



Human–Wildlife Conflict Management

Conflict to Coexistence (C2C) Strategy for
Sangbay Gewog, Haa (2026–2030)

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Department of Forests and Park Services
Ministry of Energy and Natural Resources
Haa, Bhutan



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Abbreviations

HWC.....	Human-Wildlife Conflict
C2C	Conflict to Coexistence
WWF.....	World Wildlife Fund
ACAI	Area of Collective Action and Innovative
TAI.....	Tigers Alive Initiative
BCI.....	Big Cat Initiative
%.....	Percentage
BHU	Basic Health Unit
RNR	Renewable Natural Resources
ORC	Outreach Clinics
HHS	Households
LG.....	Local Government
NFE	Non-Formal Education
RGoB.....	Royal Government of Bhutan
IKI	International Climate Initiative
QRT	Quick Response Team
AI	Artificial Insemination
NWFPs.....	Non-wood Forest Products
SMART	Spatial Monitoring and Reporting Tool
GIS.....	Geographic Information System
M&E	Monitoring and Evaluation
DoFPS.....	Department of Forests and Park Services
JKSNR.....	Jigme Khesar Strict Nature Reserve
AMTC.....	Agriculture Machinery and Technology Centre



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Royal Government of Bhutan
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Foreword



Human-Wildlife Conflict (HWC) remains a major challenge for conservation and rural livelihoods in Bhutan, particularly in forest-dependent communities like Sangbay Gewog. As pressures from climate change and development increase, promoting coexistence between people and wildlife has become more urgent than ever.

The Conflict to Coexistence (C2C) Strategy for Sangbay Gewog (2026-2030) is a timely, community-driven response developed

through field assessments and consultations across all chiwogs. It focuses on reducing conflict with key species while strengthening livelihoods, protecting habitats, and enabling wildlife to thrive alongside communities through prevention, mitigation, and strong local participation.

With the support of the IKI-WWF Project, "Living Landscapes: Securing High Conservation Values in South-Western Bhutan," and close collaboration with local governments and partners, this Strategy provides a practical roadmap for sustainable coexistence. I extend my sincere appreciation to the communities of Sangbay Gewog and the JKSNR team for their dedication and stewardship in driving this important initiative forward. The Department of Forests and Park Services remains fully committed to its implementation to safeguard both biodiversity and community well-being for generations to come.

(Karma Tenzin)
Director

Acknowledgement

The C2C strategy for Sangbay Gewog is the result of a collective and dedicated effort by the staff of the Sangbay Range Office and Jigme Khesar Strict Nature Reserve. The management 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 management is deeply grateful for their strategic direction, technical advice, and continuous encouragement and expresses our 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. The management sincerely expresses its gratitude to the stakeholders, Local Government (Gup, Mangmi, and Tshogpa) for their strong support and key contributions during the focus group discussions, social data collection, co-design process, and strategy consultations. We also extend our heartfelt appreciation to the Dzongkhag Agriculture, Livestock, and Planning sectors, and the Gewog Agriculture and Livestock offices for their valuable support and inputs.

The management would like to extend special appreciation to Mr. Ugyen, Sr. Forest Ranger (Head, Nature Conservation Section) of JKSNR, who played a crucial leadership role in guiding and coordinating the formulation of this strategy. His dedication, technical oversight, and leadership were instrumental in bringing the C2C planning process to completion. Finally, the management extends 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 Sangbay Gewog in the years to come.

Contents

Foreword	4
Acknowledgement	5
1. Introduction	8
2. Goal and Objectives	9
3. Methodology	9
3.1 Site Description	9
3.2 Method: C2C Framework	11
3.2.1 C2C Process	12
4. Results and Discussion	17
4.1 Demography and Social Information	17
4.2 Overall Results of Sangbay Gewog	18
4.2.1 Conflict Species of Gewog	18
4.2.2 Status of Outcome at Gewog level	20
4.2.3 Status of Elements at Gewog level	21
4.3 Status of Outcome at Chiwog level	24
4.3.1 Nakha-Tashigang Chiwog	24
4.3.2 Sangbay Ama Chiwog	26
4.3.3 Shaba-Shebji Chiwog	28
4.3.4 Mochu-Bebji Chiwog	29
4.3.5 Yaba-Shema Chiwog	31
5. Conflict to Coexistence Strategy	34
6. Monitoring and Evaluation	40
6.1 Monitoring	40
6.2 Evaluation	40
7. Conclusion	46
Reference	47
Annexure I: C2C Project Assessment Report of Sangbay Gewog	48
Annexure II: Summary of Respondents of Service Provider	49

Figures

Figure 1: Gewog map of Sangbay gewog	9
Figure 2: C2C framework to ensure effective and sustainable HWC management.	11
Figure 3: Stakeholder Identification using C2C Matrix Tool 5	13
Figure 4: Conflict species of Sangbay gewog.....	19
Figure 5: The average tolerance score of 4.18 out of 5 for community members.....	20
Figure 6: Result by Outcome with lowest score for livelihoods/assets.....	21
Figure 7: Result by six Elements with lowest score for each Outcome	22
Figure 8: Conflict species recorded under Nakha-Tashigang chiwog	25
Figure 9: Result by Outcome with lowest score for livelihoods/assets for Nakha-Tashigang chiwog ...	25
Figure 10: Result by elements for Nakha-Tashigang chiwog.....	26
Figure 11: Conflict species of Sangbay Ama chiwog	26
Figure 12: Outcome with lowest score for livelihoods/assets for Sangbay Ama chiwog	27
Figure 13: Lowest score elements under Sangbay Ama chiwog	27
Figure 14: Record of conflict species for Shaba-Shebji chiwog.....	28
Figure 15: Outcome with lowest score for livelihoods/assets for Shaba-Shebji chiwog.....	29
Figure 16: Elements with lowest score under Shaba-Shebji chiwog	29
Figure 17: Record of most conflicting species in the Mochu-Bebji chiwog	30
Figure 18: Outcome with lowest score for livelihoods/assets for Mochu-Bebji chiwog.....	31
Figure 19: Elements with lowest score under Mochu-Bebji chiwog.....	31
Figure 20: Conflict species recorded under Yaba-Shema chiwog	32
Figure 21: Lowest score for livelihoods/assets outcome for Yaba-Shema chiwog.....	33
Figure 22: Elements with lowest score under Yaba-Shema chiwog	33

Tables

Table 1: Stakeholder Identification Matrix	13
Table 2: Households interviewed as per the chiwog under Sangbay gewog	15
Table 3: Participants from Chiwog during Co-design consultation	17
Table 4: Score under each outcome by category of respondents	21
Table 5: Implementation Plan and Financial Outlay	35
Table 6: Monitoring and Evaluation Framework.....	41

1. Introduction

Human-Wildlife Conflict (HWC) , a pervasive issue globally, occurs when interactions between humans and wildlife lead to negative consequences for both parties (Conover, 2002). Though humans and wildlife have coexisted for millennia, the modern Anthropocene era, characterized by human-dominated landscapes and extensive human-wildlife interfaces has exacerbated the frequency and intensity of these conflicts (Caro et al., 2012). Factors such as rapid human population growth, accelerated development, habitat loss, and fragmentation significantly increase the likelihood of encounters between people and animals, often resulting in adverse outcomes for both.

In Bhutan, the community of Sangbay gewog illustrates this challenge vividly. Here, agriculture and livestock farming are primary sources of livelihood, with most settlements located within or near forests. These forests, covering almost 89.55% of the area which is predominantly broadleaf forests (71.47%) are integral to the community's way of life. However, this close dependence on forest resources has led to frequent human-wildlife interactions, particularly in the form of livestock predation and crop damage. For farmers, such conflicts disrupt agricultural activities, undermine livelihoods, and create ongoing stress, threatening both human well-being and wildlife conservation.

Managing HWC is a fundamental challenge that necessitates innovative and adaptive strategies. Over the years, various approaches have been employed worldwide, with the Conflict to Coexistence (C2C) Approach emerging as a promising framework. Developed as a revised version of the Safe Systems Approach (SSA), the C2C Approach incorporates lessons from SSA conducted between 2016 and 2022 and incorporates feedback on its approaches to effective implementation. C2C-Approach offers a framework for an integrated, holistic and inclusive approach to manage HWC on a landscape level and includes a step-wise methodology and tools for implementation, monitoring, and adaptation. In response, WWF's Human-wildlife Conflict Area of Collective Action and Innovation (ACAI), Tigers Alive Initiative (TAI), and Living with Big Cats Initiative (BCI), along with regional and wildlife focal points, collaborated to refine and enhance the system, scale up on its strengths and eliminate bias and reduce unintended negative effects. Thus, the result is C2C: Conflict to Coexistence-Approach was developed and is piloted in 2023, which offers a seven-step process to formulate strategy to manage HWC effectively. A key step in this process is the co-design of management strategies, emphasizing community and stakeholder collaboration to create effective, sustainable solutions for managing HWC. Co-design is commonly used as a broad term to describe participatory and collaborative development processes that require active participatory engagement of stakeholders. By integrating adaptive management practices and fostering active participation and contribute meaningfully, the C2C Approach aims to mitigate conflicts and promote harmonious coexistence between humans and wildlife (WWF, 2023).

2. Goal and Objectives

Goal & Objectives:

The objectives of the strategy are to;

- 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

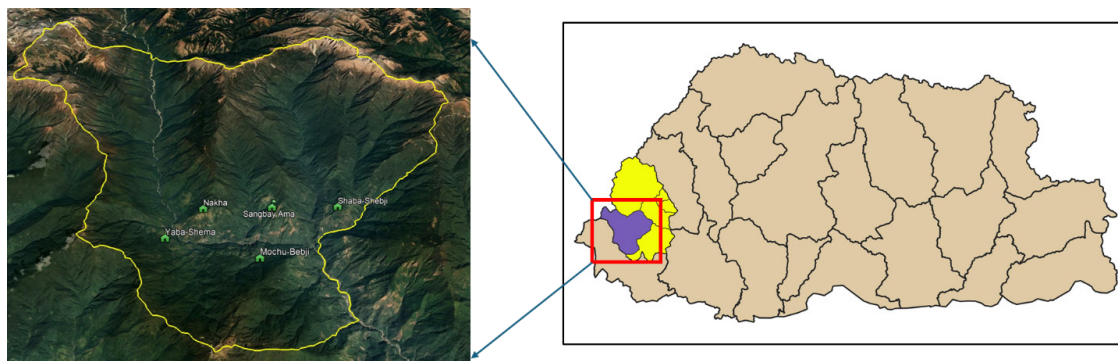


Figure 1: Gewog map of Sangbay gewog

Sangbay gewog is one of the six gewogs located in the southern part of Haa under Sangbay Dungkhag, Haa Dzongkhag. Geographically, it is located at latitudes 27.215566°N and longitudes 89.079208°E (Figure 1). The gewog covers a total area of 508.42 square kilometers (50,841.60 hectares) within an elevation range of 1,072 to 4,194 meters above sea level. Approximately 48.75% of the Jigme Khesar Strict Nature Reserve (247.85 km²) falls within the jurisdiction of Sangbay Gewog, while 51.25% (260.57 km²) lies within the IKI Project landscape area. The gewog comprises of five chiwogs (Sangbayama-Nakhekha, Shaba-Shebji, Tashigang-Nakha, Mochu-Bebjee, and Yaba-Shema), with 12 villages, and 251 households, with a total population of 2,306 as per the 2017 Population and Housing Census of Bhutan. Of this population, 1,284 are males (55.6%), and 1,022 are females (44.3%).

The gewog is served by a network comprising a 10 km Gewog Center (GC) road and 59.87 km of farm roads, providing access to all chiwogs except Yaba-Shema, which remains unconnected by farm roads. A Secondary National

Highway traverses the gewog, linking the Dungkhag office to Dorokha and extending further to Samtse Dzongkhag. The villages are also connected with electricity and drinking water facilities. To the south-west, the gewog shares its borders with Namgaycholing, Tashicholing, Norgaygang, and Tendruk gewogs under Samtse Dzongkhag, while its north-east boundary adjoins Samar Gewog under Haa Dzongkhag. It also shares an international boundary, with China towards north and India's Sikkim to the west. The majority of the population depends on agriculture and livestock rearing for their livelihood, with cardamom serving as the main sources of income. Additionally, many residents supplement their earnings through off-farm activities.

The Dungkhag Administration (Sub-District) is established at Shebjithang under Sangbay gewog to streamline service delivery for farmers in the two gewogs. The Gewog Administration office is located in Sangbay Ama village, approximately a four-hour drive from Haa. Sangbay Ama also hosts the RNR Center, which provides agriculture, livestock, and forestry services through the Range Office. Health services are offered through a Basic Health Unit (BHU) located near the RNR Center, and also present is the Bhutan Development Bank Limited (BDBL) branch for financial transactions. The gewog is home to two primary schools, Sangbay Ama and Bebjee, ensuring access to primary education. It has 100% telecommunication coverage through both B-mobile and T-cell networks. Additionally, the gewog is equipped with essential facilities, including one park range office, two primary schools, one basic health unit, one health sub-post, four outreach clinics, and three non-formal education centers, all contributing to the holistic development and well-being of the community.

The Sochu 18MW Mini Hydropower Project, currently under construction in Shaba village under Sangbay Gewog, is a significant development initiative for the community. Despite its remote location, the project is already making a positive impact by providing employment opportunities to local residents, contributing to improved livelihoods. By engaging the local workforce, the project not only offers stable income sources but also fosters skill development and capacity building among community members. Once completed, the hydropower project is expected to further enhance the socio-economic well-being of the region, supporting sustainable development and energy generation for the benefit of the broader community. This initiative demonstrates the potential of infrastructure projects in remote areas to uplift rural communities, creating a pathway for economic growth and better living standards while addressing the nation's energy needs.

