduous
<b>India</b>	Bandipur Tiger Reserve	2007	Tropical Deciduous
<b>India</b>	Bhadra Tiger Reserve	2007	Moist Deciduous
<b>India</b>	Biligiri Ranganatha Temple Tiger Reserve	2011	Tropical Broadleaf
<b>India</b>	Bor Tiger Reserve	2014	Dry Deciduous
<b>India</b>	Buxa Tiger Reserve	2009	Moist Tropical
<b>India</b>	Corbett Tiger Reserve	2010	Moist Deciduous
<b>India</b>	Dampa Tiger Reserve	2007	Tropical Wet Evergreen
<b>India</b>	Dudhwa Tiger Reserve	2007	Tropical Semi-evergreen
<b>India</b>	Indravati Tiger Reserve	2009	Moist Deciduous

<b>India</b>	Kalakad Mundanthurai Tiger Reserve	2007	Tropical Wet Evergreen, Dry Mixed Deciduous
<b>India</b>	Kali Tiger Reserve	2007	Mixed Deciduous
<b>India</b>	Kamlang Tiger Reserve	2015	Subtropical Evergreen
<b>India</b>	Kanha Tiger Reserve	2007	Mixed Deciduous
<b>India</b>	Kawal Tiger Reserve	2012	Tropical Deciduous
<b>India</b>	Kaziranga Tiger Reserve	2007	Tropical Moist Broadleaf
<b>India</b>	Manas Tiger Reserve	2008	Moist Mixed Deciduous
<b>India</b>	Melghat Tiger Reserve	2007	
<b>India</b>	Mudumalai Tiger Reserve	2007	Dry Deciduous
<b>India</b>	Mukundara Hills Tiger Reserve	2013	Mixed Deciduous
<b>India</b>	Nagarahole Tiger Reserve	2007	Mixed Deciduous
<b>India</b>	Nagarjunsagar Srisailem Tiger Reserve	2007	Mixed Deciduous
<b>India</b>	Namdapha Tiger Reserve	2021	Lowland Tropical Rainforest
<b>India</b>	Nameri Tiger Reserve	2000	Tropical Evergreen, Semi-evergreen, Moist Deciduous
<b>India</b>	Nawegaon Nagzira Tiger Reserve	2013	Dry Deciduous
<b>India</b>	Orang Tiger Reserve	2016	Moist Deciduous
<b>India</b>	Pakke Tiger Reserve	2012	Tropical Semi-evergreen
<b>India</b>	Palamau Tiger Reserve	2012	Tropical Dry Deciduous Sal
<b>India</b>	Panna Tiger Reserve	2007	Tropical Deciduous
<b>India</b>	Parabikulam Tiger Reserve	2011	Tropical Evergreen, Moist Deciduous, Dry Deciduous
<b>India</b>	Pench Tiger Reserve (MP)	2007	Dry Deciduous
<b>India</b>	Pench Tiger Reserve (MH)	2007	Dry Deciduous
<b>India</b>	Periyar Tiger Reserve	2008	Tropical Evergreen
<b>India</b>	Pilibhit Tiger Reserve	2004	Moist Deciduous
<b>India</b>	Rajaji Tiger Reserve	2015	Moist Deciduous
<b>India</b>	Ramgarh Vishdharri Tiger Reserve	2021	Mixed Deciduous
<b>India</b>	Ranthambore Tiger Reserve	2007	Dry Deciduous
<b>India</b>	Sahyadri Tiger Reserve	2012	Moist Deciduous
<b>India</b>	Sanjay-Dubri Tiger Reserve	2011	Evergreen Sal
<b>India</b>	Sariska Tiger Reserve	2007	Dry Deciduous
<b>India</b>	Sathyamangalam Tiger Reserve	2013	Mixed Deciduous
<b>India</b>	Satkoshia Tiger Reserve	2007	Moist Deciduous
<b>India</b>	Satpura Tiger Reserve	2007	Mixed Deciduous
<b>India</b>	Similipal Tiger Reserve	2011	Mixed Deciduous
<b>India</b>	Srivilliputhur Megamalai Tiger Reserve	2021	Dense Evergreen
<b>India</b>	Sunderban Tiger Reserve	2007	Mangrove
<b>India</b>	Tadoba Andhari Tiger Reserve	2007	Tropical Dry Deciduous
<b>India</b>	Udanti Sitanadi Tiger Reserve	2003	Mixed Deciduous
<b>India</b>	Valmiki Tiger Reserve	2012	Semi-Evergreen
<b>Indonesia</b>	Batang Gadis National Park	2004	Montane Rainforest
<b>Indonesia</b>	Gunung Leuser National Park	1981	Montane Rainforest
<b>Indonesia</b>	Kerinci Seblat National Park	1999	Tropical Rainforest
<b>Indonesia</b>	Sembilang National Park	2011	Mangrove, Peat Swamp Forest



<b>Indonesia</b>	South Bukit Barisan National Park	1982	Lowland Rainforest
<b>Indonesia</b>	Tesso Nilo National Park	2004	Lowland Rainforest
<b>Indonesia</b>	Way Kambas National Park	1989	Lowland Swamp
<b>Lao PDR</b>	Nam Et Phou Louey National Protected Area	2011	Dry Evergreen
<b>Malaysia</b>	Royal Belum State Park	2007	Tropical Rainforest
<b>Malaysia</b>	Endau Rompin (Johor and Pahang) National Park	1993	Tropical Rainforest
<b>Malaysia</b>	Taman Negara National Park	1939	Lowland Tropical
<b>Myanmar</b>	Bumhpabum Wildlife Sanctuary	2004	Tropical Evergreen
<b>Myanmar</b>	Htamanthi Wildlife Sanctuary	1974	Tropical Evergreen
<b>Myanmar</b>	Hukaung Valley Wildlife Sanctuary	2001	Broadleaf Evergreen
<b>Myanmar</b>	Lenya National Park	2002	Lowland Tropical
<b>Myanmar</b>	Tanintharyi nature reserve	2005	Evergreen Tropical Rainforest
<b>Nepal</b>	Banke National Park	2010	Subtropical Deciduous
<b>Nepal</b>	Bardiya National Park	1988	Riverine Forest
<b>Nepal</b>	Chitwan National Park	1973	Moist Deciduous
<b>Nepal</b>	Parsa National Park	1984	Subtropical
<b>Nepal</b>	Shukla Phanta National Park	1976	Sal Forest
<b>Russia</b>	Anyuisky National Park	2007	Taiga Forest
<b>Russia</b>	Bolshekhkhtsirsky Nature Reserve	1963	Mixed Deciduous
<b>Russia</b>	Botchinsky Nature Reserve	1994	Temperate Broadleaf
<b>Russia</b>	Kedrovaya Pad Nature Reserve	1963	Cedar Broadleaf
<b>Russia</b>	Komsomolsky Nature Reserve	1963	Manchurian Mixed
<b>Russia</b>	Lazovsky Nature Reserve	1957	Temperate Broadleaf
<b>Russia</b>	Sikhote-Alinsky Nature Reserve	1935	Manchurian Mixed
<b>Russia</b>	Udegeyskaya Legenda National Park	2007	Temperate Broadleaf
<b>Russia</b>	Ussurisky Nature Reserve	1932	Coniferous Deciduous
<b>Russia</b>	Zov Tigra National Park	2007	Temperate Broadleaf
<b>Thailand</b>	Bang Lang National Park	1999	Evergreen
<b>Thailand</b>	Dong Yai Wildlife Sanctuary	1996	Dry Evergreen
<b>Thailand</b>	Erawan National Park	1975	Mixed Deciduous
<b>Thailand</b>	Hala Bala Wildlife Sanctuary	1996	Tropical Rainforest
<b>Thailand</b>	Huai Kha Khaeng Wildlife Sanctuary	1972	Dry Tropical
<b>Thailand</b>	Kaeng Krachan National Park	1981	Dry Evergreen, Semi-evergreen
<b>Thailand</b>	Khao Luang National Park	1974	Moist Evergreen
<b>Thailand</b>	Khao Yai National Park	1962	Moist Deciduous
<b>Thailand</b>	Khlong Lan National Park	1982	Mixed Deciduous
<b>Thailand</b>	Khuean Srinagarindra National Park	1981	Montane Evergreen
<b>Thailand</b>	Kui Buri National Park	1999	Moist Evergreen, Dry Evergreen
<b>Thailand</b>	Mae Wong National Park	1987	Montane Rainforest
<b>Thailand</b>	Nam Nao National Park	1972	Montane Rainforest
<b>Thailand</b>	Pang Sida National Park	1982	Moist Evergreen
<b>Thailand</b>	Phu-Khiew Wildlife Sanctuary	1984	Montane Evergreen
<b>Thailand</b>	Salakpra Wildlife Sanctuary	1965	Tropical Deciduous
<b>Thailand</b>	Sai Yok National Park	1980	Mixed Deciduous, Dry Evergreen
<b>Thailand</b>	Ta Phraya National Park	1996	Mixed Deciduous, Dry Evergreen

