Human-Wildlife Conflict Management

Conflict to Coexistence (C2C) Strategy for **Shingkhar Gewog**, Zhemgang (2026-2030)

Divisional Forest Office-Zhemgang
Department of Forests and Park Services
Ministry of Energy and Natural Resources

WWF

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Abbreviations

BDBL	Bhutan Development Bank Limited
BO	Beat Office
BPCL	Bhutan Power Corporation Limited
C2C	Conflict to Coexistence
CDCL	Construction Development Corporation Limited
CF	Community Forest
CFMG	Community Forest Management Group
CIC	Community Information Center
CPS	Community Primary School
DAO	Dzongkhag Agriculture Office
DFO	Divisional Forest Office
DLO	Dzongkhag Livestock Office
FCB	Food Corporation of Bhutan
GTCT	Gewog Tiger Conservation Tshogpa
HH	Household
HQ	Head Quarter
HWC	Huma-Wildlife Conflict
IKI	International Climate Initiative
LG	Local Government
NGO	Non-governmental Organization
NRDCL	Natural Resources Development Corporation Limited
NWFP	Non-wood Forest Product
ORC	Outreach Clinic
PCU	Project Coordination Unit
PF	Private Forest
PHC	Primary Health Centre
PS	Primary School
RBP	Royal Bhutan Police
RNR-EC	Renewable Natural Resource- Extension Center
RO	Range Office
WWF	World Wildlife Fund

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Foreword

Human-Wildlife conflict (HWC) poses a significant challenge to both community livelihoods and wildlife conservation in Bhutan. Shingkhar Gewog, identified as a hotspot for such conflicts in Zhemgang, requires strategic and collaborative interventions to foster coexistence. I am pleased that the Divisional Forest Office, Zhemgang, has developed the Human-Wildlife Conflict (HWC) Coexistence Strategy with support from the IKI Living Landscapes Project.

This strategy emphasizes community engagement, scientific assessment, and practical interventions to mitigate conflict effectively. I extend my sincere appreciation to the DFO Zhemgang for their leadership and dedication throughout the planning and implementation phases. I also thank the local government, community members, and other stakeholders whose active participation has been invaluable in shaping this strategy.

Their collective efforts demonstrate the power of partnership in addressing conservation challenges while protecting community well-being. I commend the IKI Living Landscapes Project for their financial support, which has been critical for this initiative. It is my hope that this strategy will reduce conflicts, enhance awareness, and promote a culture of coexistence between humans and wildlife. I wish all stakeholders success in implementing this strategy and trust that it will contribute meaningfully to sustainable conservation and community resilience.

(Karma Tenzin)
Director

Acknowledgement

The C2C strategy for Shingkhar Gewog is the result of a collective and dedicated effort by the staff of the Divisional Forest Office, Zhemgang. The Division sincerely acknowledges the commitment, professionalism, and teamwork demonstrated by all officers and staff who contributed their time, experience, and technical inputs toward the successful formulation of this strategy. Their sustained engagement throughout the process ensured that the document is comprehensive, practical, and grounded in field realities.

The formulation of this strategy was made possible through the unwavering support and guidance of the Department and WWF, Bhutan. The Division is deeply grateful for their strategic direction, technical advice, and continuous encouragement. Further, the Division would also like to express its sincere gratitude to the IKI Project, "Living Landscapes: Securing High Conservation Values in South-Western Bhutan," for its generous financial support, which enabled the conduct of comprehensive socio-economic and field surveys. The data generated through these assessments formed a critical foundation for evidence-based planning and significantly informed the management interventions contained in this strategy. WWF–Bhutan, together with the Project Coordination Unit, played a pivotal role in facilitating the timely procurement of essential equipment and field gear, and in delivering capacity-building programs. These interventions greatly strengthened the technical capacity of the field teams involved in the assessment.

The Division would like to extend special appreciation to Ms. Tenzin Wangmo of UWIFoRT, who played a crucial leadership role in guiding and coordinating the formulation of this strategy. Her dedication, technical oversight, and leadership were instrumental in bringing the C2C planning process to completion. Finally, the Division extends its heartfelt thanks to all individuals, institutions, and stakeholders who, in various capacities, contributed to the development of this strategy. Their collective efforts have resulted in a key milestone that will guide Human Wildlife Conflict management and their co-existence in Shingkhar Gewog in the years to come.

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1. Introduction

Bhutan, being largely agrarian with around 60 percent of its population relying on forest-based agriculture and livestock production, faces escalating challenges from human-wildlife conflict (HWC). Its extensive forest cover and rich biodiversity create a natural predisposition for such conflicts due to the significant overlap between human and wildlife habitats. Expanding human settlements, often scattered and situated within forested areas, heighten these challenges by increasing human-wildlife interactions. Additionally, dispersed settlements necessitate further infrastructure, such as a broader network of roads and power transmission lines, leading to habitat destruction and intensifying HWCs (NCD, 2019).

Bhutan is globally recognized for its commitment to environmental conservation, with the Constitution mandating that at least 60 percent of the country's land remain permanently under forest cover. According to the 2023 State of Forest Report (National Forest Inventory), Bhutan's forest cover is 69.71 percent (2.68 million hectares). Zhemgang Dzongkhag (district) has the highest forest cover among the 20 Dzongkhags, with 93.89 percent. Zhemgang is a biodiversity hotspot, hosting a variety of faunal species such as Tiger, Golden Langur, Himalayan Musk Deer, Red Panda, Wild Dog, White-Bellied Heron, Steppe Eagle, and Golden Mahseer.

Shingkhar is one of the gewogs in Zhemgang, which falls under the jurisdiction of Zhemgang Divisional Forest Office (DFO), which hosts a wide range of wildlife species. As the wildlife populations in gewog increase and resources become scarcer, animals are forced to cross into human territories, further intensifying the conflict. Balancing the needs of both people and wildlife in the gewog requires integrated management strategies, including the involvement of the community and relevant stakeholders. IKI Living Landscape Project-WWF, in partnership with the DoFPS and Zhemgang DFO, has come up with the C2C Strategy for Shingkhar gewog under Zhemgang to address the issue of HWC and promote coexistence through the C2C approach.

2. Goals and Objectives

Goal: "To ensure compatible coexistence between wildlife and people through a holistic approach".

Objectives:

- Safeguard people and their livelihood/assets alongside wildlife presence.
- Secure wildlife and its habitat to sustain a healthy and resilient wildlife population.

3. Methodology

3.1 Site Description

Shingkhar is one of the eight gewogs under Zhemgang district administration. The gewog center is located 120 kilometers from Zhemgang town. Spanning over an area of 309 square kilometers, Shingkhar comprises 244 households with a population of 960. It is divided into five sub-blocks known as chiwog. Shingkhar has three schools, one Primary Health Care (PHC) and one Outreach Clinics (ORC), 5 lhakhangs (temples), one Forest Beat Office, and a Renewable Natural Resources Extension Center (RNR-EC).

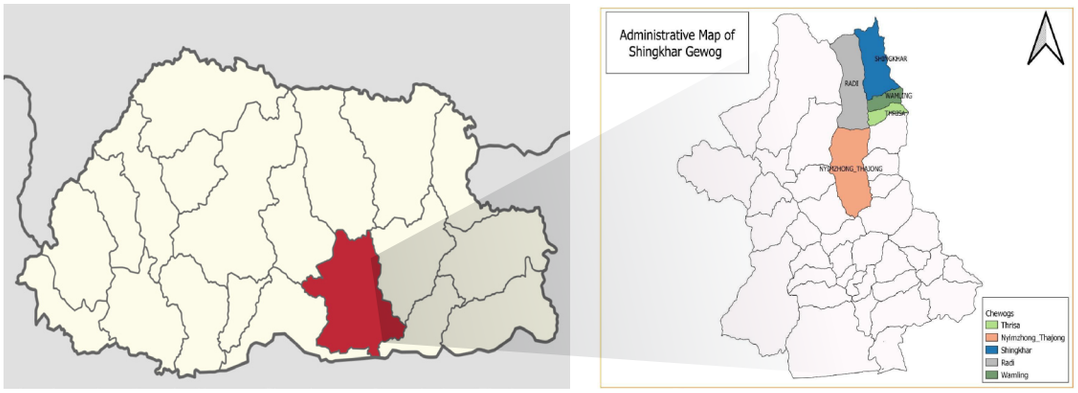

Figure 1. Shingkhar gewog with chiwog boundary

3.2 Methods

The C2C approach is an integrated, stepwise approach to enable systematic HWC management planning, implementation, and monitoring. The objectives of the framework and its approach are as follows:

- To provide clear, stepwise guidance for effective management of HWC.
- To facilitate integrated and holistic approaches to HWC management by encouraging long-term solutions coupled with short-term and intermediate results.
- To provide a template for managing HWC effectively with the flexibility to tailor to different scales and contexts across different regions.

The framework of the C2C approach (Figure 2) defines four assumptions for effective HWC management:

1. All four outcomes (Figure 2, inner circle) need to be achieved to manage HWC effectively.
2. The four outcomes are achieved by implementing actions within the context of the six HWC management elements (Figure 2, middle circle), and actions can vary based on context.
3. The six HWC management elements are interconnected, and all of them must be implemented in an integrated way. None can be implemented in isolation; actions and lessons in each element inform and reinforce actions in other elements.
4. The implementation of the six management elements follows defined principles (Figure 2, outer circle).

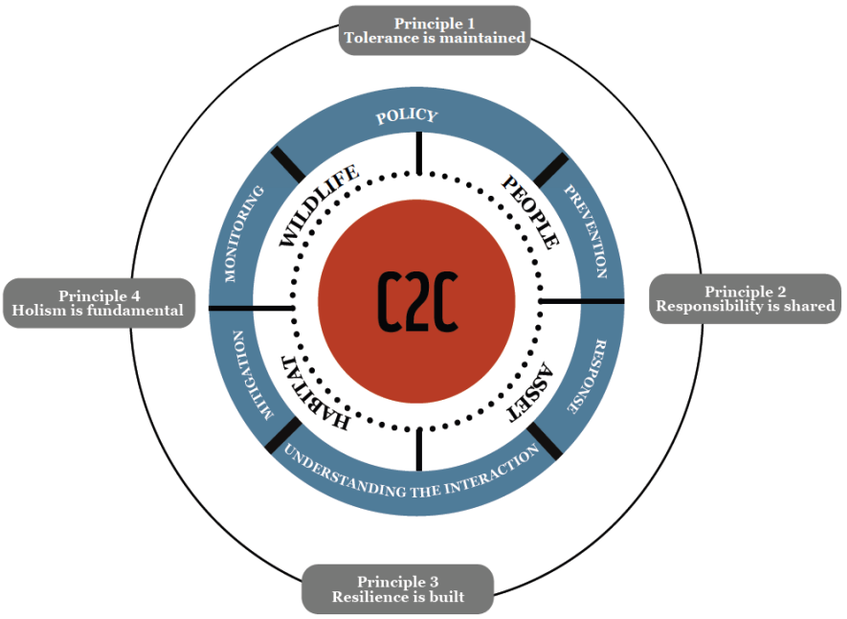

Figure 2. Conflict to Coexistence framework

Effective management of HWC requires taking the needs of people and wildlife into consideration. Therefore, the C2C Approach sets out four outcomes that need to be targeted at the same time in landscapes shared by wildlife and people:

- People able and willing to live alongside wildlife
- Wildlife thrives alongside human presence
- Livelihoods/assets secured against presence of wildlife
- Habitat sufficient to maintain viable wildlife population

The stepwise implementation of the C2C approach follows an adaptive management process. Building trust and collaboration among stakeholders is a long-term endeavor. Co-creating the HWC management strategy with communities and other stakeholders in a participatory and 3 inclusive manner takes time. The C2C Strategy development in Shingkhar gewog followed all the steps outlined (Figure.3) in the C2C approach and details of each step are presented below.