The gewog boasts a rich diversity of forest ecosystems, including Alpine, Fir Forests, Mixed Conifer Forests, and Cool and Warm Broadleaved Forests, with an impressive 89.55% of its area under forest cover. Broadleaved forests dominate the landscape, spanning over 35,368.55 hectares (71.47%), followed by Mixed Conifer Forests covering 7,270.01 hectares (14.69%), Fir Forests at 1,678.99 hectares (3.39%), and 301.94 hectares (0.61%) designated

as agricultural land. This diverse habitat supports a variety of iconic and endangered wildlife species, including the Tiger, Red Panda, Gaur, Wild dog, Leopard and Clouded Leopard, highlighting the area’s ecological significance.

3.2 Method: C2C Framework

This strategy is entrenched in the principles and methodologies of the Conflict to Coexistence (C2C) approach, an integrated and structured framework that offers a systematic guide for planning, implementing, and monitoring HWC management. The C2C approach highlights core principles, including holistic planning, resilience-building, shared responsibility, and fostering tolerance, all aimed at achieving sustainable coexistence between communities and wildlife. Figure 2 depicts the ongoing implementation of measures designed to address current or emerging HWC issues using the C2C approach from step 1 till step 7 (3.2.1 C2C Process). This process involves co-developing a long-term HWC management strategy in collaboration with communities and other stakeholders. The approach emphasizes the importance of implementing short-term or sustained interventions to effectively respond to or manage urgent HWC situations. Simultaneously, it prioritizes fostering and maintaining trust among stakeholders throughout the process. By addressing root causes and underlying issues, the C2C approach aims to develop a comprehensive and sustainable HWC management plan for long-term success.

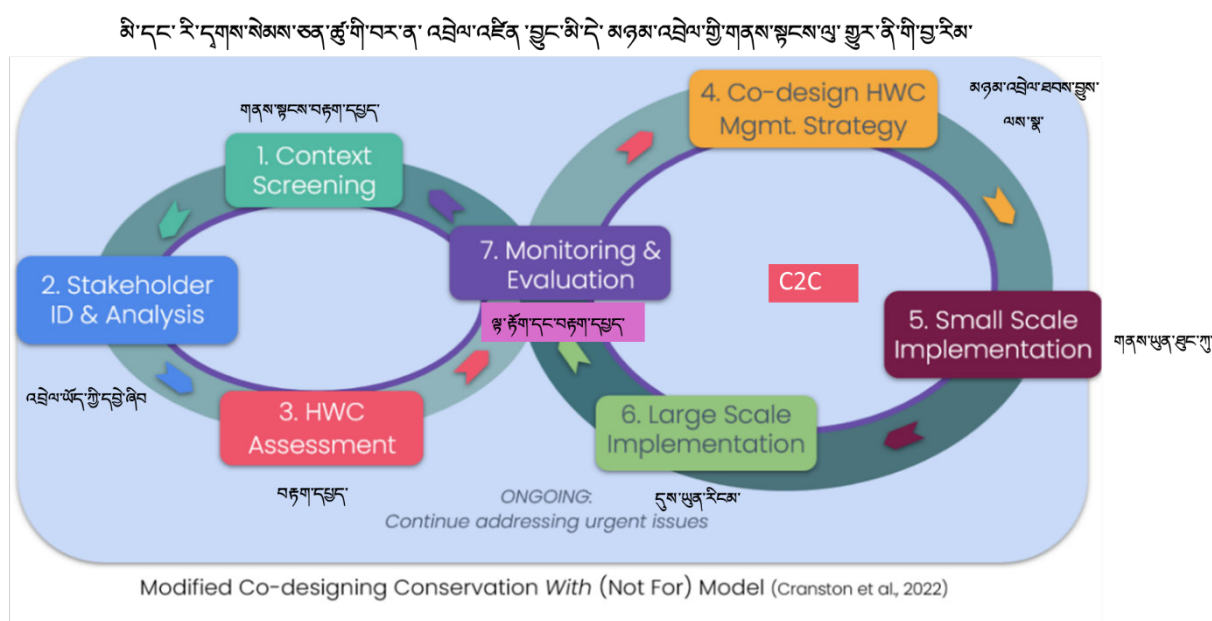


Figure 2: C2C framework to ensure effective and sustainable HWC management.

3.2.1 C2C Process

Step 1: Context Screening

Context screening is the first step in the assessment process, aimed at identifying and understanding the unique characteristics of a landscape and the prevailing Human-Wildlife Conflict situation. This step involves a detailed analysis of various factors to gain a comprehensive understanding of the specific landscape and the existing HWC dynamics. Prior to completing this step, the C2C project manager compiled all relevant baseline information, including social landscape maps, gewog profile, reports, and other resources. This effort aimed to develop a thorough and comprehensive understanding of the landscape to inform effective planning and decision-making.

On April 22, 2024, the C2C Core Team was established, and 20 staff members participated in the C2C training at JKSNR head office. During the training, context screening was conducted using the C2C Format Tool 4, which focuses on key categories for analysis, including the landscape and site description of Sangbay Gewog (site information, demographic & livelihoods), HWC trends (key conflict species, frequency, severity & type of conflict), conflict drivers (human-induced & natural drivers), social and wildlife dynamics, as well as relevant policies, governance, and institutional frameworks.

Step 2: Stakeholder Identification & Analysis

In the C2C Approach, understanding the stakeholders involved in HWC and their potential for collaboration is essential. On April 23, 2024, 20 forestry staff participated in the stakeholder identification and analysis process using C2C Tool 5 Matrix. This effort was further advanced on May 1, 2024, through focused group discussions at the gewog level, involving 15 service providers as a stakeholder who deliver services to community and/or landscape (Gup/Mangmi, Tshogpa, Agriculture and Livestock Extension staff, Gewog Administrative Officer (GAO), Bhutan Development Bank Limited & forestry officials), along with 13 local community members from different chiwog as a representative during consultation meeting (Figure 3). During the stakeholder consultation meeting, focused group discussions and participatory resource mapping were conducted to identify and engage various stakeholders. The stakeholder analysis process began with identifying duty bearers/service providers using the Stakeholder Analysis Matrix (C2C Tool 5). This matrix is a vital instrument for identifying and analyzing stakeholders involved in managing HWC within Sangbay Gewog. It provides a systematic approach to assess stakeholders' roles, interests, influence, and availability, enabling effective collaboration in developing a comprehensive HWC management strategy. This matrix employs a systematic approach, requiring responses to a series of questions rated on a scale of 1 (low) to 5 (high) to comprehensively evaluate stakeholders (Table 1) as detailed below:

Interest in HWC and its management in this landscape (Sangbay gewog): 1= Not at all interested to 5= Very interested.

Influence on long-term success of a HWC management strategy: 1= No influence to 5= High influence.

Availability to participate in the co-design of a HWC management strategy: 1= Not at all available to participate to 5= Frequently available to participate.



Figure 3: Stakeholder Identification using C2C Matrix Tool 5

Table 1: Stakeholder Identification Matrix

Stakeholders	Tshogpa	Forest	Agriculture	Livestock	Gup	Dungpa	Health	Lam
Tshogpa	X							
Forest	Forest	X						
Agriculture	Tshogpa	Forest	X					
Livestock	Tshogpa	Forest	Agriculture	X				
Gup/Mangmi	Tshogpa	Forest	Gup	Livestock	X			
Dungpa	Tshogpa	Forest	Agriculture	Livestock	Gup	X		
Health	Tshogpa	Forest	Agriculture	Livestock	Gup	Dungpa	X	
Lam	Tshogpa	Forest	Agriculture	Livestock	Gup	Lam	Health	X

The process identified the Forestry Officials as the most important stakeholder, followed by Chiwog Tshogpa, the Agriculture & Livestock officials and the Gewog Gup, particularly during challenging times when assistance and

services are needed. Stakeholders with higher scores demonstrate a strong commitment to engaging in HWC discussions and solutions, whereas those with lower scores may require targeted efforts to increase awareness and further actions.

Step 3: HWC Assessment

The C2C HWC assessment is organized into three sets of questions, each designed for different stakeholder groups:

- C2C Project Manager (Yes/No)
- Duty Bearers/Service Providers (Likert Scale 1=Strongly disagree, 5=Strongly agree)
- Community Members (Likert Scale 1=Strongly disagree, 5=Strongly agree)

This approach ensures a comprehensive understanding of diverse perspectives from different stakeholder groups and how their opinions align or differ across various elements and outcomes. Each set of questions addresses the six key elements – Policy, Prevention, Response, Understanding the Conflict, Mitigation, and Monitoring – under each of the four outcomes: People, Livelihoods/Assets, Habitat, and Wildlife. The questions for the C2C Project Manager consist of a series of Yes/No inquiries aimed at understanding the context of the HWC situation within the landscape. The questions for Duty Bearers/Service Providers focus on assessing the effectiveness and compliance with policies and programs designed to reduce HWC. These are evaluated using a Likert scale between 1 (strongly disagree) – 5 (strongly agree), allowing for an understanding of differences in opinions within and among stakeholder sub-groups. The questions for Community Members explore their perspective on HWC within the landscape, their awareness on its impacts, and their opinions on the effectiveness and usefulness of various policies and programs in addressing the conflict. These are also rated on a Likert scale between 1 (strongly disagree) – 5 (strongly agree) gauge agreement with the statements.

From May 18 to June 7, 2024, following training and a pre-test of the household survey, one-to-one enumerations (household interview) were conducted in each chiwog (Table 2). The survey included one project manager, 28 service providers/duty bearers and 154 community, 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 about 251 households for Sangbay (sampling frame). Therefore, the sampling size for the survey was 154 households for Sangbay Gewog, which was further determined for every chiwog for the survey. Efforts were undertaken to alternate between male and female respondents to reduce gender bias in the sampling process.

Table 2: Households interviewed as per the chiwog under Sangbay gewog

Sl/No.	Name of Chiwog	Total HHs	No. of HHs interviewed	Sample Size
1	Sangbay Ama	68	42	154
2	Nakha-Tashigang	26	16	
3	Shaba-Shebji	34	21	
4	Mochu-Bebji	102	63	
5	Yaba-Shama	21	13	
Total HHs		251	154	

Chiwog level Sample size selection

After determining the total sample size for the gewog, the sample is proportionally distributed among chiwogs based on their household size. This ensures fair representation.

The proportional allocation formula is:

$$n_i = \frac{N_i}{N} \times n$$

Where:

n_i = Sample size for a specific chiwog

N_i = Population of that chiwog

N = Total gewog households

n = total calculated sample size for the gewog

This approach ensures statistically reliable and proportionally representative sampling at both gewog and chiwog levels.

Selection of Households for Interview

In each chiwog, a complete list of households (sampling unit) is prepared and numbered sequentially (e.g., 1 to N). From this list, interview households are selected using systematic random sampling combined with random number generation to ensure fairness and to avoid bias and cluster selection. First, generate a random starting number using the Random Number Generator; this random number becomes the first selected household. For the remaining

household selections, subsequent households are selected by adding the sampling interval (x) to the starting number.

This process continues until the required sample size (n) is reached.

This method ensures that every household has an equal and independent chance of selection, thereby minimizing selection bias and cluster effects while maintaining statistical reliability.

Step 4: Co-design

To co-design the C2C strategy, a consultation workshop was held with local communities and key stakeholders in every chiwog from November 10th to 12th, 2024. The development of the HWC management strategy was adopted through a participatory approach. This inclusive process ensured that the strategies were closely aligned with the needs and perspectives of the local communities.

A total of 120 community members participated in the consultation process for the co-design of the C2C strategy for Sangbay gewog, with 57% of participants being male ($n = 68$) and 43% female ($n = 52$) (Table 3). The nearly equal gender participation reflects a balanced engagement, ensuring that both male and female perspectives were equally represented in the strategy development process. This gender balance is crucial for fostering inclusive decision-making and ensuring that the needs and priorities of all community members, regardless of gender, are considered in the final strategy. Equal participation also promotes social equity and enhances the legitimacy and effectiveness of the strategy by incorporating diverse viewpoints.

During the workshop, the results of the C2C assessment were shared with stakeholders through a comprehensive presentation and a visual report, which outlined the overall status of the gewog, C2C framework, C2C process, Outcome results, Element results, Conflict Species and the specific conditions in each chiwog allowing participants to validate the results. Group activities were organized to identify various management intervention strategies for addressing HWC, which was categorized into short-term and long-term actions, implementation sites and description of each action. After the group work, participants presented their group findings, which were then discussed to validate and refine the proposed actions based on the HWC scenarios in each chiwog. The LG members and RNR officials played a crucial role in validating the actions proposed by the communities during group discussions. They thoroughly deliberated on the key interventions, focusing on the outcomes most significantly impacting livelihoods and assets. The actions compiled during the workshop were used to develop the C2C strategy action plan for effective HWC management in Sangbay gewog over the next five years.

Table 3: Participants from Chiwog during Co-design consultation

Sl/No.	Chiwog	Nos. of Participants	Male	Female
1	Shaba-Shebji	34	19	15
2	Sangbay Ama-Nakhekha	42	25	17
3	Tashigang-Nakha	44	24	20
Total		120	68	52
Male: Female %			57%	43%

Step 5: Small Scale Implementation

The small-scale implementation focuses on intervention actions proposed by communities and relevant stakeholders, designed for execution within a short time frame, depending on available funding. These activities are practical and manageable, allowing affected communities to take immediate action to address urgent human-wildlife conflict challenges. In Sangbay gewog, 35 such actions have been identified as part of the small-scale implementation program. These actions aim to provide quick, tangible solutions to mitigate the impact of HWC while building momentum for longer-term strategies. Examples include installing physical deterrents, crop rotation, and conducting awareness campaigns, activities that can be efficiently carried out by local communities with minimal resources and external support. Actions requiring significant funding have been identified to address major HWC challenges. As part of the large-scale implementation program, 5 such actions have been outlined. These initiatives aim to address more complex and resource-intensive issues, ensuring a lasting impact on human-wildlife conflict management. Long-term implementation is essential for developing sustainable solutions, such as constructing permanent barriers like chain-link fences, restoring habitats, or introducing advanced monitoring systems, all of which require substantial funding and careful planning to be effective over time.