<b>Thailand</b>	Thap Lan National Park	1981	Tropical, Subtropical Dry Broadleaf
<b>Thailand</b>	Thung Yai Naresuan Wildlife Sanctuary	1974	Mixed Deciduous
<b>Thailand</b>	Umpang Wildlife Sanctuary	1964	Tropical Rainforest
<b>Vietnam</b>	Chu Mom Ray National Park	2002	Tropical Semi-evergreen
<b>Vietnam</b>	Pu Mat National Park	2001	Lowland Evergreen
<b>Vietnam</b>	Sop Cop Nature Reserve	1986	Evergreen
<b>Vietnam</b>	Song Thanh Nature Reserve	2000	Broadleaf Evergreen
<b>Vietnam</b>	Vu Quang National Park	2002	Lowland Evergreen, Hill Forest, Montane Forest
<b>Vietnam</b>	Xuan Lien Nature Reserve	2013	Montane Evergreen
<b>Vietnam</b>	Yok Don National Park	1992	Dry Deciduous

Adapted from Global Tiger Protected Area Compendium, 2021

Source: <https://globaltigerforum.org/wp-content/uploads/2021/07/Global-Tiger-Protected-Area-Compendium.pdf>

#### A List of Tiger Protected Areas Included in the Assessment for Financial Resource Mobilization

Year of Establishment	Tiger Range Country	Name of Tiger Protected Area	Core Protected Area (in sq. km)	Buffer Zone/Eco-Sensitive Zone (in sq. km)	Total Tiger Protected Area (in sq. km)
1875	Bangladesh	Sundarban Reserved Forest	6017	0	6017
1994	Bhutan	Bumdeling Wildlife Sanctuary	1534.21	0	1534.21
1974	Bhutan	Jigme Dorji National Park	4374.06	511.24	4885.3
1993	Bhutan	Jigme Khesar Strict Nature Reserve	784.225	600.63	1384.855
1995	Bhutan	Jigme Singye Wangchuck National Park	1730	654	2384
1974	Bhutan	Jomotshangkha Wildlife Sanctuary	362.58	0	362.58
1993	Bhutan	Phibsoo Wildlife Sanctuary	269	37.7	306.7
1998	Bhutan	Phrumsengla National Park	354.47	552.18	906.65
1966	Bhutan	Royal Manas National Park	1057	103	1160
1993	Bhutan	Sakteng Wildlife Sanctuary	742.46	206.374	948.834
2008	Bhutan	Wangchuck Centennial Park	4919	0	4919
1993	Cambodia	Phnom Prich WS	1243.3	981.7	2225
2016	Cambodia	Southern Cardamom National Park / Tatai Wildlife Sanctuary	4970	0	4970
2002	Cambodia	Srepok Wildlife Sanctuary	2632.62	1097.09	3729.71
2017	China	The Northeast China Tiger and Leopard National Park	14600	0	14600
2012	China	Huangnihe National Nature Reserve	585.33	0	585.33
2014	China	Taipinggou National Nature Reserve	221.99	0	221.99
2009	India	Achanakmar Tiger Reserve	626	287.8	913.8
2014	India	Amrabad Tiger Reserve	1435	445	1880
2007	India	Anamalai Tiger Reserve	600	521	1121

1994	India	Bhadra Tiger Reserve	492.5	571.8	1064.3
2014	India	Bor Tiger Reserve	138.1	678.1	816.2
1973	India	Corbett Tiger Reserve	822	466.3	1288.3
1987	India	Dudhwa Tiger Reserve	1093.8	1108	2201.8
1982	India	Indravati Tiger Reserve	1258.4	0	1258.4
2016	India	Kamlang Tiger Reserve	80	87	167
1973	India	Kanha Tiger Reserve	917.4	1134.3	2051.7
2012	India	Kawal Tiger Reserve	892.2	123.1	1015.4
2008	India	Kaziranga Tiger Reserve	625.6	573.9	1199.4
1973	India	Manas Tiger Reserve	526.2	2310.9	2837.1
2008	India	Mudumalai Tiger Reserve	321	450.1	771.1
2013	India	Mukundra Hills Tiger Reserve	82	342.8	424.8
2007	India	Nagarahole Tiger Reserve	643.4	200.6	843.9
1982	India	Namdapha Tiger Reserve	1985	245	2230
1999	India	Nameri Tiger Reserve	200	144	344
2016	India	Orang Tiger Reserve	79.3	413.2	492.5
1999	India	Pakke Tiger Reserve	862	515	1377
2008	India	Parambikulam Tiger Reserve	390.9	252.8	643.7
1998	India	Pench Tiger Reserve, Maharashtra	439	205.3	644.3
2014	India	Pilibhit Tiger Reserve	602.8	127.5	730.2
2008	India	Sanjay-Dubri Tiger Reserve	1674.5	861.9	2536.4
1978	India	Sariska Tiger Reserve	881.1	332.2	1213.4
1999	India	Satpura Tiger Reserve	1339.3	794	2133.3
1973	India	Similipal Tiger Reserve	850	1555.8	2405.8
1973	India	Sundarban Tiger Reserve	1699.6	885.3	2584.9
1992	India	Tadoba-Andhari Tiger Reserve	625.24	1101.771	1727.011
2008	India	Udanti Sitanadi Tiger Reserve	900	900	1800
1993	Lao PDR	Nam Et Phou Louey National Park	3000	2000	5000
1993	Malaysia	Endau Rompin National Park	489	0	489
2007	Malaysia	Royal Belum National Park	1175	0	1175
1939	Malaysia	Taman Negara National Park	4343	0	4343
1974	Myanmar	Htamanthi Wildlife Sanctuary (HMT)	6,708.00	0	6,708.00
2004	Myanmar	Hukaung Valley Wildlife Sanctuary	1,363.43	323.5543	1,686.99
2005	Myanmar	Tanintharyi Nature Reserve	2151	32.085	2183.085
2010	Nepal	Banke National Park	550	343	893
1988	Nepal	Bardiya National Park	968	507	1475
1973	Nepal	Chitwan National Park	952.63	729	1681.63
1984	Nepal	Parsa National Park	627.39	285	912.39
1976	Nepal	Shukla Phanta National Park	305	243.5	548.5
2007	Russia	Anyuisky National Park	4293.7	0	4293.7
1997	Russia	Bastak	1270	153	1423
2015	Russia	Bikin National Park	11604.69	1295.09	12899.78
1963	Russia	Bolshekhkheksirsky Nature Reserve	454.39	120	574.39
1994	Russia	Botchinsky Nature Reserve	2673.8	810	3483.8
1963	Russia	Kedrovaya Pad Nature Reserve*	179	0	179
1963	Russia	Khingansky Nature Reserve	970	270	1240

