TIGER CONSERVATION ACTION PLAN

(2023-2032)

Government of Nepal
Ministry of Forests and Environment
Department of National Parks and Wildlife Conservation

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2023

Technical Team
Mr. Manoj Kumar Sah, Ecologist, DNPWC
Dr. Ganesh Pant, Chief Warden, Shivapuri Nagarjun National Park
Dr. Bhagawan Raj Dahal, ZSL Nepal
Dr. Chiranjivi Prasad Pokharel, NTNC
Dr. Kanchan Thapa, WWF Nepal
Mrs. Sabnam Pathak, Assistant Conservation Officer, DoFSC
Mr. Hem Raj Acharya, Assistant Ecologist, DNPWC
Mr. Ashim Thapa, Assistant Ecologist, DNPWC

Review Team
Dr. Maheshwar Dhakal, Director General, DNPWC
Dr. Ram Chandra Kandel, Joint Secretary, MoFE
Mr. Bed Kumar Dhakal, Joint Secretary, MoFE
Mr. Ajay Karki, Deputy Director General, DNPWC
Mr. Nawaraj Pudasaini, DDG, DoFSC
Mr. Hari Bhadra Acharya, Under Secretary, DNPWC
Dr. Hem Sagar Baral, CR, ZSL Nepal
Dr. Baburam Lamichhane, Tiger Expert
Dr. Tek Raj Bhatt, Tiger Expert

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Government of Nepal

Ministry of Forests and Environment

Singhadurbar, Kathmandu

Foreword

The tiger is the largest Asian big cat and an apex predator in tropical and sub-tropical ecosystems. Moreover, the species is an indicator of healthy ecosystems and spread across 13 countries including Nepal. The global population of free living tigers- living in less than 7 percent of its historic range- has seen a rapid decline in the recent decades. As a response, St. Petersburg's Tiger Summit, 2010, set the goal to double the tiger population by 2022. Nepal made every possible effort to meet the target as early as possible. It gives me immense pleasure to mention that Nepal has dramatically increased its population by 2022. I take this opportunity to thank the Department of National Parks and Wildlife Conservation for leading the process successfully.

With the increase in tiger population, Nepal has seen a dramatic rise in human and property losses. Moreover, the country is facing various challenges and threats in the conservation sector these days. The ministry is quite concerned about the escalating human-tiger conflicts, poaching and illegal trade, climate induced disasters and habitat loss.

The ministry is committed to ensuring the best possible effort to maintain the national ecological integrity and safeguarding the wildlife related human and property losses at the same time. The species, a quintessential example of natural beauty, has a huge potentiality to contribute in both national and local economies through nature-based tourisms.

The tiger conservation action plan (2023-2032) has encapsulated the actions for a decade. I am sure this action plan will help achieve new milestones in the conservation sector and bolster the economic front of the nation.

I appreciate the painstaking effort of the conservation fraternity to make a comprehensive document like this. I am hopeful that all the actions will be completed on schedule with the combined effort of all the stakeholders.

Dr. Birendra Prasad Mahato
Honorable Minister

Government of Nepal

Ministry of Forests and Environment

Singhadurbar, Kathmandu

Foreword

Tiger is not only a charismatic but also an umbrella species of the terrestrial ecosystems. Nepal is proud to be one of the 13 tiger range countries across the globe. Lowland Terai region has a global recognition for being home to a most cherished species in the world. Five protected areas-Parsa, Chitwan, Banke, Bardia and Shuklaphanta National Parks-and their adjoining forest areas are the major tiger habitats of the species. Unfortunately, the species lost most of its historic range in the last few decades. In St. Petersburg's Tiger Summit, 2010, global leaders agreed upon development and doubling the tiger population by 2022. Nepal took several significant steps such as habitat expansion, institutional and policy reforms to recover the species rapidly. As a result, the country succeeded in achieving the target by the given time.

The tiger conservation action plan (2023-2032) aims to seek a balanced state for both the tiger and human societies. This action plan will address the most persistent threats to the tiger. In this regard, wider consultation and collaboration among the stakeholders will be needed. The ministry is committed to ensuring the success of the plan.

I encourage the Department of National Park and Wildlife Conservation to engage all the respective government agencies, conservation partners and local communities during the implementation of the plan.

I wish a successful implementation of the action plan of such a majestic species.

Dr. Rebati Raman Paudel
Secretary

Acknowledgments

On the auspicious occasion of the Global Tiger day, 2023, It gives me an immense joy to publish the Tiger Conservation Action Plan (2023-2030) together with the concerned government agencies, conservation partners and local communities. This action plan is an outcome of the effort made by the conservation experts, researchers, Chief Conservation Officers, Divisional Forest Officers, experts of conservation partners, local communities, security agencies, and media personnel.

Protected area management in general and tiger conservation in particular entail wider consultation and ownership of multiple stakeholders- all three tiers of governments, conservation partners, local communities, entrepreneurs and media. Therefore, I urge all the conservation stakeholders to take collective ownership to protect the tiger as a precious treasure of the humanity.

Finally, I would like to express my sincere thanks to Mr. Ajay Karki, DDG, DNPWC and Mr. Nawaraj Pudasaini, DDG, DoFSC for leading the preparation of this action plan, a seemingly impossible task within a short duration. My special thanks go to Mr. Manoj Kumar Sah, Ecologist, DNPWC and Dr. Tek Raj Bhatt, a tiger expert for taking the painstaking effort to get the document in this shape. I would like to thank the personnel of the ecology section and other sections of the department as well. Moreover, I would like to thank ZSL Nepal for providing the financial support in this endeavor. Similarly, I would like to remember the conservation partners like National Trust for Nature Conservation and WWF Nepal for their incessant effort in this regard.

I urge all the respective government agencies, conservation partners and local communities for the successful implementation of this action plan.

Dr. Maheshwar Dhakal
Director General

Acronyms/Abbreviations

BaNP	Banke National Park
BCC	Biodiversity Conservation Center
BNP	Bardia National Park
BZCFUG	Buffer Zone Community Forest User Group
BZUC	Buffer Zone User Committee
CBAPU	Community Based Anti-Poaching Units
CBD	Convention on Biological Diversity
CCTV	Closed Circuit Television
CFUG	Community Forest User Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNP	Chitwan National Park
DFO	Division Forest Office
DNPWC	Department of National Parks and Wildlife Conservation
DoFSC	Department of Forests and Soil Conservation
EIA	Environmental Impact Assessment
GCF	Green Climate Fund
GEF	Global Environment Facility
GIS	Geographical Information System
GoN	Government of Nepal
GPS	Global Positioning System
GSM	Global System for Mobile Communications
GTF	Global Tiger Forum
HTC	Human Tiger Conflict
IEE	Initial Environmental Examination
IUCN	International Union for Conservation of Nature
Km²	Square Kilometer
LCA	Landscape Conservation Approach
m.	Meter
MIST	Management Information System Technology

MoFE	Ministry of Forests and Environment
MoU	Memorandum of Understanding
NA	Not Available
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-Governmental Organization
NPR	Nepali Rupees
NPWCA	National Parks and Wilflife Conservation Act
NTCC	National Tiger Conservation Committee
NTNC	National Trust for Nature Conservation
NWCCCC	National Wildlife Crime Control Coordination Committee
O&M	Organization and Management
PA	Protected Area
PNP	Parsa National Park
REDD	Reducing Emissions from Deforestation and Forest Degradation
RRT	Rapid Response Team
SAWEN	South Asia Wildlife Enforcement Network
ShNP	Shuklaphanta National Park
SMART	Spatial Monitoring and Reporting Tool
TAL	Terai Arc Landscape
TRAFFIC	The Records Analysis of Flora and Fauna in Commerce
TRC	Tiger Range Countries
UNESCO	The United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
USD	United States Dollar
WCCB	Wildlife Crime Control Bureau
WCCC	Wildlife Crime Control Committees
WHC	World Heritage Convention
WII	Wildlife Institute of India
WWF	World Wide Fund for Nature
ZSL	Zoological Society of London

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Executive Summary

The Fourth Nationwide Tiger and Prey Survey, conducted in 2022, confirmed the presence of 355 adult tigers in Nepal; hence, the country successfully achieved a global commitment of the St. Petersburg Tiger Summit, 2010 to double the number of wild tigers by 2022. More than a decade-long purposefulness and commitment of the stakeholders to tiger conservation has led to this global recognition. Effective habitat management, better law enforcement, technology-based regular patrols, timely addressed policy gaps, and a meaningful partnership among associated government agencies, conservation partners, local communities, and other stakeholders were all key factors for Nepal's landmark success in tiger conservation. The establishment of Banke National Park (BaNP) in 2010 and the extension of Parsa National Park (PNP) in 2015, two crucial government steps, provided additional strictly conserved habitat for tigers in the lowland, i.e., Terai. Despite the limited resources, the Government of Nepal put a lot of effort into improving habitats for the tiger and its prey and ensuring responsible stewardship of local communities.

The Tiger Conservation Action Plan for Nepal (2016-2020) focused on addressing tiger poaching and illicit trade of its body parts; habitat degradation and fragmentation, and conflicts among humans and tigers. The document prescribed strategic activities to address these persistent threats, ensure an effective management of the growing tiger population, and foster human-tiger co-existence. Despite a notable progress in addressing these issues, they still remain as major concerns for the tiger conservation. Nepal unfortunately, registered an increasing trend loss of lives-425% and 234% increase in loss of human and livestock lives, respectively, due to tiger attacks during the period of 2018-2021. The government's cash relief to address the loss increased by 94% in the same period. Furthermore, climate change is worsening the situation through the proliferation of new challenges like the drying up of wetlands, the spread of habitat-degrading invasive plants and wildlife diseases, and increasing incidences of natural disasters such as landslides, forest fires, and floods.

The tiger-bearing protected areas (PAs) not only protect other wildlife but also sustain the ecosystem services that benefit the people in the Terai. However, the establishment and expansion of protected areas infuriated local people initially because of the strict legal provisions regarding resources' use in PAs. Consequently, several rounds of discussion and awareness programs for local communities were conducted to reconcile the conflict. The government's continued effort to bridge the gap between the parks and the local communities has led to a perceptible increase in public confidence.

Recognizing that the landscape conservation approach will suit the species with a wider home range, such as the tiger, Nepal ushered into a new conservation era by establishing a transboundary conservation landscape, Terai Arc Landscape (TAL). The TAL has five tigers bearing protected areas which are managed under a landscape approach. TAL Strategic Plan (2015-2025) has set a goal to connect the protected areas of both Nepal and India to manage Nepal's tigers as viable metapopulations. Tiger conservation within a human-dominated landscape is challenging and requires a good comprehension of the complexities involved therein. There has to be a meaningful engagement and cooperation among the various government and non-governmental organizations and local communities is essential for tiger conservation. Moreover, a meaningful transboundary cooperation and collaboration between Nepal and India is equally important for mutual benefit in tiger conservation. Since the endorsement of the Terai Arc Landscape by the Government of Nepal in 2001, the Department of National Parks and Wildlife Conservation (DNPWC) and the Department of Forests and Soil Conservation (DoFSC) have been implementing a series of conservation and forest restoration activities

across these five tiger-bearing protected areas and the buffer zones thereof and forest areas outside the PAs. Moreover, the conservation of ecological corridors and routes for the dispersal of tigers and other megafauna are receiving adequate attention.

The plan was developed with the consultation of key stakeholders. It underwent examination by a technical committee, and the preliminary version was shared with tiger-bearing protected area managers, conservation partners, and other stakeholders during the National Tiger Workshop held in Bardia and the protected area managers who attended the annual progress review meeting. The feedback and opinions thus received were incorporated into the draft, and the improved version of the plan received scrutiny from tiger experts and the senior authorities of DNPWC. Invaluable feedback from experts and stakeholders was integrated into the final document.

The current action plan aims to maintain the highly successful accomplishment in tiger conservation over the past few decades. Hence, the cardinal focus of the plan is to continue the successful conservation practices and gear up both ecological and economic well-being of landscape and local communities respectively. In addition to addressing the current threats, the plan intends to address several emerging threats with the following strategic objectives: -

- Secure tiger habitats and corridors.
- Combat poaching and illegal trade of tigers and their parts.
- Reduce human-tiger conflict and enhance economic opportunities for local communities.
- Strengthen cooperation and collaboration among stakeholders for tiger conservation.
- Strengthen monitoring of and research on tiger, prey-base, and their habitat and promote outreach.

Constitutionally, each of the three tiers of government has more or less a very important role in tiger conservation. At the federal level, the Ministry of Forests and Environment (MoFE), DNPWC, and DoFSC are responsible for planning, budgeting, and monitoring and evaluation of this action plan. Under the purview of DNPWC, it is the onus of the tiger-bearing protected area offices to execute the plan. The DoFSC and the Division Forest Offices (DFOs), governed by the provincial line ministries, are equally responsible for implementing the plan. Moreover, this action plan recognizes the importance of other government and non-governmental agencies at all three tiers of government in conserving tigers across the country.

The total indicative budget for this ten-year action plan is estimated to be NRs 5,273,700,000 (NRs 5273.7 million). Out of the total sum, around 27.67% is proposed to secure tiger habitats and corridors; 25.97% to reduce human-tiger conflict and enhance economic opportunities for local communities; 18.85% to strengthen monitoring and research on tiger, prey-base, and their habitat and promote outreach; 18.48% to combat poaching and illegal trade of tiger and its parts; and 9.03% to strengthen cooperation and collaboration among stakeholders for tiger conservation. The government's annual budget for DNPWC and DoFSC will be the major source of funding for implementing the action plan. Likewise, the provincial and local governments will co-finance some of the activities. Ongoing support from long-term conservation partners like World Wide Fund for Nature (WWF), Nepal; Zoological Society of London (ZSL), Nepal; and National Trust for Nature Conservation (NTNC) and other existing and new partners will play key roles in supporting both financially and technically for the smooth implementation of the action plan.

Chapter 1

Introduction

1.1 Relevance of the action plan revision

The tiger *(Panthera tigris)*, an apex predator of the terrestrial ecosystems and a conservation flagship species across its range, exists in a precarious state. The species is listed as Endangered on the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN) (Goodrich et al., 2022) and under Appendix-I by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (CITES, 2021). Pursuant to clause 1 of the National Parks and Wildlife Conservation (NPWC) Act, 1973, the tiger is a protected animal since the enactment of the law. The tiger is also a keystone species in both tropical and sub-tropical ecosystems in Nepal.

Nepal has made a deliberate and sustained effort to ensure tiger conservation since the decade of 1950s. Most of the ideal tiger habitats were declared protected areas (PAs). Some human settlements in the habitats were relocated, some PAs were extended, and some were upgraded from wildlife reserves to national parks. Consequently, Nepal has five bastions for tigers: the Chitwan National Park (CNP), Bardia National Park (BNP), Parsa National Park (PNP), Banke National Park (BaNP), and Shuklaphanta National Park (ShNP) (DNPWC and DoFSC, 2022).

The first Tiger Conservation Action Plan for Nepal was prepared in 1999 and revised in 2008 and 2016. The last Tiger Conservation Action Plan (2016-2020) was implemented to achieve the goal of conserving the tiger and its habitat by maintaining healthy ecosystems and, thus, contributing to doubling the tiger number by 2022. During this period, the Government of Nepal (GoN) focused mainly on conserving critical tiger habitats and corridors outside the protected areas, managing grasslands and wetlands within the park, and engaging local communities to address human-tiger conflict in Nepal. This holistic approach has substantially increased the tiger population despite limited resources and capacity. The tiger population in Nepal's protected areas has increased significantly in recent years, except for Chitwan National Park, which is approaching its carrying capacity for tigers (DNPWC, 2020). The most dramatic increases have been seen in PNP and ShNP, where tiger populations have increased by a factor of 10 and 4, respectively, since 2010. The most likely explanation for the unprecedented increase in the tiger population is the significant investment and efforts made by the DNPWC supported by its conservation partners during the period. These efforts consist of improved management of tiger-bearing protected areas, increased patrolling and law enforcement, promotion of human-tiger coexistence, and improved livelihood opportunities for local communities. It is worth mentioning that the adoption of improved monitoring methods and the use of camera traps have assisted in the most accurate estimation of tiger population. However, the precise reasons for the rapid increase in the tiger population in low-density areas need further exploration and validation. While the country's tiger population is increasing, ensuring co-existence between tigers and humans in the changing context is challenging as well.

The last action plan was critically reviewed and revised to address the changed scenario because of the accretion of the tiger population and to meet the needs and aspirations of the local communities living with the tigers. This plan focuses on ensuring science-led conservation and addressing contemporary issues, threats, and challenges in tiger conservation in Nepal. The cardinal purpose of this action plan is to present a structured and holistic framework to achieve the long-term conservation goal of the tiger and link its conservation success with both local and national prosperity at the same time in the country. In this way, this action plan is a guiding document that has concentrated on prescribing actions to gear up tiger conservation in Nepal.

1.2 Revision process

A technical committee led by the Ecologist of the Department of National Parks and Wildlife Conservation (DNPWC) and represented by the members of the Department of Forests and Soil Conservation (DoFSC); National Trust for Nature Conservation (NTNC); World Wide Fund for Nature (WWF), Nepal; and the Zoological Society of London (ZSL), Nepal- is tasked with looking into the progress of the species action plans. The body advised the department to expedite the revision process of the tiger action plan that would ensue the plan of 2016-2020. On the advice of the body, DNPWC approved the terms of reference for the consulting services and requested ZSL Nepal to furnish the resources to prepare the document on time. ZSL Nepal backed up the proposal and ensured the document was prepared on schedule.

Throughout the plan preparation, there were comprehensive consultations with the authorities of prominent tiger-bearing protected areas: CNP, PNP and BNP. Recognizing the integral role of the local communities for tiger conservation, there were several

rounds of communal deliberations with CBOs across the tiger range, such as Buffer Zone Community Forest User Groups (BZCFUG), Buffer Zone Management Committees (BZUCs), and Community Forest User Group (CFUG). Similarly, Divisional Forest Officers (DFOs), the bureaucrats tasked with conserving tigers outside PAs, were consulted adequately to foster cross-sector collaborations among agencies. Moreover, there were knowledgeable discourses on various tiger-related issues with the conservation partners like NTNC and its field office, i.e., Biodiversity Conservation Centre (BCC), Sauraha, and Terai Arc Landscape (TAL) Program. Advices, issues, concerns, and feedback gathered during the consultation process were incorporated into the initial draft of the plan. A draft of the plan was then shared with the technical committee members, and protected area managers. The input and the feedback from the technical committee and others were incorporated into the revised plan. To enrich the content of the work, the draft of the action plan was also presented in the warden seminar. In keeping with the department's decision, a national tiger workshop was convened in Bardia on 23-25 April 2023. All the exercises provided a veritable cornucopia of information and insights. Having addressed the subjects worth mentioning, the team prepared the final action plan.

Figure 1 Action plan preparation process

1.3 Scope of the action plan

The strategic focuses of this action plan are to strengthen routine protection, increase prey biomass, especially large prey; enhance landscape connectivity and functionality in PAs, corridors and forests outside PAs; manage tiger habitats, including potential high altitude tiger habitat; address the negative impacts of linear infrastructures and implement adaptation measures against the emerging threats of climate change. The action plan also aims to improve the quality of life of the local communities sharing the landscape with the tiger by engaging community members in tiger conservation actively, implementating livelihood-focused interventions, preventing and managing human-wildlife conflict, and promoting tiger-based tourism as a direct benefit to the local communities. This action plan will serve as a policy document to guide the future strategies, actions, and activities of all three tiers of the government, conservation partners, community-based organizations, and all other stakeholders actively engaged in tiger conservation. The action plan aligns with the other guiding national policy documents focusing on the tiger conversation, such as the National Biodiversity Strategy and Action Plan, Nepal (2014-2020) (MFSC, 2014), Strategy and Action Plan: 2015-2025 Terai Arc Landscape (MFSC, 2015), Nepal, Protected Area Management Strategy (2022-2030) (DNPWC, 2022b), and draft National Tiger Recovery Program (2023-2032). Through the establishment of better coordination mechanisms and capacity building of the cross-sectoral agencies at provincial and local government for wildlife conservation, the action plan envisions an increasing role of the government agencies for tiger conservation and management at all three tiers. Furthermore, this action plan intends to gear up more meaningful transboundary cooperation and promote peaceful co-existence and harmony for both humans and tigers. Round-the-clock patrols, surveillance, and periodic monitoring of the tiger, prey base, and habitat are the key activities to measure the progress and prescribe timely management interventions if needed.

This action plan contains background information on tiger conservation followed by a concise review of the previous tiger conservation action plan (2016-2020). It compiles the issues, challenges, threats, and opportunities inherent in tiger conservation in Nepal. This action plan has proposed strategies and actions for tiger conservation for the period of 2023-2032 with the budget, implementation plan, and logical framework aligned with the conservation principles and future development needs and potential in the country.

Chapter 2

Background

2.1. Tiger Biology

The tiger (*Panthera tigris*), the largest member of the cat family (*Felidae*), is rivaled only by the lion (*Panthera leo*) in strength and ferocity. There are eight sub-species of tiger which include: Bengal tiger (*Panthera. tigiris tigris*), Caspian tiger (*P. t. virgata*), Amur tiger (*P. t. altaica*), Javan tiger (*P. t. sondaica*), South China tiger (*P. t. amoyensis*), Bali tiger (*P. t. balica*), Sumatran tiger (*P. t. sumatrae*), and Indo-Chinese tiger (*P. t. corbetti*) (Wozencraft, 2005). The Siberian or Amur tiger is the largest, measuring up to 4 metres (13 feet) in total length and weighing up to 300 kg (660 pounds). The Bengal tiger is the most numerous and accounts for about half the global tiger population. Although external appearance is similar, the tigers are sexually dimorphic, with females weighing 20%-40 % less than males (Kitchener & Yamaguchi, 2010) and may attain a shoulder height of about 1 metre and a length of about 2.2 metres, excluding a tail of about 1 metre. Its weight is 160–230 kgs (350–500 pounds). Tigers from the south are smaller than those of the north. Tiger possesses 30 teeth, the upper (length 50-60 mm) and lower (40-50 mm) canines, and they are a cardinal weapon for killing prey. The tiger's lower jaw is anchored to the skull by a powerful muscle that enables powerful and precise killing bites (Karanth & Nichols, 2017). Unlike domestic cats with slitted pupils, tigers have eyes with round pupils. This is because domestic cats are nocturnal, whereas tigers are crepuscular, i.e., they hunt primarily in the morning and evening. The tiger's coat varies from pale yellow to rich red with white or beige color under parts. Tigers of tropical Southeast Asia are generally darker and more richly stripped than those in the temperate zone with a paler, more lightly colored coat.