4. Results and Discussion

4.1 Demography and Social Information

Understanding the demographic profile of community members is crucial for capturing diverse perspectives within the community, ensuring a more inclusive and accurate representation of their experiences and needs. Efforts were made to ensure gender-balanced participation in the survey. However, the final sample comprised 61% male respondents (n = 95) and 39% female

respondents (n = 60), indicating a higher male representation. In terms of age distribution, the majority of respondents (45%, n = 69) were in the 41-60 age group, followed by 29% (n = 45) in the 18-40 age group, and 26% (n = 41) were aged over 60 years. Regarding educational background, more than 68% (n = 106) of the respondents were illiterate, while 10% (n = 16) had completed primary education, 5% (n = 8) had attended Non-Formal Education (NFE) programs, 8% (n = 12) had completed secondary education, and 7% (n = 11) were others, such as lay monks. This demographic profile provides a comprehensive understanding of the community's dynamics, which is essential for designing effective, targeted interventions for managing HWC. The communities are primarily subsistence farmers, relying on agriculture and livestock farming as their main sources of livelihood and income.

4.2 Overall Results of Sangbay Gewog

4.2.1 Conflict Species of Gewog

In Sangbay gewog, both service providers and community members identified various wildlife species as sources of human-wildlife conflict. Since agriculture and livestock farming are the primary livelihoods in the gewog, crop depredation and livestock predation by wild animals were reported as the most significant challenges. The key conflict species identified include barking deer, bears, birds, porcupines, wild pigs, rodents, sambar, wild dogs, macaques, gaur, leopards, tigers, and langurs. Among these species, service providers highlighted Leopard, Macaque and Wild dog as the most problematic, while community members emphasized barking deer and bears as the most significant conflict animals. Interestingly, both groups reported monitor lizards as the least problematic species (Figure 4). The community members have requested targeted interventions to mitigate these challenges which has significant impact on their livelihoods.

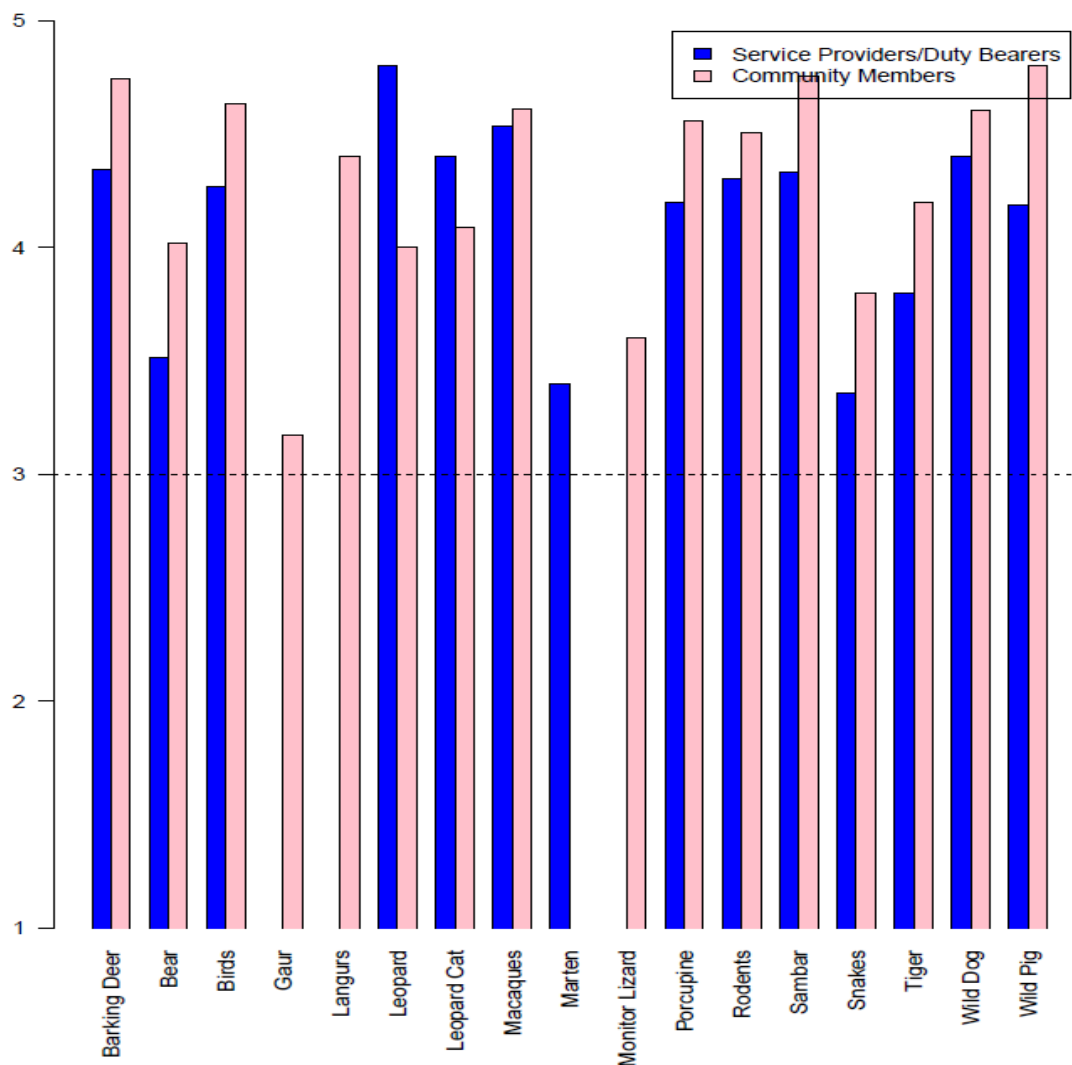


Figure 4: Conflict species of Sangbay gewog

The tolerance level of community members toward human-wildlife conflict was reported to be relatively high, with an average tolerance score of 4.18 out of 5 (Figure 5). This indicates a strong level of resilience and coexistence among the community, which is encouraging for conservation managers. Such a high tolerance reflects a positive outlook for collaborative conservation efforts and provides an opportunity to work closely with the community to implement effective strategies. However, it is crucial to recognize that this level of tolerance may diminish over time if adequate mitigation measures are not introduced to reduce the frequency and severity of conflicts. Persistent challenges without effective interventions could erode community goodwill and cooperation, potentially undermining long-term conservation goals. Therefore, proactive efforts to implement targeted conflict mitigation strategies are essential to sustain and enhance community tolerance while fostering harmonious coexistence between humans and wildlife.

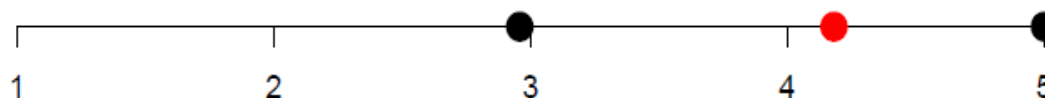


Figure 5: The average tolerance score of 4.18 out of 5 for community members

Following are the conflict species identified according to:

- **C2C Project Manager:** Barking Deer, Bear, Gaur, Wild Dog, Wild Pig
- **Service Providers/Duty Bearers:** Barking Deer, Bear, Porcupine, Snakes, Wild Dog, Wild Pig, Rodents, Macaques, Marten, Sambar, Leopard Cat, Tiger and Leopard.
- **Community Members:** Barking Deer, Bear, Porcupine, Birds, Sambar, Wild Dog, Wild Pig, Snakes, Gaur, Rodents, Macaques, Langurs, Leopard, Leopard Cat, Monitor Lizard and Tiger.

4.2.2 Status of Outcome at Gewog level

The C2C approach to manage HWC aims to achieve positive outcomes across multiple dimensions, fostering a more harmonious relationship between people and wildlife. By implementing targeted interventions, the approach seeks to minimize losses from crop damage and livestock predation, thereby securing livelihoods/assets for local communities. As a result, retaliatory killings and poaching are expected to decline, while tolerance levels among community members increase, enabling wildlife to thrive alongside human settlements. Additionally, the approach emphasizes the importance of preserving sufficient natural habitats to support sustainable and healthy wildlife populations. By addressing these interconnected aspects (people, livelihoods, wildlife, and habitat), the C2C approach demonstrates that protecting people's livelihoods while providing wildlife with space to thrive creates the foundation for sustainable coexistence. This balance ultimately benefits both communities and ecosystems, ensuring long-term harmony between humans and nature. Therefore, C2C-Approach sets out four outcomes that need to be targeted in landscapes shared by wildlife and people:

People- Able and Willing to Live Alongside Wildlife

Livelihoods/Assets- Secured Against Presence of Wildlife

Wildlife- Thrives Alongside People

Habitat- Sufficient to Ensure Sustainable Wildlife Population

The People category received the lowest scores in the C2C approach assessment, with score of 0.54 from the Project Manager, 2.61 from Service Providers, and 2.64 from Community Members, particularly under the Livelihoods/Assets outcome (Table 4).

Table 4: Score under each outcome by category of respondents

Outcome	Project Manager	Service Providers	Community Members
People	0.54	3.45	3.80
Livelihoods/Assets	0.64	2.61	2.64
Wildlife	0.64	3.89	4.31
Habitat	0.75	3.89	4.10

Note: C2C Project Manager scores are between 0 and 1, while Service Providers and Community Members scores are between 1 and 5, with 1 being Strongly Disagree and 5 being Strongly Agreeing.

As depicted in Figure 6, Livelihoods/Assets consistently emerged as the lowest-rated outcome across all groups in Sangbay Gewog. Given these findings, interventions to reduce human-wildlife conflict and foster coexistence should prioritize addressing the Livelihoods/Assets outcome first. Subsequent focus should be directed toward improving outcomes related to Habitat, People, and Wildlife, ensuring a balanced and effective strategy for long-term coexistence.

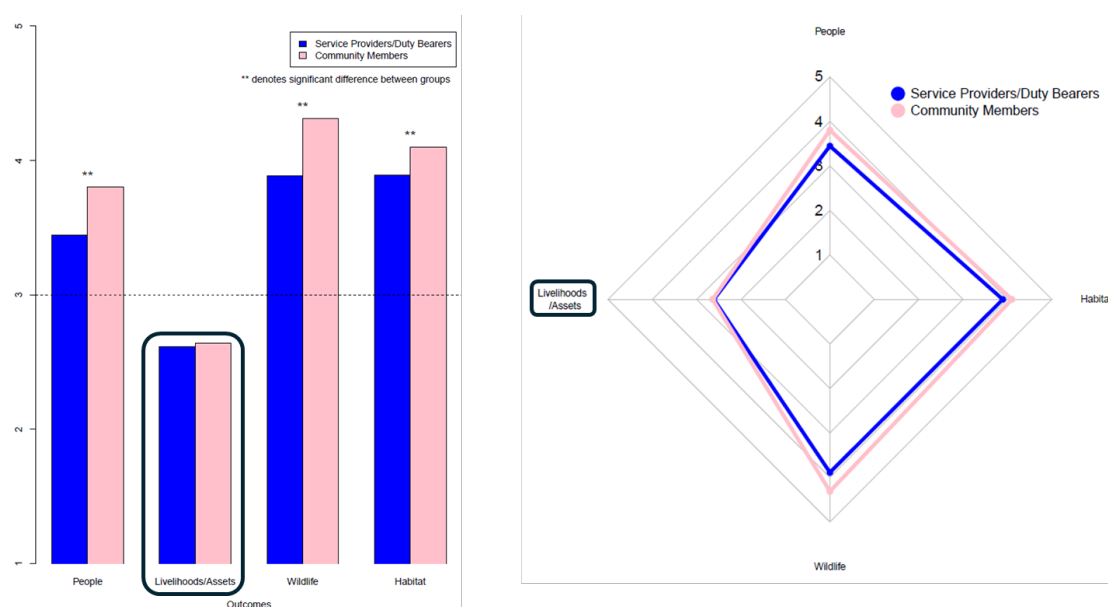


Figure 6: Result by Outcome with lowest score for livelihoods/assets

4.2.3 Status of Elements at Gewog level

To achieve the four outcomes, six essential elements (Understanding Interaction (UI), Policy & Governance, Prevention, Response, Mitigation, and Monitoring) for adaptive management, must be considered (Figure 7). These elements were analyzed within the context of each outcome. The Understanding Interaction (UI) element basically looked at the social and political dimensions of HWC, identifying gaps in knowledge about HWC interactions at various levels. Policy & Governance examines international frameworks, national laws, legislation, and plans, highlighting the need for alignment with broader policy objectives. Prevention involves proactive measures aimed at avoiding HWC before it occurs, while Response refers to actions taken to address HWC incidents as

they happen or afterward. Mitigation evaluates strategies and technologies used to minimize the impact and severity of conflicts. Finally, Monitoring assesses actions taken to track the performance and effectiveness of HWC management interventions within the gewog. Together, these interconnected elements provide a structured and holistic approach to effectively manage HWC and fostering coexistence. For the C2C Project Manager, scores range from 0 to 1, representing binary responses (Yes/No) for specific factors and for Service Providers and Community Members, scores range from 1 to 5, based on a Likert scale to capture the degree of agreement or effectiveness regarding various aspects of HWC management.