<b>2012</b>	Russia	Land of the Leopard National Park*	2799	820	3619
<b>1957</b>	Russia	Lazovsky Nature Reserve	1209.89	0	1209.89
<b>1935</b>	Russia	Sikhote-Alinsky Nature Reserve	4014	652	4666
<b>2007</b>	Russia	Udegeyskaya Legenda National Park	1037	0	1037
<b>1932</b>	Russia	Ussurisky Nature Reserve*	404.32	578	982.32
<b>2007</b>	Russia	Zov Tigra National Park	821.52	0	821.52
<b>2002</b>	Vietnam	Chu Mom Ray National Park	562.4923	889.2562	1451.7485
<b>2000</b>	Vietnam	Song Thanh Protected Area	766.6968	0	766.69
<b>2018</b>	Vietnam	Sop Cop Protected Area	49.18	51.98	101.16
<b>2002</b>	Vietnam	Vu Quang National Park	570.33	231.745	802.075
<b>2000</b>	Vietnam	Xuang Lien Protected Area	2472.806	663.3597	3136.1657
<b>1992</b>	Vietnam	Yok Don National Park	1155.45	175.7652	1331.2152

## APPENDIX II: Wildlife and Conservation Legislations in Tiger Range Countries

COUNTRY	ACT NAME	SALIENT FEATURES
Bangladesh	Bangladesh Wildlife (preservation) (amendment) Act, 1974, and Conservation and Security Act, 2012 and Bangladesh Wildlife Order 1973	Under this act the tiger and the spotted deer are defined as ‘protected animals’ in Schedule III of the Order 1973. The Order was refined and enacted as Act in 1974. In 2012, the new Act replaced the previous one and retained tiger and spotted deer as protected species. The Act provides for, and also increased imprisonment and fine for killing tigers. Hunting or killing of wild animals for illegal purposes shall lead to one year which can be extended to two years of imprisonment and 1000 taka to 2000 taka as penalty for the committed crime.
	Forest Act, 1927 (Amended in 2000)	This Act makes provision for reserved forests; it prohibits the carrying of guns, grazing of cattle, felling of any tree, removal of any forest produce, and setting fire to and clearing of land for cultivation or any other purpose. Violation of rules such as killing, hunting, illegal trade of forest produce shall lead to the imprisonment of 6 months and penalty of 5000 taka.
	The Bangladesh Environment Conservation Act, 1995	This act deals with cases of environmental degradation. In 1999 under the 1995 Act, Bangladesh declared the 10 km of land adjoining the Sundarbans as an Ecologically Critical Area (ECA). The ECA rules prohibit a number of activities from damaging natural trees, animals and fish, and to establishing factories that pollute soil, water and air. Any acts against the rules shall be sentenced to 3 years of imprisonment with 3 lac taka and this penalty can be molded on the basis of intensity of the crime.
Bhutan	Forest and Nature Conservation Act of Bhutan, 1995	The act replaces the Bhutan Forest Act of 1969. The new act aims for the protection and sustainable use of forest, wildlife and related natural resources. Violation of rules under this act shall be an offence punishable with imprisonment which may extend up to 5 months or a fine which may extend to an amount prescribed in the respective Rules.
Cambodia	Cambodia Wildlife Protection Act, 2007 and Forestry Laws, 2002	The act prohibits hunting, killing and trading of Tigers Amendment of this law specifies a punishment of up to five years imprisonment and a fine of 100 million Riel for illegal trade of wildlife species.
China	Law of the People’s Republic of China on the Protection of Wildlife	The main of this law is protecting and saving the species of wildlife, developing and rationally utilizing wildlife resources and maintaining ecological balances. This law provides protection to species which are near to extinction. Punishments for violation of the law are specified under article 31 to article 39. Illegal acts such as trading, hunting, killing etc shall lead to the punishments mentioned in these articles.
India	Wildlife Protection Act, 1972	Provide for the protection of wild animals, birds and plants and form matters connected therewith or ancillary or incidental

		thereto. Section 51 prescribes the punishment for the violation of law. Enforcement can be performed by agencies such as the Forest Department, the Wildlife Crime Control Bureau, the Customs and the Central Bureau of Investigation. Chargesheets can be filed directly by the Forest Department. Other enforcement agencies, often due to the lack of technical expertise, hand over cases to the Forest Department.
<b>Indonesia</b>	Conservation of living Resources and their Ecosystem Ministry, 1990	Conservation of Living resources and their ecosystems and use them sustainably. Article 40 gives the specifications about the punishments that shall be given on criminal acts. On committing the crime related to wildlife criminals shall be sentenced to imprisonment and shall be entitled penalties with specified amount.
<b>Lao PDR</b>	Wildlife and Aquatic Law, 2007	The law determines principles, regulations and measures on wildlife and aquatic life in nature to promote their sustainable regeneration and utilization.
<b>Malaysia</b>	Wildlife Conservation Act, 2010	The law provides for the protection and conservation of wildlife species and for matters connected therewith. Amendment of the law added 43 additional penalties and carries the fine of RM500,000 which was RM15,000 in 2010.
<b>Myanmar</b>	The Protection of Wildlife and Conservation of Natural Areas Law, (1994)	The law aims for the protection of wildlife, Conservation of natural areas and establishment of zoological gardens and botanical gardens. It also helps to implement wildlife and natural area conservation policies. Violating the hunting licence and polluting the habitat shall lead to 3 years of imprisonment and 10,000 kyats penalty. At the same time killing of species, extracting resources shall lead to years of imprisonment with 30,000 kyats of penalty.
<b>Nepal</b>	National Parks and Wildlife Conservation Act, 1973	Management of national Parks, conservation of wildlife and their habitat. The law provides the legal framework for hunting inside the national parks. Person who hunts or kills wildlife species shall be sentenced to imprisonment ranging from month to two years and fine up to 10,000 Nepali Rupees.
<b>Russia</b>	Federal Law of the Russian Federation on Wildlife (NO. 52-FZ OF 1995)	Wildlife is considered as national property of people Russian federation under this Federal Law. The law makes it mandatory for the people to protect natural habitat, environment and biodiversity of the land.
<b>Thailand</b>	Wildlife Animal Reservation and Protection Act, B.E. 2535 (1992)	Protection and reservation of wild animals and management of zoos. Protection of wild animals are prescribed under ministerial regulations with the approval committee. Section 47 to 60 of this law gives the specifications about the penalties that shall be entitled for different crimes committed related to wildlife.
<b>Vietnam</b>	Law on Forest Protection and Development	This Law provides framework for protection and development of the forest. It also specifies the obligations and rights of the forest owners. Violation of rules and involvement in illegal activities

(passed in 1991 and 2004)	such as hunting, killing shall be punished and handled for penal liability according to law provisions.
Law on Biodiversity, 2008	The law emphasizes on biodiversity conservation and sustainable development. Under article 75 compensation for damage to biodiversity are specified. Penalties should be paid to state under rules of law.
Law on Forestry, 2017	This Law deals with management, protection, development and use of forests; forest products processing and trade. Those convicted of breaking this law protecting endangered species now face up to 15 years in prison and fines up to VNĐ2 billion for an individual violator and VNĐ15 billion for a legal entity.