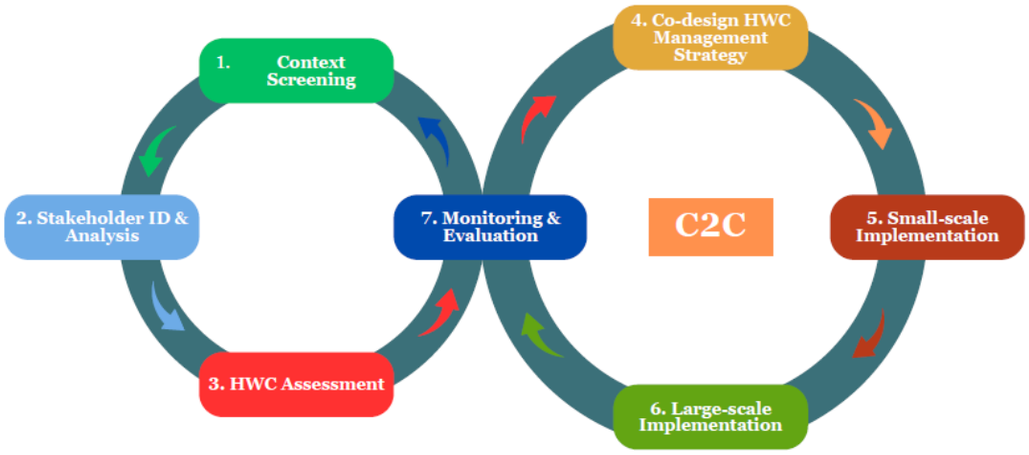

Figure 3. Conflict to Coexistence process

3.2.1 Context Screening

Context screening is the initial phase of the assessment process, aimed at identifying and analyzing the specific characteristics of a landscape and its prevailing HWC dynamics. Before completing this step, the C2C Project Manager gathered all relevant baseline information such as social landscape mapping, government census records, and other pertinent resources, to achieve a comprehensive understanding of the landscape. Context screening was conducted in consultation with forestry officials and stakeholders, including local government officials. This involved detailing the site (e.g., landscape information, human demographics, and livelihoods), trends in HWC (e.g., records of conflict species, frequency/severity and types of conflict, and management interventions), drivers of HWC (both human-induced and natural drivers), wildlife dynamics (trends in conflict and prey species, movement of species through the landscape, and conflict drivers), and relevant policies.

3.2.2 Stakeholder Identification and Analysis

Stakeholders are individuals or groups with an interest or stake in a particular issue. In the context of HWC, stakeholders include local communities, conservation organizations, government agencies, and others affected by or involved in managing these conflicts. Effective stakeholder identification is crucial for successful human-wildlife conflict mitigation and promoting coexistence. Multiple stakeholder groups are typically involved in HWC scenarios. Some are directly impacted by HWC, while others are engaged in its management. Additionally, certain stakeholders, though not directly affected, wield significant influence. For the C2C approach, it is essential to identify and understand the stakeholders involved in HWC and evaluate their potential for collaboration. Therefore, a core team consisting of the C2C manager, Range Officer, Beat Officer, local government officials, including Tshogpas from five chiwogs, together carried out the stakeholder identification and analysis matrix using the Stakeholder Analysis Matrix (C2C Tool 5), which involves clustering stakeholders (Table 1). This matrix employs a systematic evaluation process by answering a series of questions on a scale of 1 to 5, focusing on the following aspects:

- Stakeholders' interest in HWC and its management in Shingkhar gewog
- Their influence on the long-term success of HWC management strategy
- Their availability to participate in the co-design and implementation of the HWC management strategy

As reflected in Table 1, stakeholders are classified into two categories: duty bearers/service providers (indicated in blue) and community group representatives such as CFMG and NWFP Group Chairperson (indicated in green). A total of 13 duty bearers/service providers and 10 community members were identified. The stakeholder analysis highlights a diverse range of interest, influence, and availability levels among groups involved in the HWC management strategy. As shown in Table 1, stakeholders with high interest, influence, and availability (government office bearers like the relevant BO and Livestock Extension Office, and community members like the GTCT group and Shingkhar Tshogpa) are pivotal to the strategy's success. Those with moderate influence, including the gewog administration, Agricultural Extension Office, and school, can play important supporting roles in information dissemination and resource management. Conversely, stakeholders with low interest and influence, such as Bhutan Power Corporation (BPC), business community, and PHC, have minimal direct impact on the initiative.

Table 1. Stakeholder analysis matrix for Shingkhar gewog

Group, organization or individual NAME use colour code for Dutybearer/Service provider and Community member	INTEREST in HWC and its managment in this landscape (1 - 5)	INFLUENCE on long-term success of a HWC management strategy (1 - 5)	AVAILABILITY to participate in the co-design of a HWC management strategy (1 - 5)	**Category**	**Functions** (Producers/Consumers/Regulators/Policy/ Makers/Activists)
Shingkhar Gewog Administration Office	5	3	2	High interest, Medium influence, and Low availability	Makers
Shingkhar PS	4	3	1		Makers
Shingkhar PHC	3	2	2	Medium interest, Low influence and availability	Makers
Wamling Dratshang	3	2	1		Makers
Tshokiling Dratshang	3	2	2		Makers
Thrisa ECR	3	2	2		Makers
Phumeythang Dratshang	3	2	2		Makers
Gewog Livestock Extension Office	5	4	4	High interest, influence, and availability	Makers
Forest Beat Office	5	5	5		Regulators
GTCT group	5	5	4		Consumers
Shingkhar Tshogpa	5	5	4		Consumers
Gewog Agricultre Extension Office	3	3	2	Medium interest and influence, Low availability	Makers
BPC	2	2	2	Low interest, influence, and availabilty	Makers
Business community	2	2	2		Makers
Nimshong PHC	2	2	2		Makers
Shingkhar CIC	2	2	2		Makers
Wamling Tshogpa	5	5	3	High interest and influence, Medium availability	Consumers
Thrisa Tshogpa	5	5	3		Consumers
Thuktencholing CF	4	3	3		Consumers
Nimshong-Thajong Tshogpa	5	5	3		Consumers
Radi Tshogpa	5	5	3		Consumers
Thrisa Dairy Product Group	5	3	3	High interest, Medium influence and availability	Consumers
Radhi CF	4	3	3		Consumers

3.2.3 HWC Assessment

The C2C assessment under Shingkhar gewog covering five chiwogs was conducted from 14-23 April 2025, led by a team of 8 enumerators who undertook one on one interviews visiting and interviewing all the sampled households and service providers/duty bearers. The survey included 22 Duty Bearer/Service Provider and 152 community households based on sample size determined by Yamane's (1967) method at 95% Confidence Interval.

Using the formula, $$n = \frac{N}{1+Ne^2},$$

Where n = Sample size; N = Total Population/HHs in the gewog; e = level of precision (e.g., margin of error, commonly 5% or 0.05 for 95% confidence level). The total household in the study area from five chiwog is 244 households for Shingkhar Gewog (sampling frame). Therefore, the sampling size for the survey was 152 community households for Shingkhar Gewog, which was further determined for every chiwog for the survey.

Table 2. Households interviewed as per the chiwog under Shingkhar Gewog

Sl.No.	Name of Chiwog	Total HHs	No. of HHs interviewed
1	Nimshong-Thajong	56	35
2	Shingkhar	50	31
3	Thrisa	44	27
4	Radi	25	16
5	Wamling	69	43
Total HHs		244	152

3.2.4 Co-design

Based on the result of the HWC assessment under Shingkhar gewog, the co-designing of the HWC management strategy was carried out in five chiwogs. Co-design is often used as an umbrella term for participatory and collaborative development processes. A formal stakeholder engagement process it aims to create actions, processes, and environments that are responsive and appropriate to their practical and cultural needs. An effective co-design approach starts with the recognition that community members and other stakeholders are the experts of their lived experiences and know what they need and what they can build on.

The co-design process for developing the HWC management strategy for Shingkhar gewog adopted a participatory approach, ensuring that the strategies closely reflected the needs and perspectives of the local communities and the stakeholders. The participatory co-design for Shingkhar gewog C2C Strategy was conducted from 23 May to 31 May 2025. The process

involved systematic co-designing across all five chiwogs with the community members and duty bearers of each chiwog in Shingkhar gewog. A total of 177 participants, including community members and service providers, participated in the co-design where 40 percent of participants were male and 60 percent were female as indicated in Table 3.

Table 3. Participants from each chiwog during the co-design consultation

Chiwog	Male	Female	Total participants
Thrisa	6	33	39
Wamling	14	7	21
Radi	10	17	27
Shingkhar	16	32	48
Nimshong	25	17	42
Grand total	71	106	177
	40%	60%	

In the co-designing of the strategic approach, facilitators began by presenting the C2C assessment report's findings to local communities and the duty bearers at the gewog and chiwog levels. This report detailed the results of four key outcomes and analyzed how six specific elements contributed to each outcome. Following these presentations, participants were divided into several groups, among duty bearers and community bearers. Each group was tasked with discussing necessary actions to improve outcomes identified as 'not safe' and maintain those deemed 'safe' at their current status.

Group leaders then presented their proposed actions, which were opened for discussion among all participants. Suggestions that gained collective acceptance were incorporated into the action plan with action implementation responsibility assigned to respective stakeholders. This collaborative process ensured that the action plan was comprehensive and reflective of the community's insights and the duty bearers' responsibilities. Such participatory approaches are vital for effective local governance and the successful implementation of C2C strategies. This collaborative approach ensured that strategies were both locally appropriate and co-owned by the community. The co-designing process led to the development of comprehensive strategies that will address specific challenges identified by each chiwog.