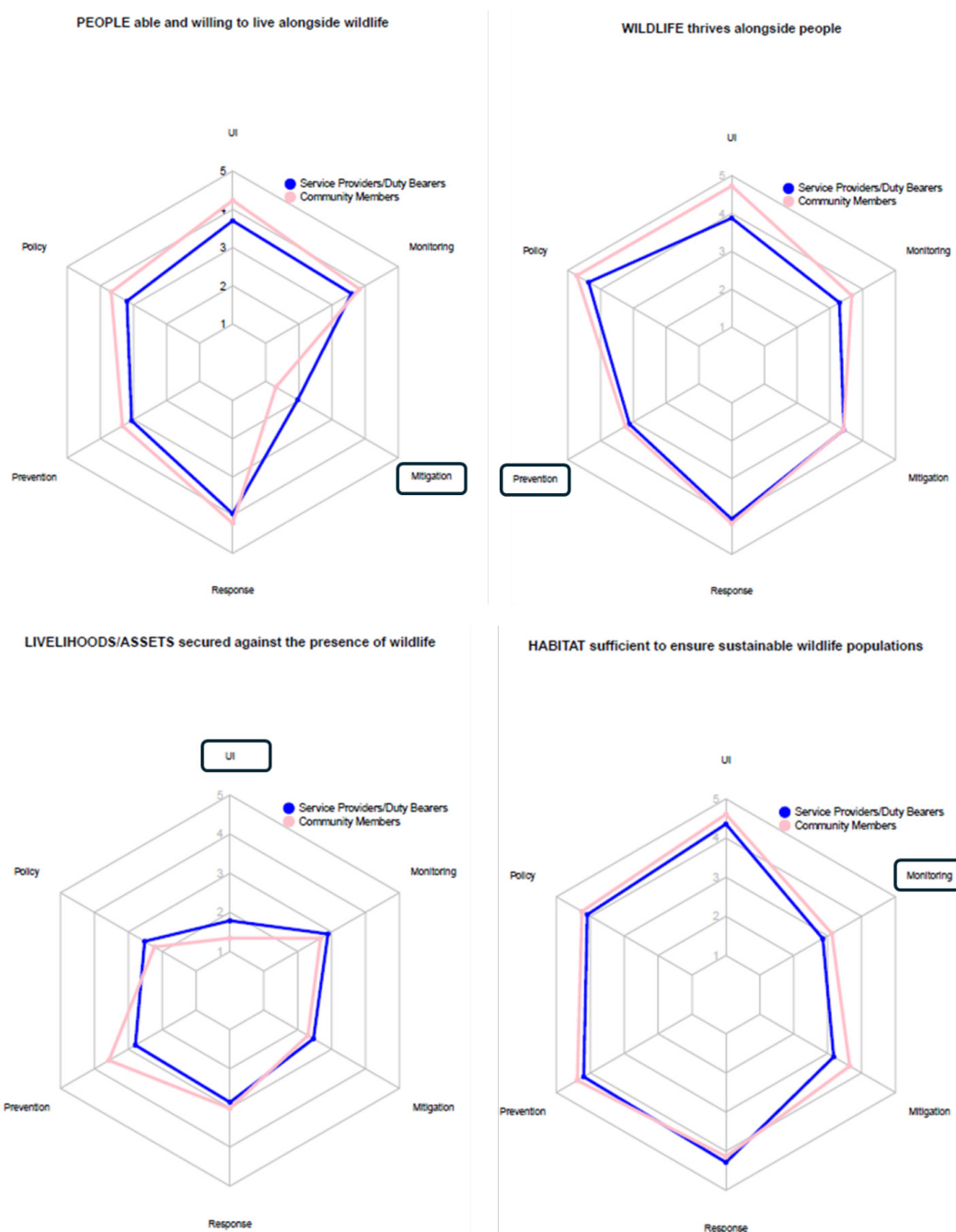


Figure 7: Result by six Elements with lowest score for each Outcome

The assessment revealed six critical elements that must be considered under each outcome to effectively manage human-wildlife coexistence in the gewog. The findings are as follows:

1. People Able and Willing to Live Alongside Wildlife:

The Mitigation element received the lowest scores 1.96 from service providers and 1.30 from community members, indicating a significant gap in implementing effective mitigation measures in Sangbay Gewog. This low score reflects the limited efforts to address the impacts of HWC and the challenges faced by the community. The lack of robust mitigation measures is concerning, as it directly affects the community's tolerance and willingness to coexist with wildlife. Without effective interventions, such as physical barriers, crop protection methods, or improved livestock management practices, the negative impacts of HWC, such as crop loss and livestock predation are likely to persist. This observation highlights the need for immediate action to design and implement targeted mitigation strategies. By addressing this gap, it is possible to improve community resilience, maintain livelihoods, and foster a more positive attitude toward living alongside wildlife.

2. Livelihoods/Assets Secured Against the Presence of Wildlife:

The Understanding Interaction (UI) element has scored relatively low in the Livelihoods/Assets Secured Against the Presence of Wildlife outcome, with 1.79 from service providers and 1.34 from community members. These scores indicate a critical gap in understanding the complex dynamics of human-wildlife conflict (HWC) in Sangbay Gewog. This low score suggests a lack of awareness and knowledge among both groups regarding the underlying causes, contributing factors, and patterns of HWC. Community members may have limited exposure to educational resources or training sessions that explain why conflicts occur, such as habitat encroachment, wildlife behavioral changes, or ecological imbalances. This observation underscores the urgent need for capacity-building programs, community stewardship, and stakeholder training to enhance awareness of HWC dynamics. By improving the understanding of these interactions, both service providers and community members can make more informed decisions, collaborate effectively, and contribute to sustainable solutions that secure livelihoods while ensuring coexistence with wildlife.

3. Wildlife Thrives Alongside People:

The Prevention element in the Wildlife Thrives Alongside People outcome scored low, with 3.12 from service providers and 3.24 from community members, underscoring the absence of preventive measures aimed at minimizing conflicts before they escalate. This suggests a reactive rather than proactive approach to prevent them. This lacks forward-thinking strategies limits the community's ability to address conflicts at their root causes, limiting

the potential for harmonious coexistence between humans and wildlife. To address this gap, it is crucial to focus on preventive measures that can reduce conflicts before they escalate. By prioritizing prevention, the gewog can shift from a reactive to a proactive approach, improving the chances of sustainable coexistence between people and wildlife.

4. Habitat Sufficient to Ensure Sustainable Wildlife Populations:

The Monitoring element in the Habitat Sufficient to Ensure Sustainable Wildlife Population outcome scored low, with 2.86 from service providers and 3.12 from community members, reflecting the lack of a proper monitoring mechanism to safeguard their habitat to ensure viable population which is critical to maintain ecosystem balance in the area. These low scores reflect the absence of structured and consistent monitoring mechanisms, limited technical capacity among stakeholders, resource constraints, and a lack of community engagement. To address these gaps, it is essential to develop a comprehensive monitoring plan, train stakeholders and community members in advanced techniques and technology, allocate sufficient resources, and actively engage communities in habitat monitoring efforts. Incorporating modern technology and creating a feedback loop to share results and inform management strategies can significantly enhance the effectiveness of monitoring, ensure sustainable wildlife habitats and promote ecosystem balance.

4.3 Status of Outcome at Chiwog level

4.3.1 Nakha-Tashigang Chiwog

According to Figure 8, community members has identified bear, barking deer, wild pigs, birds and wild dog as the primary conflict species in the chiwog. Whereas, the service providers also similarly ranked bears and barking deer as the most problematic species, followed by birds, wild dog, wild pig, porcupine and rodents. Based on the identified conflict species, it is crucial to implement and enhance appropriate mitigation measures. For community members, priority should be given to managing conflicts with bear, barking deer, wild dog and wild pigs, with continuous monitoring and adaptive management, which are essential to minimize human-wildlife conflicts and promote coexistence.

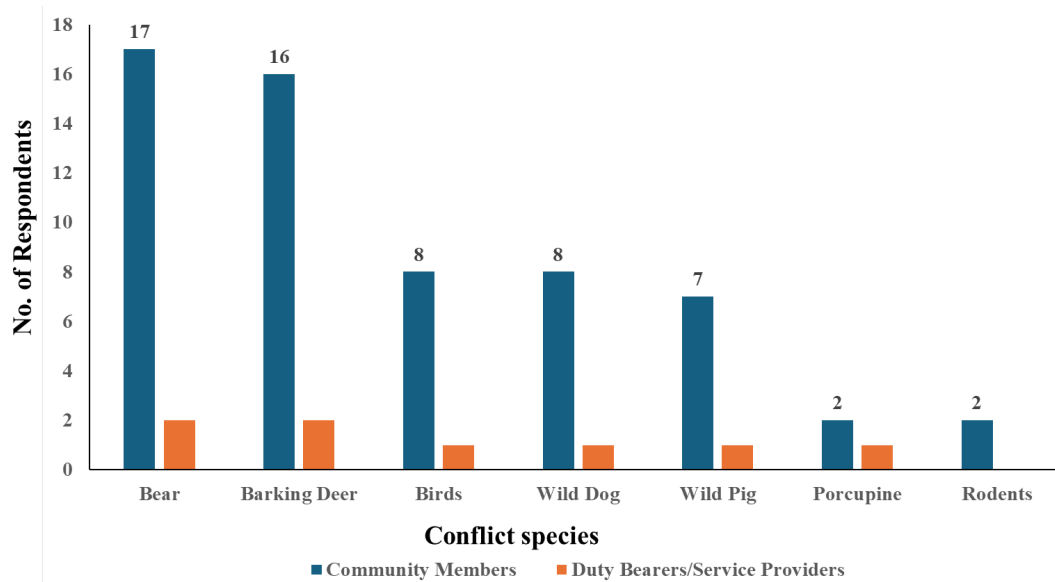


Figure 8: Conflict species recorded under Nakha-Tashigang chiwog

Figure 9 highlights that, livelihoods/assets received the lowest score among all outcomes identified by both service providers and community members in the Nakha-Tashigang chiwog with 15.7 respectively. Therefore, to enhance the livelihoods of communities affected by human-wildlife conflict, it is essential to implement targeted, sustainable interventions that address both the immediate and long-term impacts where communities can build resilience to HWC, improve their economic stability, and foster a harmonious coexistence with wildlife.

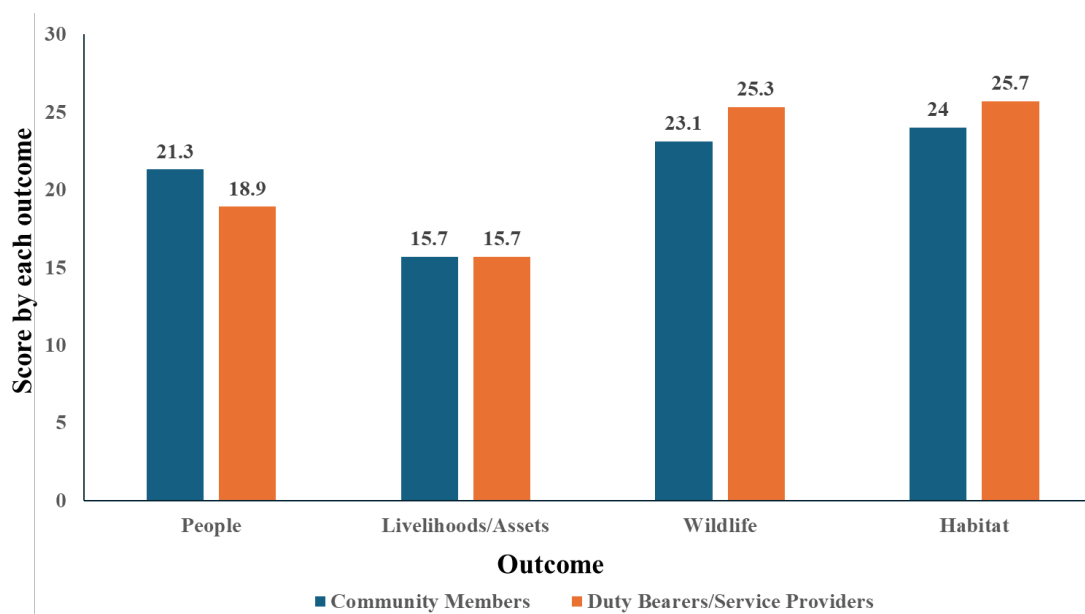


Figure 9: Result by Outcome with lowest score for livelihoods/assets for Nakha-Tashigang chiwog

In the Nakha-Tashigang chiwog, mitigation received the lowest score under the people and wildlife outcome, while UI was the lowest-ranked element under the livelihoods/assets outcome and similarly, the monitoring was identified as the weakest element under the habitat outcome, as shown in Figure 10.

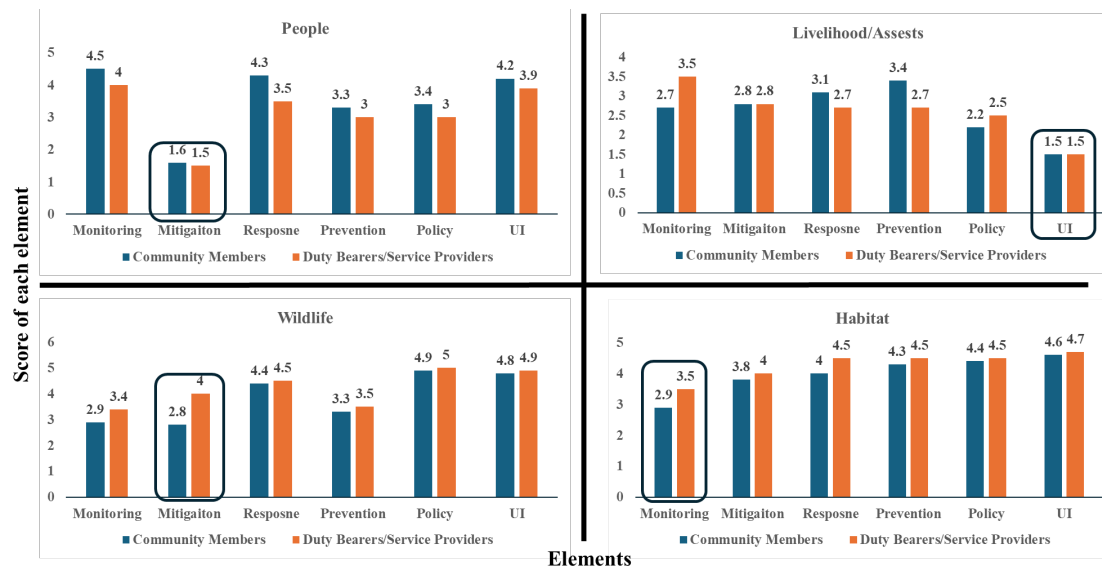


Figure 10: Result by elements for Nakha-Tashigang chiwog

4.3.2 Sangbay Ama Chiwog

According to Figure 11, community members identified bear, barking deer, birds, wild pig, and wild dog as the most conflicting species in the chiwog. Similarly, service providers also considered bear, barking deer, wild pig, birds and wild dog as the primary conflict species. Therefore, to protect their crops, farmers are compelled to spend considerable time and effort guarding their crops, often at the expense of other productive activities. This constant vigilance not only adds to their workload but also increases stress and limits opportunities for diversifying their income sources.