### Common Boundary Between Tiger Range Countries and Native Tiger Sub-Species

<b>Tiger Range Country</b>	<b>Common Boundary</b>	<b>Tiger Sub-Species</b>
<b>Bangladesh</b>	India , Myanmar	Bengal tiger ( <i>Panthera tigris tigris</i> )
<b>Bhutan</b>	China, India	Bengal tiger ( <i>Panthera tigris tigris</i> )
<b>Cambodia</b>	Lao PDR, Thailand, Vietnam	Indochinese tiger ( <i>Panthera tigris corbetti</i> )
<b>China</b>	Bhutan, India, Lao PDR, Myanmar, Nepal, Russia, Vietnam	Amur tiger ( <i>Panthera tigris altaica</i> ), Bengal tiger ( <i>Panthera tigris tigris</i> ), Indochinese tiger ( <i>Panthera tigris corbetti</i> )
<b>India</b>	Bangladesh, Bhutan, China, Myanmar, Nepal	Bengal tiger ( <i>Panthera tigris tigris</i> )
<b>Indonesia</b>	None	Sumatran tiger ( <i>Panthera tigris sumatrae</i> )
<b>Lao PDR</b>	Cambodia, China, Myanmar, Thailand, Vietnam	Indochinese tiger ( <i>Panthera tigris corbetti</i> )
<b>Malaysia</b>	Thailand, Vietnam	Malayan tiger ( <i>Panthera tigris jacksoni</i> )
<b>Myanmar</b>	Bangladesh, China, India, Lao PDR, Thailand	Indochinese tiger ( <i>Panthera tigris corbetti</i> )
<b>Nepal</b>	China, India	Bengal tiger ( <i>Panthera tigris tigris</i> )
<b>Russia</b>	China	Amur tiger ( <i>Panthera tigris altaica</i> )
<b>Thailand</b>	Cambodia, Lao PDR, Malaysia, Myanmar	Indochinese tiger ( <i>Panthera tigris corbetti</i> ), Malayan tiger ( <i>Panthera tigris jacksoni</i> )
<b>Vietnam</b>	Cambodia, China, Laos PDR, Thailand	Indochinese tiger ( <i>Panthera tigris corbetti</i> )

### APPENDIX III: Questionnaires used for Data Collection

a) Detailed Version:

ACTIVITY BASED Global Tiger Recovery Programme DATA COLLATION FOR RESOURCE MOBILIZATION TOWARDS TIGER RANGE COUNTRIES (Tiger Protected Area-Specific Data)

Questions	Responses
Email	Open
Name of the Tiger range country	Bangladesh/Bhutan/Cambodia/China/India/Indonesia/Lao PDR/Malaysia/Myanmar/Nepal/Russia/Thailand/Vietnam
Name of the Tiger protected area	Open
GPS location in Longitude and Latitude of the Tiger protected area	Open
Name and designation of the responding officer	Open
Tiger population and Habitat status	
Latest estimated total Tiger population	Open
2019: General status of PREDATOR (tigers) prey population in the protected area based on perception of tiger protected area manager	Low/Medium/High
a) Tiger population status (in the core tiger habitat)	
b) Prey-population status (in the core tiger habitat)	
c) Tiger population status (in Buffer-zones)	
d) Prey-population status (in Buffer zones)	
2020: General status of PREDATOR (tigers) prey population in the protected area based on perception of tiger protected area manager	Low/Medium/High
a) Tiger population status (in the core tiger habitat)	
b) Prey-population status (in the core tiger habitat)	
c) Tiger population status (in Buffer-zones)	
d) Prey-population status (in Buffer zones)	
2020: TIGER HABITAT STATUS based on perception of tiger protected area manager	Disturbed/Undisturbed
a) Core (Critical Tiger Habitat)	
b) Buffer zone	
Siting/Indirect Evidence/ frequency of TIGER CUBS at the site-specific level	Low/Medium/High



a) In the Core Tiger Habitat (2019)	
b) In the Core Tiger Habitat (2020)	
c) In Buffer Zone (2019)	
d) In Buffer Zone (2020)	
Estimated total area of CORE Tiger Habitat (Critical Tiger Habitat) occupied by Tigers as of December 2020	Open
Estimated FOREST COVER/CANOPY COVER of the protected areas as of December 2020	Open
Approximate PLANTATION area within 10kms radius of the Tiger protected areas as of December 2020	Open
Estimated area as BUFFER ZONE around the protected areas as of December 2020	Open
Total area extent of GRASSLAND /MEADOWS maintained/restored through weed eradication as of December 2020	Open
2019: Total area of protected area affected by NATURAL DISASTERS (e.g.: floods, fires, cyclones)	Open
Tiger Monitoring	
2019: Total number of CAMERA-TRAPS deployed to monitor the tigers	Open
2020: Total number of CAMERA-TRAPS deployed to monitor the tigers	Open
2019: Total COSTS of CAMERA-TRAPS used to undertake the Tiger population census in the protected area	Open
2020: Total COSTS of CAMERA-TRAPS used to undertake the Tiger population census in the protected area	Open
AERIAL-SURVEILLANCE in 2019-2020: Total expenditure on aerial surveillance devices like Drone, Quadcopters, Unmanned- aerial vehicles (UAV)	Open
INDIRECT EVIDENCE recorded in 2019: Traditional protocol-based evidence (including sign survey, Pug mark, Scat, Scrap and Rake marks)	Open
INDIRECT EVIDENCE recorded in 2020: Traditional protocol-based evidence (including sign survey, Pug mark, Scat, Scrap and Rake marks)	Open
2019: Total number RADIO-COLLARS for Tiger monitoring	Open
2020: Total number RADIO-COLLARS for Tiger monitoring	Open
Average cost of RADIO COLLAR per unit	Open
WILDLIFE CRIME RECORDS, PROSECUTION AND CONVICTIONS	
2019: Total recorded Wildlife crimes relating to POACHING AND SEIZURES at Interdiction site	Open

2020: Total recorded Wildlife crimes relating to POACHING AND SEIZURES at Interdiction site	Open
2019: Total number of recorded SNARES, TRAPS and other poaching tools seized by the legal authority	Open
2020: Total number of recorded SNARES, TRAPS and other poaching tools seized by the legal authority	Open
2019: Total number of WILDLIFE CRIMES damaging TIGER HABITAT (Including tree-felling, trespassing, illicit fishing, collection of NTFP, mining and quarrying)	Open
2020: Total number of WILDLIFE CRIMES damaging TIGER HABITAT (Including tree-felling, trespassing, illicit fishing, collection of NTFP, mining and quarrying)	Open
2019: Total number of recorded incidences of MAN-MADE FOREST FIRES as recorded by the FOREST DEPARTMENT	Open
2020: Total number of recorded incidences of MAN-MADE FOREST FIRES as recorded by the FOREST DEPARTMENT	Open
2019: Total Number of wildlife crimes relating to ONLY wildlife poaching and trade PROSECUTED by courts at National or Sub-National levels	Open
2020: Total Number of wildlife crimes relating to ONLY wildlife poaching and trade PROSECUTED by courts at National or Sub-National levels	Open
2019: Total Number of wildlife crimes relating to ONLY wildlife poaching and trade CONVICTED by courts at National or Sub-National levels	Open
2020: Total Number of wildlife crimes relating to ONLY wildlife poaching and trade CONVICTED by courts at National or Sub-National levels	Open
2019: Total Number of LEGAL WILDLIFE CRIME CASES recorded as a result of CROSS-BORDER COLLABORATIVE at the interdiction site	Open
2020: Total Number of LEGAL WILDLIFE CRIME CASES recorded as a result of CROSS-BORDER COLLABORATIVE at the interdiction site	Open
2019: Total number of recorded TIGER CASES emerging from CROSS-BORDER COLLABORATIONS leading to punishment/convictions	Open
2020: Total number of recorded TIGER CASES emerging from CROSS-BORDER COLLABORATIONS leading to punishment/convictions	Open
Human-Wildlife Interface Management: Inclusive Agendas with Communities	
2019: Total number of RECORDED incidents of CROP DAMAGE (Human-wildlife conflict) by the Tiger Protected Area Authority	Open