4. Results and Discussions

4.1 Overall results for Shingkhar Gewog

4.1.1 Conflict Species

Both service providers (or duty bearers) and community members identified several conflict species, both in terms of frequency and severity (conflict species with the greatest negative impact). Species such as the Barking deer, Wild pig / Bushpig / Wild boar), Tiger, Rodents, and Birds were consistently highlighted as causing frequent conflicts.

Regarding the species that cause the greatest negative impact, both groups again pointed to the Tiger, Wild pig, Barking deer, Rodents, and Birds. Additional species like the Dhole, Sambar, Porcupine, and Bear were also regarded as major contributors to the conflict.

Interestingly, while service providers also mentioned species such as the leopard, marten, snake, and wolf among the most impactful, community members uniquely highlighted macaques and bears more prominently. This divergence likely reflects differing experiences and perspectives between those managing wildlife and those living in close proximity to it. The graphical representation of the conflict animals is shown in Figure 4.

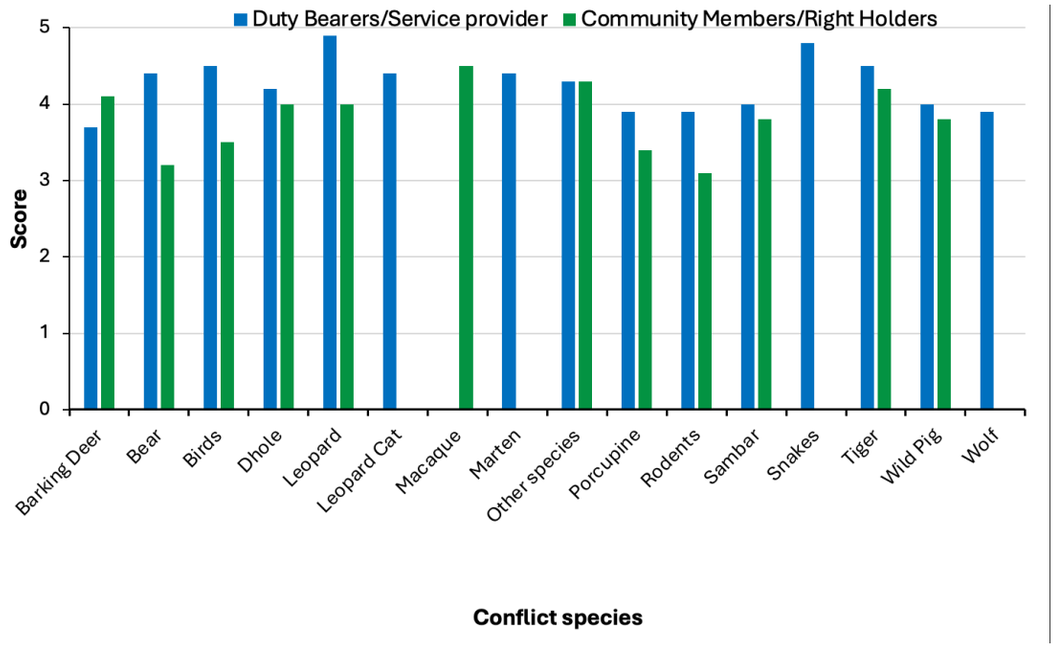

Figure 4. Graphical representation of conflicting species

Conflict species according to:

Service Providers/Duty Bearers: Bear, Dhole, Macaques, Sambar, Tiger, Barking Deer, Other species, Snakes, Wild Pig/Bushpig/Wild Boar, Birds, Leopard, Marten, Porcupine, Wolf

Community Members: Dhole, Sambar, Tiger, Barking Deer, Porcupine, Bear, Macaques, Marten, Wild Pig/Bushpig/Wild Boar, Leopard, Wolf, Birds, Other species, Capped Langur, Leopard Cat, Snakes, Birds of Prey, Golden Langur

Conflict species with the greatest negative impact (most severe):

Service Providers/Duty Bearers: Porcupine, Tiger, Wild Pig/Bushpig/Wild Boar, Rodents, Dhole, Sambar, Barking Deer, Marten, Leopard, Snakes, Birds, Wolf, Other species

Community Members: Barking Deer, Wild Pig/Bushpig/Wild Boar, Tiger, Rodents, Macaque, Birds, Sambar, Dhole, Porcupine, Bear, Other species

Conflict species causing the most frequent conflict:

Service Providers/Duty Bearers: Tiger, Barking Deer, Wild Pig/Bushpig/Wild Boar, Bear, Dhole, Rodents, Sambar, Marten, Leopard, Leopard Cat, Birds, Porcupine, Other species

Community Members: Barking Deer, Wild Pig/Bushpig/Wild Boar, Tiger, Rodents, Macaque, Birds, Sambar, Dhole, Porcupine, Bear, Other species

4.1.2 Results by Outcome

Human-wildlife coexistence is achieved when four critical outcomes safety of people, assets, wildlife, and habitat, are secured. Assessing each outcome's status is essential to determine the overall balance of this coexistence. In Shingkhar gewog, the current state of human-wildlife coexistence is imbalanced, primarily due to the vulnerability of livelihood assets. Both service providers and community members have reported similar outcomes, indicating that human vulnerability is next to livelihood in Shingkhar gewog (Figure 5). This suggests that the security and safety of people's lives are more threatened by wildlife than the protection of wildlife and their habitats. Addressing this imbalance is crucial to ensure the well-being of affected communities. Livelihood assets in Shingkhar gewog, including agriculture, livestock, and forest resources, are below safe thresholds, indicating instability in these sectors. This instability is directly linked to interactions with wildlife, leading to increased HWCs. Farmers face challenges such as crop destruction by wild boars and livestock predation by tigers and leopards, resulting in significant economic losses and threatening food security.

The imbalance in human-wildlife coexistence in Shingkhar gewog underscores the need for effective management strategies to protect livelihood assets. Implementing measures such as community-based initiatives, improved livestock enclosures, and sustainable agricultural practices can help mitigate conflicts and promote a more harmonious relationship between humans and wildlife. Addressing these challenges is crucial for the well-being of local communities and the conservation of wildlife in the region.

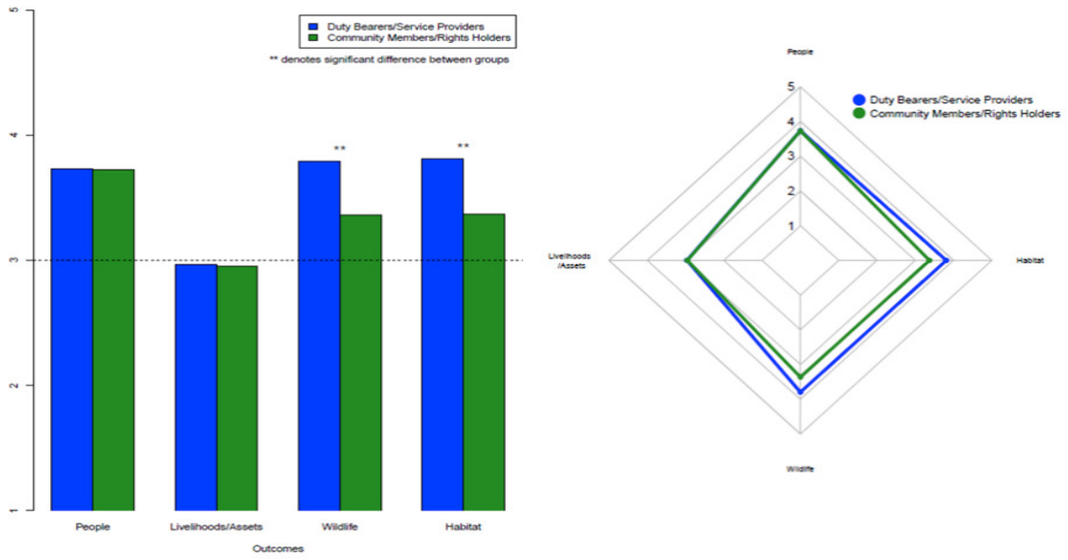

Figure 5. Graphical representation of the result by outcome

4.1.3 Results by Element contributing to each outcome

There are six key elements considered in the C2C approach to determine the state of four outcomes. The contribution of each element to each outcome within the four assumptions for Conflict to Coexistence are as follows:

I. Livelihoods/Assets Secured Against the Presence of Wildlife: The livelihoods and assets of local communities are more vulnerable among the four outcomes, and all six elements contribute at a very weak level. The contributions of elements such as prevention and monitoring are similar in quantity, with a slightly higher contribution, and the least from mitigation, which involves understanding conflict and implementing mitigation measures. This indicates that it is crucial to design mitigation measures to uplift the safety of assets, awareness policy, understanding of conflict, and response to the conflict.

II. People Able and Willing to Live Alongside Wildlife: HWC poses significant threats to both human livelihoods and wildlife conservation efforts. Current mitigation measures have often been inadequate in ensuring human safety. This inadequacy underscores the urgent need to develop and implement more

effective strategies that safeguard communities from wildlife-related dangers. Such strategies may include the erection of physical barriers, community education programs, and improved land-use planning to reduce human-wildlife interactions.

III. Habitat Sufficient to Ensure Sustainable Wildlife Populations: The wildlife habitat in Shingkhar gewog is currently in a favorable and secure condition, with effective policies and a comprehensive understanding of human-wildlife interactions with the local communities and service providers. To maintain and further enhance this status, it is essential to strengthen preventive measures across key elements such as SMART patrolling to prevent illegal use of the forest which leads to habitat fragmentation.

IV. Wildlife Thrives Alongside People: The wildlife in Shingkhar gewog is also currently in a favorable and secure condition, with effective policies, understanding of human-wildlife interactions, prevention, response, and monitoring. However, there are few mitigation measures, and it is essential to strengthen the mitigation measures to prevent poaching of wild animals and retaliatory killing.