2.1.1 Habitat preference

As implied by its original extensive geographical distribution, the tiger is tolerant to a variety of environmental conditions, the only apparent

prerequisite for its survival being some form of vegetation cover, water, and availability of sufficient prey (Schaller, 2009). Tigers were found in tropical Asia in humid rainforests, mangrove swamps, moist thorny and dry deciduous forests, thick grasses, bamboo thickets, savanna, and tamarisk shrubland (Mazák, 1981)**.** Tiger generally occurs from sea level to 2000 m, but have been recorded at higher altitude (>4,000 m). In Sikkim, a tiger was reported at an altitude of 4360 msl, and in Bhutan, at 4400 msl (Dhendup et al., 2023).

2.1.2. Social and spatial behavior

Tigers are essentially solitary, except for the short mating season and the time when the young cubs depend on their mothers. The size of the territory and home range depends on the type of habitat, density of prey, sex, and age of the animals (Mazák, 1981). Home range size for tigers in productive Terai forests in India and Nepal is 10-51 sq. km (female) and 24-243 sq. km (male) compared to 224-414 sq. km (female) and 800-1000 sq. km (male) in Russia (Hunter, 2015). Home range sizes have an inverse relationship with population density due to resource limitations (Karanth et al., 2004), i.e., the home range size depends on prey abundance. For example, a significant negative correlation was found between prey density and home range size (Sarkar et al., 2016; Simcharoen et al., 2014) it also provides new knowledge of the species biology as to how these animals explore and utilize new environments. We studied six reintroduced tigers and three of their offsprings in Panna Tiger Reserve, central India, focusing on exploration strategy, movement characteristics and spatio-temporal home range patterns. It was found that the release site had no influence on home range selection by the reintroduced tigers, regardless of the release method (soft or hard release.

Tigers are generally territorial. An adult establishes an exclusive territory where possible, but a completely exclusive area is rare except in small core areas within the range. Adults socialize chiefly for breeding, but a male in a high-density population frequently spends time with familiar family and cubs and shares kill too. Males are very tolerant since they spend time with known females. Sometimes, territory of a male tiger overlaps with that of a female. Both sexes demarcate territories and advertise their presence by depositing scent-marks by rubbing cheek and spraying on vegetation, depositing scats and scraping the ground with their hinder feet. An adult female generally lives out its life in one area. Conversely, male territorial tenure is typically shorter on an average 2.8 years (ranging from seven months to 6.5 years) in CNP.

2.1.3 Predatory behavior

Tiger is primarily crepuscular, exhibiting a pattern of activity that coincides roughly with that of its principal prey. Tiger mainly preys on large mammals such as wild boar, spotted deer, hog deer, sambar, swamp deer, barking deer, musk deer, blue bull, black buck, Indian bison, wild water buffalo, and others. The species is bold enough to attack giant species like rhinoceros and elephants. Tiger occasionally hunts a sloth beer (Ellis, 2013). Although it is not quotidian, species like leopards, birds, crocodiles, turtles, porcupines, rats, frogs, and fish are rarely eaten by the tiger. Its attacks on livestock have aggravated over the years. Humans are rarely killed and eaten only by those who turn into man-eaters (Mazák, 1981). This flexibility in capturing prey allows tigers to exploit a wide range of prey types and sizes. Tigers typically hunt large prey, but they will switch to alternative smaller prey, such as spotted and barking deer etc., if a larger prey is not available. Tigers have been observed to vary their killing techniques in response to prey, using different escape maneuvers. The hunting methods of tigers differ depending on their size, skill level, and age. Such flexibility in capturing prey allows the tiger to exploit a wide range of prey types and sizes. Tiger relies primarily on two basic techniques to kill prey. Small animals, or those weighing lesser than a tiger, are killed with a bite on the back of the neck. But it attacks throats first in case of a large and dangerous prey. The tiger hunts most of its prey in a dense to moderate cover. Generally, 93% of the tiger kill either in the early morning or evening.

Tiger hunting success rate varies from 5 to 50%, and it rarely feeds at the killing site, as it commonly drags small kills into a dense cover before feeding, whereas it feeds on a heavy prey at the site. Tigers guard their kills against other predators and consume most of the edible parts. They usually eat and rest intermittently, occasionally leaving to get hydrated. When they leave, they usually cover the remains with leaves, dirt, and even rock over the carcass. Tigers usually spend 2 to 3 days with a large kill such as sambar *(Rusa unicolor),* eating about 15-18 kgs of meat a day before abandoning a carcass. The maximum amount a tiger can eat in 24 hours is about one-fifth of its body weight. Tigers are not known to feed on carrion. There is a constant lurking threat to tiger cubs because they are killed by their own clans, i.e., adult male tigers.

2.1.4 Reproductive behavior

The reproductive behavior of the tiger is largely irrespective of any particular season in its tropical and sub-tropical range, but Amur tiger cubs are generally born in late summer (August-October) with some rare

winter births. Mating may take place any time of the year; however, it is most frequent from the end of November to the first half of April. A tigress comes into heat at an interval of 3-9 weeks and is receptive for about 3 to 6 days. An oestrus lasts for two to five days, and an average gestation period lasts 103-105 days. Litter size is two to five cubs averaging 2.3 for populations in India, Nepal, and Russia. Cubs achieve their independence at 17-24 months. The litter interval is from 21.6 to 33 months. Both male and female animals reach sexual maturity between 2.5 and 3 years. However, in the wild, breeding typically occurs later, around 3.4 to 4.5 years for females and 3.5 years for males at the earliest. Throughout its life, a female gives birth to an average of 4.5 cubs that survive to disperse and only two cubs that survive to breed. A female tiger can breed until the age of 15.5 years.

2.2 Global distribution and status

Tiger once covered over 16.6 million km^2 of Asia (Sanderson et al., 2006). Habitat loss and fragmentation, and human persecution have reduced tiger habitat, and tigers today are distributed heterogeneously and restricted to small pocket areas (Schnitzler & Hermann, 2019). Tiger distribution analysis in 2005 revealed that the current tiger range was 1.1 million km^2, covering only 7.1% of their historical range (Sanderson et al., 2010), an unprecedented collapse of 92.9 % of the historical tiger's habitat over the last 150 years (Dinerstein et al., 2007; Sanderson et al., 2006)coupled with inadequate government efforts to maintain tiger populations, have resulted in a dramatic range contraction in tiger populations. Tigers now occupy 7 percent of their historical range, and in the past decade, the area occupied by tigers has decreased by as much as 41 percent, according to some estimates. If tigers are to survive into the next century, all of the governments throughout the species' range must demonstrate greater resolve and lasting commitments to conserve tigers and their habitats, as well as to stop all trade in tiger products from wild and captive-bred sources. Where national governments, supported in part by NGOs (nongovernmental organizations. Tigers have already extirpated from Southwest and Central Asia, Indonesian islands (Java and Bali), and large areas of Southeast and Eastern Asia. Tigers now live only in 13 countries-Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Lao, Malaysia, Myanmar, Nepal, Russia, Thailand, and Vietnam (GTRP, 2011). There is no evidence of a breeding population of tigers in Cambodia, China, Vietnam, and the Democratic People's Republic of Korea (Sanderson et al., 2010; Walston et al., 2010). From 2006 to 2014**,** 42% of tiger habitat further declined (Goodrich et al., 2015).

In the Indian subcontinent, where the largest remaining tiger population lives, only 11% of the original habitat remains, but even these forests are often fragmented or degraded. Presently, the tall grasslands and riparian forests of Nepal, India, Bhutan and Myanmar set the foundation for tiger conservation across a diverse array of habitats in this bioregion (Sanderson et al., 2010).

Although there are no accurate estimates of the world's tiger population, the numbers are thought to have fallen by over 95% since the advent of the 20th Century. In 1998, the global tiger population was estimated to be 5,000 to 7,000 tigers (Seidensticker et al., 1999). Global Tiger Workshop held in Kathmandu, Nepal, estimated the global tiger population to be around 3,200 in 2009 (GTRP, 2011). Presently, the second International Tiger Forum held at Vladivostok, Russia estimated the global tiger number in the wild to be around 3726-5578. As a wide-ranging and territorial top predator, the tiger requires large spatial areas and is sensitive to changes in habitat. Thus, tiger conservation strategies require landscape-scale conservation approaches, where strategic tiger habitats outside protected areas are also conserved as corridors to link the populations in core areas in order to manage tigers as meta-populations (Wikramanayake et al., 2011). The global tiger population status is given in Table 1.

Table 1: Status of tiger in range countries

S.N.	Country	Year 2010	Year 2015	Year 2019	Year 2022	Year of recent data
1	India	1411	2246	2967	3167	2022
2	Nepal	121	198	235	355	2022
3	Bangladesh	440	106	114	114	2018
4	Bhutan	75	103	103	103	2020
5	China	45	45	50	50	2021
6	Lao PDR	17	17	NA	NA	-
7	Myanmar	85	85	20	22	2018
8	Thailand	200	200	177	177	2021
9	Viet Nam	10	10	NA	NA	-
10	Cambodia	20	20	NA	NA	-
11	Indonesia	325	325	400	400	2021
12	Malaysia	500	500	150	150	2021
13	Russia	360	360	380 – 540	480-540	2022
Total Population		**3609**	**4215**		**3726-5578**	**2022**

Data source: (DNPWC & DoFSC, 2022; Goodrich et al., 2022, 2015; GTRP, 2011; Jhala et al., 2021)

2.3 National status and distribution

The Bengal tiger is the most abundant tiger sub-species and occurs in the Indian subcontinent- Bangladesh, Bhutan, India, Nepal, and western Myanmar. Until the mid-twentieth century, Bengal tigers in Nepal were distributed along the contiguous lowland alluvial grasslands and riverine forests, i.e., Char Kose Jhadi and Bhabar of Nepal. Anecdotal records confirmed the presence of tigers in the Trijuga forest and Koshi Tappu Wildlife Reserve (KTWR) in the early 1970s. However, no sign of its presence has been recorded here after mid-1970 (Gurung, 2002).

Before 2020, the presence of a tiger was not registered at elevations higher than the *Siwalik* hills. On 13th April 2020, a tiger was captured in a camera trap at an elevation of 2,500 m in the *Mahabharat* range of the Dadeldhura district of western Nepal. In December 2020, another tiger was recorded during a camera trap survey for the red panda at an elevation of 3,165 m in Ilam district, eastern Nepal (Bista et al., 2021). Those two records revealed the new tiger habitats; hence they demand a new perspective on tiger conservation and its potential distribution outside the currently known distribution range. There is a stretch of 2,213 km^2 of prospective tiger habitat in Nepal's high-altitude range, including the *Mahabharat* range and mid-hills of the Himalayas (GTF, 2019). The occurrence of tigers at higher elevations may be attributed to increasing tiger density in PAs, improved habitats, and increased natural prey and possibly to changing climatic conditions (DNPWC and DoFSC, 2022). But, it needs further work for validation.

In the lowland areas, a considerable habitat was either converted into agricultural land or fragmented, inter alia, due to a government settlement program following malaria eradication by the late 1960s. Twenty-two years earlier, at the time of the inception of the landscape conservation program, the tiger distribution was more or less restricted to five protected areas of the TAL and adjoining forest areas. Gradually, the forests across TAL were restored; hence, the tiger population got a conducive environment to grow and expand. Tigers are now increasingly ubiquitous in all the TAL districts. This landslide success in terms of both occupancy and density across the whole range undeniably establishes the fact that the conservation interventions during the last two-plus decades have enabled the species to flourish in its former range. It goes without saying that these recovering populations are re-colonizing in previously unoccupied areas in

both buffer zones and community-managed forests outside PAs (DNPWC and DoFSC, 2022).

Pugmark based tiger survey of 1995/96 estimated a total of 93-97 breeding adult tigers in Nepal: 48-49, 30-32, and 15-16 in CNP, BNP, and ShNP, respectively. Later in 1999/2000, its population was estimated to be in the range of 98 to 123 breeding adults, indicating some growth. However, those two estimates were based largely on pugmark projection methods and camera trap surveys in the limited habitat, which have been proven to be unreliable surveys (Karanth et al., 2003). Since 2009, the tiger estimates are based on standardized and science-based methods using systematic camera trapping surveys. The surveys conducted from 2009 onwards showed a dramatic increase in tiger numbers in all protected areas (DNPWC and DoFSC, 2018, 2022; Karki et al., 2013). The third nationwide survey conducted in 2018 recorded a remarkable 19% increase since 2013. In 2022, a landmark success was recorded, i.e., 51% increase since 2022 (see the table below).

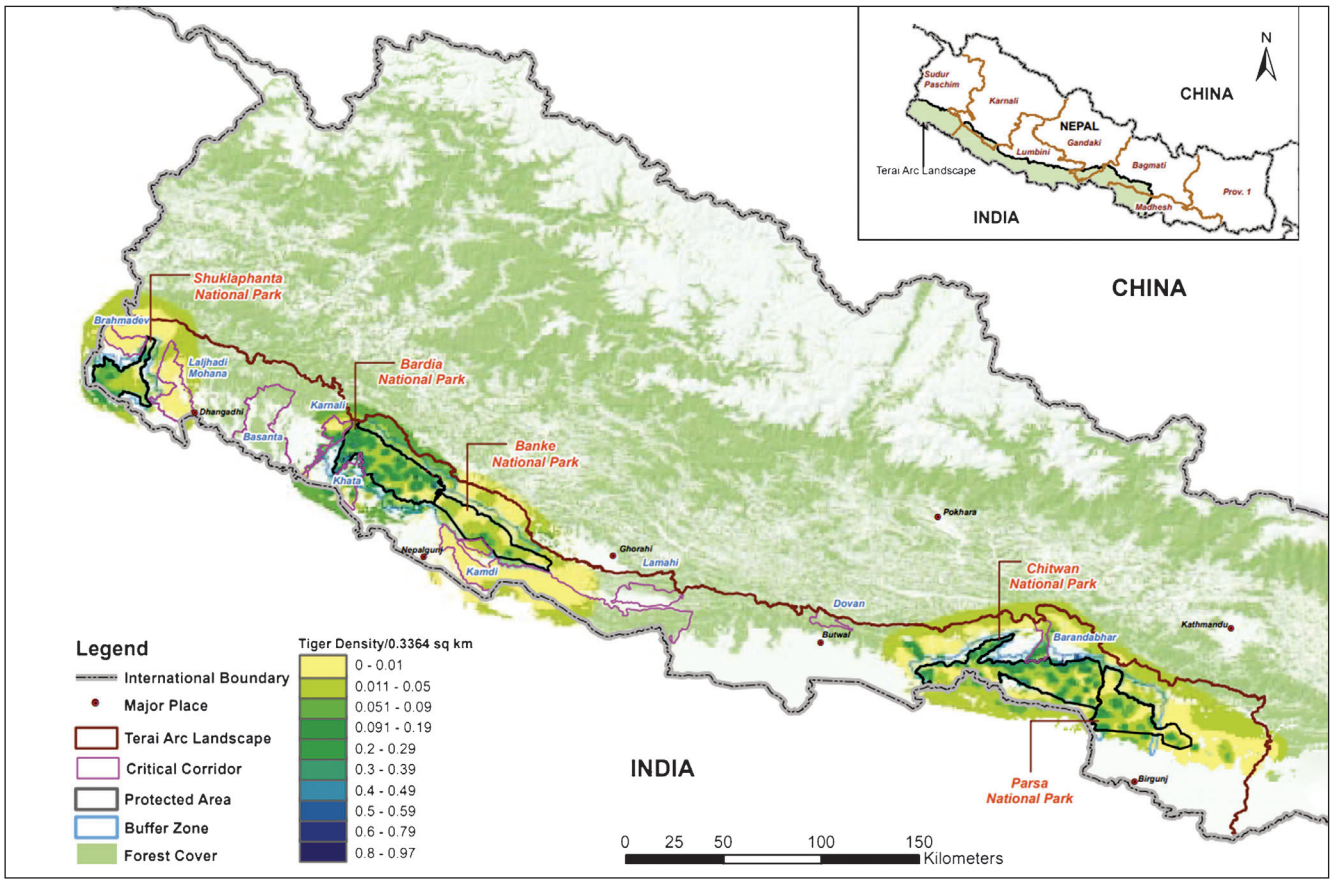


Figure 2: Tiger distribution in Nepal

Table 2: National tiger estimate in Nepal

Location	1995/96	2005	2009	2013	2018	2022
Chitwan National Park and adjoining forests	48-49	50-60	91	120	93	128
Bardia National Park and adjoining forests	30-32	32-40	18	50	87	125
Shuklaphanta National Park and adjoining forests	15-16	16-23	8	17	16	36
Banke National Park and adjoining forests				4	21	25
Parsa National Park and adjoining forests			4	7	18	41
Forest areas in Kailali, Trijuga and Jhapa		5-7	-	-	-	
Total	**93-97**	**103-130**	**121**	**198**	**235**	**355**

Chapter 3

Major Conservation Efforts and Their Achievements

Among the tiger range countries, Nepal has achieved an unparalleled success in tiger conservation over the past two-plus decades. Over this timeline of serious national effort, the tiger population in Nepal increased from 121 in 2009 to 355 in 2023 (DNPWC and DoFSC, 2022). Nepal is the first country to meet the pledge to double its wild tiger population from a 2010 baseline, conforming to the target set at the Tiger Summit in St. Petersburg in 2010 (DNPWC and DoFSC, 2022). Although it may seem an easy task, this journey remained full of vicissitudes nevertheless. The establishment of new protected areas coupled with the control of illegal poaching and trade were the key reasons for this huge success. Capacity building, outreach, institutional reforms, monitoring, transboundary cooperation and collaboration, engagement with and livelihood opportunities for local communities, and above all, meaningful partnerships with state and non-state conservation actors are regarded as the main contributing factors for the success.

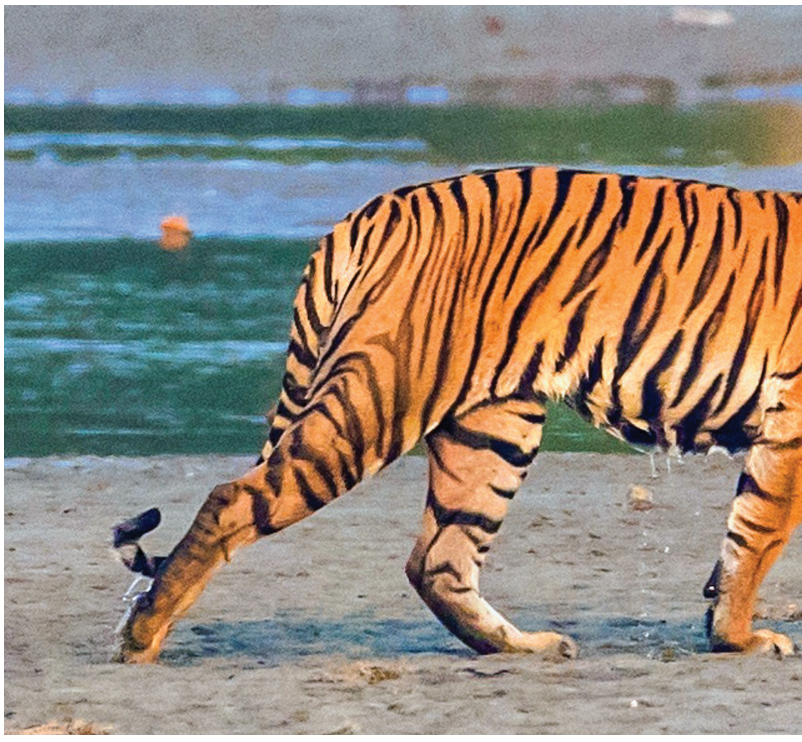
3.1. Policy, legislation and institutional reforms

The GoN has listed the tiger as a protected species under the National Parks and Wildlife Conservation (NPWC) Act 1973. Nepal Biodiversity Strategy and Action Plan NBSAP (2014-2020) had prescribed priority actions to conserve endangered species like the tiger. Nepal has adequate legal instruments to zero in on wildlife crime control. The NPWC Act, 1973 has a provision of NPR 500,000 to 1,000,000 fine and/or 5 to 15 years' imprisonment for both the offenders and accomplices involved in an illegal killing/trade of a tiger. Moreover, Nepal has enacted the Control of International Trade of Endangered Wild Fauna and Flora Act, 2017, to regulate the international trade of CITES-listed species. This act has prohibited the trade of threatened or vulnerable wild fauna, flora, or specimen thereof. This act has also banned some domestic trade of endangered wildlife and specimen thereof. To address the escalating human-wildlife conflicts and mounting pressure therefrom, the GoN endorsed the Wildlife Damage Relief Guidelines in 2012; hence it created a conducive environment for the tiger conservation. Notwithstanding the limited resources, the Government has maintained its pledge to extend relief to ever-increasing human causalities, livestock depredations, and property damages from wildlife. As per the guidelines, the government provides cash relief of 1 million NPR to the bereaved family in case of a human death. It also provides cash relief for crop, property, and livestock losses. In response to the repeated demands of the agrarian communities, the government recently endorsed "Wildlife Damage Relief Guidelines, 2023" to address the damage caused by two more species, i.e., monkey and blue bull, that were severely impacting these communities.

3.2 Protection of tiger and its habitat

3.2.1 Creation and extension of protected areas

Without exploring new habitats for tiger, among other things, it would not have been possible to double the tiger population. Sticking to the pledge, the GoN declared a new protected area, i.e., Banke National Park, in 2010. Located in the low-lying areas of Lumbini Province, it is an ideal habitat for the species, with 550 km^2 as its core area and 343 km^2 as its buffer zone.



Since it is contiguous with Bardia National Park, it is like an extension of the existing ideal habitat. Governments took another important decision to add 180 km^2 comprising of Taranga, Hariharpur, Lekhparajul, and Chhinchu areas of Surkhet district to the existing buffer zone of Bardia National Park in the same year. In 2016, Parsa Wildlife Reserve got a spatial extension of 138 km^2 in the eastern side to include the Halkhoria *daha*, a renowned wetland. Its status as a Wildlife Reserve was also changed to a National Park on July 3, 2017. Likewise, the Shuklaphanta Wildlife Reserve also got a new identity as a National Park in the same year. All those strong moves of the government set the ground for even better tiger conservation in Nepal. Furthermore, the meeting of NTCC held in July 2021 decided to conduct a feasibility study for the extension of Parsa and Banke National Parks.

3.2.2 Protected area management

During the establishment of Nepal's parks and reserves in the 1970s, the Government of Nepal relocated human settlements from core areas of the reserves to locations outside of the reserve boundaries (Smith, 1993). This forced relocation occurred at both Bardia and Chitwan National Parks, as well as at other locations. Further, voluntary relocation also occurred in Chitwan National Park in the 1990s. This policy was successful in re-establishing depleted wildlife populations (Bhattarai et al., 2019)an unwelcome consequence of greater tiger numbers is the increased prevalence of human-tiger conflict (HTC. National Parks and Wildlife Conservation Act, 1973, and National Parks and Wildlife Conservation Regulation, 1974 banned livestock grazing and harvesting of natural resources from the park.