2020: Total number of RECORDED incidents of CROP DAMAGE (Human-wildlife conflict) by the Tiger Protected Area Authority	Open
2019: Total number of RECORDED incidents of LIVESTOCK DEPRADATION (Human-wildlife conflict) by the Tiger Protected Area Authority	Open
2020: Total number of RECORDED incidents of LIVESTOCK DEPREDATION (Human-wildlife conflict) by the Tiger Protected Area Authority	Open
2019: Total number of RECORDED incidents of HUMAN DEATH/INJURY (Human-wildlife conflict) by the Tiger Protected Area Authority	Open
2020: Total number of RECORDED incidents of HUMAN DEATH/INJURY (Human-wildlife conflict) by the Tiger Protected Area Authority	Open
2019: Total number of incidents of CROP DAMAGE (Human-Wildlife Conflict) cases for which LOSSES ARE COMPENSATED	Open
2020: Total number of incidents of CROP DAMAGE (Human-Wildlife Conflict) cases for which LOSSES ARE COMPENSATED	Open
2019: Total number of incidents of LIVESTOCK DEPREDATION (Human-Wildlife Conflict) cases for which LOSSES ARE COMPENSATED	Open
2020: Total number of incidents of LIVESTOCK DEPREDATION (Human-Wildlife Conflict) cases for which LOSSES ARE COMPENSATED	Open
2019: Total number of incidents of HUMAN DEATH/INJURY (Human-Wildlife Conflict) cases for which LOSSES ARE COMPENSATED	Open
2020: Total number of incidents of HUMAN DEATH/INJURY (Human-Wildlife Conflict) cases for which LOSSES ARE COMPENSATED	Open
2019: Total AMOUNT of compensation disbursed for CROP DAMAGE due to Human Wildlife conflict	Open
2020: Total AMOUNT of compensation disbursed for CROP DAMAGE due to Human Wildlife conflict	Open
2019: Total AMOUNT of compensation disbursed for LIVESTOCK DEPREDATION due to Human Wildlife conflict	Open
2020: Total AMOUNT of compensation disbursed for LIVESTOCK DEPREDATION due to Human Wildlife conflict	Open
2019: Total AMOUNT of compensation disbursed for HUMAN INJURY due to Human Wildlife conflict	Open
2020: Total AMOUNT of compensation disbursed for HUMAN INJURY due to Human Wildlife conflict	Open

2019: EX-GRATIA compensation for HUMAN DEATH due to Human Wildlife Conflict	Open
2020: EX-GRATIA compensation for HUMAN DEATH due to Human Wildlife Conflict	Open
2019: The extent of which GAINS/LIVELIHOOD for communities are planned and provided in the park-people interface area: Estimated total number of man-days/livelihood gains provided to local people in the park interface/peripheral area.	Open
2020: The extent of which GAINS/LIVELIHOOD for communities are planned and provided in the park-people interface area: Estimated total number of man-days/livelihood gains provided to local people in the park interface/peripheral area.	Open
2019: COST incurred for the provision of solar fencing, trenching etc. to mitigate Human Wildlife Conflict	Open
2020: COST incurred for the provision of solar fencing, trenching etc. to mitigate Human Wildlife Conflict	Open
2019: Total MONEY SPENT for LIVELIHOOD PROGRAMS by Forest Departments	Open
2020: Total MONEY SPENT for LIVELIHOOD PROGRAMS by Forest Departments	Open
2019: Total NUMBER of CATTLE VACCINATED in the Fringe Forest Areas of Tiger Protected Areas	Open
2020: Total NUMBER of CATTLE VACCINATED in the Fringe Forest Areas of Tiger Protected Areas	Open
2019: Total cost of COST OF CATTLE VACCINATION in the Fringe Forest Areas of Tiger Protected Areas	Open
2020: Total cost of COST OF CATTLE VACCINATION in the Fringe Forest Areas of Tiger Protected Areas	Open
2019: Total COST invested in preventing Canine Distemper or any contagious disease spill-overs in Fringe Forest of Tiger Protected Areas	Open
2020: Total COST invested in preventing Canine Distemper or any contagious disease spill-overs in Fringe Forest of Tiger Protected Areas	Open
2019: EXPENDITURE on Awareness Campaigns for Reducing HWC and more community Engagement + Emoluments paid for Conservation Stewards	Open
2020: EXPENDITURE on Awareness Campaigns for Reducing HWC and more community Engagement + Emoluments paid for Conservation Stewards	Open
Frontline Forest Staff and Enforcement Measures	

2019: Total NUMBER of Frontline Forest Staff employed in Tiger Protected Area	Open
2020: Total NUMBER of Frontline Forest Staff employed in Tiger Protected Area	Open
ANNUAL SALARY of Frontline Forest Staff	Open
2019: Total SALARY disbursed for all Frontline Forest Staff	Open
2020: Total SALARY disbursed for all Frontline Forest Staff	Open
2019: Total NUMBER of local/daily wagger workforce deployed	Open
2020: Total NUMBER of local/daily wagger workforce deployed	Open
Per-day wages of the local workforce/ daily wage laborer deployed in the Tiger Protected Areas	Open
Total NUMBER of Frontline Forest Staff affected by COVID between March 2020 to March 2021	Open
Total MEDICAL EXPENDITURE on health and vaccination of Frontline Forest Staff between March 2020 to March 2021	Open
2019: Types of Arms / Equipment available for the Frontline Forest Staff for effective protection of Tiger Protected Area	Arms/GPS Devices/ Fixed wireless Device/Wireless Walkie-Talkie/Sniffer Dogs/Bikes/Jeep or Four-wheel Drive Vehicles/Boats/Mini truck/Big-Cat Trap Cage
2020: Types of Arms / Equipment available for the Frontline Forest Staff for effective protection of Tiger Protected Area	Arms/GPS Devices/ Fixed wireless Device/Wireless Walkie-Talkie/Sniffer Dogs/Bikes/Jeep or Four-wheel Drive Vehicles/Boats/Mini truck/Big-Cat Trap Cage
Number of ARMS available for the Frontline Forest Staff: in 2019 and in 2020	Open
Number of GPS Devices available for the Frontline Forest Staff: In 2019 and in 2020	Open
Number of Fixed Wireless Device available for the Frontline Forest Staff in the entire Tiger Protected Area: In 2019 and in 2020	Open
Number of Wireless Walkie-Talkie available for the Frontline Forest Staff in the entire Tiger Protected Area: In 2019 and in 2020	Open
Number of Sniffer Dogs on Duty in the entire Tiger Protected Area: In 2019 and in 2020	Open
Number of Bikes available for Frontline Forest Staff on Patrolling Duty in the entire Tiger Protected Area: In 2019 and in 2020	Open