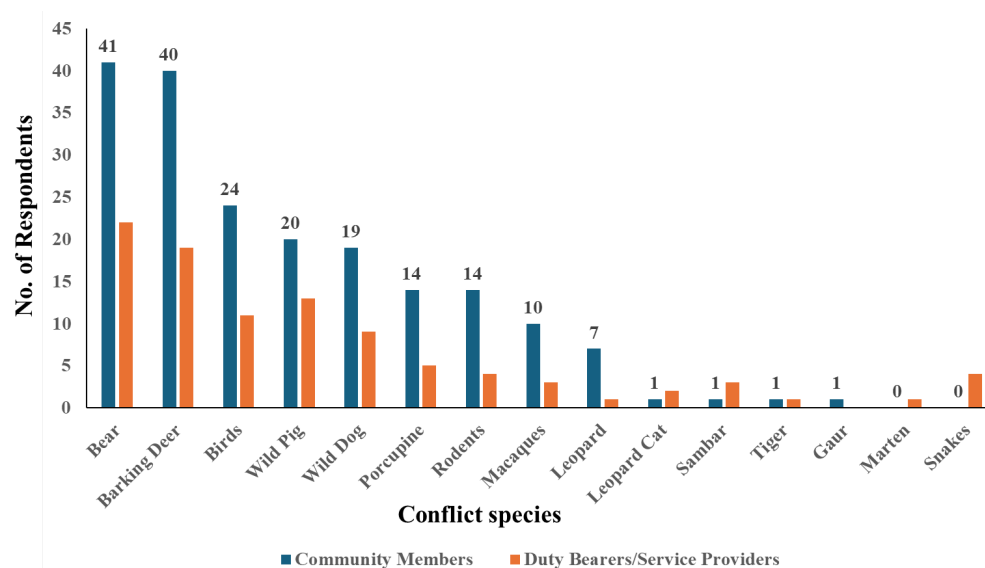


Figure 11: Conflict species of Sangbay Ama chiwog

Figure 12 shows that livelihoods/assets received the lowest score of 14 and 15.8, respectively, among all outcomes as reported by both community members and service providers/duty bearers in the Sangbay Ama chiwog. Therefore, addressing this challenge requires interventions that can help mitigate the impacts while safeguarding the livelihoods of the community and promoting coexistence, which should prioritize improving livelihoods in the chiwog.

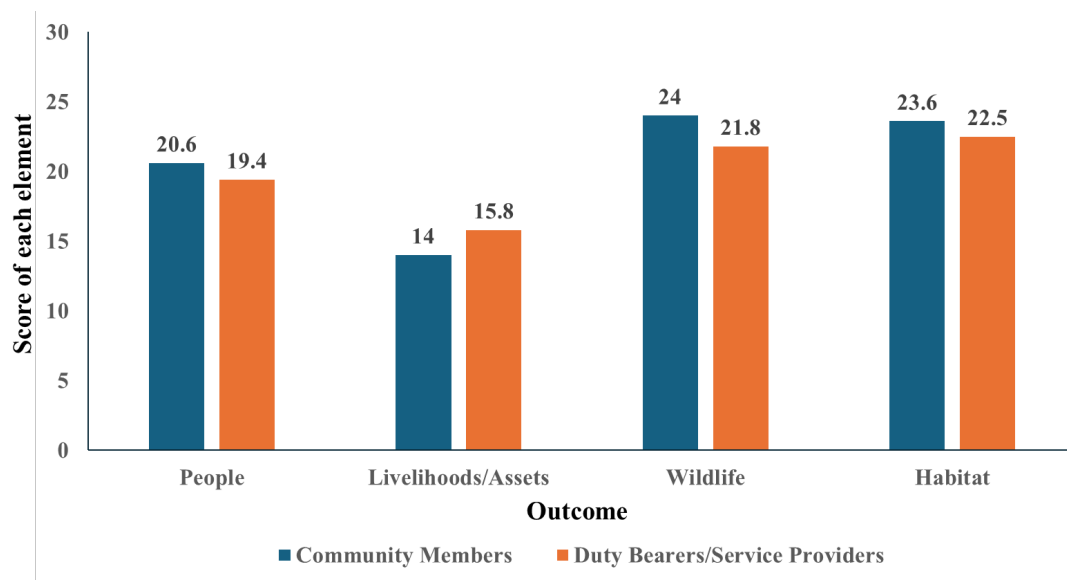


Figure 12: Outcome with lowest score for livelihoods/assets for Sangbay Ama chiwog

In the Sangbay Ama chiwog, the element of mitigation received the lowest score under the people outcome, while UI was the lowest-ranked element under the livelihoods/assets outcome. Additionally, prevention was identified as the weakest element under the wildlife outcome, and monitoring was also highlighted as the key area which needs attention under the habitat outcome. These elements should be prioritized to address coexistence and reduce human-wildlife conflict in the chiwog (Figure 13).

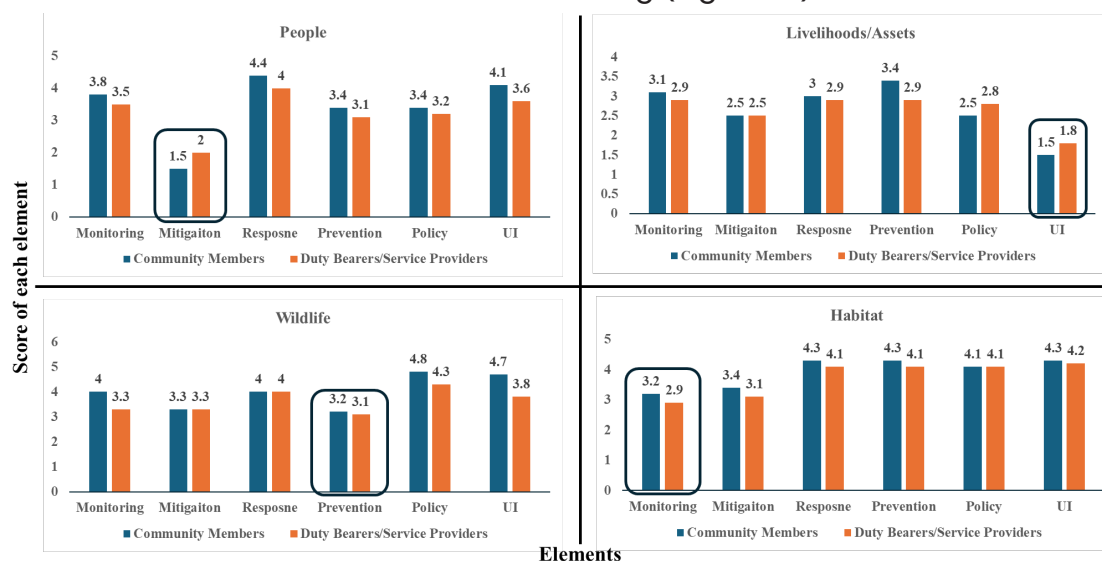


Figure 13: Lowest score elements under Sangbay Ama chiwog

4.3.3 Shaba-Shebji Chiwog

In Shaba-Shebji chiwog, the community members and service providers identified barking deer, bear, sambar, wild pig, birds, gaur, porcupine, wild dog and rodents are the most conflicting species, as shown in Figure 14. Over the past 3–4 years, gaur have increasingly caused disturbances by frequently visiting the herds in the areas. Such incidents have led to injuries, with one man and one woman being harmed. These incidents have been reported by the Shaba-Shebji herders, who are now requesting urgent interventions to address the issue. And even in recent years, bears have been frequently visiting the herding sites, preying on local cattle. Its repeated presence near the herds not only threatens livestock but also poses a serious risk to the lives of the herders, who are often in close proximity to these dangerous encounters. The situation has raised concerns among the herding communities, urging the need for timely intervention to ensure their safety and protect their livelihoods.

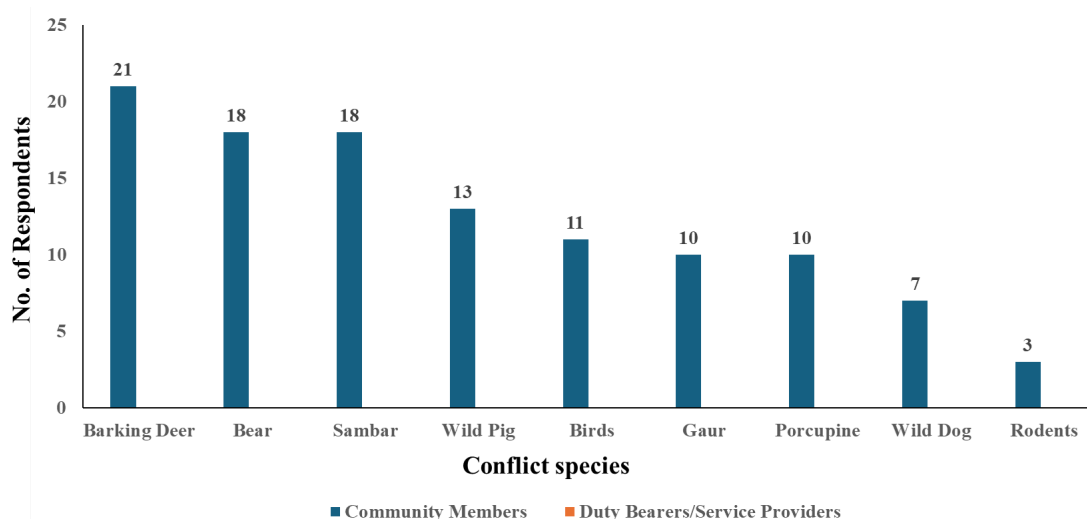


Figure 14: Record of conflict species for Shaba-Shebji chiwog

Livelihoods/assets category has received the lowest score of 15 among all outcomes as reported by community members in the Shaba-Shebji chiwog as shown in Figure 15. This is primarily due to significant crop and livestock predation, as well as the risks posed to assets and human lives. These challenges have severely impacted the livelihoods of the communities, making it a critical area that requires serious and immediate attention. Effective interventions are necessary to mitigate these risks and protect both the assets and the well-being of the affected communities.

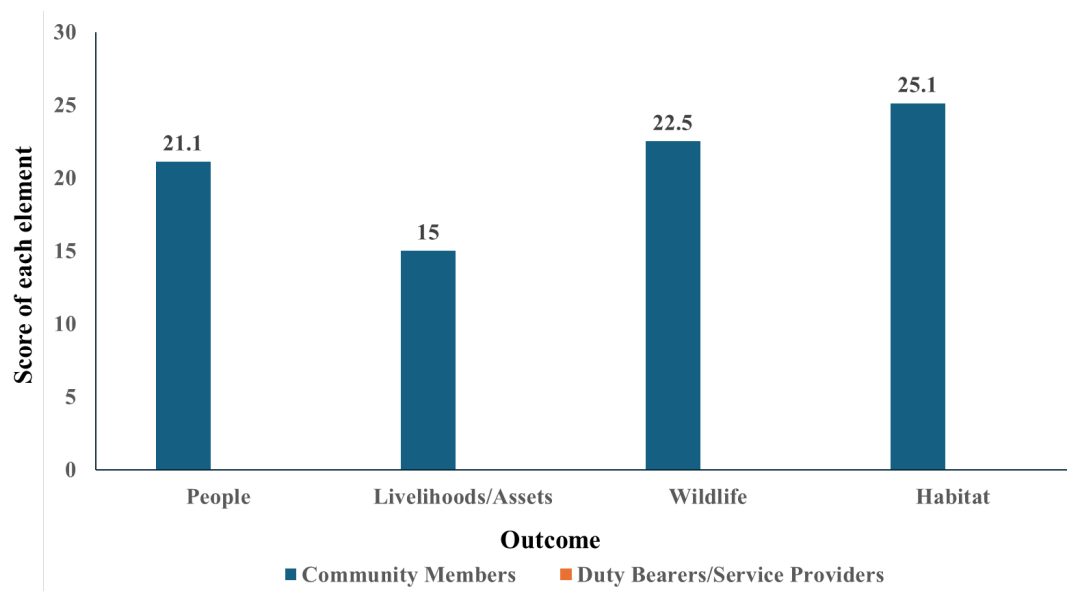


Figure 15: Outcome with lowest score for livelihoods/assets for Shaba-Shebji chiwog

In Shaba-Shebji chiwog, the element mitigation has the lowest score for people and wildlife, and UI under livelihoods/assets outcome, and monitoring under habitat outcome (Figure 16). Therefore, to ensure safety for both people and wildlife, a holistic approach is necessary, combining awareness, mitigation measures and robust monitoring systems.