3.2.3 Management of corridors and connectivity

The government adopted Landscape Conservation Approach (LCA) to establish the ideal connectivity among the protected areas in a certain landscape. The fifth amendment of the NPWC Act of 1973 has legalized the importance of biological corridors for wildlife conservation. Clause 15 (gha) of the act states that government may declare areas outside the protected area system as biological corridors. Nepal and India have jointly identified mutually beneficial nine biological corridors- Laljhadi-Mohana, Brahmadev-Boom (India); Lagga-Bagga-Tatarganj (India); Basanta; Karnali; Khata; Kamdi; Parsa-Valmiki (India); and Someshwor across the transboundary landscape, i.e., TAL (Chanchani et al., 2014). Globally recognized Khata corridor provides better passage for the wildlife in Bardia National Park, Nepal to Katarniyaghat Wildlife Sanctuary, India and vice versa. The linkage between these two protected areas via the Khata corridor led to the availability of a protected tiger landscape of 3000 km^2 in western Nepal and Northern India (Wegge et al., 2018). Likewise, the Kamdi forest corridor connects BaNP, Nepal, with Suhelwa Wildlife Sanctuary, India. The Barandavar corridor plays a central role in the movement of wildlife from the Chure-Bhabar to the *Mahabharat* range and vice versa in central Nepal. Pursuant to the Forest Act, 1993, the government declared the potential tiger corridors as protection forests in 2010 (Wegge et al., 2018). There is a plethora of evidence that both the transient and the resident breeding tigers benefit from these corridors (Chanchani et al., 2014; DNPWC & DoFSC, 2022; Wegge et al., 2018).

3.3 Wetlands and grassland management

Both grasslands and wetlands are key habitat components of tigers. The gradual conversion of grasslands into shrublands and forests remains a major concern for tiger habitat conservation. For example, a decrease in grassland area from 20% in 1970s to about 9.5% in 2015 has been reported in CNP (CNP, 2016). To complicate the situation, the invasion of grasslands and other ecosystems by *Mikania micrantha* has emerged as an ominous challenge. Notwithstanding the limited fund, Chitwan national park manages more or less 600 hectares of grassland in a single fiscal year. In recent years, CNP, BNP, and ShNP, among others, have been

piloting mechanical grassland management to save the resources. The dependency of local communities on the parks mostly for animal husbandry, ends in increasing number of human-wildlife conflicts. Parks' authorities encourage local communities to switch to stall feeding and better livestock breeds to produce better outcomes. Moreover, PAs also remove woody vegetation, conduct controlled burning, and control invasive species. PAs survey and monitor grasslands periodically to find the gaps, if there are any, on time.

3.4 Combat tiger-related crime

Poaching is undeniably a major threat to the global biodiversity, and Nepal isn't an exception. The increasing threat of the illegal killings of wildlife herein encouraged the government to revisit the existing law and enforcement process. The wider realization to engage all the stakeholders led to a paradigm shift in the process. Every possible effort was made to ensure better coordination, consolidate the institutional effort and engage the community members in anti-poaching operations, where and when necessary, in the recent decade. Through better planning and perseverance, the government agencies were able to disrupt illegal trade networks, which led to a significant decrease in poaching and illegal trade in Nepal. These efforts, created a great camaraderie among protected area managers, law enforcement agencies, and both national and international conservation organizations.

On 16th May, 2010, the council of ministers decided to form a National Tiger Conservation Committee (NTCC) under the chairmanship of the honorable Prime Minister. This apex body cemented the diverse stakeholders together to pursue a common goal. On 21st November 2010 National Wildlife Crime Control Coordination Committee (NWCCCC), an important body chaired by the honorable Minister for the Ministry of Forests and Environment, consisting of the Secretaries of home, defense, and finance ministries, the chiefs of all the security agencies; and Director General of the DNPWC was formed later by the cabinet. The committee was tasked with formulating policies, legislation and directives to enhance coordination and collaboration among major stakeholders and assisting the apex body in policy matter. Those two moves of the government encouraged the dedicated unit of Nepal Police, i.e., the Central Investigation Bureau, to conduct back-to-back several successful operations in close coordination with the park authorities, Nepal Army, and other government agencies. And importantly, the cabinet made the provision for Wildlife Crime Control Bureaus (WCCBs) at both the central and district level. The central level WCCB, a body comprised of the Director General of the DNPWC and other high-ranking public servants from other departments, i.e., the Department of Forests, Department of Customs, National Investigation Department, Nepal Army, Crime Investigation Bureau of Nepal Police, Armed Police Force; and two representatives from NGOs actively engaged in wildlife conservation, is a very powerful body to check the wildlife crime and take the necessary policy steps in the first place. The WCCB secretariat, which is housed in the DNPWC, oversees routine sectoral developments across the country and assists the bureau head to initiate the necessary steps to curb wildlife crime. In a more than decade-long exercise, it won't be an overstatement to say that the WCCB has made giant strides in bolstering coordination and collaboration among the agencies. Over the years, the body also ensured that other important agencies which are associated with wildlife conservation and research, such as the National Forensic Science Laboratory, NTNC, and NAST etc, are on board.

The provision of district-level WCCBs, field-based implementing units, is pivotal to the entire policy. A district-based WCCB unit comprises officers from all the agencies which are regarded to be related with wildlife crime control in any way. The bureau is tasked with the onus of controlling environment-related crimes. Thirty-four district-level WCCBs are in place to date (Annual report, DNPWC, 2023). Based on the assessment of sensitivity, it is a ritual to form a new district-level WCCB. In keeping with the policy evolution, the Nepal Police, the Department of Forest and Soil Conservation, and the Armed Police Force each made an institutional provision to set up a dedicated unit therein. The Central Investigation Bureau Pillar IV of Nepal Police is one such unit that has earned both national and international recognition for cracking wildlife-related crimes. The previous policy document wasn't enough to address changes because of the advent of federalism in the country. The federal cabinet recently approved the "Wildlife Crime Control Order, 2023" mainly to get the provincial institutions on board.

The GoN has made a conscious effort to engage the local governments, youths, and community-based institutions in the decision-making process. As a result, community-based anti-poaching units (CBAPUs) in buffer zones, forest protection areas, and community forests are the means of local support for law enforcement and awareness-raising campaigns. Perseverance and commitment in the PAs have made it possible to set a result-driven law enforcement architecture even in the volatile political atmosphere.

SMART patrols and surveillance by GSM-enabled cameras are technology-based quotidian jobs in the Terai PAs. There is a sizeable network of informants in the tiger range PAs.

3.5 Engage local communities

3.5.1 Community development

In 1996, the fourth amendment of Nepal's National Parks and Wildlife Conservation Act, 1973 introduced provisions to plow 30 to 50% of PAs' revenue back into the buffer zone communities to address their development priorities. A sizeable source of this revenue comes from park entrance fees paid by the tourists. For decades, the communities used the funds in a whole gamut of community development activities: school maintenance, rural road improvement, irrigation, sanitation, health, plantation, grassland management, and so on and so forth. The chasm, once widened in the past, between the park and people metamorphosed into a more-friendly relationship. Currently, the involvement of local communities since the incipient stage of planning the buffer zone program has created a sense of ownership among local people. Therefore, communities extend park authorities the best possible assistance in the event of human-wildlife conflicts; escalating cases result in a few uncomfortable situations, nonetheless.

3.5.2 Relief and economic incentives

The federal government has been working in cooperation with conservation partners with tireless dedication to seeking innovative solutions to prevent and mitigate human-wildlife conflict. Notwithstanding the best possible effort, some damages by wildlife are simply unavoidable. Amid mounting pressure from every corner of society, the Ministry of Forests and Environment enacted the 'Wildlife Damage Relief Guidelines, 2069 BS' to address monetarily the wildlife-related losses incurred by the individuals. Before the scheme was in the picture, some local people were even found to abet the poachers in killing problematic animals. They also received financial benefits from poachers in return for providing assistance to the poachers (Johnson et al., 2006). Although this scheme is merely relief, not compensation, it has helped tremendously to cope with the human-tiger conflicts. At the same time, the retaliatory killing of wildlife has reduced significantly after the relief scheme began in Nepal (Acharya et al., 2016)therefore, may undermine public support for conservation. Although Nepal, with rich biodiversity, is doing well in its conservation efforts, human-wildlife conflicts have been a major challenge in recent years. The lack of detailed information on the spatial and temporal patterns of human-wildlife conflicts at the national level impedes the development of effective conflict mitigation plans. We examined patterns of human injury and death caused by large mammals using data from attack events and their spatiotemporal dimensions collected from a national survey of data available in Nepal over five years (2010-2014. The restoration of the tiger population can be attributed partly to the momentous innings played by the scheme. Some civil societies and organizations have been lobbying and advocating for a more radical approach to reduce the incidents dramatically. In case of an event, a speedy relief mechanism is expected. Needless to say, any public expenditure has to go through certain formalities. For example, the administrative process for relief disbursement, which includes collecting the required documents and evidence, verifying and assessing losses, and contacting involved parties of a compensation scheme, is costly and time-consuming (Acharya et al., 2016; Dhungana et al., 2018)therefore, may undermine public support for conservation. Although Nepal, with rich biodiversity, is doing well in its conservation efforts, human-wildlife conflicts have been a major challenge in recent years. The lack of detailed information on the spatial and temporal patterns of human-wildlife conflicts at the national level impedes the development of effective conflict mitigation plans. We examined patterns of human injury and death caused by large mammals using data from attack events and their spatiotemporal dimensions collected from a national survey of data available in Nepal over five years (2010-2014. Sometimes inadequacy of the budget remains an issue. The government of Nepal disbursed around NRs. 170 million for the relief scheme in the last Nepali fiscal year (DNPWC, 2022a). The administrative costs associated with these payments are not reported but are likely to have been substantial.

3.6 Tiger and prey-base monitoring and research

Although it was a ritual to monitor tigers in each PA routinely, a more systematic approach was felt for the job later. Consequently, two nationwide tiger counts were carried out in 2009 and 2013. In 2017, the government approved the "Tiger and Prey Base Monitoring Protocol" to systematize the assessment of the tigers and their prey base across the range (DNPWC, 2017). Later in 2018, a third nationwide tiger

count was conducted on the score of the provisions in the protocol (DNPWC and DoFSC, 2018). The first assessment estimated 121 tigers in Nepal which served as the baseline for the government's commitment to double the tiger population from 121 to 250 by 2022. The second assessment recorded a 63% increase in the country's tiger population over roughly four years, with the estimated population being 198 (Dhakal et al., 2014). The DNPWC and its field offices led the entire process of the third and fourth nationwide tiger and prey status assessment in both 2018 and 2022. Conservation partners, i.e., WWF Nepal, ZSL-Nepal, and NTNC, furnished their best possible assistance.

3.7 National, transboundary, regional, and international cooperation

Illegal trade networks are operated by well-organized crime syndicates which are far beyond the park boundaries. Nepal army, in close cooperation with the park staff, is entrusted with tackling environment-related crimes in PAs and their buffer zones. It is the job of park authorities to investigate and prosecute the offenders. As the nature of crimes evolved into organized crimes, the existing machinery urgently needed collaboration with specialized agencies in the country. Since the Nepal police have a cornucopia of information; access to better intelligence inputs; and more engagement with the societies, their active role beyond the park boundaries was expected. The WCCB worked as a platform to overcome any problem whatsoever faced by the machinery.

The Ministry of Forests and Environment signed a Memorandum of Understanding with China to mutually assist each other in promoting biodiversity conservation and curbing illegal wildlife trade in 2010. At the local level, Indo-Nepal joint monitoring and meetings are organized by park authorities regularly. Curbing wildlife crime demands well-coordinated multi-agency and multi-country efforts with a high level of commitment and advancement. South Asia Wildlife Enforcement Network (SAWEN) is a regional inter-governmental wildlife law enforcement support body of South Asian countries, namely - Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. It is a platform to work together in the fight against the burgeoning wildlife crime. It focuses on the harmonization of policies and laws; strengthening institutional capacity; sharing of knowledge, experiences, and technologies among the member countries; and promoting collaboration with national, regional, and international partners to enhance wildlife law enforcement in the region. Moreover, agencies like UNODC, Interpol, and World Bank assist the government in many ways to continue its conservation efforts.

3.8 Conservation education

Without broader public support, the conservation may cease to continue in the way it has to. Having sensed the reality, the government has been pursuing its pledge to educate the people in every possible way. Over the years, the government stepped up efforts to build a more rational society. Therefore, regular conservation education programs, awareness-raising activities, and stakeholder meetings are routine activities of each PA and DFO. These days, several activities center on human-wildlife conflict because of the urgency to de-escalate the tension between parks and people. Outreach programs engage livestock herders, farmers, nature guides, hotel owners, CFUGs, BZMCs, and CBAPUs. July 29th, world tiger day, is celebrated as a festival in the conservation fraternity each year.

Chapter 4

Review of the Action Plan 2016-2020

4.1 Implementation status

The previous action plan was implemented from 2016 to 2020. The action plan ended with mixed conservation outcomes. In fact, priority activities of the plan achieved only partial success during implementation. Out of the total 93 proposed activities, 34 weren't even initiated. Unfortunately, 51 activities were achieved only partially. Only ten activities were successfully achieved. Objective-wise implementation status of the proposed action is given in Figure 3, and the status of each action is given in Table 3.

In a landlocked and least-developed country like Nepal, it is always a difficult task to generate huge resources. It seems that the plan struggled to generate the resource to complete the tasks listed in the plan. Whatever the reason is, failure to even initiate many tasks isn't a good sign.

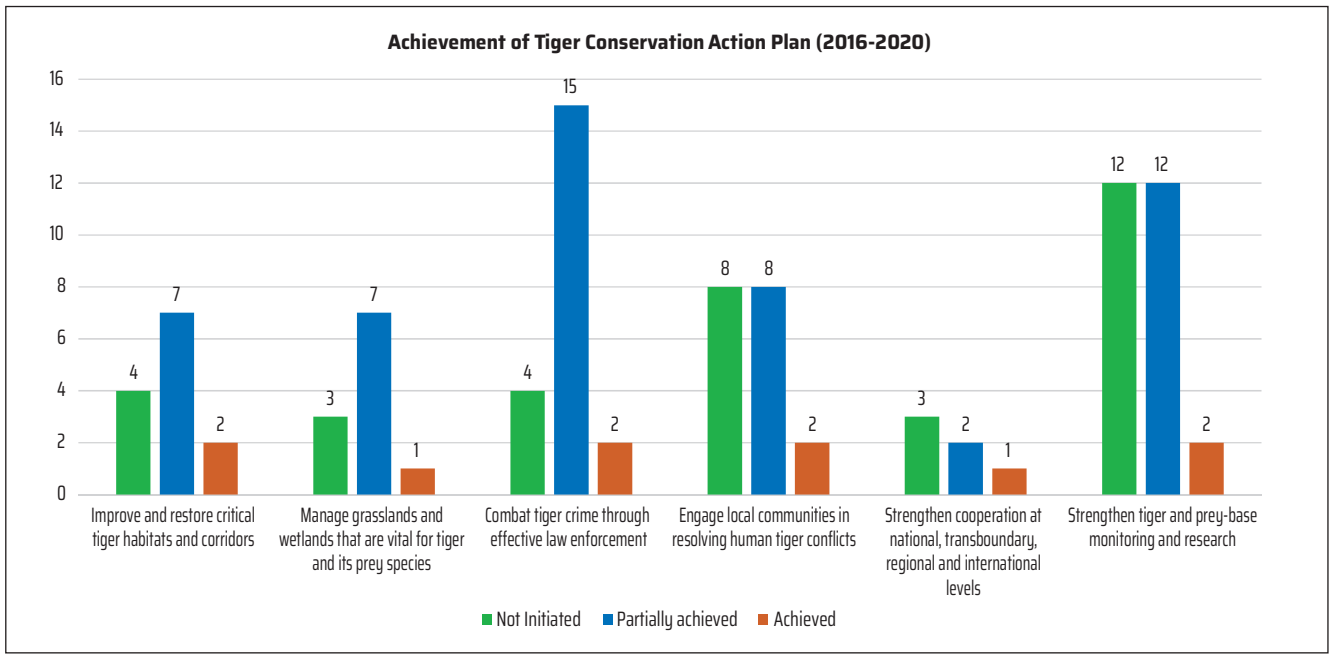


Figure 3: Implementation status of tiger conservation action plan (2016-2020)

Table 3 : Implementation status of the previous action plan

Tiger Conservation Actions	Not Initiated	Partially achieved	Achieved
Improve and restore critical tiger habitats and corridors			
Prepare land use map of protected areas and forest corridors focusing on wetlands and grasslands		■	
Declare identified corridors as eco-sensitive zones	■		
Monitor land use change using remote sensing and aerial drones wherever applicable		■	
Select, design and construct wildlife-friendly flyovers or underpasses (as appropriate) at strategic locations of biodiversity hubs for wildlife movement		■	
Connect major blocks of wildlife habitat through corridors for maintaining the ecological integrity			■
Prioritize climate resilient patches of forest for conservation in the northern flanks of TAL	■		
Restore forest patches for enhancing connectivity in major corridors : Brahmadev, Laljhadi-Mohana, Basanta, Khata, and Kamdi		■	
Evacuate and restore the encroachments in corridors and other important tiger habitats	■		
Develop standard norms for green infrastructure development in tiger habitat			■
Support livelihood improvement programme that enhances greenery in degraded corridors		■	
Advocate for social and environmental assessment at the plan, programme and policy level for development of mega projects before undertaking EIA at an individual project level		■	
Conduct feasibility study of potential tiger habitat across the TAL	■		
Construct water recharge pond and water harvesting dams in Chure and foothills to provide water for tiger and preybase		■	
Manage grasslands and wetlands that are vital for tiger and its prey species			
Identify, classify and map all critical grasslands and wetlands in all tiger-bearing PAs and critical forest corridors outside PAs after inventories of grasslands based on their species compositions, and assess their successional dynamics to inform management prescriptions	■		
Improve and manage key grassland habitat through prescribed management interventions		■	
Reintroduce wild water buffalo and swamp deer into CNP to maintain wetlands and grasslands (these animals are ecological engineers that can maintain wetlands through wallowing and grazing).		■	
Provide forest fire-fighting training and equipment support to staff and communities		■	
Identify fire-prone habitat in the TAL and take appropriate measures to reduce fire risk	■		
Control invasive species in protected areas, buffer zones, and corridors		■	
Restore degraded watersheds in the Chure hills, especially in PWR and BaNP		■	
Conduct periodic assessments of water quality in wetlands, water holes and rivers in tiger bearing habitat, especially to monitor for agricultural chemicals and industrial effluents	■		
Prepare site management plans for wetlands (prioritize Ramsar sites)		■	
Manage wetlands and waterholes to prevent them from silting and drying up in the dry season		■	
Engage communities to restore and manage wetlands in the corridors and other potential tiger habitats			■
Combat tiger crime through effective law enforcement			
Implement android based Real-Time SMART patrolling system and other advanced technology as appropriate.		■	
Conduct training for protected areas staff and communities anti-poaching units on the use of new technology.		■	

Conduct sweeping, camping and long-range operations in protected areas.			
Improve the wildlife crime investigation process and enhance the evidence collection system through capacity building and training			
Conduct awareness-raising programs on anti-poaching and conservation related laws.			
Engage sniffer dogs in anti-poaching operations.			
Strengthen, build capacity and mobilize community based anti-poaching units in all PAs in TAL.			
Provide capacity building trainings to PA and DFO staff.			
Install closed circuit television (CCTV) in sensitive areas, as appropriate, and build capacity to operate and maintain these systems			
Strengthen informant networks, information gathering and communication networks for anti-poaching operation.			
Strengthen Wildlife Crime Control Bureaus in 2 districts (Makawanpur and Dang).			
Conduct interaction programs among park staff protection units and CBAPUs.			
Provide equipment and logistics support to maintain and improve anti-poaching operations			
Initiate the formation of anti-poaching units in Banke NP.			
Develop a national anti-poaching strategic plan, with sub-plans for each tiger-bearing PA and DFO			
Provide training on CITES implementation at all levels.			
Provide motorized wooden boats for regular river patrolling.			
Establish a well-equipped Rapid Response Team to rescue stray and problem animals			
Introduce new technology to aid in tackling wildlife crime			
Install the hoarding boards and display material in the customs and airports.			
Provide the capacity building and sensitization training to the staff of customs and airports.			
Engage local communities in resolving human tiger conflicts			
Organize campaign and interaction program to raise conservation awareness among youth.			
Prepare training curriculum and relevant materials for Nature Guides.			
Celebrate world tiger day on 29th July every year and take opportunity to promote tiger conservation awareness during other green days (Wildlife Week, Environment Day, World Rhino Day, Wetland Day, Biodiversity Day)			
Organize observation tours for social activists for spreading tiger conservation message.			
Organize cross learning observation tours for community based anti-poaching units to transboundary parks in India.			
Provide problem animals management/handling techniques training to park staff and DFOs and prepare a manual on rescue and handling of stray tigers,			
Establish wildlife relief fund and continue support to sustain it.			
Construct trenches at strategic locations in BaNP (Balapur, Mahadeva, Dhakeri, Khadgawar, Chyama, Gotheri, Gaabar).			
Promote alternative and repellant cash crops in the buffer zones.			
Provide support for installing solar fence and their maintenance.			
Provide support for constructing temporary towers for crop protection.			
Provide the financial relief support to the victims of wildlife attack according to the wildlife damage relief support guidelines approved by the government.			
Revise wildlife relief guidelines to make it simpler and user friendly.			