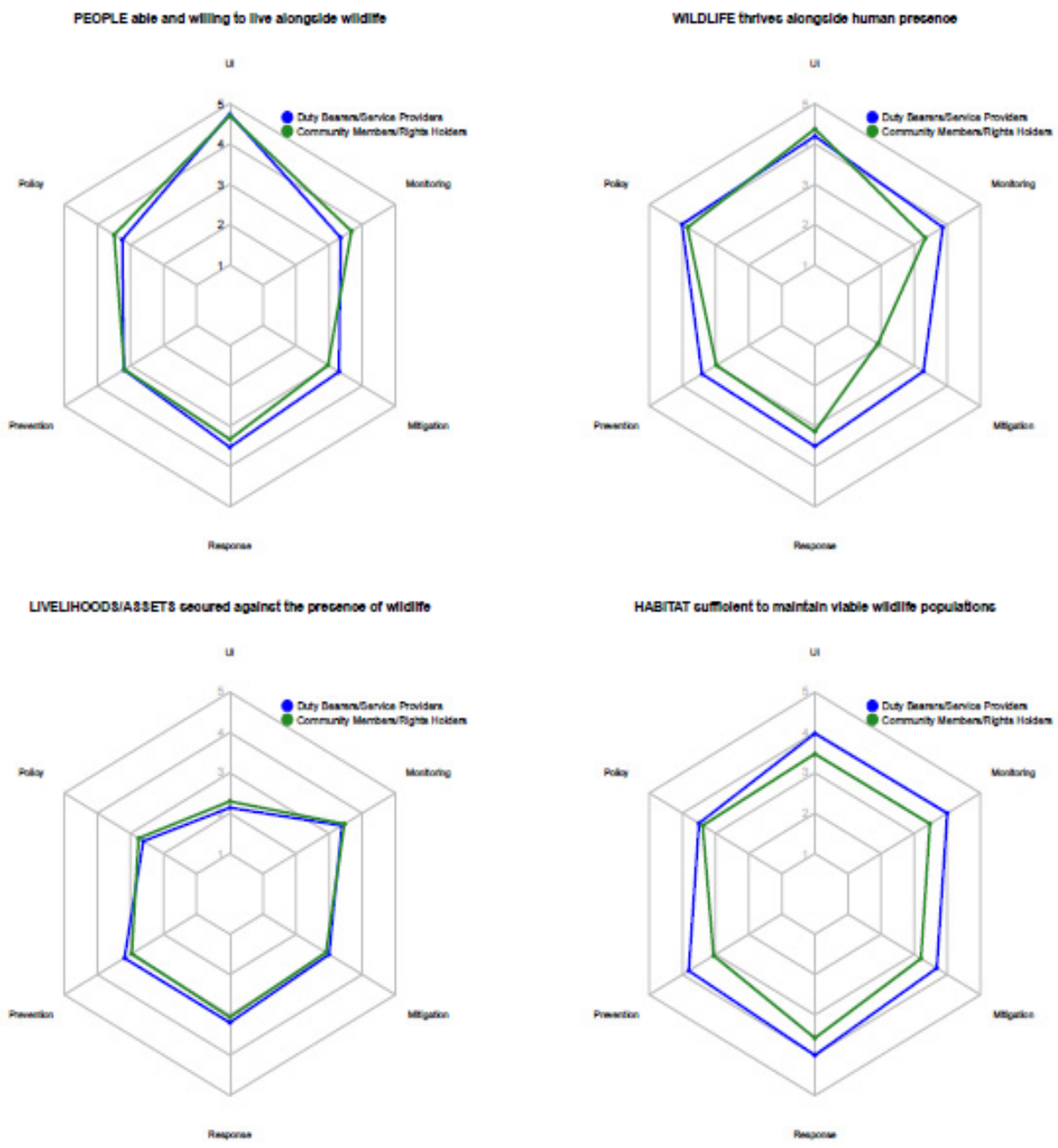

Figure 6. Graphical presentation of results by element4.2 Chiwog-wise Results

4.2 Chiwog-wise Results

The chiwog-wise results by outcome, element, and conflict species are presented as follows:

4.2.1 Nimshong-Thajong chiwog

Livelihood and assets are the most significantly impacted outcomes as a result of negative human-wildlife interactions, as reported by both duty bearers and

community members (Figure 7). This impact is primarily attributed to crop damage caused by wildlife species such as wild boar, porcupine, barking deer, and birds with livestock killed by dhole, and tiger. The intervention to reduce the human wildlife conflict and enhance coexistence shall prioritize under livelihood/assets outcome.

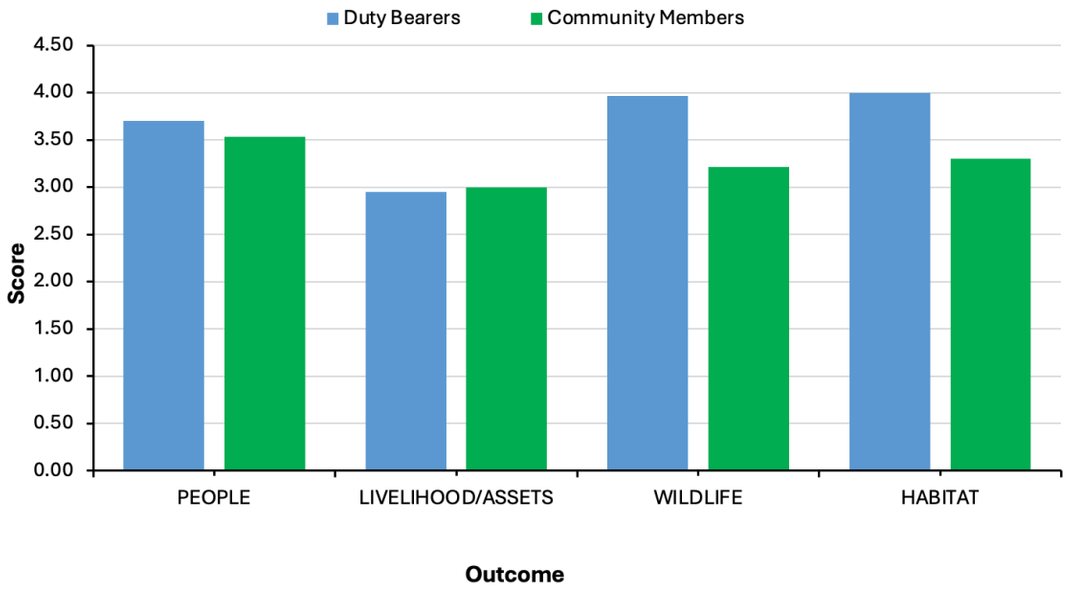

Figure 7. Result by outcome for Nimshong-Thajong chiwog

As illustrated in Figure 8, the community members assigned the lowest scores to mitigation under outcome people and livelihood/assets, while the lowest scores for wildlife and habitat attributed to response and prevention. To achieve the outcome people able and willingness to live alongside wildlife and secure livelihood/assets it's important to prioritize mitigation measures. In order to ensure wildlife thrives alongside people need immediate response mechanism in place and preventive measures to ensure the habitat is sufficient for wildlife populations to sustain themselves.

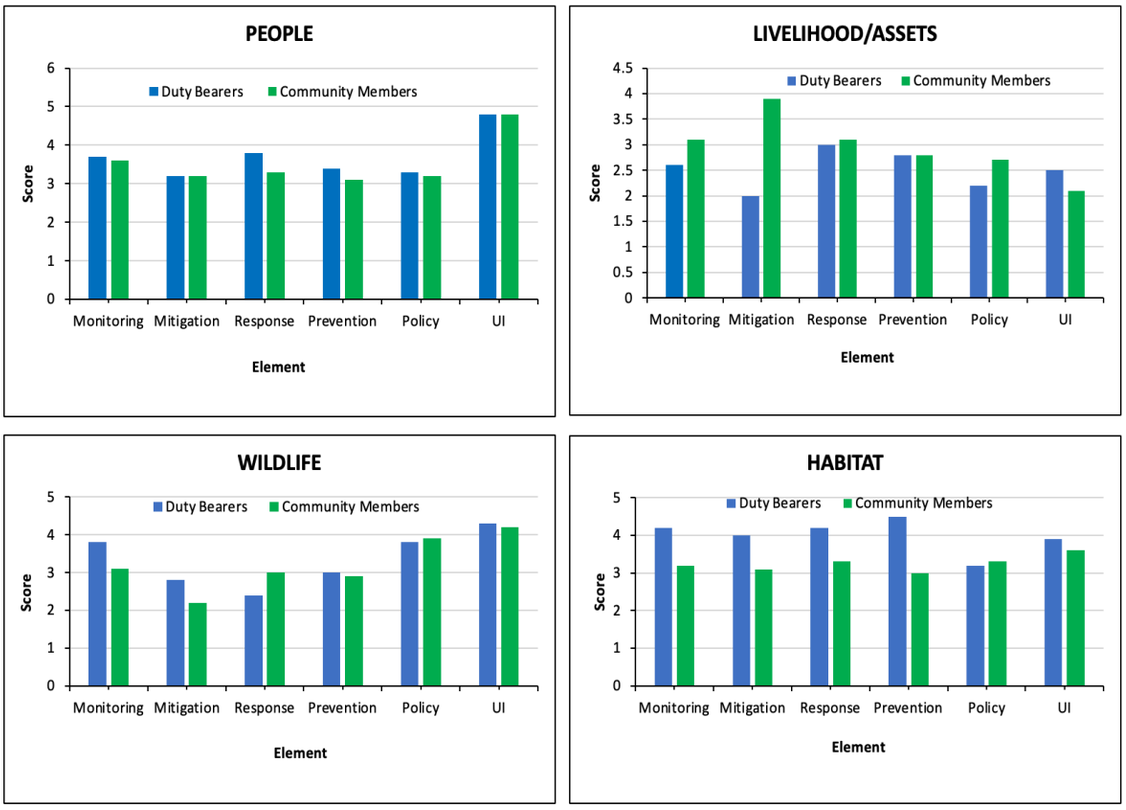

Figure 8. Results by elements for Nimshong-Thajong chiwog

In Nimshong-Thajong chiwog, human-wildlife conflict (HWC) is primarily driven by wild pig, porcupine, dhole, barking deer, and sambar. These animals cause extensive damage to crops. The dhole, bear, tiger, followed by leopard are the main predator species killing and affecting the livelihood of the communities in the chiwog.