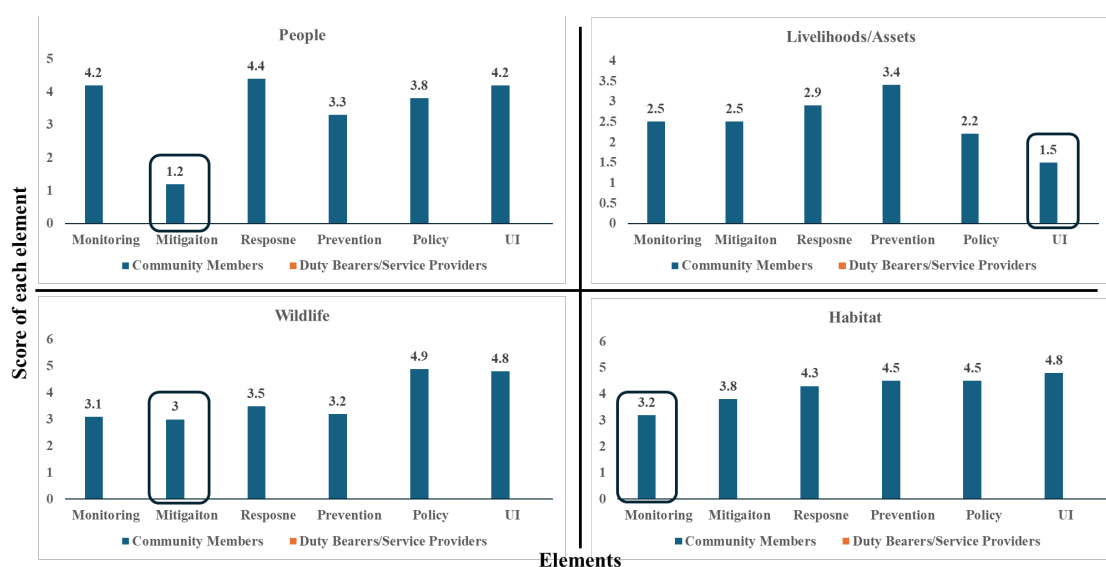


Figure 16: Elements with lowest score under Shaba-Shebji chiwog

4.3.4 Mochu-Bebji Chiwog

Mochu-Bebji chiwog has long been a hotspot for human-wildlife conflicts, with several notable incidents highlighting the challenges faced by the local communities. The primary conflict species identified were barking

deer, bears, porcupine, birds, rodents, sambar, wild pig, snakes, macaque, wild dog, leopard, gaur and tiger (Figure 17). Approximately three years ago, a significant incident occurred at Debji village when a bear broke into a household kitchen, causing considerable fear and disruption. Such incidents underscore the growing challenges of coexisting with wildlife in the village, necessitating urgent and strategic interventions to mitigate conflicts while ensuring the safety and well-being of both wildlife and communities.

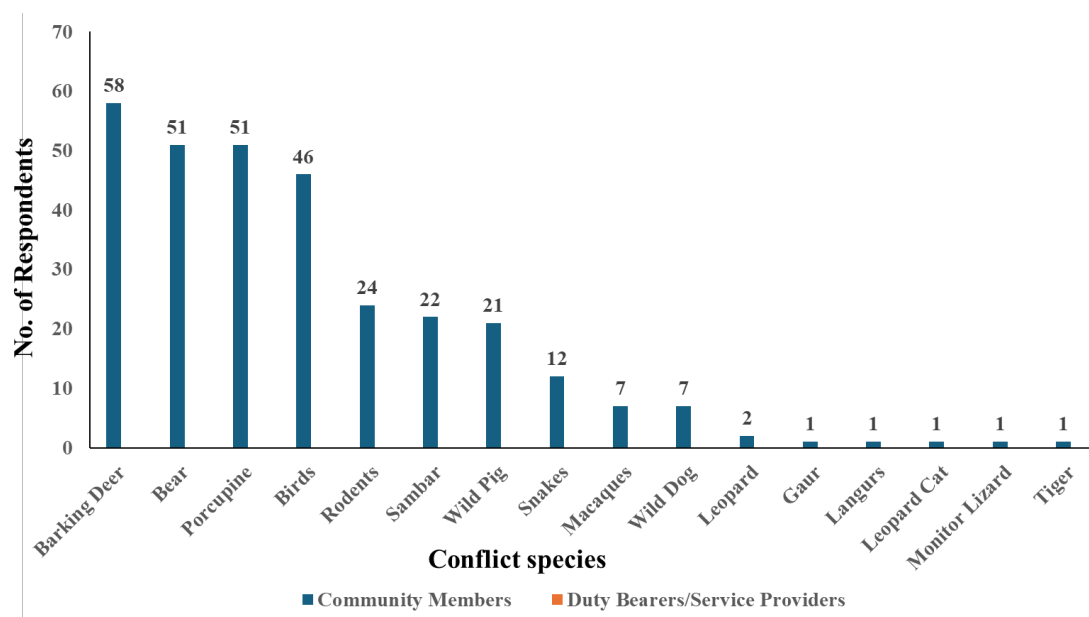


Figure 17: Record of most conflicting species in the Mochu-Bebji chiwog

As shown in Figure 18, Livelihoods/Assets outcome received the lowest score among all outcomes, according to both community members and service providers/duty bearers in the Mochu-Bebji chiwog. This can be attributed to crop depredation and livestock predation, which severely impact the livelihoods of the local communities. Additionally, bear attacks pose a direct risk to assets, human safety, and lives, creating fear and insecurity among community members. Such recurring incidents not only disrupt daily livelihoods but also erode community tolerance toward wildlife, intensifying the need for effective mitigation measures.

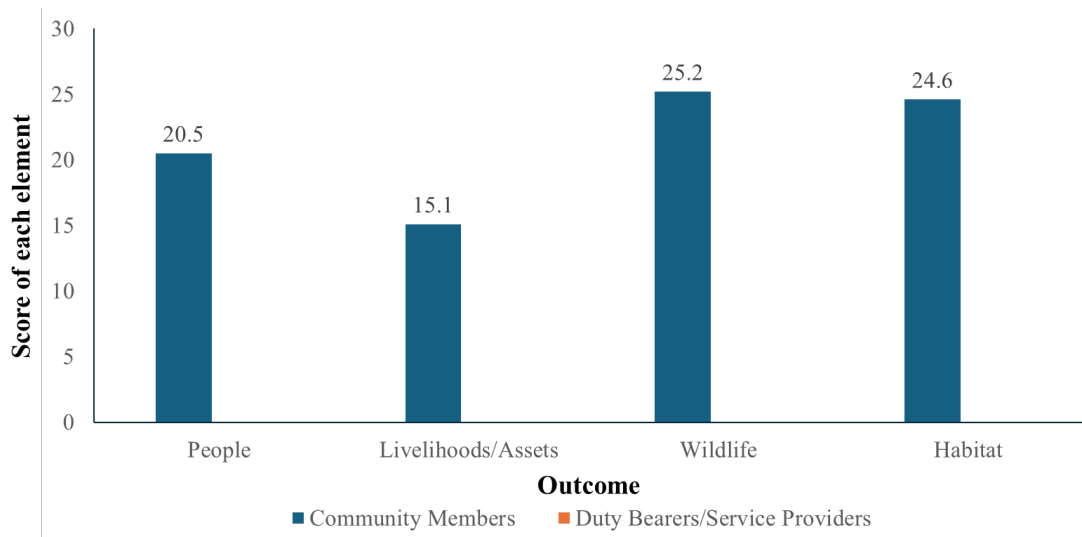


Figure 18: Outcome with lowest score for livelihoods/assets for Mochu-Bebji chiwog

In Mochu-Bebji chiwog, the element mitigation has the lowest score for people, UI element under livelihoods/assets, prevention under wildlife outcome, and monitoring under habitat outcome also scored lowest (Figure 19).

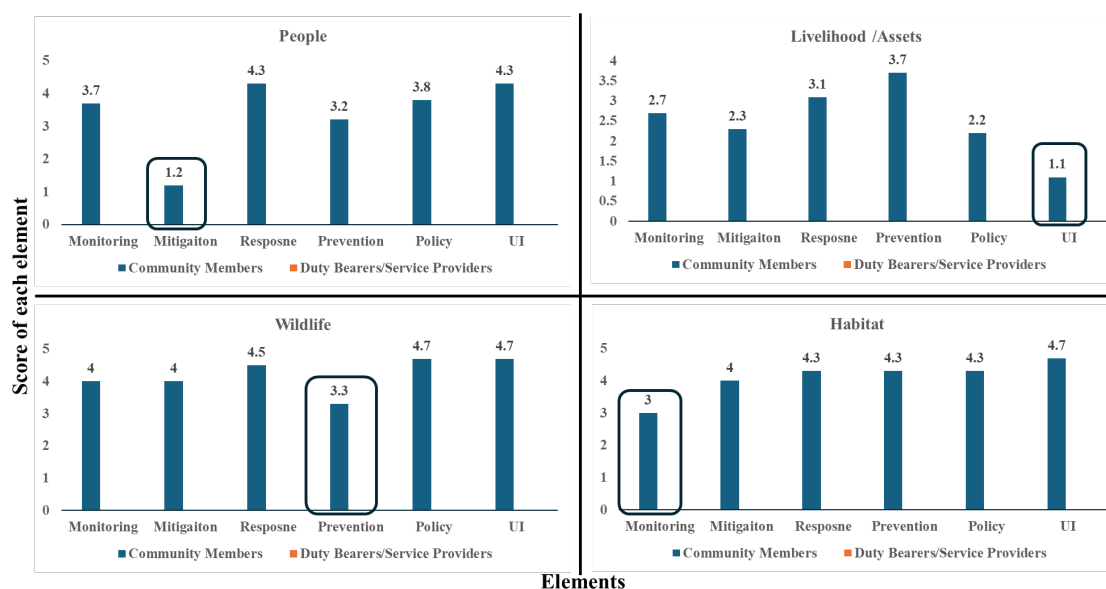


Figure 19: Elements with lowest score under Mochu-Bebji chiwog

4.3.5 Yaba-Shema Chiwog

Similar to other chiwogs, Yaba-Shema has also identified barking deer, bear, porcupine, birds, wild pigs, snakes, sambar, gaur and wild dog as the most conflicting species in the chiwog, as shown in Figure 20. Yaba-Shema is one of the remotest chiwogs under Sangbay gewog which is not connected with road.

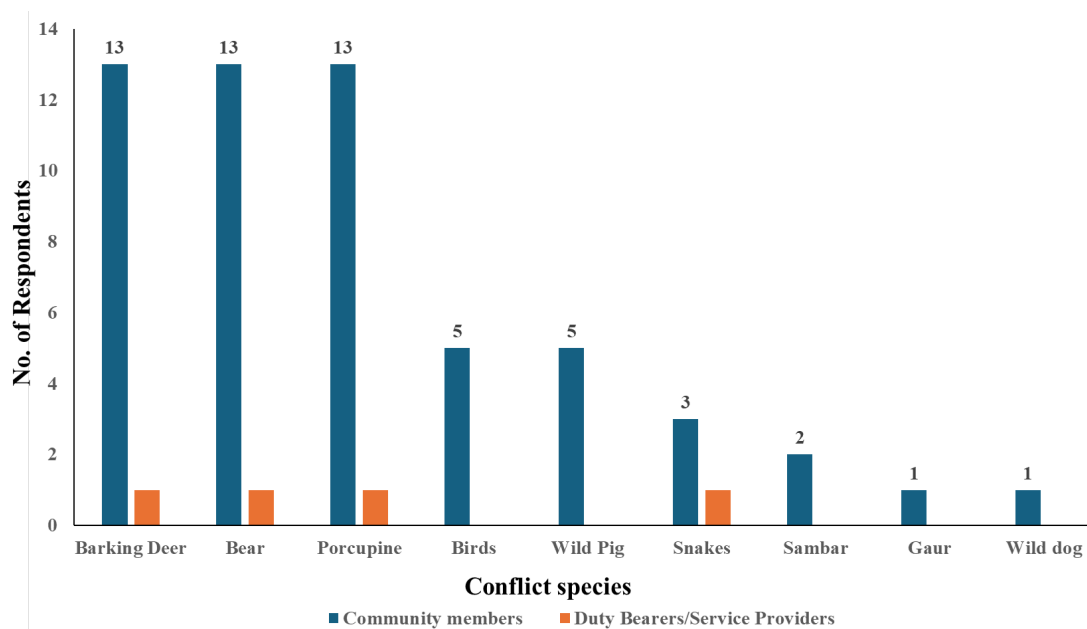


Figure 20: Conflict species recorded under Yaba-Shema chiwog

As shown in Figure 21, Livelihoods/assets received the lowest score among all outcomes in the Yaba-Shema chiwog as reported. This is primarily due to the remote location of the village under Sangbay Gewog. The absence of road connection has resulted in limited access to essential services, interventions, and educational programs, leaving the community underserved and vulnerable to human-wildlife conflict. Because of these challenges, the residents face difficulties in protecting their crops and livestock, which are their primary sources of livelihood. The lack of timely interventions and awareness programs further exacerbates their struggles, making it essential to provide targeted support to improve their livelihood resilience. Initiatives such as better road infrastructure, educational outreach, and tailored mitigation measures are crucial to sustaining their livelihoods and ensuring their well-being in the face of ongoing challenges.