Initiate and develop online database for proper and systematic documentation of conflicts			
Develop and implement strategic mitigation measures to reduce conflicts.			
Develop rescue and rehabilitation center for problem and orphan wild animals including tigers.			
Provide capacity building training to enhance staff's skill on negotiation, mediation and conflict resolutions.			
Initiate tri-monthly meeting of the relevant stakeholders to review progress on combating wildlife crime.			
Strengthen cooperation at national, transboundary, regional and international levels			
Commence complementary transboundary efforts to combat illegal wildlife trade.			
Organize regular and periodic meetings and workshops at transboundary level			
Introduce innovative transboundary conservation interventions practiced elsewhere in the region.			
Conduct periodic meeting between the development sectors and conservation sectors to review the development plans and their impacts on wildlife habitat.			
Share the information and intelligence regarding transboundary issues of wildlife conservation.			
Conduct the intensive consultative and coordination meetings, presentations between the development agencies and conservation agencies while planning and implementing the mega development projects.			
Strengthen tiger and prey-base monitoring and research			
Design a common standard to measure the extent of human wildlife/tiger conflict in Nepal			
Conduct studies on the scale, extent and local variations in the intensity of human wildlife conflict (tiger and ungulates) to help identify and design effective mitigation measures			
Establish permanent experimental plots (control and treatment) to gather information pertaining to grassland management, carbon and biodiversity monitoring			
Establish research stations at Chitwan-Parsa Complex, Banke-Bardia Complex and Kailali-Kanchanpur Complex			
Continue long term monitoring of tiger prey base using approved protocol			
Continue long term monitoring of tiger by camera trapping following approved protocol			
Monitor problem tigers, equipped with satellite telemetry			
Undertake an assessment of tiger population viability and carrying capacity in TAL			
Enhance the forensic capacity at national level			
Undertake research on invasive species control			
Initiate long term study programs to understand vegetation dynamics in response to specific management practices, altered hydrological regimes and climate change impacts			
Initiate serum banking of opportunistic capture for disease surveillance			
Commence study of tourism impact on biological diversity in TAL			
Conduct an economic valuation of tiger bearing protected areas			
Provide training focusing on database development and management			
Support rangers for certificate courses at Wildlife Institute of India (WII), India			
Support Assistant/Conservation Officers for Diploma in Wildlife Management at WII			
Conduct conflict management training			
Provide training on wildlife health, wildlife rescue and restraining methods for Veterinary staff			
Establish monitoring plots and transect lines in forests and grasslands			
Undertake intensive research on transboundary movement of tigers and the use of corridors, buffer zones and human land-use areas through satellite radio telemetry			

Conduct and monitor management effectiveness of the site where restoration, relocation or other notable management interventions have occurred		■	
Support studies on impacts of land use change, infrastructure and other development on tiger and prey base populations			
Establish long-term monitoring programs to understand vegetation dynamics in TAL in response to specific management practices, altered hydrological regimes, and climate change impacts	■		
Undertake detailed studies on ungulate-habitat relationships and the feeding ecology of ungulates		■	
Develop studies on the socio-economic and cultural drivers of human-nature interactions in the TAL	■		

4.2 Major lessons

- Securing tiger habitat and functional forest corridors is essential to enhance gene flow across the landscape and ensure the long-term survival of the species. This requires meaningful cooperation and collaboration among multiple stakeholders and careful conservation planning to prevent the detrimental effects of anthropogenic activities on tigers.
- The action plan tilted more towards doubling the species. Hereon, an adequate attention should go to strike a balanced state ofhuman-tiger co-existence.
- Promoting conflict mitigation measures such as electric and/or mesh wire fences and predator-proof livestock corrals, educating local communities about wildlife behavior, and managing problematic wildlife in time are instrumental in reducing human-wildlife conflict.
- It is essential to streamline the roles of communities' roles and local and provincial governments through timely policy, legal, and institutional reforms.
- Since better cooperation and collaboration among the stakeholders produced better outcomes in the recent past, it should remain as a crucial step to reduce both the wildlife crimes and human-wildlife conflicts.
- Technology has not only assisted management in many ways, but also helped to validate the progress. Therefore, use of available technology should remain as a priority task.

Chapter 5

Issues, Threats, Challenges & Opportunities

5.1. Issues

5.1.1 Issues related to habitat and dispersal corridors

- Habitat degradation triggered by the invasion of alien invasive species, especially *Mikania micrantha*, *Lantana camera, and Parthenium hysterophorus*.
- Habitat fragmentation and dissection of corridors due to biodiversity unfriendly linear infrastructure such as roads and irrigation canals etc., and encroachment.
- Excessive mining of boulders, gravel, and sand, especially from rivers and riparian areas.
- Overgrazing by livestock in corridor forests and peripheral areas of tiger-bearing PAs (such as ShNP, PNP, and BaNP).
- Drying up of and encroachment by invasive plant species in wetlands, including ox-bow lakes.
- Shrinkage of grasslands and grazing lawns due to the growth of woody perennials in core areas of PA.
- High anthropogenic pressure in the forests in buffer zones and outside protected areas.

5.1.2 Issues related to wildlife crime

- Inadequate network of law enforcement agencies at district, province, and central levels.
- Increasing trend of demand for tiger parts in the international black market.
- Under-equipped anti-poaching units and a limited network of informants and intelligence generation.
- Difficulty in finding the scene of crime and evidence collection inside the forests where the crime scene has to be mapped.
- Insufficient reliable forensic laboratories.
- Inadequate resources to park staff and WCCB units at the district level.
- Porous international borders with India and China.
- Poor surveillance at the airports, customs, and international borders.

5.1.3 Issues related to human-tiger conflicts

- Increasing human casualties from tigers.
- Lengthy relief fund delivery process to wildlife victims.
- Insufficient livelihood support programs for wildlife victims and their families.
- Inadequate monitoring systems, techniques, and technology to identify problem causing tigers.
- Low level of awareness of tiger behavior and safety measures.
- High dependency of local communities for forest produce collection in tiger-inhabited forests of the buffer zones and the corridors.
- Poisoning and retaliatory killing of tigers.
- Livestock depredation by tigers.
- Encounter with the tiger while using the public right of way in the core area that passes through the tiger habitat.
- Insane perception, knowledge, and human behavior toward tigers.
- Insufficient knowledge, capacity, and priority of provincial governments on human-tiger conflict.

5.1.4 Issues related to national and trans-boundary cooperation

- Cross-border poaching and illegal wildlife trade between Nepal and India and Nepal and China.
- Inadequate consultative meetings at the local level, mainly with China.
- Inadequate intelligence and information sharing among neighboring countries.
- Inadequate coordination and support between development agencies and conservation agencies, especially for the construction of mega-infrastructure projects.

5.1.5 Issues related to the knowledge base

- Inadequate knowledge of tiger ecology, demographic patterns, and population dynamics, particularly outside protected areas.
- Insufficient knowledge of the ecological functionality of the protected area and corridors.
- Inadequate linkage of science to policy for tiger conservation.
- Inadequate knowledge of anthropogenic impacts on tiger and its habitat.
- Lack of reliable forensic facilities for individual tiger identification.
- Limited information on population viability and carrying capacity of tigers.
- Limited national capacity for forensic science and wildlife diseases.
- Insufficient knowledge of human-tiger coexistence in future climate-change scenarios.

5.2. Threats

5.2.1 Habitat loss and fragmentation

Historically, there was contiguous forest cover across the Terai and Chure regions of Nepal. Sixty percent of forest cover in the 1960s dwindled to 29% in the 1990s. Nepal lost 5,700 km^2 of natural forests during a span of 27 years, i.e., from 1964 to 1991. Out of the total area of 3,800 km^2 was converted into agricultural land. The latest forest resource assessment of Nepal shows that 76.70 % of the core area and 23.30 % of the buffer zone is covered by forests (DFRS, 2015). After malaria eradication, the great influx of migrants from the hills into Terai resulted in the forest loss thereof for settlements and agricultural lands. Linear infrastructure projects- roads, railroads, irrigation canals, etc.- are time and again proposed in both protected areas and corridors. Moreover, every possible effort is being made to use these forest areas to address the issues of landless people. Recent research has also suggested that the implementation of similar development projects without adequate planning will fragment tiger habitat, resulting in a loss of potential connectivity for tigers among PAs of Nepal (Bhatt et al., 2023; Subedi et al., 2021a; Thapa & Tuladhar, 2021).

Moreover, at least some sections of the East-West highway pass through all five tiger-bearing PAs; hence an increase in wildlife road kills has been registered over the years. To complicate the situation, poorly designed irrigation canals through BNP and BaNP are like hurdles in the movement of wildlife in their core habitat. Although designed to address the movement of elephants and other wildlife in a few places, underpasses and overpasses in the Kathmandu-Terai fast track road will not be adequate in number to ensure the free passage of wildlife. The authorities' proposal to build a railway track through the core area of CNP was met with initial resistance from local stakeholders. However, after dialogue, the authorities agreed to withdraw the proposal and realign the track. There is no denying that citizens are entitled to better facilities, but the need of the hour is to design conservation-friendly development projects in concord with landscape-level conservation planning. However, local people, some politicians, and some institutions are lobbying for two road proposals, Kasara- Madi-Bankatta in CNP and Bhurigaon -Telpani in BNP, which may cause irreparable loss if accepted in present forms. In addition, the ritualistic nature of environmental impact assessment and implementation of impact mitigation measures does not help strike a balance between conservation and development. It is worth mentioning that the habitat fragmentation limits the dispersal potential of new individuals, which may result in inbreeding depression in the long run. Thus, habitat loss, degradation, and fragmentation limit the growth and even subsistence of tigers.

5.2.2 Habitat degradation and prey-base population depletion

The quality of tiger habitat is a part of healthy ecosystems. Tiger density depends directly on prey availability (Karanth et al., 2004). Prey density in the protected areas is relatively good but very low outside PAs in Nepal (DNPWC, 2020). Widespread hunting of prey species, especially outside the protected areas, has been documented across the Chure range of Nepal (Subedi et al., 2021b). Continued illegal hunting outside PAs also contributes to the depletion of the natural prey base. Inadequate large or medium-sized prey cannot support viable tiger populations (Karanth et al., 2004).

Since most of the tiger habitats are encircled by agrarian communities; hence, they depend on forests for fodder, grasses, firewood, livestock grazing, etc. Besides those communal activities, forest fires and the spread of alien invasive species are ubiquitous. Similarly, floods, pollution, and land loss because of the meandering river system and siltation are other important concerns in tiger habitats. Livestock grazing in the forests, especially in the western TAL, has increased the competition with wild prey. A survey of the entire *Chure* range shows over 50% of the area is grazed by livestock (Subedi et al., 2021b)**.** Consequently, the ideal habitats are altered,-and the government needs to be more concerned about the activities.

5.2.3 Invasive species

Major invasive alien plant species that adversely affect tiger habitats are *Mikania micrantha, Chromoleana odorata, Parthenium hysterophorus,* and *Lantana camera*. *Mikania* grows in marshy and riparian habitats and is spreading rapidly from east to west. This species has already been recorded in Kapilbastu, Dang and may reach Banke and Bardia. *Mikania* suppresses the growth of other native plant species on which tiger prey species depend. The spread of *Mikania* is exacerbated by disturbances, such as fire, annual flood, and human-mediated dispersal. *Lantana* and *Chromolaena* have spread in all tiger-bearing protected areas. *Lantana* is a woody perennial that grows well on alluvial soils and aggressively invades open grasslands but also does well in forest ecosystems. *Chromolaena* grows in almost all environments and suppresses the growth of native vegetation. Water hyacinth *(Eichornia crassipes)*

is prevalent in all lowland lakes, including ox-bow lakes, and encourages siltation and drying up of wetlands. Other invasive species that adversely impact tiger habitats include *Ageratum conyzoides*, *Ageratina adenophora,* and *Parthenium hysterophorus*.

5.2.4 Wildlife poaching and trafficking

Poaching of tigers and their prey and the trafficking of tiger body parts are major threats to tiger conservation across all tiger range countries. The increased number and volume of seizures of tiger bones and skins across Nepal in recent years indicate that tiger poaching and illegal trafficking are still a critical threat to the tigers in Nepal, despite the numerous steps taken to arrest poaching and poachers. In 2015 alone, 15 tiger skins and 121 tiger bones were confiscated during 14 different seizures. Reportedly, Nepal is both a source and transit country for illegal wildlife trade between India and China, and Kathmandu is a major staging point for the illegal trade in the region. The porous border with India and China and extensive international airline connections without world-class security arrangements aren't enough to check adequately the trafficking of tiger and other wildlife parts from Nepal.

5.2.5 Human-tiger interface

Everyday occurrences of human-wildlife conflicts in Nepal are escalating unpleasant moments in the society. If these remain inadequately addressed, they may jeopardize the astonishing success of tiger conservation. For example, between 2018 and 2021, there has been an increase in the number of human fatalities from tiger attacks by 425% and the loss of livestock by more than 234 % (DNPWC, 2019, 2022a). Sadly, the upward trend of graph human casualties by tigers is a painful experience in the country. It is shocking to see an accretion from an average of 1.2 (±1.2) persons per year prior to 1998 to 7.2 (±6.9) persons per year from 1998 to 2006 (Gurung et al., 2008). Since 1994 to date, 30 and over 100 fatal tiger attacks on people have been reported in BNP and CNP, respectively, and 34 tigers have lost their lives due to the human-wildlife conflict since 1979 (Bhattarai et al., 2019)an unwelcome consequence of greater tiger numbers is the increased prevalence of human-tiger conflict (HTC. Livestock depredation by tigers and human casualties due to accidental attacks and man-eating behavior of some tigers are the major reasons for tiger-human conflicts. The underlying causes of human-tiger conflict are increasing tiger density, habitat shrinkage and degradation, and increasing human-tiger interface along the park boundaries. Moreover, crop damages by the wild ungulates in the buffer zones add to the sustained hostility of the communities. In some parts of tiger habitats, livestock grazing has also amplified the chances of livestock depredation by tigers. In light of the facts, several confidence-building steps have to be taken aggressively to ensure the goodwill of the maximum number of citizens in this noble cause. These increasing incidences of the human-tiger conflicts create a burgeoning pressure on the limited resources available for tiger conservation. For example, the relief amount disbursed to wildlife victims increased from 8.91 crore (NPR) in 2018 to 17.28 crore (NPR) in 2021, an increase of 94% (DNPWC, 2019, 2022a). Therefore, preventing human-tiger conflict remains a major priority for effective tiger conservation in the country.

5.2.5 Diseases

Recent studies regard infectious diseases as emerging threats to the tiger and demonstrated that free-ranging tigers are exposed to a range of feline pathogens such as feline coronavirus, canine distemper virus, feline parvovirus, and toxoplasma gondii (Goodrich et al., 2015). Sadly, two cases of rabies were also reported in India (Mazák, 1981). Canine distemper is a fatal disease that observed large-scale mortality of African lions and rabies in Ethiopian wolves, which will also be potential threats to the tiger population. The impacts of infectious diseases can increase in small populations with decreased genetic diversity. Identification of potential pathogens and the development of mitigation strategies to decrease their potential impact should be an important part of the ongoing conservation efforts of wild tigers (Thomas et al., 2016).

5.2.6 Climate change impacts

Increasing climate variability is likely to result in extreme weather conditions, which include–prolonged drought conditions as well as increased floods and flash floods. Water stress can threaten tigers and prey species in the dry season and may escalate into conflicts causing injuries and damage. Increased contact among wildlife, livestock, and people can transfer each other zoonotic diseases. Impacts of high flash floods in wildlife habitats, especially in riparian areas, were experienced in the past. But the impacts can persist long after the flood water recede, as grazing lawns are buried under sand depositions and water holes are filled with mud. In the long term, rising temperatures and changes in precipitation patterns and intensity due to climate change will impact vegetation types and composition. This may result in major shifts or changes in wetlands, grasslands, and forest types and their species compositions. Those changes will invite more frequent and intense forest fires due to warmer conditions and longer droughts.

5.3. Challenges

5.3.1 Maintenance of healthy large prey-base

Prey biomass plays a key role in either improving or at least maintaining tiger density. It is a major challenge to increase the prey density, particularly large prey, for tiger conservation. In this regard, reintroductions of large prey- Indian bison from Chitwan to Babai valley, wild water buffalo from Koshi to Chitwan, swamp deer from Shuklaphanta to Chitwan, Bardia or Koshi will be key to maintaining a healthy tiger population.

5.3.2 Impact of linear infrastructure

The number and coverage of large-scale linear infrastructures are likely to increase in TAL, Nepal, and beyond. They will further fragment the already fragile forest habitats. It is high time policymakers and development partners revisited the process to save critical tiger habitats.

5.3.3 Management of problematic tiger

From 2019 to 2023, a total of 38 people succumbed to tiger attacks. An analysis of the data shows that most attacks were in the daytime (97%), and attacks are more frequent in the corridors such as Khata, Basanta, and Barandabhar. Managing an increasing number of problematic tigers remains a daunting task, both financially and technically, for protected area managers. Zoos and rescue centers are already overwhelmed with problematic tigers. A comprehensive protocol is urgently needed to cope with the rescue, handling, and rehabilitation of problem animals. The government often struggles with resources to fund the purchase of radio collars, camera traps, and medical equipment.

5.3.4. Linkage of tiger conservation to the local economy

The dedicated fund to ensure sustainable financing for tiger conservation and community development projects is regarded as a sustainable way. It is anticipated that both government and conservation partners align their resources with the identified projects. All three tiers of governments have been investing in tiger conservation and human-tiger conflict mitigation; nonetheless, they need to work in close cooperation with each other. Besides the government fund, there are various possibilities to explore financial resources such as payment for ecosystem services, public-private partnerships, corporate social responsibility, and carbon finance, etc. DNPWC can take the lead in convincing policymakers to set up a conservation trust fund and an impact mitigation fund.

5.3.5. Management of dispersing tiger habitat and tiger population

Tigers were recorded in high altitudes, i.e., Ilam (3,165 m) in 2021 (Bista et al., 2021) and Dadeldhura (2,511 m) in 2020 (Mandal, 2020). Moreover, while existing corridors exist to provide passeges to tigers dispersing between India and Nepal, little information is available on the functional status of the corridor. Furthermore, a recent study by Bhatt et al., (2023), identified potential tiger corridors connecting tiger-bearing PAs of Nepal through the Chure range. Similarly, eastern Terai, including Koshi Tappu Wildlife Reserve and Trijuga forest; *Mahabharat* range; *Chure* range; and high-altitude large forest patches are considered as climate refugia and potential habitats for tiger dispersal. Conservation of these key dispersing routes and climate refugia is a priority action for tiger conservation. However, conserving tigers within these human-dominated landscapes may be a significant challenge.

5.3.6 Collaboration and coordination

It is true that the government aggrandized its power to get things right in the early days of conservation. It took a bit long time to agree upon the agenda

that the best possible effort of the stakeholders is key to achieving successful conservation in a large geography, i.e., a landscape. Nobody can disagree that meaningful coordination is regarded as an important element in the success in tiger conservation here. Government agencies, conservation partners, media, civil society, international communities, and citizens all have played their innings to gear up tiger conservation to this level. The Nepal Army has done a wonderful job in biodiversity conservation. Moreover, the CIB pillar IV of Nepal police has done a good job of controlling the illegal wildlife trade and putting some kingpins behind bars. However, there is always a room for more inter-sectorial collaboration and coordination as new threats emerge over time.

5.4 Opportunities

5.4.1 Priority species for conservation

Tiger conservation is not only a matter of pride but also a means of prosperity for the country. Since humans have pushed many species to the point of extinction, it is our ethical duty to safeguard the species that we have. In this regard, several segments of society increasingly support the process, including local communities, youth, policymakers, and conservation partners. Naturally, the synergism developed among the partners, yielding a result for tiger conservation that has drawn accolades from many corners of the globe.

5.4.2 Landscape conservation

The tiger is a wide-ranging species requiring a large territory for long-term conservation. Since the mid-seventies, the government has made every possible effort to develop a network of PAs in the Terai. Landscape-level conservation approach aids in maintaining contiguous tiger habitats in PAs and other surrounding habitats and benefits many other wildlife species. For example, leopard occupancy is much higher in the Terai Arc Landscape (TAL) compared to similar habitats in the east of TAL (Thapa et al., 2021).

5.4.3. Tiger-based tourism

The promotion of tiger-based tourism alone can generate the necessary funds for biodiversity conservation while uplifting the local communities' economic status. The pledge of the national and international conservation organizations to uphold the government's policies for tiger, among other things, conservation is praiseworthy.

5.4.4 Enabling policy and institutions

The round-the-clock effort of the law enforcement agencies has paid off. There has been a significant achievement in controlling poaching and illegal trafficking of wildlife parts. Achieving and maintaining zero poaching years of rhinos in a row thereafter is worth reiterating. It goes without saying that this effort equally benefitted tiger conservation as well.

5.4.5. Carbon trade

A lot of preparation and effort has to be made to gain and maximize the benefit from carbon trade. The country is very much in the direction of gaining a lot of financial incentives through carbon trade from well-managed forests and corridors.

5.4.6. Conservation funding

It is a matter of an ineffable joy for a rational person to see a charismatic flagship species like a wild tiger. In other words, it is a quintessential example of natural beauty. Its dwindling number in the past set the ground for global partnerships to make every possible effort to ensure its survival for the generations to come. Therefore, there is always a great possibility of generating assistance, both financial and technical, from across the globe for its betterment.

5.4.7. Payment of ecosystem services

The landscape meant for tiger conservation yields various ecosystem services such as water recharge, fresh air, carbon sequestration, and disaster risk reduction. It is high time policymakers came up with a policy to make the users pay for ecosystem services they avail of.

Chapter 6

Tiger Conservation Action Plan

6.1 Goal

Conserve the tiger and its habitat by maintaining ecological, economic, and sociocultural integrity and the well-being of the communities.

6.2 Objectives

Objective 1: Secure tiger habitats and corridors

Rationale

The increasing demand for land by an increasing human population for settlements and agriculture expansion and the large linear infrastructure developments are the major drivers of tiger habitat loss, degradation, and fragmentation at a landscape scale. Drying wetlands, spreading alien invasion species, and forest succession in important grasslands also degrade important tiger habitats in the core areas. Whereas overgrazing by livestock and unsustainable forest resource use are degrading dispersal corridors. A study by Thapa et al. (2018) found that Nepal's tigers have moderate levels of genetic variation, which is likely due to large-scale land use change and habitat fragmentation in the Terai forest over the past two centuries. This finding was corroborated by a recent study by Bhatt et al. (2023), which identified several corridor bottlenecks in the landscape-features that hinder the species connectivity. Despite this concerning evidence, several significant linear infrastructure projects, such as the expansion of the current east-west highway, the development of the postal (*Hulaki*) highway, the construction of the Kathmandu-Terai fast track, the implementation of the east-west railway, and multiple irrigation projects, are either underway or being planned in the Terai/ Chure landscape. The implementation of any of these projects will severely fragment tiger habitat within the core areas and sever corridors, threatening the long-term survival of tigers in Nepal and reversing more than a decade of conservation investment and successes achieved. Thus, it is highly recommended to either revisit or realign the development infrastructure to prevent further fragmentation of core areas. The design with adequate mitigation measures, such as viaducts and wildlife underpasses, can be an optimal solution to maintain corridor functionality where infrastructure cannot be realigned.

Grasslands, water holes, riparian vegetation, and other mosaic habitats are the pivotal areas for the tiger and its prey. There are limited grasslands to support herbivores in BNP, BaNP, and PNP. It is worrisome that the coverage of grassland ecosystems is decreasing due to succession and encroachment by woody perennials over the years. The rivers maintain the mosaic, including grassland and riverine forest, through flood dynamics and natural succession. Due to obstructions in the natural flow of rivers due to several artificial structures therein, the functionality of grassland is degrading as well as its ecosystem is converting into a higher successional forest ecosystem. In recent years, both the GoN and conservation partners have focused immensely on exploring more sustainable methods, such as mechanical grassland management.