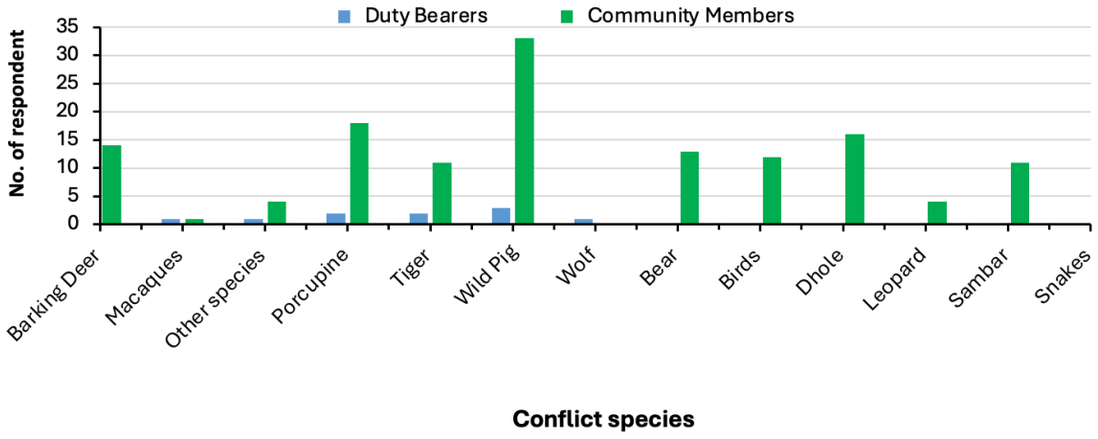

Figure 9. Conflict species in Nimshong-Thajong chiwog

4.2.2 Radi chiwog

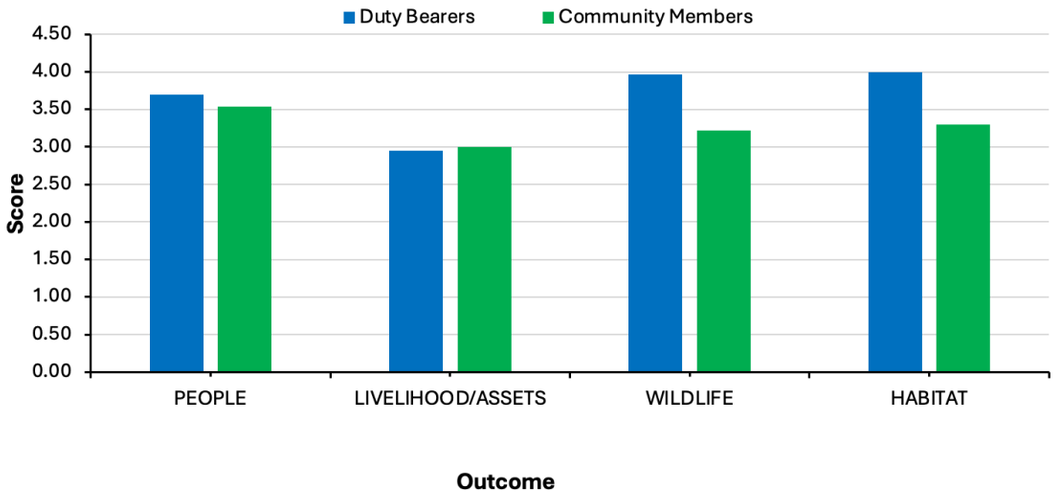

Figure 10. Result by outcome for Radi chiwog

In Radi chiwog, the livelihood and assets outcome were rated the lowest by both duty bearers and community members compared to other assessed outcomes. This indicates that human-wildlife conflict has a significant negative impact on people's sources of income and essential resources. The interventions to reduce human-wildlife conflict and foster peaceful coexistence should give priority to addressing challenges under the livelihood and assets outcome.

According to the results disaggregated by elements as depicted in Figure 11, the Human-Wildlife Conflict (HWC) to coexistence, the community members rated mitigation the lowest across all three of four outcome areas. This indicates a critical gap in the current approaches to preventing or minimizing the impact of HWC at the community level.

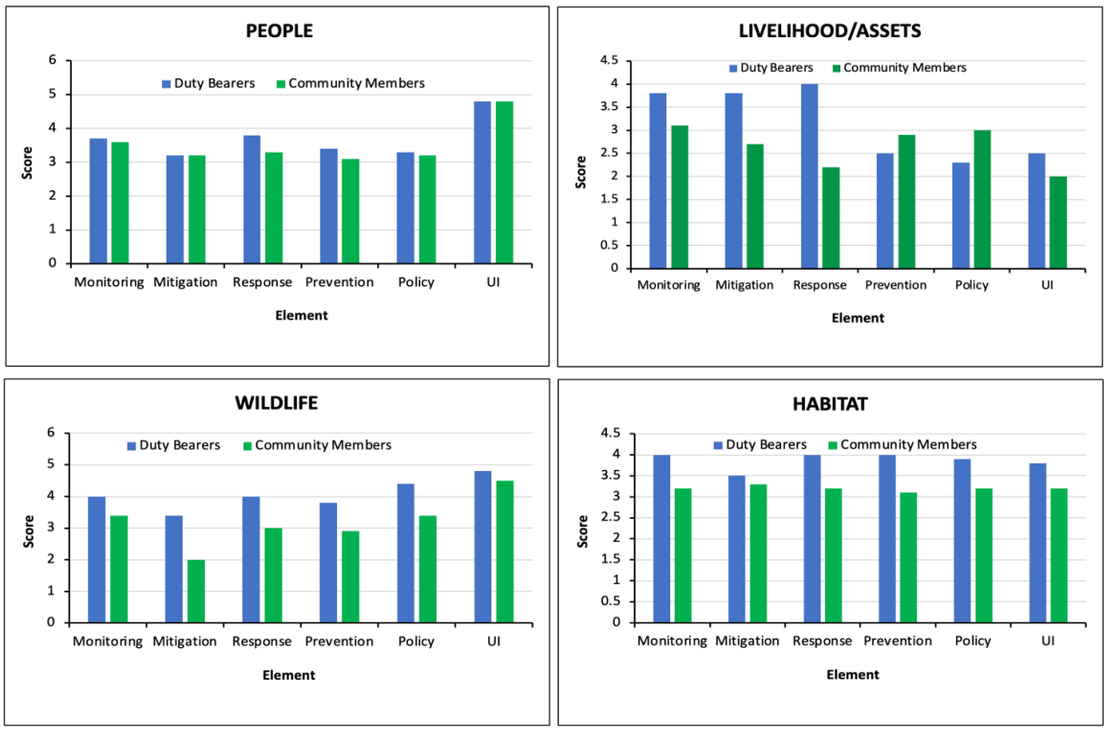

Figure 11. Results by elements for Radi chiwog

In Radi chiwog, sambar, wild pig, porcupine and barking deer are identified as the most problematic wildlife species causing significant damage to agricultural crops. They are followed by macaques, birds, and capped langurs. In terms of livestock depredation, bears are reported as the primary conflict species, followed by dholes, leopards, and tigers.

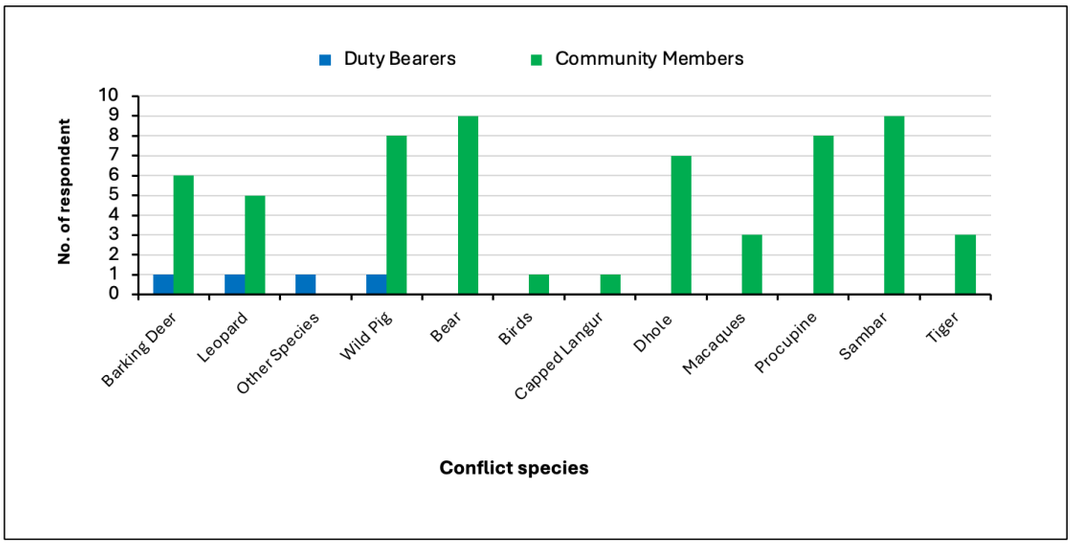

Figure 12. Conflict species in Radi chiwog

4.2.3 Shingkhar chiwog

Similar to other chiwogs, the livelihood/assets have the lowest score both by the duty bearers and community members in Shingkhar chiwog. The interventions to reduce the human wildlife conflict and enhance the coexistence shall be prioritized under the livelihood/asset outcome.

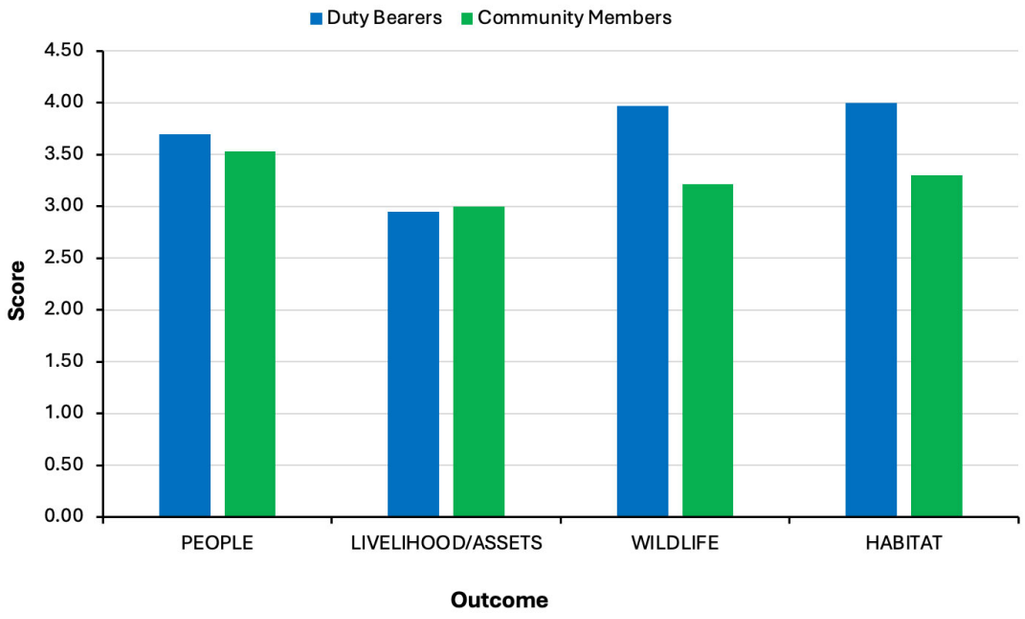

Figure 13. Result by outcome for Shingkhar chiwog

In Shingkhar chiwog, the mitigation element has the lowest score under the 'people and wildlife' outcome, with the lowest score also in' understanding interaction 'under the' livelihood/assets' outcome. This indicates a pressing need to enhance mitigation measures to enable people willing and able to live alongside wildlife, which has sufficient habitat to thrive alongside people.