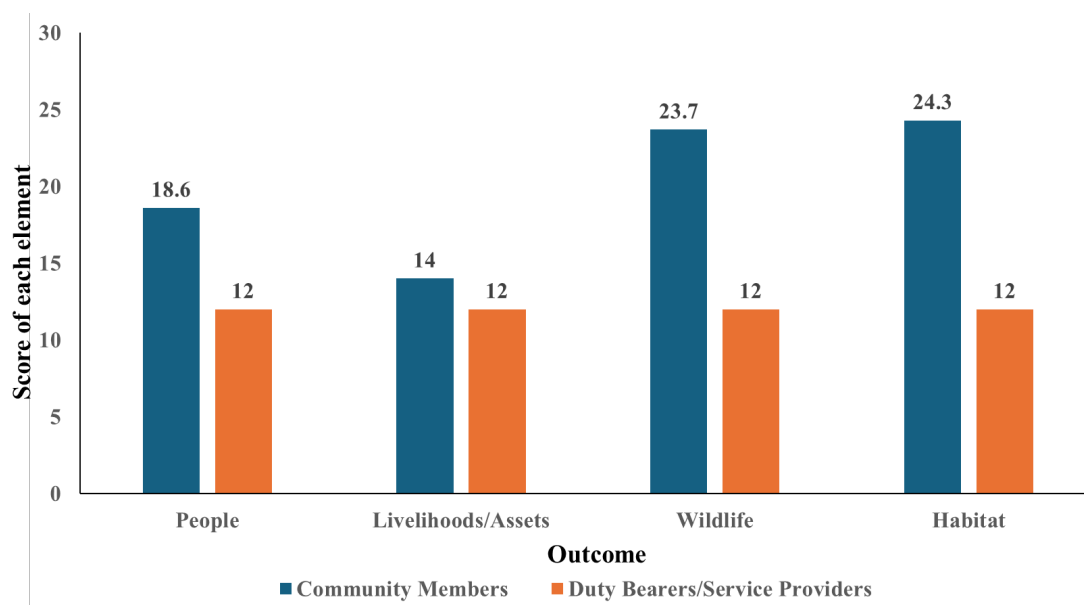


Figure 21: Lowest score for livelihoods/assets outcome for Yaba-Shema chiwog

The element mitigation has the lowest score for people, UI element under livelihoods/assets, prevention under wildlife outcome and mitigation under habitat outcome for Yaba-Shema chiwog (Figure 22).

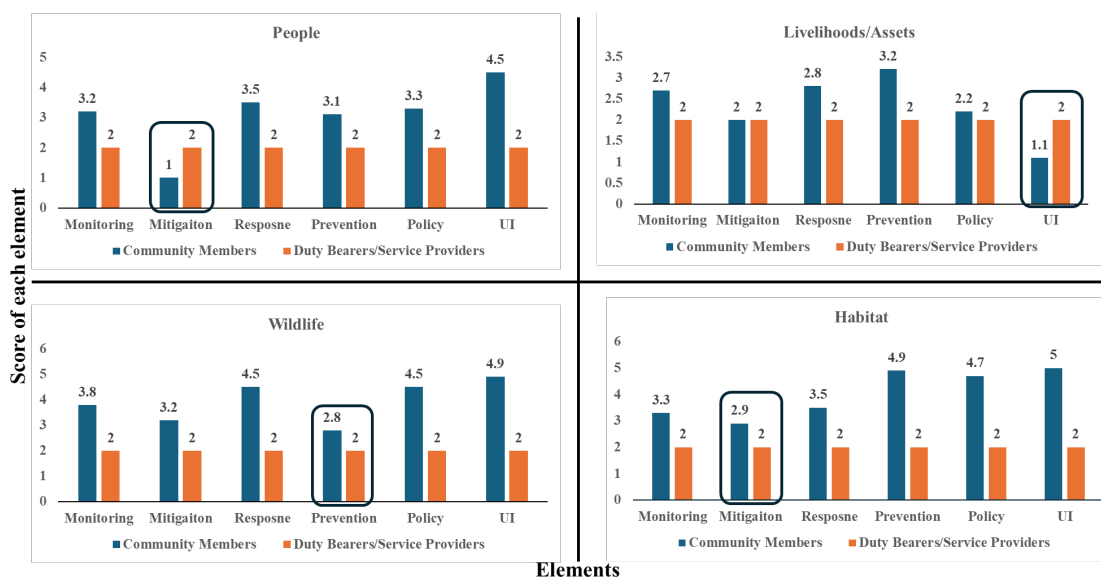


Figure 22: Elements with lowest score under Yaba-Shema chiwog

5. Conflict to Coexistence Strategy

The C2C Management Strategy for Sangbay Gewog aims to transform human-wildlife conflict into a model of coexistence by addressing root causes, enhancing community resilience, and promoting sustainable management practices. The strategy is based on insights gathered from HWC-focused group discussions, assessment results, and chiwog-level consultations during co-design workshop. The strategy prioritizes mitigating conflicts with the most problematic wildlife species identified by both community members and service providers, such as barking deer, bears, macaques, wild pigs, wild dogs, tigers, and leopards. Interventions will focus on protecting livelihoods/assets by strengthening crop protection, improving livestock management, and promoting alternative livelihood opportunities.

Community engagement is central to the strategy, empowering local communities to take a proactive role in managing wildlife interactions and fostering wildlife stewardship. Key measures include implementing effective mitigation and prevention strategies, such as physical barriers, compensation schemes, early warning systems, and sustainable agricultural and livestock practices to minimize wildlife impacts on livelihoods.

Policy integration will play a crucial role in creating and enforcing wildlife conservation frameworks and conflict resolution mechanisms. Regular monitoring and evaluation will ensure the tracking of wildlife populations and the effectiveness of implemented interventions. Additionally, habitat management efforts will focus on reducing human-wildlife encounters by maintaining viable ecosystems. Collaboration between communities, service providers, government agencies, and NGOs will be vital for achieving long-term success. This adaptive and integrated approach is designed to foster sustainable coexistence, ensuring a harmonious balance between wildlife conservation and community well-being.

The strategy is structured around two primary objectives, four core strategies and outcomes, and a total of 40 specific actions outlined in the implementation framework. Of these, 35 actions are designated for small-scale implementation, while five actions focus on large-scale implementation. Together, these efforts aim to create a resilient, balanced, and sustainable environment where both humans and wildlife can thrive.

The total budget outlay for the 5-year C2C Strategy (2026–2030) for Sangbay gewog is estimated at Nu. 30.05 million. Of this amount, Nu. 7.0 million has been secured from the WWF-IKI Project, Nu. 0.80 million from BFL, Nu. 12.15 million from Gewog Budget and 7.7 million from the Royal Government of Bhutan (RGoB). This leaves a funding gap of Nu. 2.4 million as shown in Table 5: Implementation Plan and Budget outlay. To ensure the successful implementation of the strategy and the achievement of its outcomes, it is

critical to bridge this funding deficit. Additional financial support must be sought from other donors, development partners, or through supplementary contributions from the RGoB.

By implementing above actions, the gewog can effectively mitigate human-wildlife conflicts, ensure the sustainability of both wildlife populations and local livelihoods, and foster a more harmonious coexistence between humans and wildlife.

Table 5: Implementation Plan and Financial Outlay

Outcome	Actions/Activities	Location	Category	Responsibility		Budget	Source of fund	Timeline
				Lead	Collaborator			
People- able and willing to live alongside wildlife	1.1: Initiate outreach programs to raise awareness and educate communities as part of stewardship in the gewogs about HWC and strategies for coexistence.	All chiwog	Short Term	JKSNR	NCD/Gewog	0.50	Potential Donors	2026-2031
	1.2: Provide safety field gear to forest rangers and the QRT/Citizen Scientist group.	All chiwog	Short Term	JKSNR	Gewog/QRT	0.50	Potential Donors	2026-2028
	1.3: Promote eco-tourism initiatives that generate income for communities from wildlife conservation, such as local guides, promote farmhouses, sustainable farming, and cultural experiences.	Sangbay Ama & Mochu	Short Term	JKSNR	NCD/Gewog	0.60	Explore Fund	2027-2029
	1.4: Coordination meeting with relevant stakeholders	Gewog	Short Term	JKSNR	Stakeholders	0.25	Potential Donors	2026-2031
	1.5: Conduct a survey to assess the benefits derived from the strategy's implementation plan.	All chiwog	Short Term	NCD	JKSNR/Gewog	0.20	Potential Donors	2031

Livelihoods/Assets-secured against the presence of wildlife	2.1: Implement crop protection strategies, such as wildlife-proof fencing, bio-fencing (using plants that deter wildlife), and scare devices to reduce crop damage from species like deer, wild pigs, and bears, as listed below:							
	2.1.1 Provide integrated chain-link fencing	All chiwog	Long Term	JKSNR	DoA	4.50	RGoB	2029-2031
	2.1.2 Provide solar or electric fencing with poly post and poly wire	Sangbay Ama & Shaba-Shebji & Yaba	Short Term	DoA	JKSNR	0.70	Potential Donors	2026-2029
	2.1.3 Install (Bio-acoustic) AMTC-designed timer-based animal repellents mechanism to deter wild animals at two pilot sites.	Sangbay Ama & Yaba-Shema	Short Term	JKSNR	DoA/ NCD	0.50	Potential Donors	2026-2028
	2.1.4. Introduce wildlife-resistant crop varieties (supply of seeds) that are less attractive to conflict-prone species.	All chiwog	Short Term	DoA	JKSNR/ Gewog	0.25	Gewog Budget	2027-2029
	2.1.5..Farm mechanization through the supply of machinery- Grinding Machine	All chiwog	Short Term	DoA	JKSNR/ Gewog	0.70	Gewog Budget	2027-2029
	2.1.6.Farm mechanization through the supply of machinery- Mini power tiller	Selected Farmers	Short Term	DoA	JKSNR	0.70	Gewog Budget	2027-2029
	2.1.7 Farm mechanization through the supply of machinery- Supply of Oil extraction machine	Yaba-Shema	Short Term	DoA	JKSNR/ Gewog	0.50	Gewog Budget	2026-2028
	2.1.8 Support agricultural land development	Nakha-Tashigang, Sangbay Ama	Short Term	DoA	JKSNR/ Gewog	5.00	Gewog Budget	2026-2028
	2.1.9 Support the irrigation channel	Nakha-Tashigang,Shaba-Shebji, Bebji	Short Term	DoA	JKSNR/ Gewog	5.00	Gewog Budget	2026-2028
	2.1.10.Facilitate the adoption of bio-based and climate-resilient pest and weed management practices to safeguard crops from pests and diseases.	All chiwog	Short Term	DoA	JKSNR/ Gewog	0.30	RGoB	2027-2029
	2.1.11.Adopt crop varieties that are less palatable to wildlife or incorporate wildlife-friendly practices in farming (e.g., organic farming, mushroom farming, agroforestry).	Selected farmers	Short Term	DoA	JKSNR/ Gewog	0.30	Potential Donors	2026-2030
	2.1.12.Exposure tour and skill development training for agriculture	All chiwog	Short Term	DoA	JKSNR/ Gewog	0.30	Explore Fund	2026-2028
	2.1.13.Support and supply of the water pipe and the water sprinkler	All chiwog	Short Term	DoA	JKSNR/ Gewog	0.50	RGoB	2026-2028

2.2: Support & promote the diversification of livestock farming systems as listed below:							
2.2.1 Supply improved cattle breed (Jersey) and supply of construction materials on a cost-sharing basis	Nakaha-Tashigang, Sangbay Ama	Short Term	DoL	JKSNR/Gewog	0.40	RGoB	2027-2029
2.2.2 Support improving and extending the existing livestock group	Sangbay Ama & Mohu-Bebji	Short Term	DoL	JKSNR/Gewog	0.50	Potential Donors	2027-2029
2.2.3 Supply pasture seeds and fodder for pasture development	All chiwog	Short Term	DoL	JKSNR/Gewog	0.50	Potential Donors	2027-2029
2.2.4 Support treatment, supply of medicine, and vaccination on time	All chiwog	Short Term	DoL	JKSNR/Gewog	0.50	RGoB	2026-2030
2.2.5 Exposure tour and skill development training for livestock farming	All chiwog	Short Term	DoL	JKSNR/Gewog	0.30	Explore Fund	2026-2028
2.3: Provide financial support for communities affected by wildlife damage, including insurance schemes and compensation programs to reduce economic losses from wildlife conflicts.	Shaba-Shebji	Long Term	DoL	JKSNR/Gewog/NCD	0.50	Explore Fund	2028-2031
2.4: Create community savings and credit groups to provide emergency funds and reduce vulnerability to wildlife-related economic shocks.	Nakha-Tashigang, Sangbay Ama	Long Term	DoL	JKSNR/Gewog	0.50	Explore Fund	2026-2029
2.5: Initiate awareness, educational, capacity development, and training programs to stakeholders and communities.	All chiwog	Short Term	DoL	JKSNR/Gewog	0.30	Potential Donors	2027-2030
2.6: Enhance and support agriculture and livestock marketing and farm outlets.	Sangbay Ama, Mochu-Bebji	Short Term	MoAL	JKSNR/Gewog	1.50	RGoB	2027-2029

Wildlife- thrives alongside people	3.1: Organize wildlife appreciation events such as festivals, wildlife events, exhibitions, and storytelling sessions that celebrate local biodiversity and its cultural significance in schools and in gewogs.	All chiwog	Short Term	JKSNR	NCD/ Gewog	0.20	Potential Donors	2026-2030
	3.2: Provide training and capacity building on coexistence strategies, wildlife conservation, and conflict mitigation techniques, including safe human-wildlife interaction practices.	All chiwog	Short Term	JKSNR	NCD	0.25	Potential Donors	2027-2031
	3.3: Develop eco-tourism initiatives like trekking, high-end fishing, and birding that generate revenue for communities from wildlife conservation.	Mochi-Bebji	Short Term	JKSNR	NCD/ Gewog	0.20	Explore Fund	2026-2029
	3.4: Conduct field studies and research on the most problematic species, like wild pig, wild dog, gaur, and bears, for population management.	All chiwog	Short Term	JKSNR	NCD	0.25	Potential Donors	2026-2029
	3.5: Rescue and translocate the problematic species, such as bear and gaur.	Shaba-Shebji, Nakha-Tashigang	Short Term	JKSNR	NCD/QRT	0.30	Potential Donors	2026-2030
	3.6: Collaborate with local schools and youth groups to integrate wildlife conservation into education, fostering a conservation ethic among younger generations.	Schools	Short Term	JKSNR	NCD/ Gewog	0.15	Potential Donors	2026-2028
	3.7: Strengthen and enhance SMART (Spatial Monitoring and Reporting Tool) patrolling.	All chiwog	Short Term	JKSNR	DoFPS	0.30	Potential Donors	2026-2031
	3.8: Conduct periodic biodiversity assessments to identify key species, critical habitats, and potential conflict hotspots.	All chiwog	Short Term	JKSNR	NCD	0.35	Potential Donors	2027-2031