Number of JEEPS/ FOUR WHEEL DRIVES available for Frontline Forest Staff on Patrolling Duty in the entire Tiger Protected Area: In 2019 and in 2020	Open
Number of BOATS available for Frontline Forest Staff on Patrolling Duty in the entire Tiger Protected Area: In 2019 and in 2020	Open
Number of MINI TRUCKS available for Frontline Forest Staff in the entire Tiger Protected Area: In 2019 and in 2020	Open
Number of BIG-CAT TRAP CAGES available in the entire Tiger Protected Area: In 2019 and in 2020	Open
2019: Total NUMBER of Frontline Forest Staff who have received SKILL DEVELOPMENT support/ capacity building support	Open
2020: Total NUMBER of Frontline Forest Staff who have received SKILL DEVELOPMENT support/ capacity building support	Open
Total NUMBER of TRAINING and CAPACITY BUILDING WORKSHOPS held by the Forest Department or other Agencies for the Frontline Forest Staff: in 2019 and in 2020	Open
2019: Total EXPENDITURE on Skill Development and Capacity Building of Frontline Forest Staff	Open
2020: Total EXPENDITURE on Skill Development and Capacity Building of Frontline Forest Staff	Open
Total NUMBER of PROTECTION CAMPS (range office, chowki, anti-poaching camps) inside the Protected Area: in 2019 and in 2020	Open
AVERAGE COST of Building one PROTECTION CAMPS (range office, chowki, anti-poaching camps) inside the Protected Area	Open
Total NUMBER of Rapid Response Teams in the Tiger Protected Area: in 2019 and in 2020	Open
Total NUMBER of Manned-Check Post at Entry and Exit Points of Tiger Protected Areas: in 2019 and in 2020	Open
AVERAGE COST of building one Check-Post Infrastructure	Open
Total NUMBER of Fire Watch-Towers inside the Tiger Protected Area: in 2019 and in 2020	Open
AVERAGE COST of building one single Fire Watch-Tower Infrastructure	Open
Total NUMBER of Forest Hospital for the welfare of the Forest Department Staff: in 2019 and in 2020	Open
AVERAGE COST of building up a Forest Hospital	Open
Total NUMBER of Veterinary Units / Rescue Centers in the Tiger Protected Area	Open
AVERAGE COST of setting-up and other operational costs of Veterinary Units/ Rescue Centers in the Tiger Protected Area	Open

Tiger Conservation Funding and Sources	
What are the various funding opportunities available for each of the following activities	Sovereign Funding/Donor Funding/Non-Governmental Organizational (NGO) Funding and Others
a) Habitat Management: Predator and Prey Base	
b) Protection: Frontline Staff /Equipment	
c) Communities: Reallocations, Livelihood, EX-Gratia, Compensations	
Total Money received through GOVERNMENT BUDGET/SOVEREIGN FUNDS for Tiger Conservation: In 2019 and in 2020	Open
Total Money received through DONOR FUNDING for Tiger Conservation: In 2019 and in 2020	Open
Total Money received through NGO's and ANY OTHER SOURCES for Tiger Conservation: In 2019 and in 2020	Open
Total Funding Received for Tiger Habitat Management: In 2019 and in 2020	Open
Total Funding Received for Site Security, Protection, Capacity building and Equipping Frontline Forest Staff: In 2019 and In 2020	Open
Total Funding Received for Human-Wildlife Management and Inclusive Agendas (like for mitigation measures, relocations, compensations, alternative livelihood schemes etc.): In 2019 and In 2020	Open
Total Funding Received for Awareness Campaigns to sensitize local communities about conservation issues: In 2019 and in 2020	Open
Total Funding Received for Tiger Conservation related Research topics (e.g., tiger ecology, prey-predator population density, wildlife crimes etc.): In 2019 and in 2020	Open

b) Concise Version

Protected Area Information	Question Type
Country	Open
Name of the Tiger Protected Areas	Open
Year of Establishment	Open
Latitude	Open
Longitude	Open
Area of the Park (Core Area in Sq. km)	Open
Area of the Park (Buffer/Peripheral Area in Sq. km)	Open
Tiger Status	

Tiger Status (in Numbers) According to most recent census	<b>Open</b>
Tiger Cubs (Direct and Indirect Siting)	<b>Yes/No; Open</b>
<b>Prey Status</b>	
Prey Density in Core Habitat	<b>High/Medium/ Low</b>
Prey Density in Buffer or Peripheral Habitat	<b>High/Medium/ Low</b>
<b>Habitat Status</b>	
Core Tiger Habitat Status	<b>Disturbed/Undisturbed</b>
Peripheral/Buffer Status (Activities in Buffer areas)	<b>Mining/Plantations/Human Habitations/ Logging/Infrastructures</b>
<b>Monitoring and Enforcement</b>	
Total Number of Frontline Forest Staff	<b>Open</b>
Average Salary of Ranger Per year (in local currency)	<b>Open</b>
Number of Ranger Stations inside the Tiger Protected Area	<b>Open</b>
Number of Watch Towers inside the Tiger Protected Area	<b>Open</b>
Foot Patrolling (Average no. of kilometers or hours per week)	<b>Open</b>
Monitoring Equipment Available (Please give the number of available devices in brackets):	<b>Arms/GPS Devices/ Wireless Walkie-Talkie/ Fixed Wireless/Bikes/ Four Wheel Vehicles/Boats/ Cat Traps</b>
Snaring Cases Recorded from the Tiger Protected Area between 2019-2020	<b>Open</b>
Poaching Cases Recorded from the Tiger Protected Area Between 2019-2020	<b>Open</b>
Number of Wildlife Poaching Cases Prosecuted between 2019-2020	<b>Open</b>
Number of Wildlife Poaching/Seizures Cases Convicted between 2019-2020	<b>Open</b>
Transboundary Efforts	<b>Yes/No</b>
<b>Financial Funding Sources</b>	
Sovereign (Amount)	<b>Open</b>
List of Activities for which Sovereign Funding is given:	<b>Habitat Management/ Protection and Enforcement/Communities/Awareness /Research</b>



Donor (Amount)	<b>Open</b>
List of Activities for which Donor Funding is given	<b>Habitat Management/ Protection and Enforcement/Communities/Awareness /Research</b>
Other Sources (NGO's) (Amount)	<b>Open</b>
List of Activities for which Other Source Funding is given	<b>Habitat Management/ Protection and Enforcement/Communities/Awareness /Research</b>
<b>Community Engagement, Awareness and Human-Wildlife Mitigation</b>	
Number incidences of Crop-Damage due to Human-Wildlife Conflict between 2019-2020	<b>Open</b>
Amount Paid in Compensation for Crop-Damage between 2019-2020 (in local currency)	<b>Open</b>
Number of Incidences of Livestock Depredation due to Human-Wildlife Conflict between 2019-2020	<b>Open</b>
Amount Paid in Compensation for Livestock Depredation between 2019-2020 (in local currency)	<b>Open</b>
Number of Incidences of Human-Injury/Death Due to Human Wildlife Conflict between 2019-2020	<b>Open</b>
Amount Paid in Compensation Human Injury or Death between 2019-2020 (in local currency)	<b>Open</b>
Amount Spent on Community Awareness Programs in 2020 (in local currency)	<b>Open</b>
Amount Spent on Livelihood Schemes in 2020 (in local currency)	<b>Open</b>
<b>Major Threats to Tiger Protected Area (Give: Yes(Y) or No (N))</b>	
Hunting/Poaching/ Illegal Wildlife Trade	<b>Yes/No</b>
Logging/Tree Felling	<b>Yes/No</b>
Forest Fires (Man-Made)	<b>Yes/No</b>
Agriculture and Plantation Encroachment	<b>Yes/No</b>
Infrastructure Development	<b>Yes/No</b>
	<b>Yes/No</b>
Retaliatory Killing due to Human-Wildlife Interface	<b>Yes/No</b>
Mining	<b>Yes/No</b>
Pollution: Water, Air or Land	<b>Yes/No</b>

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## APPENDIX IV: Definitions of Terms Used in the Report

**Biological Diversity:** The variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (CBD definitions).

**Buffer Zone:** Areas between core protected areas and the surrounding landscape or seascape which protect the network from potentially damaging external influences and which are essentially transitional areas (Bennett and Mulongy, 2009). In the Indian context, a buffer zone has been defined legally as a part of a Tiger Protected Area/Tiger Reserve as per the Indian Wildlife (Protection) Act, 1972. Alternatively, in the context of other Tiger Range Countries a buffer zone or peripheral zone is assumed to be a three-kilometer area from the boundary of the tiger protected area.

**Core Zone/Critical Tiger Habitat:** an inviolate habitat for wildlife is referred to as core zone of critical tiger habitat in a Tiger Protected Area.