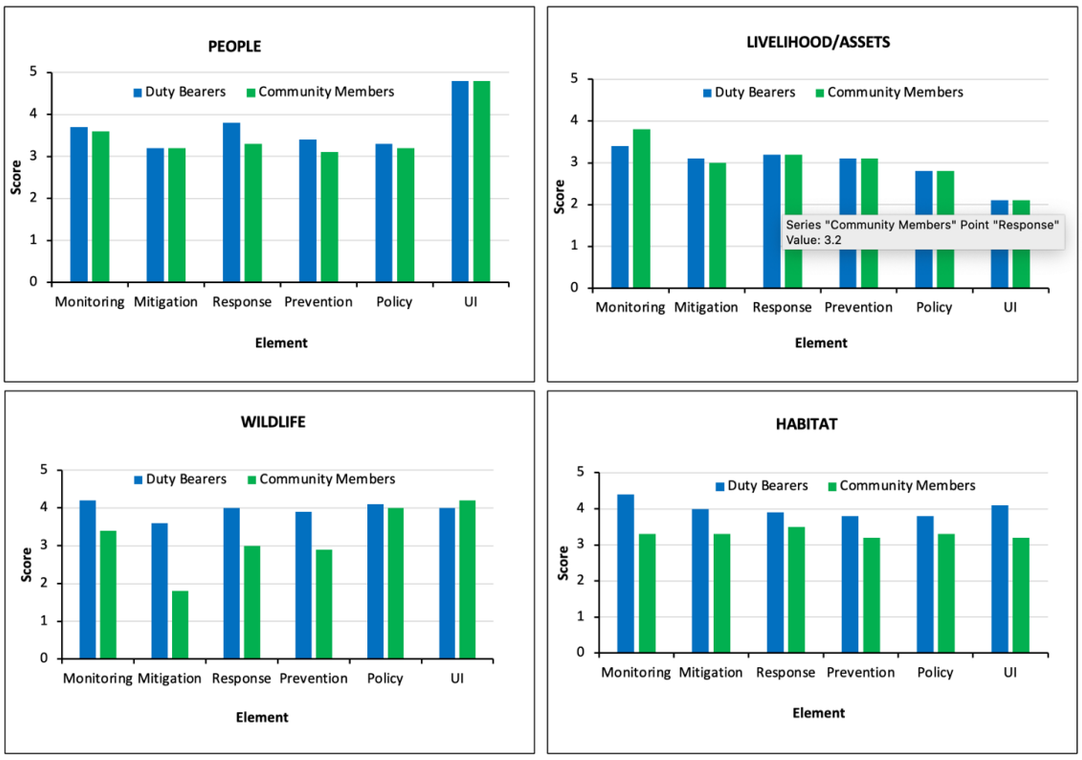

Figure 14. Results by elements for Shingkhar chiwog

The figure 15 indicates that the sambar is the most conflicting species followed by wild pig, barking deer, porcupine and macaque damaging the agriculture and horticulture crops. While tiger is the most conflicting species followed by bear and dhole in terms of livestock depredations.

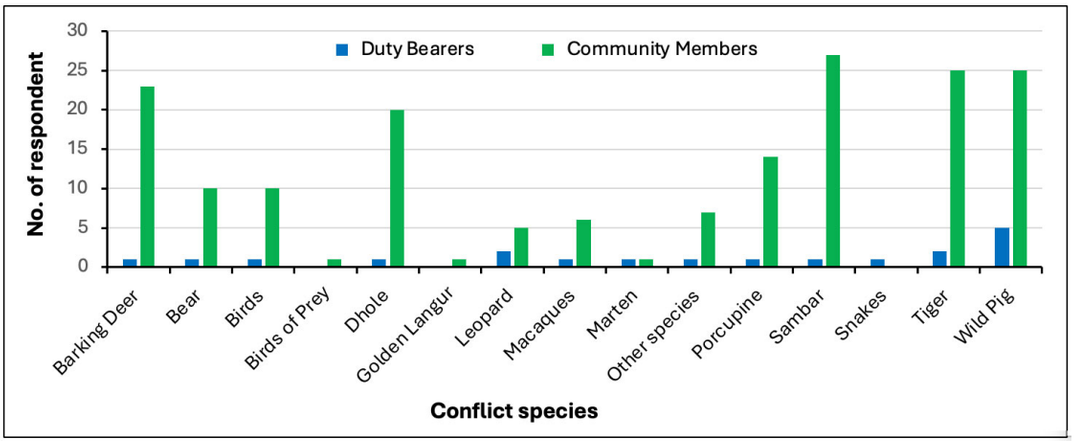

Figure 15. Conflict species in Shingkhar chiwog

4.2.4 Thrisa chiwog

The livelihood/assets have the lowest score compared to other outcomes provided by both duty bearers and community members for the whole Thrisa chiwog, as shown in Figure 16. The interventions to reduce the human wildlife

conflict and to enhance the coexistence shall be prioritized under livelihood/ assets outcome compared to the other three outcomes.

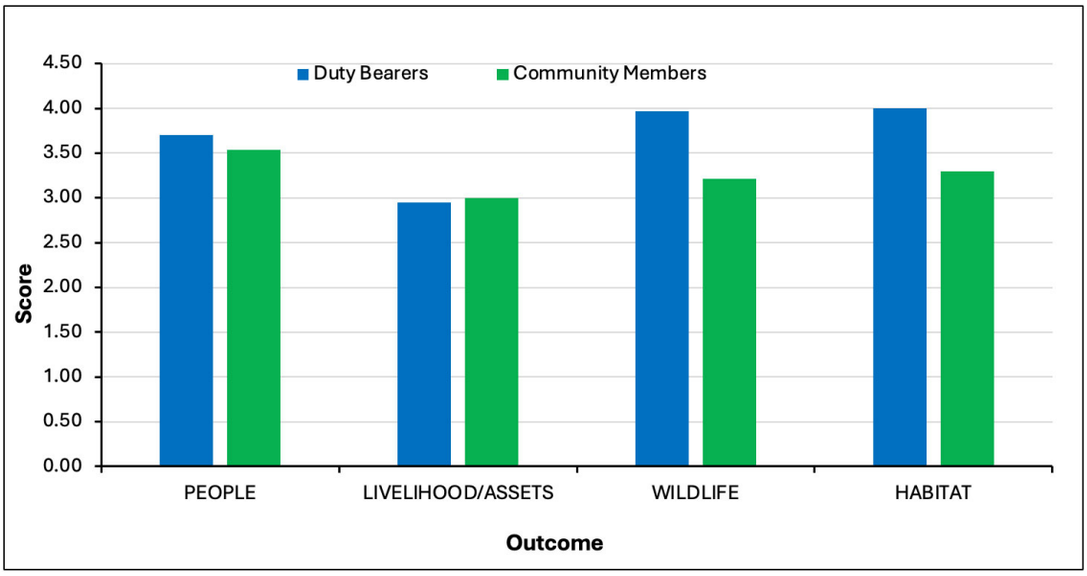

Figure 16. Result by outcome for Thrisa chiwog

As depicted in Figure 17, the most pressing concern is the lack of effective mitigation measures and monitoring to safeguard both people and wildlife. Additionally, there is a poor understanding of the interaction of HWC. Addressing these gaps requires targeted improvements in mitigation and prevention efforts and understanding of interaction through advocacy programs to the communities.

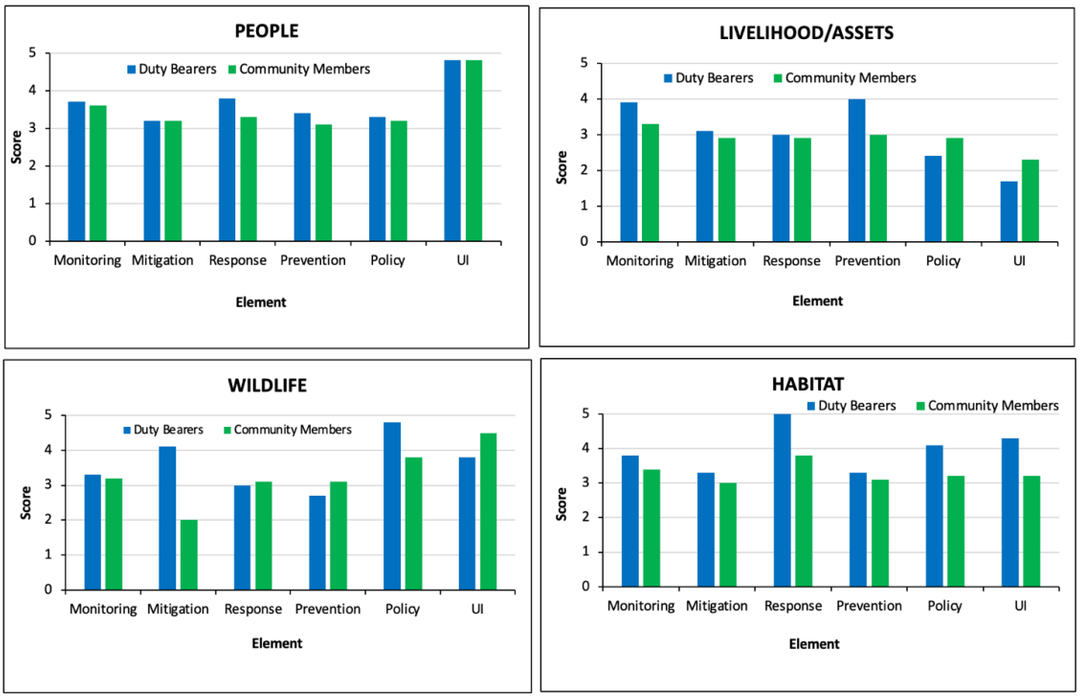

Figure 17. Results by elements for Thrisa chiwog

In Thrisa chiwog, ungulates such as sambar, porcupine, barking deer, wild boar and birds are the most conflicting species damaging the agricultural crops. The tiger and dhole are the most conflicting species in term of livestock kills. The intervention to mitigate these conflicting species should be keep in mind when planning the intervention activities.

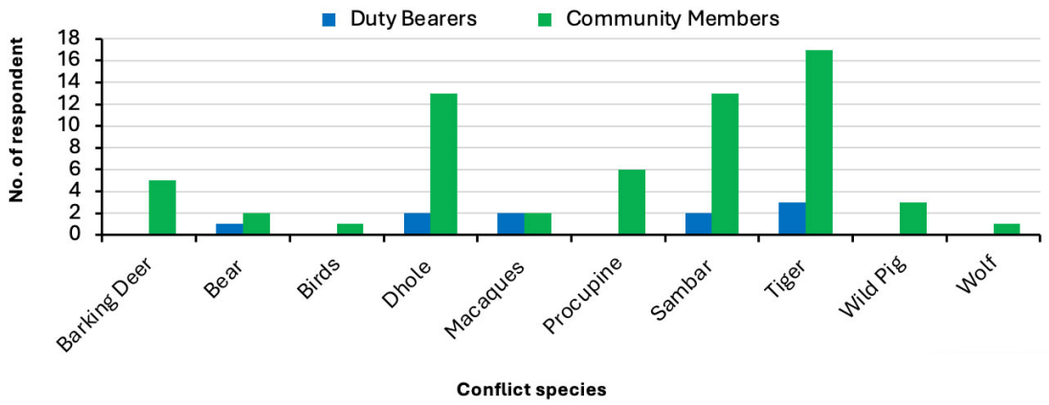

Figure 18. Conflict species in Thrisa chiwog

4.2.5 Wamling chiwog

Similar to the other four chiwogs under Shingkhar gewog, the livelihood/assets have the lowest score compared to the other three outcomes provided by both the duty bearers and community members, indicating the intervention to enhance the human wildlife conflict to coexistence interventions shall be focus under this outcome.