A good combination of small grasslands and waterholes does produce a habitat mosaic that increases the productivity of the habitat. The grassland management practices are still based on orthodox ideas. Some managed grassland patches are plagued by aggressive colonization of *parthenium* and woody perennials. Scientific grassland management, with site-specific interventions based on the moisture content, area, and local characteristics, as well as the right time, duration, technique, available cutting-edge technology, and specific requirements of prey species, can produce better outcomes.

Most of the historical tiger habitats with abundant water sources are now occupied by human settlements. The remaining tiger-ranging *Bhabar* and foothills of *Chure* is water scarce zone. The available water sources and wetlands are drying due to prolonged droughts and silt deposition from rivers that originate and flow through degraded catchments, creating water scarcity during the hot and dry seasons. Moreover, encroachment, pollution, and excessive exploitation of resources therein limit the available potable water and wetland resources. Furthermore, climate change will amplify and expedite the magnitude of these existing anthropogenic threats. Most of the prominent tiger habitats are invaded by invasive species such as *Mikania, Lantana, Chromolaena,* and *Parthenium,* resulting in the suppression of the indigenous vegetation, such as the palatable food for browsing and grazing ungulates that form the prey base for tigers.

The availability of large-sized prey species has an impact on a tiger's health. The abundance of large prey like wild water buffalo, blue bull, and Indian bison should be maintained. To maintain an adequate prey base, species translocation programs were conducted in the past; nevertheless, some ended in abortive attempts. Findings signal that more research is required in this regard. Some failures should not stop the translocation of species because these practices promote science-based conservation in the long run.

Moreover, several studies have shown that prey species are always in danger of being infected with zoonotic

diseases like foot and mouth diseases, rinderpest, etc. Similarly, the predator itself may fall prey to canine distemper and other viral diseases from livestock and human beings. To minimize the possibility, the authorities should be concerned about the healthy prey base for tigers. This can be maintained by ensuring a healthy habitat for the prey species. Healthy habitat for prey can be achieved by scientific management of food, cover, water, and space for specific prey species. In this way, maintaining the secured tiger habitats is necessary to maintain viable metapopulation of tigers and their prey species.

Objective 1: Secure tiger habitats and corridors		
Outputs	**Actions**	
(A) Strategic policies, plans, and monitoring mechanisms developed	A.1.	Prepare and periodically update tiger habitat suitability and land-use/land cover change map for current and future climate scenarios for all tiger-bearing protected areas and forest corridors.
	A.2.	Identify potential sites and conduct a feasibility study of potential tiger habitats across the Chure, Mahabharat, and high-altitude regions.
	A.3.	Assess the functional status of the existing corridors and identify potential new corridors among protected areas and potential tiger habitats.
	A.4.	Prepare and implement encroachment management and relocation plan for corridors, buffer zones, and identified potential tiger habitats.
	A.5.	Develop and implement a habitat management plan for the identified corridors and potential high-altitude tiger habitats with a particular focus on the sustainable management of critical wetlands and grassland habitats.
	A.6.	Monitor compliance with the implementation of wildlife-related policies, strategies, and guidelines, e.g., Wildlife-friendly Infrastructure Construction Directives 2022.
	A.7.	Conduct a feasibility study to establish protection forests in eastern Terai and Midhills with a special focus on Taplejung, Panchthar, Ilam corridors, and Trijuga forest.
	A.8.	Develop and implement a strategy and action plan for controlling invasive species.
	A.9.	Develop procedures and guidelines to regulate the extraction of riverbed materials.
	A.10.	Implement the mitigation measures prescribed by the EIA and IEE reports and monitor compliance.
(B) Tiger habitats in the core areas, buffer zones and corridors are restored and reclaimed	B.1.	Restore and conserve major blocks of wildlife habitat such as protection forest areas, community-conserved areas, and other areas of corridors to maintain the ecological connectivity and integrity across TAL and high-altitude tiger habitat.
	B.2.	Restore forest patches for enhancing connectivity in major wildlife corridors; such as Brahmadev, Laljhadi-Mohana, Basanta, Khata, and Kamdi.
	B.3.	Facilitate relocation of settlements from corridors and other important tiger habitats and restore encroachment areas.
	B.4.	Support agroforestry and private forest to enhance greenery in degraded corridors and high-altitude tiger habitats.
	B.5.	Provide forest-fire fighting training and equipment support to staff and communities.

	B.6.	Implement appropriate fire management strategies such as timely clearing of fire lines, controlled early burning of hazard-prone areas, mobilizing firefighting teams, constructing fire hydrants with water facilities, etc., to mitigate fire hazards.
	B.7.	Relocate settlements from the critical corridors such as Bhiman of PNP and Sikaribas of CNP by providing other livelihood options and compensation mechanisms.
	B.8.	Develop Kositappu Wildlife Reserve as a tiger habitat by connecting it with the hill forests up to the Chatara Dham through the extension of the reserve northward.
	B.9.	Promote wildlife tourism-focused community forest management in corridors and potential tiger habitats within the Chure and Mahabharat range.
	B.10	Promote private forests near protected areas and corridors as climate refugia.
	B.11	Prepare forest fire incident map and database, and develop an alarm system.
	B.12.	Strengthen institutional capacity for forest fire surveillance and control.
(C) Impact of linear infrastructures on major tiger habitats and corridors mitigated	C.1	Ensure proper implementation of Wildlife-friendly Infrastructure Construction Directives 2022 in tiger habitats in coordination with concerned stakeholders.
	C.2	Ensure Social and Environmental Impact Assessment before the development of all infrastructure projects where applicable and effective implementation of the recommendations therein.
	C.3	Identify potential sites for wildlife-friendly infrastructure.
	C.4.	Select, design, and construct wildlife-friendly flyovers or underpasses at strategic locations, i.e., Barandabhar, CNP; Banke, Parsa, and Bardia National Parks.
	C.5.	Restrict development projects in the core area and important corridors.
	C.6.	Enhance engagement with infrastructure planners and developmental agencies to promote wildlife-friendly infrastructures and integrate effective mitigation measures in the infrastructural planning process.
	C.7.	Develop measures in existing linear infrastructures in coordination with the line agencies (for example - automated barriers to maintain speed limits, digital tracking of passing vehicles, and construction of over/ underpasses or guiding fences in vulnerable sites to provide safe routes for wildlife).
(D) Grasslands are scientifically managed and maintained	D.1.	Develop and implement habitat management guidelines to improve and manage key grasslands across all tiger habitats.
	D.2.	Create invasive species free grazing pastures in core protected areas to increase the food availability for herbivores.
	D.3.	Implement appropriate measures to reduce fire risk, such as controlled fire burning and establishment of fire breaks to reduce the risk of grassland fires across all fire-prone habitats in the TAL.
(E) Safe, secure, and perennial wetlands and water resources for tiger and prey ensured	E.1.	Identify, classify, and map all critical wetlands in all tiger habitats.
	E.2.	Restore existing degraded watersheds and construct new perennial water recharge ponds and water harvesting dams in the Chure hills, especially in PNP and BaNP, to provide water for animals during dry seasons.
	E.3.	Reduce the use of hazardous pesticides in agricultural land in buffer zones and conservation areas.
	E.4.	Clean and remove weeds and alien invasive species from wetlands.
	E.5.	Install additional solar pumps to recharge the water holes and maintain and repair existing pumps.
	E.6.	Conduct periodic assessments of water quality in wetlands, water holes, and rivers in tiger-bearing habitats, especially to monitor compliance with the discharge of agricultural chemicals and industrial effluents, and sewage to the water sources.
	E.7.	Update site management plans for wetlands of international importance (Ramsar sites).
	E.8.	Manage wetlands and waterholes to prevent them from silting and drying up in the dry season.

	E.9.	Engage communities and local governments to restore and manage wetlands in the corridors and other potential tiger habitats.
	E.10.	Enable buffer zone communities to effectively manage waterways, riparian, and ponds.
	E.11.	Facilitate the natural flow of the river system to maintain floodplain grassland habitat
(F) Adequate healthy populations of prey base for tiger maintained	F.1.	Facilitate reintroductions and recovery of large prey such as Indian bison (Chitwan to Babai Valley), wild water buffalo (Koshi to Chitwan), swamp deer (Shuklaphanta to Chitwan, Bardia, and Koshi).
	F.2.	Regulate livestock grazing in critical corridors and habitats.
	F.3.	Prevent wildlife-livestock disease transmission through periodic vaccinations of livestock in fringe areas of the tiger habitats in collaboration with the local governments.
	F.4.	Facilitate genetic exchange between isolated populations by translocation, augmentation, and restoration.
	F.5.	Foster collaborations with the central veterinary laboratory and strengthen its capacity for the detection of viral and bacterial wildlife diseases.
	F.6.	Establish incinerator facilities for the safe disposal of dead wildlife at each PA.
	F.7.	Train veterinary staff on wildlife health, rescue, and restraining methods.
	F.8.	Strengthen plant and animal quarantine facilities.

Objective 2: Combat tiger poaching and illegal trade of its parts

Rationale

There is an increasing trend of poaching and illegal trade of all major wildlife species, including tigers (Paudel et al., 2020)**.** Genetic studies of seized tiger parts in Nepal have traced their origins to ShNP, BNP, and CNP. China and Southeast Asia are evolving as a market of consumers of tiger parts mainly for traditional medicines, cosmetics, and other consumer goods. Their demands exert direct pressure on the wild tiger source population. Nepal, which has a good source population and is also a transit route for illegal wildlife trade, has been experiencing the pressure. During the period of 2011 to 2015, there were records of 830 wildlife seizures and trades across Nepal. To deal with illegal poaching and trade Government of Nepal (GoN) reformed institutional arrangements to address the existing and emerging issues on time. The formation of a body, which is headed by the honorable Prime Minister, signals the gravity of the government. There are several powerful bodies at federal, provincial, and district levels to tackle the crimes and bring the offenders to books.

Similarly, community-based anti-poaching units are being promoted at the grassroots level. It is worth mentioning that more than 4,500 local youths are mobilized under the aegis of community-based anti-poaching units (CBAPUs) to deal with wildlife crimes. The Nepal Army is accoutered with low-cost advanced technology, i.e., android-based real-time SMART patrol system, in all tiger-bearing protected areas. In this context, this action plan envisions strengthening the current efforts and building the national capacity to combat tiger and other wildlife poaching and illegal trade.

Objective 2: Combat tiger poaching and illegal trade of its parts

Outputs	Actions	
(A) Enabling policy, legislation and institutional framework for wildlife law enforcement ensured	A.1.	Develop a national anti-poaching strategic plan, with sub-plans for each tiger-bearing PA and adjoining DFO.
	A.2.	Review and revise the Nepal Army Conservation School curriculum, including the training of trainers in thus revised curriculum.
	A.3.	Develop protocols for the assessment of the security of the PAs and conduct security assessments at regular intervals.
	A.4.	Establish wildlife crime control mechanisms at the province level and form additional WCCB cells at the district level as required.
(B) Capacities of wildlife law enforcement agencies enhanced	B.1.	Improve accessibility within each PA for effective patrolling and law enforcement.
	B.2.	Conduct sweeping, camping, and long-range patrolling operations in protected areas.
	B.3.	Provide vehicles and motorized boats to patrol teams for regular patrolling, including river patrolling.
	B.4.	Provide mobility support, such as daily provisions and equipment for effective patrolling and park management.
	B.5.	Strengthen, build capacity, and mobilize CBAPUs, including the use of new technology.
	B.6.	Conduct training of trainers on patrol-based monitoring.
	B.7.	Equip tiger-bearing PAs with cross-cutting equipment like CCTV, metal detectors, poacher cams, drones, night vision binoculars, etc.
	B.8.	Provide equipment and logistics support to officials of DFOs.
	B.9.	Improve the wildlife crime investigation process using genetic profiles and enhance the evidence collection system through capacity building and training.
	B.10.	Strengthen informant networks, information gathering, and communication networks for anti-poaching operations.
	B.11.	Provide capacity-building training to PA and DFO staff on wildlife crime, forensics, and scene of crime.
	B.12.	Strengthen the capacity of CITES implementation at all levels.
	B.13.	Conduct awareness-raising programs on anti-poaching and conservation-related laws, including the installation of information boards and display materials at key entry and exit ports such as customs and airports.
	B.14.	Initiate the formation of anti-poaching units in BaNP and PNP.
	B.15.	Provide capacity building and sensitization training to the staff of customs and airports.
(C) New and appropriate technology in wildlife crime control deployed	C.1.	Install GSM-enabled surveillance cameras in additional sites.
	C.2.	Procure the logistic goods (GPS, camera, binoculars) to use them in patrolling to collect real-time and reliable information.
	C.3.	Install closed circuit television (CCTV) in sensitive areas, as appropriate, and build capacity to operate and maintain these systems.
	C.4.	Implement an android-based Real-Time SMART patrolling system and other advanced technology as appropriate.
	C.5.	Train and employ sniffer dogs for anti-poaching operations.
	C.6.	Explore and introduce new technology to tackle wildlife crime.

(D) Cooperation and coordination among law enforcement agencies and other stakeholders strengthened	D.1.	Conduct regular meetings of NTCC, WCCCC, and WCCB.
	D.2.	Strengthen Wildlife Crime Control Bureaus in additional districts.
	D.3.	Conduct interaction programs among park staff, protection units, and CBAPUs
	D.4.	Initiate tri-monthly meetings of the relevant stakeholders to review progress on combating wildlife crimes.

Objective 3: Reduce human-tiger conflict and enhance economic opportunities for the local community.

Rationale

Human-wildlife conflict is one of the grave concerns for tiger conservation in Nepal. With the uptick in tiger numbers over the years, conflicts are escalating. From 1979 to 2014, 110 fatal tiger attacks on people were reported in CNP, and from 1994-2007, 12 human fatalities in BNP (Bhattarai et al., 2019)an unwelcome consequence of greater tiger numbers is the increased prevalence of human-tiger conflict (HTC. Chitwan National Park has the highest rate of conflicts. There is an upward trend of human casualties and injuries, with an average of 1-4 injuries and 3-7 casualties during the period of 2009 to 2014 in Chitwan National Park alone. In 2019, ten human-tiger incidents resulted in seven human fatalities, tserious iunjuries to three people , and one tiger was taken into captivity. The GoN addresses the damages withcash relief scheme coupled with other assistances to the bereaved families. The long-term survival of tigers can be a reality if humans learn to co-exist with the species. Notwithstanding a knotty problem, it is doable with the several schemes to safeguard human lives and a pledge to assist the victims in every possible way.

Objective 3: Reduce human-tiger conflicts and enhance economic opportunities for local communities		
Outputs	**Actions**	
(A) Innovative policy, financial and institutional arrangement for HTC management established and operationalized	A.1.	Develop and implement the national HWC strategy.
	A.2.	Explore Wildlife Damage Relief Guidelines, 2080, to simplify claim processes, reduce delays, and enhance transparency and efficiency at all levels.
	A.3.	Establish or strengthen additional relief schemes, such as the one managed by NTNC.
	A.4.	Establish and operationalize professional market-based insurance schemes (human, livestock, property, and crops) and wildlife relief endowment fund and continue support to sustain it.
	A.5.	Establish and operationalize 'wildlife conservation funds' such as CITES fund, and PA management fund, etc., under the DNPWC.
	A.6.	Develop mechanisms and capacity to access and use carbon funds to clutch the REDD+ and climate change funds for tiger conservation.
	A.7.	Assess and utilize private sectors and corporate social responsibility investment for tiger conservation.
	A.8.	Promote the application of improved technology and innovation for the use of invasive species to generate income and employment opportunities.
	A.9.	Align the "Forest Development Fund" with the protection of important tiger corridors.
	A.10.	Develop Bardia National Park as a model tiger-tourism site and replicate its success in other tiger-bearing protected areas and high-altitude tiger habitats.

	A.11.	Promote private sector investment in tourism business in protected areas and buffer zones.
	A.12.	Facilitate and capacitate government bodies and conservation partners to secure external funds through development banks, Green Climate Fund (GCF), and GEF funds.
	A.13.	Establish effective, equitable, and sustainable human-wildlife coexistence community-led cooperatives.
(B) Human-tiger conflict reduced and maintained below thresholds	B.1.	Use cutting-edge technology (e.g., satellite collars, camera traps) to monitor the behavior of problematic tigers.
	B.2.	Initiate and develop mobile applications and an online database for proper and systematic documentation of conflict-related incidences.
	B.3.	Equip newly established animal wildlife hospital for food and care for orphan and injured animals.
	B.4.	Provide problem animals' management/handling techniques training to park staff and DFOs and prepare a manual on the rescue and handling of stray tigers.
	B.5.	Mobilize existing quick relief funds through cooperatives, and make necessary arrangements to include currently marginalized groups with legitimate claims.
	B.6.	Provide support for constructing temporary towers, fencing, and predator-proof collars for crop and livestock protection.
(C) Robust mechanism for the management of increased tiger population established and strengthened	C.1.	Develop and support rescue and rehabilitation facilities such as zoological gardens, wildlife rescue, and breeding centers for injured, problematic, and orphan wild animals, including tigers, at national, provincial, and local levels.
	C.2.	Formulate and implement operational guidelines for zoological gardens/parks, wildlife rescue, and breeding centers.
	C.3.	Upgrade and capacitate community-managed orphanages and zoos.
	C.4.	Train staff of PAs, forest departments, local governments, CBAPUs, CBOs, and Rapid Response Teams on human-wildlife conflict management
	C.5.	Promote ex-situ species conservation facilities as a center for tourism, conservation education, and research.
	C.6.	Enhance the provision of insurance and occupational safety for the employee and workers involved in handling problem tigers.
	C.7.	Build the capacity of frontline staff on problem animal handling and establish a well-equipped Rapid Response Team to rescue transient and problem tigers and prey.
(D) Livelihood and employment opportunities of local communities enhanced	D.1.	Promote alternative and repellant cash crops in the buffer zones and areas surrounding potential high-altitude tiger habitats.
	D.2.	Promote the use of alternative energy sources (biogas, improved cooking stoves, and solar energy).
	D.3.	Arrange soft loans or micro-credit for poor and marginalized people, including women, to invest in agricultural-biodiversity enterprises.
	D.4.	Promote small-scale enterprises for handicrafts and other products across critical conservation sites.
	D.5.	Promote livelihood support programs for wildlife victims' families with a particular emphasis on the promotion of tiger-based eco-tourism enterprises.
(E) Local communities' capacities and awareness to resolve HTC strengthened	E.1.	Organize campaigns and interaction programs to raise conservation awareness among youths.

	E.2.	Prepare training curriculum and relevant materials for nature guides.
	E.3.	Celebrate world tiger day on 29th July every year and take the opportunity to promote tiger conservation awareness.
	E.4.	Organize observation tours for social activists, advocacy groups, and community leaders to spread the tiger conservation message.
	E.5.	Organize cross-learning observation tours for CBAPUs to transboundary parks in India.
	E.6.	Provide capacity-building training to enhance staff's skills in negotiation, mediation, and conflict resolution.
	E.7.	Conduct behavioral change campaigns at schools and colleges.
	E.8.	Support local communities with training and tools/equipment to improve their ability to manage HWC.
	E.9.	Conduct conservation awareness programs targeting women, students, and youths.
	E.10.	Conduct school education programs to impart conservation messages.

Objective 4: Strengthen cooperation and collaboration for tiger conservation

Rationale

The gradual increase in both the number and distribution of tigers is cogent evidence to suggest that the government has made the best possible effort regardless of its limited resources. In the process, conservation partners backed up the government incessantly in every possible way to accomplish this conservation initiative in the country. However, protected area management is not just about species management; it is a holistic and multi-dimensional approach that seeks the welfare of both wildlife as well as humans. There is a need to cement the relationship of all the line agencies, organizations, local bodies, and research institutions for the conservation of wildlife in perpetuity. Department of Forest and Soil Conservation (DoFSC) is responsible for managing forests outside the protected areas- the areas that harbor quite a good number of the species. Therefore, close cooperation and collaboration among DoFSC, provincial and local governments is essential for conserving wildlife and their habitats. At the same time, the role of the organizations, be it a CBO or an NGO, is necessary for curbing poaching and controlling illegal trade in wildlife and their products.

The high demand for tiger parts in international markets persistently poses severe threats to the survival of tigers in the wild. Therefore, promoting transboundary cooperation with its neighboring countries, i.e., India and China, is important for mutual effort in protecting wild animals in either side of the countries and controlling their illegal trade. Similarly, regional and international collaboration is always necessary for conserving tigers effectively in the range states. Nepal is a signatory to several international conventions and treaties like CITES, CBD, UNESCO, Ramsar, and GTF. The SAWEN, TRAFFIC, and Interpol are seriously engaged in wildlife crime control. Nepal conducts regular coordination meetings with its counterparts in India and China.

Objective 4: Strengthen cooperation and collaboration for tiger conservation		
Outputs	**Actions**	
(A) Collaboration and coordination mechanisms at all three tiers of governments developed	A.1.	Establish or strengthen collaboration with local and provincial governments to mobilize financial resources for tiger conservation.

	A.2.	Engage provincial and local governments and conservation partners for tiger habitat management with a focus on wetland and grassland management.
	A.3.	Develop sharing mechanism for water resources.
	A.4.	Liaise with the local governments and develop a mechanism for the disbursement of compensation to the wildlife victims.
	A.5.	Build the capacity of local governments for safe and effective management of human-wildlife conflict.
	A.6.	Establish a wildlife relief endowment fund and leverage support from conservation partners to sustain it.
	A.7.	Capacitate and strengthen the community-managed livestock insurance schemes to reduce human-tiger conflict.
(B) Inter-sectoral coordination and dialogue between development agencies and conservation sectors improved	B.1.	Conduct periodic meetings between the development sectors and conservation sectors to review the development plans and their impacts on wildlife habitat.
	B.2.	Conduct intensive consultative and coordination meetings and presentations between the development agencies and conservation agencies while planning and implementing the mega development projects.
	B.3.	Conduct regular meetings among PA managers, forest department officials, heads of local governments, and key community members to support inclusive PA management.
	B.4.	Coordinate with telecommunications companies to establish, renovate, and strengthen the communication system in the remote areas of the PAs.
(C) Trans-boundary cooperation in tiger conservation strengthened	C.1.	Organize regular and periodic meetings and workshops at transboundary levels.
	C.2.	Explore and introduce established and innovative transboundary conservation interventions practiced elsewhere in the region.
	C.3.	Conduct transboundary exchange visits for PA managers and local representatives and leaders.
	C.4.	Design and deliver joint training courses for transboundary PA managers.
	C.5.	Conduct transboundary intelligence-sharing meetings among PA managers.
	C.6.	Conduct joint patrolling and information sharing between border security forces, i.e., Seema Suraksha Bal of India and Armed Police Force, and Nepali Army of Nepal.
	C.7.	Update the 'Tigers of the Transboundary Terai Arc Landscape' report with the latest survey dataset in coordination with the Government of India.
(D) Regional and international support and cooperation in tiger conservation increased	D.1.	Strengthen the SAWEN Secretariat and conduct regular programs.
	D.2.	Coordinate with Interpol, TRAFFIC, and CITES Secretariat to control wildlife crime.
	D.3.	Collaborate with regional and international institutions with genetic laboratories to compile the genetic profile and database of the tiger.
	D.4.	Establish a Memorandum of Understanding (MOU) with research and academic institutions.