**Co-Financing (GEF Project):** As per the 2014 Co-Financing Policy, co-financing means 'resources that are additional to the GEF grant and that are provided by the GEF Partner Agency itself and/or by other non-GEF sources that support the implementation of the GEF-financed project and the achievement of its objectives.

**Ecosystem Services:** The benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious and other non-material benefits (Hassan et al., 2005).

**In-Situ Conservation:** The conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties (CBD definitions).

**Keystone Species:** is a concept introduced in 1969 by the zoologist Robert T. Paine. A keystone species is an organism that helps define an entire ecosystem. Without its keystone species, the ecosystem would be dramatically different or cease to exist altogether. Tiger is considered one of the keystone species and thus, immense emphasis is laid on the conservation of the species.

**Per Capita Gross Domestic Product:** GDP per capita acts as a metric for determining a country's economic output per each person living there. Often times, rich nations with smaller populations tend to have higher per capita GDP. The fact that the GDP per capita divides a country's economic output by its total population makes it a good measurement of a country's standard of living.

**Protected Area:** is “a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values”(IUCN, 2008).

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**Targeted Killing:** refers to killing of wild animals in the event of a negative human-wildlife interface. Such forms of human-wildlife interface could include crop depredation by prey animals, livestock depredation and human-death or injury by any other wild animal.

**Wildlife Corridor/Forested Linkages:** Way to maintain vital ecological or environmental connectivity by maintaining physical linkages between core areas (Bennett and Mulongoy, 2009).

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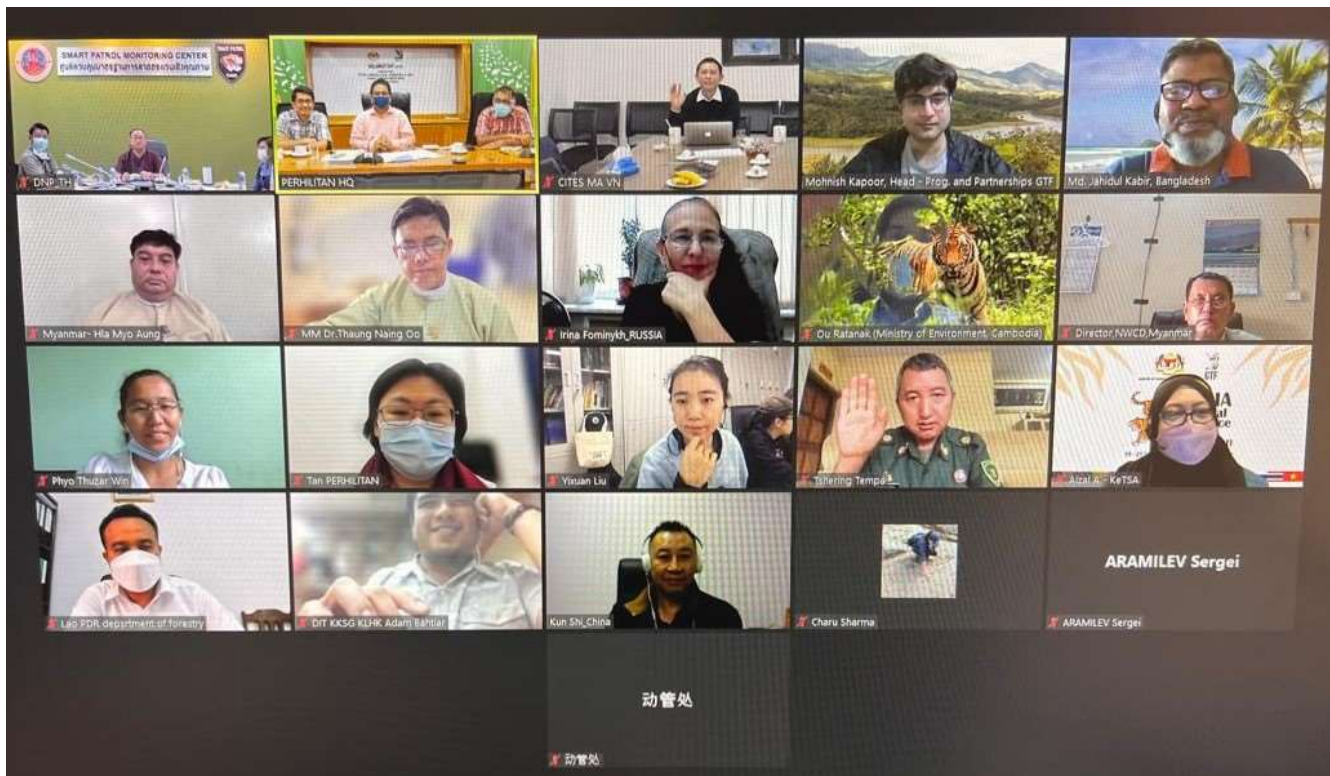
## APPENDIX V: Exchange Rates Reference Used in the Report

<b>Exchange Rates Used for Reference in the Report</b>	<b>1 USD in Local Currency Units (based on 2019 Exchange Rates)</b>
Bangladesh Taka	90.91
Bhutan Ngultrum	71.43
Cambodia Riel	4166.67
Chinese Yuan	6.44
Indian Rupee	73.53
Indonesian Rupiah	14245.01
Lao Kip	10000.00
Malaysia Ringgit	4.16
Myanmar kyat	1886.79
Nepali Rupee	112.36
Russian Ruble	72.99
Thai Bhat	33.33
Vietnamese dong	22763.49
Source WSJ: 15 Sept 2021: <a href="https://www.wsj.com/market-data/currencies">https://www.wsj.com/market-data/currencies</a>	