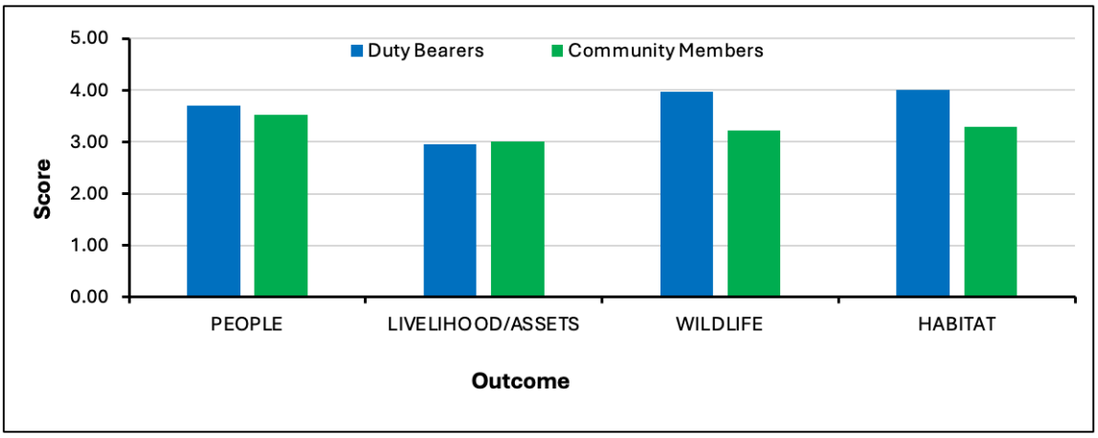

Figure 19. Result by outcome for Wamling chiwog

The figure 20 indicates that, in Wamling chiwog the mitigation measures in people and wildlife outcome are lower. These gap highlights the need to enhance the mitigation measures under the Wamling chiwog to enhance the

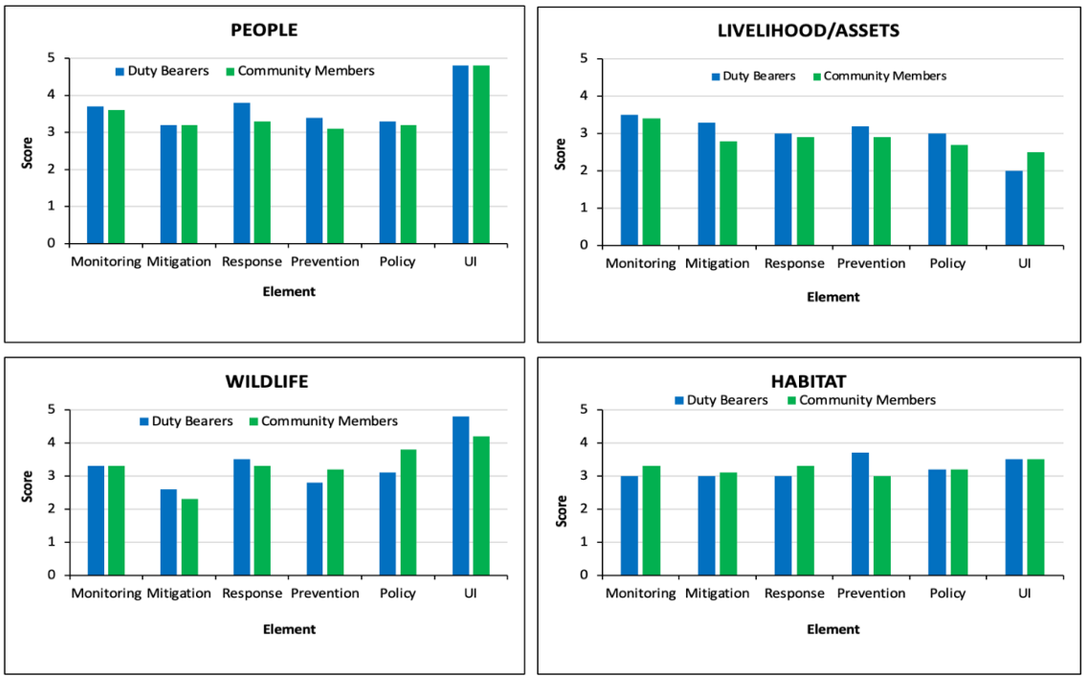

Figure 20. Results by elements for Wamling chiwog

coexistence between people and wildlife.

In Wamling chiwog, sambar, wild pig, and barking deer are the most conflicting species damaging the crops, which impacts the livelihood of the communities. Species such as the tiger and dhole are the most conflicting species in terms of livestock depredation.

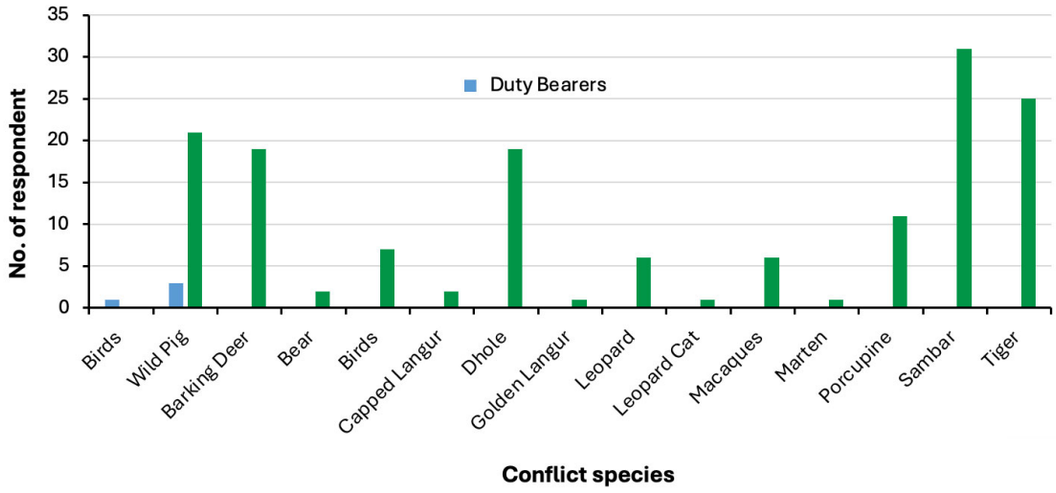

Figure 21. Conflict species in Wamling chiwog

5. Conflict to Coexistence Strategy

The C2C Strategies and actions for Shingkhar gewog aim to transform human-wildlife conflict into a model of coexistence by addressing the root causes of conflict, enhancing community resilience, and promoting sustainable management practices. Based on the results from HWC assessment, and chiwog consultation for co-design, the strategy prioritizes addressing the most conflicting species identified by both community members and service providers, such as wild pig, sambar, barking deer, porcupine, golden langur, macaque, bear, birds, tiger, leopard, dhole and marten.

Interventions will focus on safeguarding livelihoods and assets by strengthening crop production, crop protection, improving livestock management, and promoting alternative livelihoods. Community engagement is central, with programs designed to empower local communities to manage wildlife interactions and implement stewardship programs. Effective mitigation and prevention measures, such as physical barriers, schemes, early warning systems, and sustainable agricultural and livestock practices, will reduce the impact of wildlife on community livelihoods.

Policy integration will support the creation and enforcement of wildlife conservation and conflict resolution, while regular monitoring will track wildlife populations and the effectiveness of interventions. Habitat management will reduce human-wildlife encounters, and collaboration between communities, service providers, government agencies, and NGOs will ensure long-term success. This adaptive, integrated approach aims to create a sustainable coexistence between wildlife and communities, fostering a harmonious balance for both.

This section presents the strategic recommendations to address the Conflict to Coexistence (C2C) challenges and issues faced by the communities under Shingkhar gewog. Through consultative co-designing, 33 actions with 23 short term, 7 long term and 3 short/long terms were derived and adopted for implementation. There are:

- Seventeen actions/activities under livelihood/assets with budget outlay of Nu. 26.00 million
- Five actions/activities under people with budget outlay of Nu. 1.75 million
- Six actions/activities under wildlife with budget outlay of Nu. 3.10 million
- Five actions/activities under habitat with budget outlay of Nu. 1.3 million

The total budget outlay for the five-year C2C Strategy (2026-2030) for Shingkhar gewog is projected at Nu. 32.15 million with Nu. 11.85 million for the short term, Nu. 18.50 million for long term and Nu. 1.80 million for short/long-term interventions. The funding must be sought from potential conservation donors and the Royal Government of Bhutan.