Objective 5: Strengthen monitoring and research on tiger, prey-base, and their habitat and promote outreach

Rationale

Nepal has been a pioneer nation in initiating scientific research on tigers. In fact, several tiger projects were initiated in the decades of 1970s and 80s. There is hardly any year when the tiger wasn't researched in the past. The findings

from these projects have provided a knowledge base to improvise the conservation and management strategy for tigers, their habitats, and prey species in Nepal. However, research should be a ritual to enrich our understanding to gauge the impacts of emerging issues such as climate changes, ecological and genetic consequences of population isolation, increasing anthropogenic pressures, and natural dynamics of fragmenting and limiting habitats. Such research will pave the path for long-term tiger conservation in Nepal and elsewhere.

Objective 5: Strengthen monitoring and research on tiger, prey-base and their habitat and promote outreach		
Outputs	**Actions**	
(A) Research institutions established and capacity of existing institutions enhanced	A.1.	Improve collaboration between DNPWC and academic and research institutions on relevant tiger conservation and management research.
	A.2.	Attract the use of cutting-edge research tools and techniques in wildlife research.
	A.3.	Upgrade the research permit system using an online portal.
	A.4.	Develop and update the roster of research institutions and experts.
	A.5.	Upgrade the existing structure of the Lalmati research station.
	A.6.	Develop additional satellite research centers at Guthi of BNP in Banke-Bardia Complex; Adhavar of PNP, and Sukivar of CNP in Chitwan-Parsa Complex; and ShNP in Kailali-Kanchanpur Complex.
	A.7.	Enhance the forensic capacity at the national and regional levels.
	A.8.	Initiate serum banking of opportunistic capture for disease surveillance.
	A.9.	Enhance the capacity of the genetic lab under NTNC to conduct genetic sequencing studies.
	A.10.	Engage Nepalese universities and university students in wildlife monitoring and research.
(B) Relevant studies on ecology, conflict, threats and opportunities of tiger conservation carried out	B.1.	Conduct studies on the scale, extent, and local variations in the intensity of human-wildlife conflict (tiger and ungulates) to help identify and design effective mitigation measures.
	B.2.	Establish permanent experimental plots (control and treatment) to gather information pertaining to grassland management, carbon, and biodiversity monitoring.
	B.3.	Continue long-term monitoring of the tiger prey base using the approved protocol for the monitoring of the health of the ecosystem and tiger habitat.
	B.4.	Continue long-term monitoring of tigers by camera trapping.
	B.5.	Monitor the movement of problem tigers using satellite telemetry.
	B.6.	Conduct satellite telemetry of tigers to identify potential movement corridors and understand the impacts of roads and other infrastructure development on tiger movement.
	B.7.	Manage control and treatment plots for the monitoring of grassland management interventions and alien invasive species.
	B.8.	Undertake an assessment of tiger population viability and carrying capacity of all protected areas.
	B.9.	Undertake long-term research on invasive species management and control by establishing monitoring plots and transect lines in forests and grasslands.
	B.10.	Initiate long-term study programs to understand vegetation dynamics in response to specific management practices, altered hydrological regimes and climate change impacts.
	B.11.	Commence study of tourism impact on biological diversity in the TAL.
	B.12.	Conduct an economic valuation of tiger-bearing protected areas.
	B.13.	Undertake intensive research on the transboundary movement of tigers and the use of corridors, buffer zones, and human land-use areas through satellite radio telemetry.

	B.14.	Support studies on impacts of land use change, infrastructure, and other development on tiger and prey base populations
	B.15.	Undertake detailed studies on ungulate-habitat relationships and the feeding ecology of ungulates.
	B.16.	Identify potential tiger corridors and distribution ranges in high altitudes using camera trapping and non-invasive genetic tools.
	B.17.	Conduct studies on the socio-economic and cultural drivers of human-nature interactions in the TAL.
	B.18.	Undertake baseline study of potential conservation landscapes- Eastern Chure Terai Complex and Karnali Conservation Landscape.
	B.19.	Conduct a feasibility study on the extension of existing corridors and the creation of new corridors, and provide legal protection to biological corridors and remaining forests outside PAs in TAL and beyond.
	B.20.	Conduct a study of tiger dispersal and movement in climate refugia such as Eastern Terai, including Koshi Tappu WR and Trijuga forest, Mahabharat range, Chure range, and high-altitude large forest patches.
(C) Capacity on research and monitoring of tigers enhanced	C.1.	Provide training focusing on database development and management.
	C.2.	Support rangers for certificate courses at the Wildlife Institute of India (WII), India
	C.3.	Support officers for diploma/graduate/post-graduate courses in Wildlife Management at WII and other international universities
	C.4.	Train CBAPUS, community members, and citizen scientists in the survey and reporting of tiger records to the local forest and PA offices
	C.5.	Build the capacity of frontline staff to recognize, record and report disease or poor health condition of animals or the spread of invasive species.
(D) Tiger conservation efforts of Nepal at national, regional and international forum recognized	D.1.	Conduct national, regional, and international tiger conservation workshops.
	D.2.	Share the achievement of tiger conservation at regional, international, and global forums.
	D.3.	Prepare video, documentary, and promotional material on tiger conservation opportunities and challenges.

Chapter 7

Implementation Plan

7.1 Institutional arrangements

The action plan will be implemented by the respective departments of the Ministry of Forests and Environment. The Department of National Parks and Wildlife Conservation will be responsible for implementing the activities in the protected areas, and thier buffer zones. Similarly, the DoFSC and Provincial Ministries will implement activities outside protected areas, including dispersal corridors. Protection of tiger-bearing protected areas is the responsibility of the Nepal Army deputed therein. The Armed Forest Guards and community organizations will be responsible for protecting government-managed forests and community forests respectively.

7.2 Human resources, capacity development, and infrastructure

The DNPWC will primarily search for the resources to conduct trainings in areas such as tiger and prey base monitoring, telemetry studies, genetic studies, database and knowledge management, anti-poaching operation, rescue and rehabilitation of problematic animals, tiger ecology, SMART patrolling and community mobilization in buffer zones. Similarly, DoFSC staff will be trained to conduct tiger and prey base monitoring, anti-poaching operation, corridor restoration, and ecological research. Both DNPWC and DoFSC will motivate their staff by providing the opportunities and safety such as insurance, exposure, higher studies, rewards, proper job placement, etc., and encourage their staff to undertake tiger conservation activities with high morale. Basic infrastructure such as road and communication connectivity, staff quarters and office buildings, and other fundamental facilities will be ensured without any delay. Besides, continued support from conservation partners such as NTNC, WWF, ZSL, and IUCN will be highly anticipated. Since any company or a battalion of the Nepal army is deputed for more or less two years in a PA, only a few of the officials and staff may have previous work experience in a protected area. Thus, it will be a routine task to train the army about the terrain, wildlife behaviors, poaching control, wildlife conservation policies, laws, etc. Similarly, buffer zone and community forest officials and other local communities will be provided with various skill enhancement trainings for sustaining their livelihoods.

7.3 Governance

Both the federal and respective provincial line ministries will deploy their best staff to produce better outcomes in tiger conservation. Concerned departments and their field offices are responsible for effectively implementing the action plan. Also, it is expected to maintain transparency and fix accountability in the execution of programs. The expenditure of both the government and conservation partners will promote the principle of maximum disclosure. Regular supervision, monitoring, and evaluation will be ensured by all the agencies in the execution of the plan. The periodic progress reports and other publications will share the pieces of information with all those concerned about the tiger.

7.4 Coordination

Effective coordination among relevant stakeholders will be ensured by the government machinery. If certain specific provisions are made by the government, such provisions will prevail. The concerned departments and field offices will be responsible primarily for ensuring meaningful collaboration and coordination among all the stakeholders at their levels. The role of WCCB at both centre and districts will be enhanced to produce better outcomes in tiger conservation, among other jobs. The recent "Wildlife Crime Control Order, 2023" has made provisions to form provincial-level WCCBs. In the days to come, their role will be very crucial in tiger conservation.

7.5 Financial resources

The total indicative budget for this 10-year action plan is estimated to be NRs 5273700,000 (NRs 5273.7 million). Out of the total sum, around 27.67% is proposed to secure tiger habitats and corridors, 25.97% to reduce human-tiger conflict and enhance economic opportunities for local communities;; 18.85% to strengthen monitoring and research on tiger, prey-base, and their habitat and promote outreach; 18.48% to combat poaching and illegal trade of tiger and its parts, and 9.03% to strengthen cooperation and collaboration among stakeholders for tiger conservation. The objective-wise budget plan is shown in the table below.

Table 4 Proposed budget

Objectives	Budget (NRs. 000)	Percentage (%)
Secure tiger habitats and corridors	1459400	27.67
Combat tiger poaching and illegal trade of its parts	974400	18.48
Reduce human tiger conflict and enhance economic opportunities for local community	1369400	25.97
Strengthen cooperation and collaboration for tiger conservation	476400	9.03
Strengthen monitoring and research on tiger, prey-base and their habitat and promote outreach	994100	18.85
Total	**5273700**	**100**

7.6 Sustainable financing

Of the total estimated budget, large share of the budget will be managed from government sources provided that it is channelized in pro rata with the revenue generation and the urgent needs. Thus, the government's annual budget to DNPWC and DoFSC will be a major source of financing the activities. In addition to the government budget, conservation partners like NTNC, ZSL, IUCN, etc., are expected to make significant contributions. Either The DNPWC itself or with other conservation partner/s will raise the funds from international conservation organizations. A "Tiger Conservation Fund" will be established for sustainable tiger conservation works.

7.7 Conservation partner organizations

NTNC, WWF Nepal, ZSL Nepal, and other relevant partners identified by the Government of Nepal will be encouraged to support the respective departments in implementing the action plan.

7.8 Monitoring and Evaluation

The implementation status of this plan will be reviewed every two years. In the planning phase of the annual budget, this plan will be taken as a reference to incorporate the activities proposed herein. At the end of the fifth year, a mid-term evaluation of this plan will be conducted. The periodic joint monitoring of TAL and other relevant programs will also provide insight into the effectiveness of the plan.

7.9 Review of the Action Plan

A review of the action plan will be done by DNPWC with the support of DoFSC and conservation partners. The mid-term review of the plan will be conducted to evaluate its implementation status and recommend the important steps to rectify the course on time, if necessary. The final evaluation will be carried out towards the end of the plan period. The updated tiger conservation action plan will be prepared based on the recommendations of terminal evaluation accordingly.

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Annex 1 Logical Framework

Hierarchy of Objectives	Objectively Verifiable Indicator	Means of Verification	Risk/ Assumption
Goal: Conserve tiger and its habitat through maintaining ecological, economic and sociocultural integrity and wellbeing of communities			
Objective 1: Secure tiger habitats and corridors			
Output 1.1. Strategic policies, plans and monitoring mechanisms developed	- Number of habitat management plans, encroachment and relocation plans completed; - Number of tiger habitat suitability and land use maps, land use plans prepared; - Number of assessment and compliance reports produced.	- Publications of MOFE, DNPWC, DoFSC, and Provincial line ministries, DFOs & PAs; - Monitoring reports and plans	All the stakeholders carry out their assigned jobs.
Output 1.2. Tiger habitats in the core areas, buffer zones and corridors are restored and reclaimed	- Hectares of habitat restored and reclaimed; - Hectare of encroached habitat restored; - Number of farmers and hectare of agricultural lands brought under agroforestry system; - Area of habitat included within PAs .	Reports of MOFE, DNPWC, DoFSC, and Provincial line ministries, DFOs & PAs	
Output 1.3. Impact of linear infrastructure on major tiger habitats and corridors mitigated	- Number of wildlife friendly structure constructed, - Number of SEA of large infrastructure projects completed, - Number of joint monitoring of EIA implementations conducted	Reports of DoR, ADB,	
Output 1.4. Grasslands are scientifically managed and maintained	- Grassland management guidelines completed; - Hectares of grassland habitat restored and managed; - Density of ungulates per km^2 increased.	Reports of MOFE, DNPWC, DoFSC, and Provincial line ministries, DFOs & PAs.	Allocated funding secured, All the relevant institutions, conservation partners, and local stakeholders actively involved
Output 1.5. Safe and secured wetlands and water resources for tiger and prey using science informed management interventions	- Hectare of invaded wetlands cleared; - Number of perennial waterholes and ponds created; - Number of solar pumps installed; - Number of meetings and consultations held with local communities and local governments.	Reports of MOFE, DNPWC, DoFSC, and Provincial line ministries, DFOs & PAs.	
Output 1.6. Safe and healthy large size prey base for tiger	Increased prey density within each PA against the baseline of 2022.	Reports of MOFE, DNPWC, DoFSC, and Provincial line ministries, DFOs & PAs.	

A.1	Prepare and periodically update tiger habitat suitability and land-use/land cover change map for current and future climate scenarios for all tiger-bearing protected areas and forest corridors.
A.2	Identify potential sites and conduct a feasibility study of potential tiger habitats across the Chure, Mahabharat, and high-altitude regions.
A.3	Assess the functional status of the existing corridors and identify potential new corridors among protected areas and potential tiger habitats.
A.4	Prepare and implement encroachment management and relocation plan for corridors, buffer zones, and identified potential tiger habitats.

A.5	Develop and implement a habitat management plan for the identified corridors and potential high-altitude tiger habitats with a particular focus on the sustainable management of critical wetlands and grassland habitats.
A.6	Monitor compliance with the implementation of wildlife-related policies, strategies, and guidelines, e.g., Wildlife-friendly Infrastructure Construction Directives 2022.
A.7	Conduct a feasibility study to establish protection forests in eastern Terai and Midhills with a special focus on Taplejung, Panchthar, Ilam corridors, and Trijuga forest.
A.8	Develop and implement a strategy and action plan for controlling invasive species.
A.9	Develop procedures and guidelines to regulate the extraction of riverbed materials.
A.10	Implement the mitigation measures prescribed by the EIA and IEE reports and monitor compliance.
B.1	Restore and conserve major blocks of wildlife habitat such as protection forest areas, community-conserved areas, and other areas of corridors to maintain the ecological connectivity and integrity across TAL and high-altitude tiger habitat.
B.2	Restore forest patches for enhancing connectivity in major wildlife corridors such as Brahmadev, Laljhadi-Mohana, Basanta, Khata, and Kamdi.
B.3	Facilitate relocation of settlements from corridors and other important tiger habitats and restore encroachment areas.
B.4	Support agroforestry and private forest to enhance greenery in degraded corridors and high-altitude tiger habitats.
B.5	Provide forest-fire fighting training and equipment support to staff and communities.
B.6	Implement appropriate fire management strategies such as timely clearing of fire lines, controlled early burning of hazard-prone areas, mobilizing firefighting teams, constructing fire hydrants with water facilities, etc., to mitigate fire hazards.
B.7	Relocate settlements from the critical corridors such as Bhiman of PNP and Sikaribas of CNP by providing other livelihood options and compensation mechanisms.
B.8	Develop Kositappu Wildlife Reserve as a tiger habitat by connecting it with the hill forests up to the Chatara Dham through the extension of the reserve northward.
B.9	Promote wildlife tourism-focused community forest management in corridors and potential tiger habitats within the Chure and Mahabharat range.
B.10	Promote private forests near protected areas and corridors as climate refugia.
B.11	Prepare forest fire incident map and database, and develop an alarm system.
B.12	Strengthen institutional capacity for forest fire surveillance and control.
C.1	Ensure proper implementation of Wildlife-friendly Infrastructure Construction Directives, 2022 in tiger habitats in coordination with concerned stakeholders.
C.2	Ensure Social and Environmental Impact Assessment before the development of all infrastructure projects where applicable and effective implementation of the recommendations therein.
C.3	Identify potential sites for wildlife-friendly infrastructure.
C.4	Select, design, and construct wildlife-friendly flyovers or underpasses at strategic locations, i.e., Barandabhar, CNP; Banke, Parsa, and Bardia National Parks.
C.5	Restrict development projects in the core area and important corridors.
C.6	Enhance engagement with infrastructure planners and developmental agencies to promote wildlife-friendly infrastructures and integrate effective mitigation measures in the infrastructural planning process.
C.7	Develop measures in existing linear infrastructures in coordination with the line agencies (for example - automated barriers to maintain speed limits, digital tracking of passing vehicles, and construction of over/underpasses or guiding fences in vulnerable sites to provide safe routes for wildlife).
D.1	Develop and implement habitat management guidelines to improve and manage key grasslands across all tiger habitats.
D.2	Create invasive species free grazing pastures in core protected areas to increase the food availability for herbivores.

D.3	Implement appropriate measures to reduce fire risk, such as controlled fire burning and establishment of fire breaks to reduce the risk of grassland fires across all fire-prone habitats in the TAL.
E.1	Identify, classify, and map all critical wetlands in all tiger habitats.
E.2	Restore existing degraded watersheds and construct new perennial water recharge ponds and water harvesting dams in the Chure hills, especially in PNP and BaNP, to provide water for animals during dry seasons.
E.3	Reduce the use of hazardous pesticides in agricultural land in buffer zones and conservation areas.
E.4	Clean and remove weeds and alien invasive species from wetlands.
E.5	Install additional solar pumps to recharge the water holes and maintain and repair existing pumps.
E.6	Conduct periodic assessments of water quality in wetlands, water holes, and rivers in tiger-bearing habitats, especially to monitor compliance with the discharge of agricultural chemicals and industrial effluents, and sewage to the water sources.
E.7	Update site management plans for wetlands of international importance (Ramsar sites).
E.8	Manage wetlands and waterholes to prevent them from silting and drying up in the dry season.
E.9	Engage communities and local governments to restore and manage wetlands in the corridors and other potential tiger habitats.
E.10	Enable buffer zone communities to effectively manage waterways, riparian, and ponds.
E.11	Facilitate the natural flow of the river system to maintain floodplain grassland habitat.
F.1	Facilitate reintroductions and recovery of large prey such as Indian bison (Chitwan to Babai Valley), wild water buffalo (Koshi to Chitwan), swamp deer (Shuklaphanta to Chitwan, Bardia, and Koshi).
F.2	Regulate livestock grazing in critical corridors and habitats.
F.3	Prevent wildlife-livestock disease transmission through periodic vaccinations of livestock in fringe areas of the tiger habitats in collaboration with the local governments.
F.4	Facilitate genetic exchange between isolated populations by translocation, augmentation, and restoration.
F.5	Foster collaborations with the central veterinary laboratory and strengthen its capacity for the detection of viral and bacterial wildlife diseases.
F.6	Establish incinerator facilities for the safe disposal of dead wildlife at each PA.
F.7	Train veterinary staff on wildlife health, rescue, and restraining methods.
F.8	Strengthen plant and animal quarantine facilities.

Objective 2: Combat tiger poaching and illegal trade of its parts through effective law enforcement			
Hierarchy of Objectives	**Objectively Verifiable Indicator**	**Means of Verification**	**Risk/Assumption**
Output 2.1. Enabling policy, legislation and institutional framework for wildlife law enforcement ensured	- Number of actions/interventions implemented based on national anti-poaching strategic plan; - Number of ToT completed based on new curriculum; - Number of wildlife crime control committee formed at provincial level.	Reports of MOFE, DNPWC, DoFSC, and Provincial line ministries, DFOs, PAs & Nepal Army	Enabling policy environment created. All the stakeholders carry out their share of responsibilities

Output 2.2. Capacities of wildlife law enforcement agencies enhanced	- Number of wildlife crimes related arrest and seizures against baseline records of 2022; - Number of frontline staff trained on law enforcement (LE) trainings; - Number of CBAPU members trained on patrolling; - Number of patrols completed per year against the baseline of 2022.	Reports of MOFE, DNPWC, DoFSC, and Provincial line ministries, DFOs, PAs , Nepal Army & conservation partners.	
Output 2.3. New and appropriate technology in wildlife crime control deployed	- Number of staff trained on use of new technology; - Number of arrest and seizures made and information produced by the application of new technology.	Reports of MOFE, DNPWC, DoFSC, and Provincial line ministries, DFOs, PAs , Nepal Army & conservation partners.	
Output 2.4. Cooperation and coordination among law enforcement agencies and other stakeholders strengthened	- Number of meetings of NTCC, WCCCC and WCCB; - Number of district where WCCB was established.	Report published by DNPWC, DoFSC, Conservation partner, media reports	

Actions

A.1	Develop a national anti-poaching strategic plan, with sub-plans for each tiger-bearing PA and adjoining DFO.
A.2	Review and revise the Nepal Army Conservation School curriculum, including the training of trainers in thus revised curriculum.
A.3	Develop protocols for the assessment of the security of the PAs and conduct security assessments at regular intervals.
A.4	Establish wildlife crime control mechanisms at the province level and form additional WCCB cells at the district level as required.
B.1	Improve accessibility within each PA for effective patrolling and law enforcement.
B.2	Conduct sweeping, camping, and long-range patrolling operations in protected areas.
B.3	Provide vehicles and motorized boats to patrol teams for regular patrolling, including river patrolling.
B.4	Provide mobility support, such as daily provisions and equipment for effective patrolling and park management.
B.5	Strengthen, build capacity, and mobilize CBAPUs, including the use of new technology.
B.6	Conduct training of trainers on patrol-based monitoring.
B.7	Equip tiger-bearing PAs with cross-cutting equipment like CCTV, metal detectors, poacher cams, drones, night vision binoculars, etc.
B.8	Provide equipment and logistics support to officials of DFOs.
B.9	Improve the wildlife crime investigation process using genetic profiles and enhance the evidence collection system through capacity building and training.
B.10	Strengthen informant networks, information gathering, and communication networks for anti-poaching operations.
B.11	Provide capacity-building training to PA and DFO staff on wildlife crime, forensics, and scene of crime.
B.12	Strengthen the capacity of CITES implementation at all levels.
B.13	Conduct awareness-raising programs on anti-poaching and conservation-related laws, including the installation of information boards and display materials at key entry and exit ports such as customs and airports.
B.14	Initiate the formation of anti-poaching units in BaNP and PNP.
B.15	Provide capacity building and sensitization training to the staff of customs and airports.
C.1	Install GSM-enabled surveillance cameras in additional sites.