## APPENDIX VI: List of Consultations with Tiger Range Countries

<b>GTRP Consultations with TRCs</b>		
<b>Date</b>	<b>Event</b>	<b>List of Participants</b>
Wednesday, September 01, 2021	Consultation with Malaysia (STRAP and Financial Gap Analysis)	Hazril Rafhan Abdul Halim, Mohnish Kapoor, Shreya Sethi, Sivananthan Elagupillay
Friday, September 10, 2021	Consultations with Malaysia, Indonesia and Thailand (STRAP and Financial Gap Analysis)	Catrini Kubontubuh, Hazil Rafhan Abdul Halim, Mohnish Kapoor, Shreya Sethi, Sivananthan Elagupillay, Somphot Duangchantrasiri, Somying Thuhikorn
Saturday, September 18, 2021	Discussion with GTF Focal Point, Vietnam (STRAP and Financial Gap Analysis)	G.C Lam , Mohnish Kapoor, Shreya Sethi, Vuong Tien Manh
Monday, September 20, 2021	Meeting (in person) with Focal Point, Nepal (Financial Gap Analysis)	Arun Kumar, Chiranjibi Pokharel, Mohnish Kapoor, Naresh Subedi, Rajesh Gopal, Ridhima Solanki, Shreya Sethi
Thursday, September 23, 2021	Consultations with Thailand and Malaysia (STRAP and Financial Gap Analysis)	Hannah O'Kelly, Hazril Rafhan Abdul Halim, Shreya Sethi, Sivananthan Elagupillay, Somying Thunhikorn
Friday, September 24, 2021	Consultation with Malaysia and Indonesia (STRAP and Financial Gap Analysis)	Catrini Kubontubuh, Hannah O'Kelly, Hazril Rafhan Abdul Halim, Mohnish Kapoor, Shreya Sethi, Sivananthan Elagupillay
Thursday, September 30, 2021	Consultation with Malaysia and Vietnam (STRAP and Financial Gap Analysis)	Hannah O'Kelly, Hazril Rafhan Abdul Halim, Mohnish Kapoor, Shreya Sethi, Sivananthan Elagupillay, Vuong Tien Manh
Monday, October 04, 2021	Consultation with Malaysia and Cambodia (STRAP and Financial Gap Analysis)	Hannah O'Kelly, Hazril Rafhan Abdul Halim, Mohnish Kapoor, Shreya Sethi, Sivananthan Elagupillay, Thomas Gray, Usama Alifa
Monday, November 01, 2021	Consultation with Indonesia and Malaysia (STRAP and Financial Gap Analysis)	Adam Bahtiar, Hanah O'Kelly, Hazril Rafhan Abdul Halim, Mohnish Kapoor, Shreya Sethi, Sivananthan Elagupillay, Subdit Penerpan Kovensi, Usama Alifa
Tuesday, November 09, 2021	Consultation with Lao and Malaysia (STRAP and Financial Gap Analysis)	Akchousan Rasphone, Hanah O'Kelly, Hazril Rafhan Abdul Halim, Keophouong Chanthapanya, Mohnish Kapoor, Santi Saypanya, Shreya Sethi, Sivananthan Elagupillay, Somvang Phimmvong, Usama Alifa
Thursday, November 11, 2021	Consultations with SEA NGO's (STRAP and Financial Gap Analysis)	Christopher Wong, Dale Miquelle, Daniel Hot Aish Sianipar, Director Pelingdung Ala, E Lam, Hannah O'Kelly, Hazril Rafhab Abdul Halim, John Goodrich, Kae Kawanishi, Kanitha Krishnasamy, Khalid Pasha, Kristana Kaeplang, Lan Anh Nguyen, Mark Rayan, Mike Belecky, Mohammad Hafis, Nay Myo Shwe, Rajesh Gopal, Rungnapa Phoonjampa, Sivananthan Elagupillay, Song Horng Neo Liang, Stuart Chapman, Sugoto Roy, Suwanna Gauntlet, Thomas Gray, Tim Redford, Usama Alifa
Friday, December 10, 2021	Meeting with Dr. Kesaro, Cambodia mediated by DWNP, Malaysia (STRAP and Financial Gap Analysis)	Adam Bahtiar, Channa Phan, Hanah O'Kelly, HUN Serenithia, Mohd Taufik Abdul Rahman, OU Ratanak, Sivananthan Elagupillay, Vibol Neth
Thursday, December 23, 2021	Meeting with Indonesia Mediated by DWNP, Malaysia (STRAP and Financial Gap Analysis)	Adam Bahtiar, Fakhrul Hatta, Hanah O'Kelly, Hazril Rafhan Abdul Halim, Indra Exploitasia, Mohnish Kapoor, Shreya Sethi, Sivananthan Elagupillay
Tuesday, January 04, 2022	Meeting with Thailand Mediated by DWNP, Malaysia (STRAP and Financial Gap Analysis)	Hannah O'Kelly, Hazril Rafhan Abdul Halim, Mohnish Kapoor, Prasert Sornsathapornkul, Shreya Sethi, Sivananthan Elagupillay, Somphot Duangchantrasiri, Somying Thunhikorn, Usama Alifa

Thursday, January 06, 2022	Senior Official's Meeting	Abdul Kadir Bin Abu Hashim, Adam Bahtiar, Hannah O'Kelly, Kry Masphal, Mohnish Kapoor, Prasert Sornsathapornkul, Shreya Sethi, Sivananthan Elagupillay, Somying Thunhikorn, Sunram
Friday, January 14, 2022	Senior Official's Meeting	Adam Bahitar, Aizal A, Amit Mallick, Anish Banerjee, Armilev Sergei, Charu Sharma, Hannah O'Kelly, Hla Myo Aung, Irina Fominykh, Keophouvong Chanthapanya, Kun Shi, Md. Jahidul Kabir, Menjjing, Mohnish Kapoor, Ou Ratanak, Phyo Thuzar Win, Prasert Sornsathapornkul, Shreya Sethi, Somphot Duangchantrasiri, Somying Thunhikorn, Soudamini Desai, Thant Zaw Oo, Thuang Naing, Tshering Tempa, Voung Tien Mahn, Yixuan Liu



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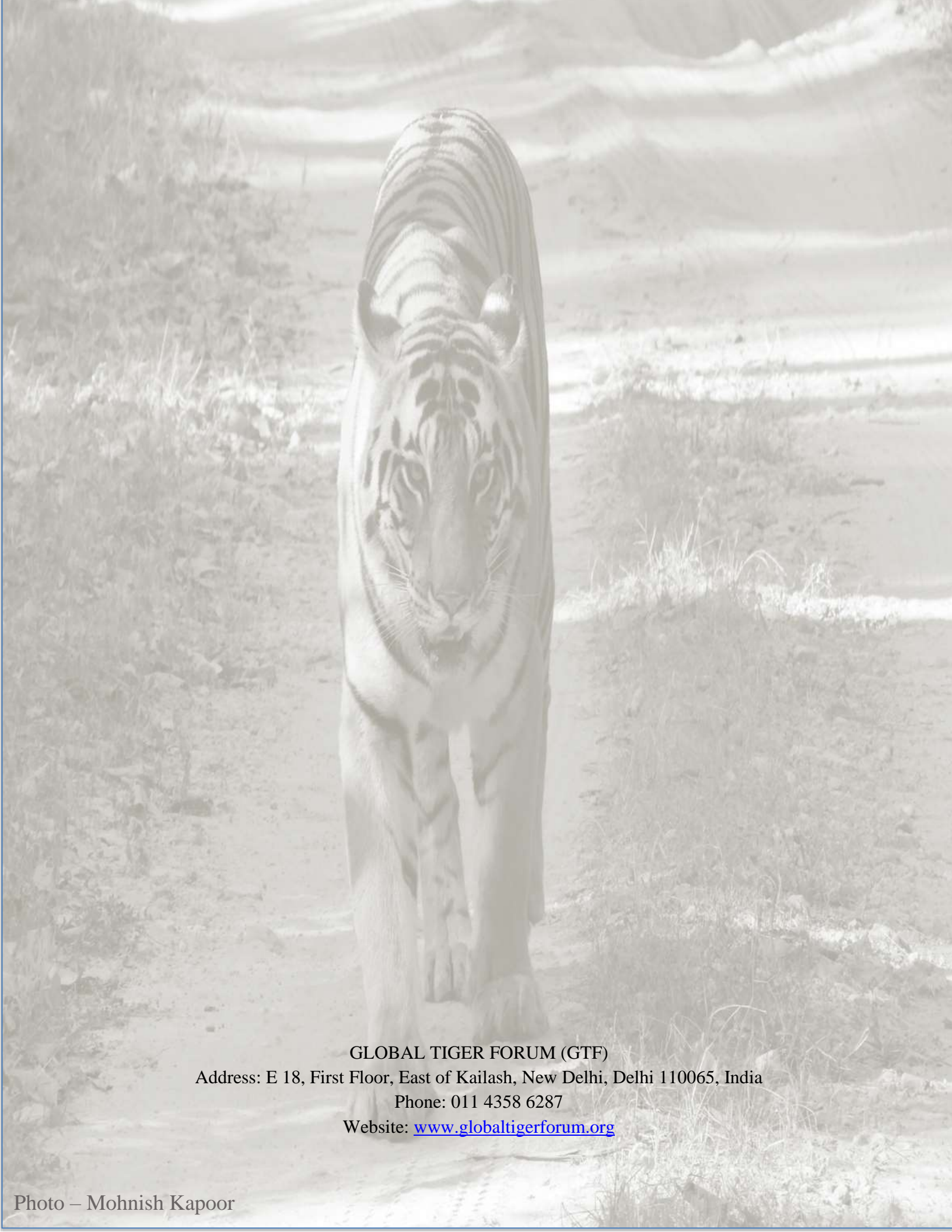
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### **Special Thanks to:**

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