Table 4. Implementation Plan and Financial Outlay

Sl. No.	Outcome	Actions/Activities	Category	Location	Responsibility		Budget estimate (Nu. in million)	Timeline
					Lead	Collaborator		
1	Livelihood/ Assets	Supply of Jersey breeding bull	Short term	Thrisa, Shingkhar, Nimshong	DLO	DFO/LG	0.1	2026
2	Livelihood/ Assets	Supply of native poultry pullets	Short term	Thrisa, Shingkhar	DLO	DFO	0.4	2027
3	Livelihood/ Assets	Supply of cardamom rhizome	Short term	Thrisa (Thongpai), Shingkhar (Tronpai, Shumar), Wamling, Radi (Gramkhar), Nimshong	DAO	DFO	1	2026,2027
4	Livelihood/ Assets	Supply of tea seedlings	Short term	Shingkhar, Wamling	DAO	DFO	0.15	2027
5	Livelihood/ Assets	Supply of coffee seedlings	Short term	Wamling, Shingkhar, Radi, Nimshong	DAO	DFO	1	2026, 2027
6	Livelihood/ Assets	Supply of avocado seeds/seedlings	Short term	Shingkhar	DAO	DFO	0.25	2027
7	Livelihood/ Assets	Provide integrated chain link fencing	Long term	Shingkhar, Nimshong	DAO	DFO	15	2030
8	Livelihood/ Assets	Provide materials for construction of cattle shed	Long term	Radi	DLO	DFO	0.5	2028
9	Livelihood/ Assets	Install light and sound (Bio-acoustic) mechanism to deter wild animals	Short term	Five chiwogs	DFO	LG	0.3	2026
10	Livelihood/ Assets	Corral or solar electric fencing for agriculture field and orchard	Short term	Wamling, Therang, Sipzagang	DFO	DAO/LG	3	2026, 2027
11	Livelihood/ Assets	Provide support in procurement and set up of oil expeller machine	Long term	Thrisa, Shinkhar	DAO	DFO/LG	0.2	2029
12	Livelihood/ Assets	Supply of mushroom spawn	Short term	Nimshong, Thajong	DAO	DFO/LG	0.3	2026

13	Livelihood/ Assets	Improvement of drinking water supply including reservoir	Long term	Wamling, Thrisa (Baywa, Samed, Therang), Radi, Nimshong	LG	DFO	2	2030
14	Livelihood/ Assets	Supply of fodder seeds/cuttings	Short term	Wamling, Radi, Nimshong	DLO	DFO	0.2	2027
15	Livelihood/ Assets	Supply of good quality potato tubers	Short term	Radi, Thrisa	DAO	DFO/LG	1	2026
16	Livelihood/ Assets	Capacity building on Orchard management	Short term	Five chiwogs	DAO	DFO	0.30	2026
17	Livelihood/ Assets	Support to orchard management tools (Pruning saw and secateurs) on cost sharing basis	Short term	Five chiwogs	DAO	DFO	0.30	2027
18	People	Conduct community tour program (forestry/ agriculture/ livestock sectors)	Long term	Shingkhar	DFO	LG	0.5	2026
19	People	Installation of stairs, railings and signages along Tingkar Nye	Short term	Shingkhar	LG	DFO	0.5	2027
20	People	Raise awareness on livestock diseases and its preventive measures	Short term	All five chiwogs	DLO	DFO	0.3	2026
21	People	Capacity building of communities on raising of seedlings of Cardamom, Orange and nursery management training and preparation of organic pesticides	Short term	Shingkhar, Radi, Wamling, Nimshong, Thrisa	DAO	DFO	0.3	2026
22	People	Water source protection	Long term	Shingkhar	DFO	BO/RO	0.15	2029
23	Wildlife	Supply of solar lighting for migratory herders/ Farming hut	Short term	Thrisa (Thekpalang, Baywa, Samed, Therang)	DFO	LG	0.5	2027
24	Wildlife	Awareness on wildlife protection (tiger conservation), FNCRR	Short term	Shingkhar	DFO	BO/RO	0.3	2026

25	Wildlife	Awareness on wildlife and zoonotic diseases	Short term	Shingkhar Gewog	DLO	DFO	0.3	2026
26	Wildlife	Enhance SMART Patrolling	Short term/Long term	Shingkhar, Nangkor, Bardo	DFO	BO/RO	1	2026, 2027,2028,2029, 2030
27	Wildlife	Procurement of AI powered trail guard Camera trap	Short term		DFO		1	2027
28	Habitat	Enrichment of wildlife habitat through management of grassland	Short term	Shingkhar, Thrisa top	DFO	BO/RO	0.3	2026, 2027
29	Habitat	Improvement and protection of waterholes	Short term/Long term	Shingkhar, Thrisa, Nimshong	DFO	BO/RO	0.3	2028
30	Habitat	Provide tree seedlings to Community Forests	Short term/Long term	Radi, Nimshong	DFO	CFMG	0.5	2026, 2027, 2028, 2029, 2030
31	Habitat	Mid-term review of CFMP	Short term	Thuktencholing CF, Radi CF	DFO	CFMG	0.05	2026, 2028
32	Habitat	Revision of CFMP	Long term	Thuktencholing CF	DFO	CFMG	0.15	2030
Total							32.15	

6. Monitoring and Evaluation

Timely monitoring and evaluation of planned programs are essential to ensure the effective delivery of intended outcomes. This section outlines the approach to monitoring and evaluating the implementation of strategy actions. A comprehensive monitoring and evaluation plan, detailed in Table 5: Monitoring and Evaluation Framework, has been developed to align seamlessly with the implementation framework. The plan includes specific indicators to measure the performance of the strategy, and providing a clear basis for assessing progress. Output indicators will primarily track the achievements of the actions identified in Section 5, ensuring accountability and fostering continuous improvement throughout the implementation process.

6.1 Monitoring

Monitoring is an ongoing assessment process aimed at providing stakeholders with timely and detailed updates on the progress or delays of activities, ensuring transparency and clarity regarding their implementation status. For the five-year strategy plan, the Division management team will conduct annual monitoring to evaluate progress, identify challenges, and ensure that the planned actions are on track to achieve the intended outcomes.

6.2 Evaluation

The evaluation of the strategy plan will take place twice during the plan period to ensure its effectiveness and alignment with objectives. A mid-term review will be conducted in the last quarter of the second year, followed by a final review in the last quarter of the fifth year. These evaluations will be carried out by a combined team of internal members from Division and external representatives, including members from functional division ensuring a comprehensive and impartial assessment of the plan's implementation and outcomes.

Table 5. Monitoring and Evaluation Framework

Outcome	Output	Actions/Activities	Indicator	Baseline	Unit	Yearly target				
						2026	2027	2028	2029	2030
Livelihood/Assets	Secured livelihood/ assets along with the presence of wildlife	Supply of Jersey breeding bull	Number of Jersey bulls supplied	0	Number	3	-	-	-	-
Livelihood/Assets		Supply of native poultry pullets	Number of native poultry pullets supplied	0	Number	-	780	-	-	-
Livelihood/Assets		Supply of cardamom rhizome	Number of cardamom rhizomes supplied	0	Number	25000	25000	-	-	-
Livelihood/Assets		Supply of tea seedlings	Number of tea seedlings supplied	0	Number	-	6000	-	-	-
Livelihood/Assets		Supply of coffee seedlings	Improved coffee seedlings supplied	0	Number	15000	10000	-	-	-
Livelihood/Assets		Supply of avocado seeds/seedlings	Avocado seedlings supplied	0	Number	-	1400	-	-	-
Livelihood/Assets		Provide integrated chain link fencing	Area of agricultural land fenced	0	Ha	-	-	-	-	40
Livelihood/Assets		Provide materials for construction of cattle shed	Construction materials supplied	0	Number	-	-	5	-	-
Livelihood/Assets		Install light and sound (Bio-acoustic) mechanism to deter wild animals	Equipment procured and installed	0	Number	70	-	-	-	-
Livelihood/Assets		Corral or solar electric fencing for agriculture field and orchard	Area of agriculture land and orchard fenced	0	Ha	5	10	-	-	-
Livelihood/Assets		Provide support in procurement and set up of oil expeller machine	Number of oil expeller machine procured and installed	0	Number	-	-	-	2	-
Livelihood/Assets		Supply of mushroom spawn	Number of households supported	0	Number of households	10	-	-	-	-
Livelihood/Assets		Improvement of drinking water supply including reservoir	Water pipe supplied to four chiwogs	0	No. of village	-	-	-	-	7
Livelihood/Assets		Supply of fodder seeds/cuttings	Fodder seeds/ cuttings supplied	0	No. of cuttings	-	1500	-	-	-

Livelihood/Assets		Supply of good quality potato tubers	Potato tubers supplied	0	No. of Kg	8000	-	-	-	-
Livelihood/Assets		Capacity building on Orchard management	Capacity build in five chiwogs	0	Number	5	-	-	-	-
Livelihood/Assets		Support to orchard management tools (Pruning saw and secateurs) on cost sharing basis	Supplied the tools to households	0	Five chiwogs	-	5	-	-	-
People	People able to live alongside wildlife	Conduct community tour program (forestry/ agriculture/ livestock sectors)	Number of participants attend the program	1	Number	15	-	-	-	-
People		Installation of stairs, railings and signages along Tingkar Nye	No. of stairs, railings, and signages installed	-	Number	-	3	-	-	-
People		Raise awareness on livestock diseases and its preventive measures	No. of awareness programs conducted	5	Number of chiwog	5	-	-	-	-
People		Capacity building of communities on raising of seedlings of Cardamom, Orange and nursery management training and preparation of organic pesticides	No. of chiwogs covered	0	Number	5	-	-	-	-
People		Water source protection	Water source protected	1	Number	-	-	-	1	-

Wildlife		Supply of solar lighting for migratory herders/ Farming hut	Number of solar lights procured	0	Number	-	15	-	-	-
Wildlife		Awareness on wildlife protection (tiger conservation), FNCRR	Awareness program conducted in chiwogs	0	Number	5	-	-	-	-
Wildlife		Awareness on wildlife and zoonotic diseases	Awareness program conducted in chiwog	0	Number	5	-	-	-	-
Wildlife		Enhance SMART Patrolling	Number of patrols conducted	0	Number	2	2	2	2	2
Wildlife		Procurement of AI powered trail guard Camera trap	Number of AI-powered trail guard camera traps procured	0	Number	-	20	-	-	-
Habitat	Ensured sufficient habitat for wildlife	Enrichment of wildlife habitat through management of grassland	Hectares of grassland managed	0	Ha	1	1	-	-	-
Habitat		Improvement and protection of waterholes	No. of waterholes improved	3	Number	-	-	3	-	-
Habitat		Provide tree seedlings to Community Forests	No. of tree seedlings provided		Number	2000	2000	2000	2000	2000
Habitat		Mid-term revie w of CFMP	Mid-term review of CFMP conducted	2	Number	1	-	1	-	-
Habitat		Revision of CFMP	Revised CFMP	1	Number	-	-	-	-	1

7. Conclusion

The C2C Strategy developed for Shingkhar gewog represents an inclusive community-driven framework designed to address human-wildlife conflict (HWC) and promote harmonious coexistence. The strategy is the result of extensive consultations, participatory HWC assessments, and co-design workshops involving local communities, government agencies, conservation organizations, and other relevant stakeholders. It is structured around four key outcomes, viz. People, Livelihoods/Assets, Wildlife, and Habitat, and integrate six interrelated elements of Policy, Prevention, Response, Understanding the Conflict, Mitigation, and Monitoring. The C2C Strategy prioritizes the conservation of sufficient habitat to support wildlife populations while safeguarding the livelihoods and assets of the communities. By fostering coexistence through capacity-building initiatives and promoting a sense of stewardship among residents, the approach ensures a thriving environment for wildlife that exists harmoniously alongside human settlements. Additionally, the strategy emphasizes the importance of sustainable development, maintaining a balance between ecological conservation and community welfare.

The successful implementation of the strategy relies on the collective efforts of all stakeholders. Local communities play a key role through active participation and ownership, supported by government organizations and other agencies. The strategy's adaptive management framework and robust monitoring mechanisms ensure that interventions remain effective and responsive to emerging challenges. Ultimately, the C2C Strategy seeks to enhance ecological resilience, secure livelihoods, and promote long-term coexistence between people and wildlife.

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