C.2	Procure the logistic goods (GPS, camera, binoculars) to use them in patrolling to collect real-time and reliable information.
C.3	Install closed circuit television (CCTV) in sensitive areas, as appropriate, and build capacity to operate and maintain these systems.
C.4	Implement an android-based Real-Time SMART patrolling system and other advanced technology as appropriate.
C.5	Train and employ sniffer dogs for anti-poaching operations.
C.6	Explore and introduce new technology to tackle wildlife crime.
D.1	Conduct regular meetings of NTCC, WCCCC, and WCCB.
D.2	Strengthen Wildlife Crime Control Bureaus in additional districts.
D.3	Conduct interaction programs among park staff, protection units, and CBAPUs
D.4	Initiate tri-monthly meetings of the relevant stakeholders to review progress on combating wildlife crimes.

Objective 3: Reduce human tiger conflict and enhance economic opportunities for local community

Hierarchy of Objectives	Objectively Verifiable Indicator	Means of Verification	Risk/Assumption
Output 3.1. Innovative policy, financial and institutional arrangement for HTC management established and operationalized	- Number of wildlife relief claims resolved; - Number of actions/interventions implemented based on national HWC strategy.	Reports of MoFE, DNPWC, DoFSC, and Provincial line ministries, DFOs, PAs, Nepal Army, conservation partners & media.	Conservation stakeholders respond positively to community outreach efforts
Output 3.2. Human-tiger conflict reduced and maintained below thresholds	- Number of problematic tiger monitored; - Number of cases of HTC recorded annually.	Reports of MoFE, DNPWC, DoFSC, and Provincial line ministries, DFOs, PAs, Nepal Army, conservation partners & media.	Local people and school kids engaged actively in conservation
Output 3.3. Robust mechanism for the management of increased tiger population established and strengthened	- Number of zoos and rescue and breeding centers established; - Number of staff trained on rescue and safe handling problem tigers.	Reports of MoFE, DNPWC, DoFSC, and Provincial line ministries, DFOs, PAs, Nepal Army, & conservation partners.	Local people actively participated in the conservation and monitoring activities
Output 3.4. Livelihood and employment opportunities of local community enhanced	- Number of households directly benefitted from establishment of micro-cooperative; - Number of community members trained alternative income opportunities; - Number of wildlife victim families adopting tiger-based tourism.	Reports of MoFE, DNPWC, DoFSC, and Provincial line ministries, DFOs, PAs, Nepal Army, conservation partners and media.	
Output 3.5. Local communities' capacities and awareness to resolve HTC strengthened	- Number of awareness program conducted - Number of observation tours conducted, and event celebrated	Reports of MoFE, DNPWC, DoFSC, and Provincial line ministries, DFOs, PAs, Nepal Army, conservation partners and media.	

Actions

A.1	Develop and implement the national HWC strategy.
A.2	Explore Wildlife Damage Relief Guidelines, 2080, to simplify claim processes, reduce delays, and enhance transparency and efficiency at all levels.
A.3	Establish or strengthen additional relief schemes, such as the one managed by NTNC.
A.4	Establish and operationalize professional market-based insurance schemes (human, livestock, property, and crops) and wildlife relief endowment fund and continue support to sustain it.

A.5	Establish and operationalize 'wildlife conservation funds' such as CITES fund and PA management fund, etc., under the DNPWC.
A.6	Develop mechanisms and capacity to access and use carbon funds to clutch the REDD+ and climate change funds for tiger conservation.
A.7	Assess and utilize private sectors and corporate social responsibility investment for tiger conservation.
A.8	Promote the application of improved technology and innovation for the use of invasive species to generate income and employment opportunities.
A.9	Align the "Forest Development Fund" with the protection of important tiger corridors.
A.10	Develop Bardia National Park as a model tiger-tourism site and replicate its success in other tiger-bearing protected areas and high-altitude tiger habitats.
A.11	Promote private sector investment in tourism business in protected areas and buffer zones.
A.12	Facilitate and capacitate government bodies and conservation partners to secure external funds through development banks, Green Climate Fund (GCF), and GEF funds.
A.13	Establish effective, equitable, and sustainable human-wildlife coexistence community-led cooperatives.
B.1	Use cutting-edge technology (e.g., satellite collars, camera traps) to monitor the behavior of problematic tigers.
B.2	Initiate and develop mobile applications and an online database for proper and systematic documentation of conflict-related incidences.
B.3	Equip newly established animal wildlife hospital for food and care for orphan and injured animals.
B.4	Provide problem animals' management/handling techniques training to park staff and DFOs and prepare a manual on the rescue and handling of stray tigers.
B.5	Mobilize existing quick relief funds through cooperatives, and make necessary arrangements to include currently marginalized groups with legitimate claims.
B.6	Provide support for constructing temporary towers, fencing, and predator-proof collars for crop and livestock protection.
C.1	Develop and support rescue and rehabilitation facilities such as zoological gardens, wildlife rescue, and breeding centers for injured, problematic, and orphan wild animals, including tigers, at national, provincial, and local levels.
C.2	Formulate and implement operational guidelines for zoological gardens/parks, wildlife rescue, and breeding centers.
C.3	Upgrade and capacitate community-managed orphanages and zoos.
C.4	Train staff of PAs, forest departments, local governments, CBAPUs, CBOs, and Rapid Response Teams on human-wildlife conflict management
C.5	Promote ex-situ species conservation facilities as a center for tourism, conservation education, and research.
C.6	Enhance the provision of insurance and occupational safety for the employee and workers involved in handling problem tigers.
C.7	Build the capacity of frontline staff on problem animal handling and establish a well-equipped Rapid Response Team to rescue transient and problem tigers and prey.
D.1	Promote alternative and repellant cash crops in the buffer zones and areas surrounding potential high-altitude tiger habitats.
D.2	Promote the use of alternative energy sources (biogas, improved cooking stoves, and solar energy).
D.3	Arrange soft loans or micro-credit for poor and marginalized people, including women, to invest in agricultural-biodiversity enterprises.
D.4	Promote small-scale enterprises for handicrafts and other products across critical conservation sites.
D.5	Promote livelihood support programs for wildlife victims' families with a particular emphasis on the promotion of tiger-based eco-tourism enterprises.
E.1	Organize campaigns and interaction programs to raise conservation awareness among youths.
E.2	Prepare training curriculum and relevant materials for nature guides.
E.3	Celebrate world tiger day on 29th July every year and take the opportunity to promote tiger conservation awareness.
E.4	Organize observation tours for social activists, advocacy groups, and community leaders to spread the tiger conservation message.
E.5	Organize cross-learning observation tours for CBAPUs to transboundary parks in India.
E.6	Provide capacity-building training to enhance staff's skills in negotiation, mediation, and conflict resolution.

E.7	Conduct behavioral change campaigns at schools and colleges.
E.8	Support local communities with training and tools/equipment to improve their ability to manage HWC.
E.9	Conduct conservation awareness programs targeting women, students, and youths.
E.10	Conduct school education programs to impart conservation messages.

Objective 4: Strengthen cooperation and collaboration for tiger conservation			
Hierarchy of Objectives	**Objectively Verifiable Indicator**	**Means of Verification**	**Risk/Assumption**
Output 4.1. Developed collaboration and coordination mechanisms at all three tires of governments developed.	- Number of meeting organized; - Number of government staff trained on human-wildlife conflict management; - Number of household benefitted from LIS and endowment funds .	Annual report of DNPWC, DoFSC, PAs, DFOs, conservation partners, & media reports	Better coordination among all three tires of government and conservation agencies
Output 4.2. Inter-sectoral coordination and dialogue between development agencies and conservation sectors improved	- Number of coordination meetings and workshop held.	Annual report of DNPWC, DoFSC, PAs, DFOs, conservation partners, media reports, & meeting minutes & resolutions.	
Output 4.3. Trans-boundary cooperation in tiger conservation strengthened	- Number of meeting and interaction program organized, - Number of trans-boundary visit and PA level transboundary meeting,	Annual report of DNPWC, DoFSC, PA, DFOs, conservation partners, media reports, & meeting minutes & resolutions.	Well functioning mechanism for the transboundary level coordination.l
Output 4.4. Regional and international support and cooperation in tiger conservation increased	Number of meeting with Interpol, TRAFFIC and CITES; Number of MoUs with academic institutions signed.	Annual report of DNPWC, DoFSC, PA, DFOs, conservation partners, media reports, & meeting minutes & resolutions.	Enabling policy and support from MOFE and other policy level bodies.
Actions			

A.1	Establish or strengthen collaboration with local and provincial governments to mobilize financial resources for tiger conservation.
A.2	Engage provincial and local governments and conservation partners for tiger habitat management with a focus on wetland and grassland management.
A.3	Develop sharing mechanism for water resources.
A.4	Liaise with the local governments and develop a mechanism for the disbursement of compensation to the wildlife victims.
A.5	Build the capacity of local governments for safe and effective management of human-wildlife conflict.
A.6	Establish a wildlife relief endowment fund and leverage support from conservation partners to sustain it.
A.7	Capacitate and strengthen the community-managed livestock insurance schemes to reduce human-tiger conflict.
B.1	Conduct periodic meetings between the development sectors and conservation sectors to review the development plans and their impacts on wildlife habitat.
B.2	Conduct intensive consultative and coordination meetings and presentations between the development agencies and conservation agencies while planning and implementing the mega development projects.
B.3	Conduct regular meetings among PA managers, forest department officials, heads of local governments, and key community members to support inclusive PA management.

B.4	Coordinate with telecommunications companies to establish, renovate, and strengthen the communication system in the remote areas of the PAs.
C.1	Organize regular and periodic meetings and workshops at transboundary levels.
C.2	Explore and introduce established and innovative transboundary conservation interventions practiced elsewhere in the region.
C.3	Conduct transboundary exchange visits for PA managers and local representatives and leaders.
C.4	Design and deliver joint training courses for transboundary PA managers.
C.5	Conduct transboundary intelligence-sharing meetings among PA managers.
C.6	Conduct joint patrolling and information sharing between border security forces, i.e., Seema Suraksha Bal of India and Armed Police Force, and Nepali Army of Nepal.
C.7	Update the 'Tigers of the Transboundary Terai Arc Landscape' report with the latest survey dataset in coordination with the Government of India.
D.1	Strengthen the SAWEN Secretariat and conduct regular programs.
D.2	Coordinate with Interpol, TRAFFIC, and CITES Secretariat to control wildlife crime.
D.3	Collaborate with regional and international institutions with genetic laboratories to compile the genetic profile and database of the tiger.
D.4	Establish a Memorandum of Understanding (MOU) with research and academic institutions.

Objective 5: Strengthen monitoring and research on tiger, prey-base and their habitat and promote outreach			
Hierarchy of Objectives	**Objectively Verifiable Indicator**	**Means of Verification**	**Risk/Assumption**
Output 5.1. Established research institutions and capacity of existing institutions enhanced	- Number of MoUs with national and international research institutions signed; - -New research stations established and operationalized	Report of DNPWC, research permit database, report of academic institutions, & media report.	Enabling policy and funding mechanism
Output 5.2. Relevant studies on ecology, conflict, threats and opportunities of tiger conservation carried out	- Number of research projects and publications - Ecological carrying capacity studies completed for all tiger complexes	Report of MOFE, DNPWC, PAs, NTNC, Academia, research institutions, conservation partners. Paper published on scientific journal	Researcher and research institution actively involved; Enabling environment created by government .
Output 5.3. Capacity on research and monitoring of tigers enhanced	- Number of staff trained on database management; - Number of student and front line staff enrolled for degree at WII and other universities.	Report of MOFE, DNPWC, PAs, NTNC, & Academia,	Strong support from government institutions
Output 5.4. Tiger conservation efforts of Nepal at national, regional and international forum recognized	- Number of national and international level tiger conservation workshop conducted	Report published by MOFE, DNPWC, PAs, NTNC, & Academia,	Enabling environment and support from GoN
Actions			

A.1	Improve collaboration between DNPWC and academic and research institutions on relevant tiger conservation and management research.

A.2	Attract the use of cutting-edge research tools and techniques in wildlife research.
A.3	Upgrade the research permit system using an online portal.
A.4	Develop and update the roster of research institutions and experts.
A.5	Upgrade the existing structure of the Lalmati research station.
A.6	Develop additional satellite research centers at Guthi of BNP in Banke-Bardia Complex; Adhavar of PNP, and Sukivar of CNP in Chitwan-Parsa Complex; and ShNP in Kailali-Kanchanpur Complex.
A.7	Enhance the forensic capacity at the national and regional levels.
A.8	Initiate serum banking of opportunistic capture for disease surveillance.
A.9	Enhance the capacity of the genetic lab under NTNC to conduct genetic sequencing studies.
A.10	Engage Nepalese universities and university students in wildlife monitoring and research.
B.1	Conduct studies on the scale, extent, and local variations in the intensity of human-wildlife conflict (tiger and ungulates) to help identify and design effective mitigation measures.
B.2	Establish permanent experimental plots (control and treatment) to gather information pertaining to grassland management, carbon, and biodiversity monitoring.
B.3	Continue long-term monitoring of the tiger prey base using the approved protocol for the monitoring of the health of the ecosystem and tiger habitat.
B.4	Continue long-term monitoring of tigers by camera trapping.
B.5	Monitor the movement of problem tigers using satellite telemetry.
B.6	Conduct satellite telemetry of tigers to identify potential movement corridors and understand the impacts of roads and other infrastructure development on tiger movement.
B.7	Manage control and treatment plots for the monitoring of grassland management interventions and alien invasive species.
B.8	Undertake an assessment of tiger population viability and carrying capacity of all protected areas.
B.9	Undertake long-term research on invasive species management and control by establishing monitoring plots and transect lines in forests and grasslands.
B.10	Initiate long-term study programs to understand vegetation dynamics in response to specific management practices, altered hydrological regimes and climate change impacts.
B.11	Commence study of tourism impact on biological diversity in the TAL.
B.12	Conduct an economic valuation of tiger-bearing protected areas.
B.13	Undertake intensive research on the transboundary movement of tigers and the use of corridors, buffer zones, and human land-use areas through satellite radio telemetry.
B.14	Support studies on impacts of land use change, infrastructure, and other development on tiger and prey base populations
B.15	Undertake detailed studies on ungulate-habitat relationships and the feeding ecology of ungulates.
B.16	Identify potential tiger corridors and distribution ranges in high altitudes using camera trapping and non-invasive genetic tools.
B.17	Conduct studies on the socio-economic and cultural drivers of human-nature interactions in the TAL.
B.18	Undertake baseline study of potential conservation landscapes- Eastern Chure Terai Complex and Karnali Conservation Landscape.
B.19	Conduct a feasibility study on the extension of existing corridors and the creation of new corridors, and provide legal protection to biological corridors and remaining forests outside PAs in TAL and beyond.
B.20	Conduct a study of tiger dispersal and movement in climate refugia such as Eastern Terai, including Koshi Tappu WR and Trijuga forest, Mahabharat range, Chure range, and high-altitude large forest patches.
C.1	Provide training focusing on database development and management.

C.2	Support rangers for certificate courses at the Wildlife Institute of India (WII), India
C.3	Support officers for diploma/graduate/post-graduate courses in Wildlife Management at WII and other international universities
C.4	Train CBAPUS, community members, and citizen scientists in the survey and reporting of tiger records to the local forest and PA offices
C.5	Build the capacity of frontline staff to recognize, record and report disease or poor health condition of animals or the spread of invasive species.
D.1	Conduct national, regional, and international tiger conservation workshops.
D.2	Share the achievement of tiger conservation at regional, international, and global forums.
D.3	Prepare video, documentary, and promotional material on tiger conservation opportunities and challenges.

Annex 2 Budget

Tiger Conservation Actions		Budget in NRs. 000										
		Year										Total
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	
1. Secure tiger habitats and corridors												
A.1	Prepare and periodically update tiger habitat suitability and land-use/land cover change map for current and future climate scenarios for all tiger-bearing protected areas and forest corridors.	1000				1000					1000	3000
A.2	Identify potential sites and conduct a feasibility study of potential tiger habitats across the Chure, Mahabharat, and high-altitude regions.		1000	1000								2000
A.3	Assess the functional status of the existing corridors and identify potential new corridors among protected areas and potential tiger habitats.											
A.4	Prepare and implement encroachment management and relocation plan for corridors, buffer zones, and identified potential tiger habitats.			3000		2100		2200		2300		9600
A.5	Develop and implement a habitat management plan for the identified corridors and potential high-altitude tiger habitats with a particular focus on the sustainable management of critical wetlands and grassland habitats.		1900	5000	5500	6000	6000	6500	6500	7000	7000	51400
A.6	Monitor compliance with the implementation of wildlife-related policies, strategies, and guidelines, e.g., Wildlife-friendly Infrastructure Construction Directives 2022.		1200				1500					2700
A.7	Conduct a feasibility study to establish protection forests in eastern Terai and Midhills with a special focus on Taplejung, Panchthar, Ilam corridors, and Trijuga forest.				1900	2000						3900
A.8	Develop and implement a strategy and action plan for controlling invasive species.	1500	3200	3200	3300	3400	3500	3600	3700	3800	3900	33100
A.9	Develop procedures and guidelines to regulate the extraction of riverbed materials.		1500									1500
A.10	Implement the mitigation measures prescribed by the EIA and IEE reports and monitor compliance.	1000	1200	1200	1200	1200	1500	1500	1500	1500	1500	13300
B.1	Restore and conserve major blocks of wildlife habitat such as protection forest areas, community-conserved areas, and other areas of corridors to maintain the ecological connectivity and integrity across TAL and high-altitude tiger habitat.	10000	10000	11000	11000	12000	12000	13000	13000	14000	14000	120000
	Restore forest patches for enhancing connectivity in major wildlife corridors such as Brahmadev, Laljhadi-Mohana, Basanta, Khata, and Kamdi.	5000	5000	6000	7000	8000	9000	10000	11000	12000	13000	86000
B.3	Facilitate relocation of settlements from corridors and other important tiger habitats and restore encroachment areas.	600	600	600	600	700	700	700	700	800	800	6800

B.4	Support agroforestry and private forest to enhance greenery in degraded corridors and high-altitude tiger habitats.	1500	1600	1700	2000	2000	2000	2500	2500	2500	3000	21300
B.5	Provide forest-fire fighting training and equipment support to staff and communities.	4000	4000	4200	4200	5000	5000	5000	5500	5500	5500	47900
B.6	Implement appropriate fire management strategies such as timely clearing of fire lines, controlled early burning of hazard-prone areas, mobilizing firefighting teams, constructing fire hydrants with water facilities, etc., to mitigate fire hazards.	10000	11000	12000	13000	14000	15000	16000	17000	18000	19000	145000
B.7	Relocate settlements from the critical corridors such as Bhiman of PNP and Sikaribas of CNP by providing other livelihood options and compensation mechanisms.	1200	1200	1200	1300	1300	1400	1500	1600	1700	1700	14100
B.8	Develop Kositappu Wildlife Reserve as a tiger habitat by connecting with it the hill forests up to the Chatara Dham through the extension of the reserve northward.			1900	2500							4400
B.9	Promote wildlife tourism-focused community forest management in corridors and potential tiger habitats within the Chure and Mahabharat range.	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	34500
B.10	Promote private forests near protected areas and corridors as climate refugia.	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	24500
B.11	Prepare forest fire incident map and database, and develop an alarm system.	3000		3200	3400		3600	3800		4000	4200	25200
B.12	Strengthen institutional capacity for forest fire surveillance and control.	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	27500
C.1	Ensure proper implementation of Wildlife-friendly Infrastructure Construction Diractives, 2022 in tiger habitats in coordination with concerned stakeholders.	800	900	1000	1100	1200	1300	1400	1500	1600	1700	12500
C.2	Ensure Social and Environmental Impact Assessment before the development of all infrastructure projects where applicable and effective implementation of the recommendations therein.	700	700	800	800	850	890	930	970	1010	1050	8700
C.3	Identify potential sites for wildlife-friendly infrastructure.		1800				2000					3800
C.4	Select, design, and construct wildlife-friendly flyovers or underpasses at strategic locations, i.e., Barandabhar, CNP; Banke, Parsa, and Bardia National Parks.			1600		1800			1900			5300
C.5	Restrict development projects in the core area and important corridors.	500	500	500	500	500	500	500	500	500	500	5000
C.6	Enhance engagement with infrastructure planners and developmental agencies to promote wildlife-friendly infrastructures and integrate effective mitigation measures in the infrastructural planning process.	1500	1500	1500	1500	1600	1600	1600	1600	1700	1700	15800
C.7	Develop measures in existing linear infrastructures in coordination with the line agencies (for example - automated barriers to maintain speed limits, digital tracking of passing vehicles, and construction of over/underpasses or guiding fences in vulnerable sites to provide safe routes for wildlife).	3500	3500	3500	4000	4000	4000	4500	4500	4500	5000	41000
D.1	Develop and implement habitat management guidelines to improve and manage key grasslands across all tiger habitats.	10000	11000	12000	13000	14000	15000	16000	17000	18000	19000	145000

D.2	Create invasive species free grazing pastures in core protected areas to increase the food availability for herbivores.	5000	6000	5000	6000	5000	6000	7000	8000	9000	10000	67000
D.3	Implement appropriate measures to reduce fire risk, such as controlled fire burning and establishment of fire breaks to reduce the risk of grassland fires across all fire-prone habitats in the TAL.	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	50000
E.1	Identify, classify, and map all critical wetlands in all tiger habitats.		1400				1500					2900
E.2	Restore existing degraded watersheds and construct new perennial water recharge ponds and water harvesting dams in the Chure hills, especially in PNP and BaNP, to provide water for animals during dry seasons.	5000		6000	7000		8000	9000		10000	11000	56000
E.3	Reduce the use of hazardous pesticides in agricultural land in buffer zones and conservation areas.	4000	5000	6000	7000		9000	10000		12000	13000	66000
E.4	Clean and remove weeds and alien invasive species from wetlands.	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	34500
E.5	Install additional solar pumps to recharge the water holes and maintain and repair existing pumps.	3200	3500	3800	4100	4400	4700	5000	5300	5600	5900	45500
E.6	Conduct periodic assessments of water quality in wetlands, water holes, and rivers in tiger-bearing habitats, especially to monitor compliance with the discharge of agricultural chemicals and industrial effluents, and sewage to the water sources.	1800				1900				2000		5700
E.7	Update site management plans for wetlands of international importance (Ramsar sites).	3000				3000					3000	9000
E.8	Manage wetlands and waterholes to prevent them from silting and drying up in the dry season.	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	34500
E.9	Engage communities and local governments to restore and manage wetlands in the corridors and other potential tiger habitats.	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	19500
E.10	Enable buffer zone communities to effectively manage waterways, riparian, and ponds.	3500	3600	3700	3800	3900	4000	4100	4200	4300	4400	39500
E.11	Facilitate the natural flow of the river system to maintain floodplain grassland habitat.	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	31500
F.1	Facilitate reintroductions and recovery of large prey such as Indian bison (Chitwan to Babai Valley), wild water buffalo (Koshi to Chitwan), swamp deer (Shuklaphanta to Chitwan, Bardia, and Koshi).	3000			3500			5000		5500		17000
F.2	Regulate livestock grazing in critical corridors and habitats.	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	19500
F.3	Prevent wildlife-livestock disease transmission through periodic vaccinations of livestock in fringe areas of the tiger habitats in collaboration with the local governments.	2600		2700		2800		2900		3000		14000
F.4	Facilitate genetic exchange between isolated populations by translocation, augmentation, and restoration.		3500			3800			4200			11500