Habitat- sufficient to ensure a sustainable wildlife population	4. 1: Implement bioengineering work such as check dams, erosion control structures, and initiate watershed management.	All chiwog	Long Term	JKSNR	DoA/ Gewog	0.35	Potential Donors	2028-2031
	4. 2: Restore degraded habitats by replanting native fruit trees, improving salt lick, and reintroducing natural water holes.	All chiwog	Short Term	JKSNR	NCD	0.70	Potential Donors	2026-2029
	4. 3: Provide training on herding techniques and safe grazing management systems.	All chiwog	Short Term	JKSNR	DoL	0.15	Potential Donors	2027-2029
	4. 4: Conduct regular habitat quality assessments using remote sensing, GIS, and field surveys.	All chiwog	Long Term	JKSNR	NCD	0.30	Potential Donors	2027-2029
	4. 5: Provide training and capacity-building programs on habitat restoration and sustainable resource management.	All chiwog	Short Term	JKSNR	NCD	0.25	Potential Donors	2026-2028
Total Nu. in million						30.05		

6. Monitoring and Evaluation

Monitoring and Evaluation plays a crucial role in tracking the progress of both short-term and long-term intervention actions for effective human-wildlife conflict management. Timely monitoring and evaluation of planned activities are critical to ensuring the effective delivery of intended outcomes. This section outlines the approach to monitoring and evaluating the implementation of the strategy actions. A comprehensive Monitoring and Evaluation (M&E) plan, detailed in Table 6: Monitoring & Evaluation Framework, was developed to align seamlessly with the Implementation Plan. The action will include specific indicators to measure the performance of the strategy, providing a clear basis for assessing progress. Output indicators will primarily track the achievements of the actions identified in Section 4, 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 5-year strategy, the JKSNR 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 midterm 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 JKSNR and external representatives, including members from functional divisions, DoFPS, ensuring a comprehensive and impartial assessment of the plan's implementation and outcomes.

Table 6: Monitoring and Evaluation Framework

Outcome	Actions/Activities	Action Indicator	Baseline	Unit	Yearly Target				
					I	II	III	IV	V
People- able and willing to live alongside wildlife	1.1: Initiate outreach programs to raise awareness and educate communities as part of stewardship in the gewogs about HWC and strategies for coexistence.	Number of awareness and educational programs conducted & prepared a report	3	Report	1	1	1	1	1
	1.2: Provide safety field gear to forest rangers and the QRT/ Citizen Scientist group.	Number of forest rangers and QRT/Citizen Scientist group members provided with safety field gear.	15	Nos.	5	5	5	0	0
	1.3: Promote eco-tourism initiatives that generate income for communities from wildlife conservation, such as local guides, promote farmhouses, sustainable farming, and cultural experiences.	The number of eco-tourism initiatives and the community income generated from wildlife conservation activities.	1	Nos.	0	1	1	1	0
	1.4: Coordination meeting with relevant stakeholders	Number of coordination meetings held with relevant stakeholders and record minutes/report.	3	Times	1	1	1	1	1
	1.5: Conduct a survey to assess the benefits derived from the strategy's implementation plan.	Survey conducted and determine the percentage of respondents reporting positive benefits from the strategy's implementation, and prepare a report.	0	Report	0	0	0	0	1

Livelihoods/ Assets- secured against the presence of wildlife	2.1: Implement crop protection strategies, such as wildlife-proof fencing, bio-fencing (using plants that deter wildlife), and scare devices to reduce crop damage from species like deer, wild pigs, and bears, as listed below:								
	2.1.1Provide integrated chain-link fencing	Length of integrated chain-link fencing installed and the reduction in wildlife conflicts in fenced areas.	3	KM	0	0	4	4	4
	2.1.2 Provide solar or electric fencing with poly post and poly wire	Number of solar or electric fences with poly posts and poly wire installed and HHs benefited.	10	HHs	10	10	10	0	0
	2.1.3 Install (Bio-acoustic) AMTC-designed timer-based animal repellents mechanism to deter wild animals at two pilot sites.	Number of (Bio-acoustic) deterrent systems installed at pilot sites.	0	Nos.	1	1	0	0	0
	2.1.4 Introduce wildlife-resistant crop varieties (supply of seeds) that are less attractive to conflict-prone species.	Number of wildlife-resistant crop varieties introduced & supplied.	251	Pkts	0	251	251	251	0
	2.1.5 Farm mechanization through the supply of machinery- Grinding Machine	Number of Grinding Machines supplied and the increase in efficiency.	0	Nos.	0	2	2	1	0
	2.1.6 Farm mechanization through the supply of machinery- Mini power tiller	Number of Mini power tillers supplied and the increase in efficiency.	0	Nos.	0	1	1	1	0
	2.1.7 Farm mechanization through the supply of machinery- Supply of Oil extraction machine	The number of Oil extraction machines supplied and the increase in efficiency.	0	Nos.	1	1	0	0	0
	2.1.8 Support agricultural land development	Area of agricultural land developed	5	Acres	5	5	5	0	0
	2.1.9 Support the irrigation channel	The number of irrigation systems established has increased water access for agriculture.	3	KM	5	5	5	0	0
	2.1.10 Facilitate the adoption of bio-based and climate-resilient pest and weed management practices to safeguard crops from pests and diseases.	Household initiated for bio-pest and disease-management.	150	HHs	0	50	50	50	0
	2.1.11 Adopt crop varieties that are less palatable to wildlife or incorporate wildlife-friendly practices in farming (e.g., organic farming, mushroom farming, agroforestry).	Household-initiated organic farming or agroforestry.	50	HHs	5	5	5	5	5
	2.1.12 Exposure tour and skill development training for agriculture	Household attended exposure tours and skill development trainings conducted	50	HHs	20	20	20	0	0
	2.1.13 Support and supply of the water pipe and water sprinkler	Number of water pipes and sprinklers supplied for agricultural and gardening.	20	Nos.	20	20	20	0	0

Livelihoods/ Assets- secured against the presence of wildlife	2.2: Support & promote the diversification of livestock farming systems as listed below:								
	2.2.1 Supply improved cattle breed (Jersey) and supply of construction materials on a cost-sharing basis	Number of improved cattle breeds (Jersey) supplied.	5	Nos.	0	2	2	2	0
	2.2.2 Support improving and extending the existing livestock group	The number of livestock farming group enhanced	1	Group	0	1	1	1	0
	2.2.3 Supply pasture seeds and fodder for pasture development	Quantity of pasture seeds and fodder supplied for availability for livestock.	150	Kg	0	100	100	100	0
	2.2.4 Support treatment, supply of medicine, and vaccination on time	The quantity of medicine supplied and vaccination on time was done.	100	HHs	50	50	50	50	50
	2.2.5 Exposure tour and skill development training for livestock farming	Household attended exposure tours/skill development training conducted for livestock farming.	50	Nos.	30	30	30	0	0
	2.3: Provide financial support for communities affected by wildlife damage, including insurance schemes and compensation programs to reduce economic losses from wildlife conflicts.	Number of HHs established an insurance/compensation scheme group as a pilot.	0	HHs	10	10	10	10	10
	2.4: Create community savings and credit groups to provide emergency funds and reduce vulnerability to wildlife-related economic shocks.	Number of community savings and credit groups established as a pilot.	0	Group	1	1	1	1	1
	2.5: Initiate awareness, educational, capacity development, and training programs to stakeholders and communities.	Number of awareness, educational, and training programs conducted.	150	HHs	0	50	50	50	50
	2.6: Enhance and support agriculture and livestock marketing and farm outlets.	Number of agricultural and livestock marketing outlets established	1	Nos.	0	1	1	0	0

Wildlife- thrives alongside people	3.1: Organize wildlife appreciation events such as festivals, wildlife events, exhibitions, and storytelling sessions that celebrate local biodiversity and its cultural significance in schools and in gewogs.	Number of wildlife conservation events organized in the school & community.	0	Events	1	1	1	1	1
	3.2: Provide training and capacity building on coexistence strategies, wildlife conservation, and conflict mitigation techniques, including safe human-wildlife interaction practices.	Number of trainings conducted for conflict mitigation techniques.	50	Nos.	0	40	40	40	40
	3.3: Develop eco-tourism initiatives like trekking, high-end fishing, and birding that generate revenue for communities from wildlife conservation.	Number of eco-tourism programs developed.	0	Nos.	1	1	0	0	0
	3.4: Conduct field studies and research on the most problematic species, like wild pig, wild dog, gaur, and bears, for population management.	Number of monitoring conducted & prepared action plan/report.	0	Report	1	1	1	1	0
	3.5: Rescue and translocate the problematic species, such as bear and gaur.	Rescue case attended and action taken in a timely manner	4	Report	1	1	1	1	1
	3.6: Collaborate with local schools and youth groups to integrate wildlife conservation into education, fostering a conservation ethic among younger generations.	Number of events with schools and youth groups for wildlife conservation education organized.	0	Event	1	1	1	0	0
	3.7: Strengthen and enhance SMART (Spatial Monitoring and Reporting Tool) patrolling.	Number of SMART patrols conducted for wildlife monitoring coverage & incident reporting.	4	Quarterly	4	4	4	4	4
	3.8: Conduct periodic biodiversity assessments to identify key species, critical habitats, and potential conflict hotspots.	Number of biodiversity assessments conducted and the identification of key species, critical habitats, and conflict hotspots completed.	1	Report	1	1	1	1	1

Habitat-sufficient to ensure a sustainable wildlife population	4.1: Implement bioengineering work, such as check dams, erosion control structures, and initiate watershed management.	Report prepared for the area brought under conservation measures through bio-engineering work.	0	Report	0	0	1	1	1
	4.2: Restore degraded habitats by replanting native fruit trees, improving salt lick, and reintroducing natural water holes.	Report prepared for the area of degraded habitat restored, the number of native fruit trees planted, and the improvement in the availability of salt licks and natural water holes.	11	Report	1	1	1	1	0
	4.3: Provide training on herding techniques and safe grazing management systems.	Trainings conducted on herding techniques and safe grazing management, and participants adopted improved practices.	0	Report	0	1	1	1	0
	4.4: Conduct regular habitat quality assessments using remote sensing, GIS, and field surveys.	Habitat quality assessments were conducted through available technology and produced a report.	0	Report	0	1	1	1	0
	4.5: Provide training and capacity-building programs on habitat restoration and sustainable resource management.	Training and capacity-building programs were conducted on habitat restoration and sustainable resource management practices.	1	Report	1	1	1	0	0

7. Conclusion

The Conflict to Coexistence (C2C) strategy for Sangbay gewog offers a holistic and community-centered approach for addressing human-wildlife conflict (HWC) over the next five years. Built upon extensive consultations with communities and key stakeholders in the gewog, participatory assessments, and co-design workshops, the strategy provides targeted interventions across four key outcomes; People, Livelihoods/Assets, Wildlife, and Habitat, and integrates six critical elements; Policy, Prevention, Response, Understanding the Conflict, Mitigation, and Monitoring.

This strategy focuses on ensuring sufficient habitats for wildlife, safeguarding community livelihoods/assets, and enhancing coexistence through capacity-building and stewardship programs. It promotes a balanced approach where conservation goals are aligned with sustainable development priorities, fostering a harmonious coexistence between people and wildlife.

The successful implementation of the strategy will require robust financial support and will depend on the active participation of the Sangbay community, collaboration among government agencies, conservation partners, and other stakeholders, and the adoption of adaptive management practices supported by robust monitoring systems. Confirmed funding includes contributions from the WWF-ICI Project, the Royal Government of Bhutan (RGoB), and other partners, amounting to Nu. 30.05 million, with an additional funding gap of Nu. 2.40 million. Bridging this gap through supplementary contributions from donors and agencies will be crucial for achieving the strategy's outcomes.

By embracing this strategy, Sangbay gewog will not only enhance ecological resilience but also secure community livelihoods and foster long-term coexistence between humans and wildlife. Through shared commitment, innovative solutions, financial investment and continuous collaboration, Sangbay Gewog can become a model for sustainable human-wildlife interactions, ensuring a harmonious thriving future for both people and wildlife.

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Annexure I: C2C Project Assessment Report of Sangbay Gewog

Age:

Age	Frequency
15-18	1
19-40	44
41-60	69
over 60	41

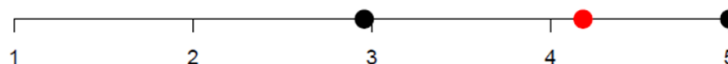
Gender:

Gender	Frequency
Female	60
Male	95

Education:

Education	Frequency
Non-formal education	8
None	106
Other	11
Primary school	16
Secondary school	12
Tertiary (college/technical)	2

The average tolerance score for community members across all questions is 4.18. The standard deviation above and below this mean is 2.96 - 5.



What is your livelihood (main source of income)?

Livelihood	Frequency
Business/trade	10
Day/Casual labourer	12
Farming - Agriculture	152
Farming - Livestock	127
Other	5
Paid employment	1
Transport provider	4

Annexure II: Summary of Respondents of Service Provider

Age:

Age	Frequency
19-40	18
41-60	10

Gender:

Gender	Frequency
Female	8
Male	20

Industry/Profession:

Industry/Profession	Frequency
Area businesses	1
District/local government agencies	10
Farming - Agriculture	2
Local leadership	2
National/central government agencies	2
Non-governmental organisations (NGOs; regional, national, or international private initiatives)	1
Other	4
Other private business/company	1
Provincial/state government agencies	5

Do you live in the community?

Live in Community	Frequency
Yes	28

How many days a month do you spend working in the landscape?

Days Working	Frequency
7-14 days	1
more than 22 days	27

Do you belong to the local community?

Local Community	Frequency
	28