F.5	Foster collaborations with the central veterinary laboratory and strengthen its capacity for the detection of viral and bacterial wildlife diseases.	700	800	900	1000	1100	1200	1300	1400	1500	1600	11500
F.6	Establish incinerator facilities for the safe disposal of dead wildlife at each PA.											
F.7	Train veterinary staff on wildlife health, rescue, and restraining methods.		800		900		1000		1100		1200	5000
F.8	Strengthen plant and animal quarantine facilities.			2000				2500				4500
	Sub-Total	**111600**	**112700**	**131800**	**137500**	**135750**	**149890**	**166830**	**144770**	**183710**	**184850**	**1459400**
2. Combat tiger poaching and illegal trade of its parts												
A.1	Develop a national anti-poaching strategic plan, with sub-plans for each tiger-bearing PA and adjoining DFO.		5000									5000
A.2	Review and revise the Nepal Army Conservation School curriculum, including the training of trainers in thus revised curriculum.			3000								3000
A.3	Develop protocols for the assessment of the security of the PAs and conduct security assessments at regular intervals.				3000							3000
A.4	Establish wildlife crime control mechanisms at the province level and form additional WCCB cells at the district level as required.			1200			1500			2000		4700
B.1	Improve accessibility within each PA for effective patrolling and law enforcement.	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	95000
B.2	Conduct sweeping, camping, and long-range patrolling operations in protected areas.	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	100000
B.3	Provide vehicles and motorized boats to patrol teams for regular patrolling, including river patrolling.	12000	12000	13000	13000	14000	14000	15000	15000	16000	16000	140000
B.4	Provide mobility support, such as daily provisions and equipment for effective patrolling and park management.	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	60000
B.5	Strengthen, build capacity, and mobilize CBAPUs, including the use of new technology.	7000	8000	9000	10000	11000	12000	13000	14000	15000	16000	115000
B.6	Conduct training of trainers on patrol-based monitoring.	700	800	900	1000	1100	1200	1300	1400	1500	1600	11500
B.7	Equip tiger-bearing PAs with cross-cutting equipment like CCTV, metal detectors, poacher cams, drones, night vision binoculars, etc.	10000		10000		11000		11000		12000		54000
B.8	Provide equipment and logistics support to officials of DFOs.	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	50000
B.9	Improve the wildlife crime investigation process using genetic profiles and enhance the evidence collection system through capacity building and training.		1500	5000	1500	1500	1500	1700	1700	1700	1700	17800
B.10	Strengthen informant networks, information gathering, and communication networks for anti-poaching operations.	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	60000

B.11	Provide capacity-building training to PA and DFO staff on wildlife crime, forensics, and scene of crime.	2000	2000	2000	2500	2500	2500	2500	3000	3000	3000	25000
B.12	Strengthen the capacity of CITES implementation at all levels.	2000	1200	1200	1200	1200	1400	1400	1400	1400	1400	13800
B.13	Conduct awareness-raising programs on anti-poaching and conservation-related laws, including the installation of information boards and display materials at key entry and exit ports such as customs and airports.	2600	2600	2700	2700	2800	2800	2900	2900	3000	3000	28000
B.14	Initiate the formation of anti-poaching units in BaNP and PNP.	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	15000
B.15	Provide capacity building and sensitization training to the staff of customs and airports.		1200			1300			1400			3900
C.1	Install GSM-enabled surveillance cameras in additional sites.	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	19500
C.2	Procure the logistic goods (GPS, camera, binoculars) to use them in patrolling to collect real-time and reliable information.	3000	3300	3600	3900	4200	4500	4800	5100	5400	5700	43500
C.3	Install closed circuit television (CCTV) in sensitive areas, as appropriate, and build capacity to operate and maintain these systems.	1200			1200			1200			1200	4800
C.4	Implement an android-based Real-Time SMART patrolling system and other advanced technology as appropriate.	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	25000
C.5	Train and employ sniffer dogs for anti-poaching operations.	1200			1200			1200		600		4200
C.6	Explore and introduce new technology to tackle wildlife crime.	600	700	800	900	1000	1100	1200	1300	1400	1500	10500
D.1.	Conduct regular meetings of NTCC, WCCCC, and WCCB.	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	24500
D.2.	Strengthen Wildlife Crime Control Bureaus in additional districts.	600	700	800	900	1000	1100	1200	1300	1400	1500	10500
D.3.	Conduct interaction programs among park staff, protection units, and CBAPUs	600	600	700	700	700	800	800	900	900	1000	7700
D.4	Initiate tri-monthly meetings of the relevant stakeholders to review progress on combating wildlife crimes.	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	19500
	Sub Total	**84500**	**81900**	**97500**	**88600**	**99500**	**91900**	**108000**	**99500**	**116700**	**106300**	**974400**
3. Reduce human-tiger conflicts and enhance economic opportunities for local communities												
A.1	Develop and implement the national HWC strategy.		2000									2000
A.2	Explore Wildlife Damage Relief Guidelines, 2080, to simplify claim processes, reduce delays, and enhance transparency and efficiency at all levels.			1200								1200
A.3	Establish or strengthen additional relief schemes, such as the one managed by NTNC.	10000	10000	10000	11000	11000	11000	11000	12000	12000	12000	110000
A.4.	Establish and operationalize professional market-based insurance schemes (human, livestock, property, and crops) and wildlife relief endowment fund and continue support to sustain it.	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	30000

A.5	Establish and operationalize 'wildlife conservation funds' such as CITES fund, PA management fund, etc., under the DNPWC.	1200	1300	1400								3900
A.6	Develop mechanisms and capacity to access and use carbon funds to clutch the REDD+ and climate change funds for tiger conservation.		1200	1300	1400							3900
A.7	Assess and utilize private sectors and corporate social responsibility investment for tiger conservation.			1200	1300	1400						3900
A.8	Promote the application of improved technology and innovation for the use of invasive species to generate income and employment opportunities.	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	12000
A.9	Align the "Forest Development Fund" with the protection of important tiger corridors.	700		800			900			1000		3400
A.10	Develop Bardia National Park as a model tiger-tourism site and replicate its success in other tiger-bearing protected areas and high-altitude tiger habitats.	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	28500
A.11	Promote private sector investment in tourism business in protected areas and buffer zones.	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	34500
A.12	Facilitate and capacitate government bodies and conservation partners to secure external funds through development banks, Green Climate Fund (GCF), and GEF funds.	1700	1700		1700	1800		1800	1800		1800	12300
A.13	Establish effective, equitable, and sustainable human-wildlife coexistence community-led cooperatives.	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	15000
B.1	Use cutting-edge technology (e.g., satellite collars, camera traps) to monitor the behavior of problematic tigers.	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	30000
B.2	Initiate and develop mobile applications and an online database for proper and systematic documentation of conflict-related incidences.	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	15000
B.3	Equip newly established animal's wildlife hospital for food and care for orphan and injured animals.	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	100000
B.4	Provide problem animals management/handling techniques training to park staff and DFOs and prepare a manual on the rescue and handling of stray tigers.	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	15000
B.5	Provide support for constructing temporary towers, fencing, and predator-proof collars for crop and livestock protection.	5000	5000	6000	6000	6000	7000	7000	8000	8000	9000	67000
C.1	Develop and support rescue and rehabilitation facilities such as zoological gardens, wildlife rescue, and breeding centers for injured, problematic, and orphan wild animals, including tigers, at national, provincial, and local levels.	20000	20000	21000	21000	22000	22000	23000	23000	24000	24000	220000
C.2	Formulate and implement operational guidelines for zoological gardens/parks, wildlife rescue, and breeding centers.		2000									2000
C.3	Upgrade and capacitate community-managed orphanages and zoos.	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	60000

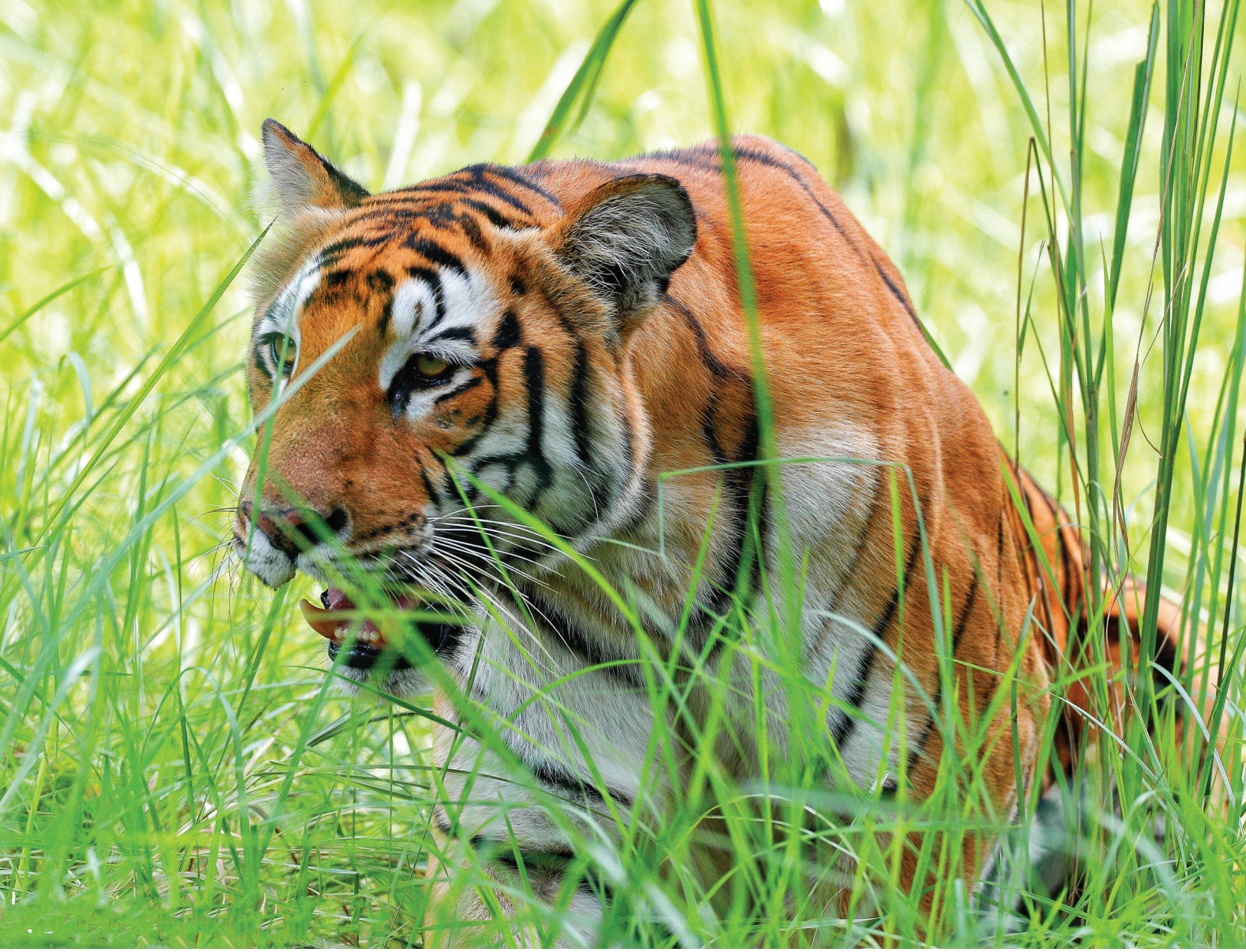
C.4	Train staff of PAs, forest departments, local governments, CBAPUs, CBOs, and Rapid Response Teams on human-wildlife conflict management	1000	1000	1100	1100	1200	1200	1300	1300	1400	1400	12000
C.5	Promote ex-situ species conservation facilities as a center for tourism, conservation education, and research.	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	60000
C.6	Enhance the provision of insurance and occupational safety for the employee and workers involved in handling problem tigers.	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	15000
C.7	Build the capacity of frontline staff on problem animal handling and establish a well-equipped Rapid Response Team to rescue transient and problem tigers and prey.	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
D.1	Promote alternative and repellant cash crops in the buffer zones and areas surrounding potential high-altitude tiger habitats.	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	35000
D.2	Promote the use of alternative energy sources (biogas, improved cooking stoves, and solar energy).	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	35000
D.3	Arrange soft loans or micro-credit for poor and marginalized people, including women, to invest in agricultural-biodiversity enterprises.	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
D.4	Promote small-scale enterprises for handicrafts and other products across critical conservation sites.	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	30000
D.5	Promote livelihood support programs for wildlife victims' families with a particular emphasis on the promotion of tiger-based eco-tourism enterprises.	10000	10000	11000	11000	12000	12000	13000	13000	14000	14000	120000
E.1	Organize campaigns and interaction programs to raise conservation awareness among youths.	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
E.2	Prepare training curriculum and relevant materials for nature guides.		1300									1300
E.3	Celebrate world tiger day on 29th July every year and take the opportunity to promote tiger conservation awareness.	1500	1500	1500	1500	1500	2000	2000	2000	2000	2000	17500
E.4	Organize observation tours for social activists, advocacy groups, and community leaders to spread the tiger conservation message.	1500	1500	1500	1500	1500	2000	2000	2000	2000	2000	17500
E.5	Organize cross-learning observation tours for CBAPUs to transboundary parks in India.	1500	1500	1500	1500	1500	2000	2000	2000	2000	2000	17500
E.6	Provide capacity-building training to enhance staff's skills in negotiation, mediation, and conflict resolution.	1500	1500	1500	1500	1500	2000	2000	2000	2000	2000	17500
E.7	Conduct behavioral change campaigns at schools and colleges.	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	24500
E.8	Support local communities with training and tools/equipment to improve their ability to manage HWC.	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	100000
E.9	Conduct conservation awareness programs targeting women, students, and youths.	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
E.10	Conduct school education programs to impart conservation messages.	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	17000

	Sub-Total	127900	134100	133900	133700	134900	135900	139200	141500	143100	145200	1369400
4. Strengthen cooperation and collaboration for tiger conservation												
A.1	Establish or strengthen collaboration with local and provincial governments to mobilize financial resources for tiger conservation.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	10000
A.2	Engage provincial and local governments and conservation partners for tiger habitat management with a focus on wetland and grassland management.	3200	3300	3400	3500	3600	3700	3800	3900	4000	4100	36500
A.3.	Develop sharing mechanism for water resources.		1500									1500
A.4	Liaise with the local governments and develop a mechanism for the disbursement of compensation to the wildlife victims.	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	12000
A.5.	Build the capacity of local governments for safe and effective management of human-wildlife conflict.	1600	1600	1600	1600	1700	1700	1700	1700	1800	1800	16800
A.6	Establish a wildlife relief endowment fund and leverage support from conservation partners to sustain it.	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	25000
A.7	Capacitate and strengthen the community-managed livestock insurance schemes to reduce human-tiger conflict.	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	35000
B.1	Conduct periodic meetings between the development sectors and conservation sectors to review the development plans and their impacts on wildlife habitat.	1500	1500	1500	1500	1800	1800	1800	1800	2000	2000	17200
B.2	Conduct intensive consultative and coordination meetings and presentations between the development agencies and conservation agencies while planning and implementing the mega development projects.	2000	2000	2000	2200	2200	2200	2400	2400	2400	2400	22200
B.3	Conduct regular meetings among PA managers, forest department officials, heads of local governments, and key community members to support inclusive PA management.	2000	2000	2000	2200	2200	2200	2400	2400	2400	2400	22200
B.4	Coordinate with telecommunications companies to establish, renovate, and strengthen the communication system in the remote areas of the PAs.	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	12000
C.1	Organize regular and periodic meetings and workshops at transboundary levels.	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
C.2	Explore and introduce established and innovative transboundary conservation interventions practiced elsewhere in the region.	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	25000
C.3	Conduct transboundary exchange visits for PA managers and local representatives and leaders.	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	30000
C.4	Design and deliver joint training courses for transboundary PA managers.	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	26000
C.5	Conduct transboundary intelligence-sharing meetings among PA managers.	500	500	500	500	500	500	500	500	500	500	5000

C.6	Conduct joint patrolling and information sharing between border security forces, i.e., Seema Suraksha Bal of India and Armed Police Force, and Nepali Army of Nepal.	600	600	600	600	600	600	600	600	600	600	6000
C.7	Update the 'Tigers of the Transboundary Terai Arc Landscape' report with the latest survey dataset in coordination with the Government of India.		2000									2000
D.1	Strengthen the SAWEN Secretariat and conduct regular programs.	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	100000
D.2	Coordinate with Interpol, TRAFFIC, and CITES Secretariat to control wildlife crime.	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
D.3	Collaborate with regional and international institutions with genetic laboratories to compile the genetic profile and database of the tiger.	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
D.4	Establish a Memorandum of Understanding (MOU) with research and academic institutions.	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	12000
	Sub-Total	**46100**	**49700**	**46300**	**46800**	**47300**	**47400**	**47900**	**48000**	**48400**	**48500**	**476400**
5. Strengthen monitoring and research on tiger, prey-base and their habitat and promote outreach												
A.1	Improve collaboration between DNPWC and academic and research institutions on relevant tiger conservation and management research.	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	15000
A.2	Attract the use of cutting-edge research tools and techniques in wildlife research.	3200	3200	3200	3200	3200	3500	3500	3500	3500	3500	33500
A.3	Upgrade the research permit system using an online portal.	1900	1900									3800
A.4	Develop and update the roster of research institutions and experts.	500										500
A.5	Upgrade the existing structure of the Lalmati research station.	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	100000
A.6	Develop additional satellite research centers at Guthi of BNP in Banke-Bardia Complex; Adhavar of PNP, and Sukivar of CNP in Chitwan-Parsa Complex; and ShNP in Kailali-Kanchanpur Complex.		15000				15000		15000		15000	60000
A.7	Enhance the forensic capacity at the national and regional levels.	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
A.8	Initiate serum banking of opportunistic capture for disease surveillance.	800	800	800	800	800	800	800	800	800	800	8000
A.9	Enhance the capacity of the genetic lab under NTNC to conduct genetic sequencing studies.				20000				5000			25000
A.10	Engage Nepalese universities and university students in wildlife monitoring and research.	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	30000
B.1	Conduct studies on the scale, extent, and local variations in the intensity of human-wildlife conflict (tiger and ungulates) to help identify and design effective mitigation measures.	5000		5000		5000		5000		5000		25000
B.2	Establish permanent experimental plots (control and treatment) to gather information pertaining to grassland management, carbon, and biodiversity monitoring.	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
B.3	Continue long-term monitoring of the tiger prey base using the approved protocol for the monitoring of the health of the ecosystem and tiger habitat.	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	100000

B.4	Continue long-term monitoring of tigers by camera trapping.	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	100000
B.5	Monitor the movement of problem tigers using satellite telemetry.	7500	7500	7500	7500	7500	7500	7500	7500	7500	7500	75000
B.6	Conduct satellite telemetry of tigers to identify potential movement corridors and understand the impacts of roads and other infrastructure development on tiger movement.			5000		5000			5000			15000
B.7	Manage control and treatment plots for the monitoring of grassland management interventions and alien invasive species.	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	25000
B.8	Undertake an assessment of tiger population viability and carrying capacity of all protected areas.	1200	1200	1300	1300	1400	1400	1500	1500	1600	1600	14000
B.9	Undertake long-term research on invasive species management and control by establishing monitoring plots and transect lines in forests and grasslands.	600	600	700	700	800	800	900	900	1000	1000	8000
B.10	Initiate long-term study programs to understand vegetation dynamics in response to specific management practices, altered hydrological regimes and climate change impacts.	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	30000
B.11	Commence study of tourism impact on biological diversity in the TAL.				3500							3500
B.12	Conduct an economic valuation of tiger-bearing protected areas.			6000								6000
B.13	Undertake intensive research on the transboundary movement of tigers and the use of corridors, buffer zones, and human land-use areas through satellite radio telemetry.			5000				5000				10000
B.14	Support studies on impacts of land use change, infrastructure, and other development on tiger and prey base populations	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	30000
B.15	Undertake detailed studies on ungulate-habitat relationships and the feeding ecology of ungulates.	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
B.16	Identify potential tiger corridors and distribution ranges in high altitudes using camera trapping and non-invasive genetic tools.	1700					1700			1700		5100
B.17	Conduct studies on the socio-economic and cultural drivers of human-nature interactions in the TAL.	1500			1500				1500		1500	6000
B.18	Undertake baseline study of potential conservation landscapes- Eastern Chure Terai Complex and Karnali Conservation Landscape.		1800									1800
B.19	Conduct a feasibility study on the extension of existing corridors and the creation of new corridors, and provide legal protection to biological corridors and remaining forests outside PAs in TAL and beyond.			1600					1700			3300
B.20	Conduct a study of tiger dispersal and movement in climate refugia such as Eastern Terai, including Koshi Tappu WR and Trijuga forest, Mahabharat range, Chure range, and high-altitude large forest patches.		1900				1900					3800
B.1	Provide training focusing on database development and management.	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	15000

B.2	Support rangers for certificate courses at the Wildlife Institute of India (WII), India	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	40000
B.3	Support officers for diploma/graduate/post-graduate courses in Wildlife Management at WII and other international universities	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	45000
B.4	Train CBAPUS, community members, and citizen scientists in the survey and reporting of tiger records to the local forest and PA offices	2200	2200	2200	2200	2500	2500	2500	2500	3000	3000	24800
B.5	Build the capacity of frontline staff to recognize, record and report disease or poor health condition of animals or the spread of invasive species.	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	15000
C.1	Conduct national, regional, and international tiger conservation workshops.	4000				4000					4000	12000
C.2	Share the achievement of tiger conservation at regional, international, and global forums.	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	20000
C.3	Prepare video, documentary, and promotional material on tiger conservation opportunities and challenges.	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	25000
	Sub-Total	**95100**	**101100**	**103300**	**105700**	**95200**	**100100**	**91700**	**109900**	**89100**	**102900**	**994100**
	Grand Total	**465200**	**479500**	**512800**	**512300**	**512650**	**525190**	**553630**	**543670**	**581010**	**587750**	**5273700**



Department of National Parks and Wildlife Conservation
Department of Forests and Soil Conservation, Babarmahal, Kathmandu, Nepal.