

Human-Wildlife Conflict & Sanctuary Governance

In Kakraha Range- Katarniaghat Wildlife Sanctuary



Submitted to

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Abbreviations

BDO- Block Development Office

CHC- Community Health Centre

DFO- Divisional Forest Officer

FD- Forest Department

GO- Government Order

HWC- Human Wildlife Conflict

IEC- Information, Education and Communication

KWS- KatarniaGhar Wildlife Sanctuary

MGNREGA- Mahatma Gandhi National Rural Employment Guarantee Act

ODF- Open Defecation Free

PMAY-G- Pradhan Mantri Awas Yojana-Grameen

PHC- Primary Health Centre

SBM-G- Swach Bharat Mission-Grameen

SDMA- State Disaster Management Act

SDRF- State Disaster Response Fund

Introduction

Human-Wildlife Conflict can be described as a consequence of adverse action by people or the animal affecting each other. They are characterised by the nature of attacks and the form of dependence on forest resources. The dispute is not always pertaining to access to forest resources but also safety and risks perceived by people and the animals (or the department that protects them). The wildlife in question may or may not be of conservationist's interest. The most prominent sites of HWC are often those involving species under the IUCN red list. However, more monetary damage is done by animals like monkeys and abandoned cattle which often fall out of the scope of forest institutions.

The discussion on HWC extends beyond the narrow inquiries of conservationists to the political ecology of wildlife. HWC has negative social, economic, and ecological impacts, which are important for sustainable development. The nature of dependence on forest resources differs widely across all protected areas. Community coping strategies and cultural understanding of certain species of animals play a crucial role

in shaping the attitude of communities towards the forest they live in close proximity to and the forest department.

The complexity of HWCs can be analysed through the surrounding competing objectives. One of the primary objectives in the existing literature emphasizes the *conservation efforts* required for protecting endangered species, thereby supporting conservation legislation. The *impact of HWC on people's livelihood*, such as farming, is also highlighted. Farmers' workloads are increased due to wildlife damage to infrastructure and agriculture. Men are often forced to leave their villages in search of employment to make up for lost income, and women take on the physically arduous task of salvaging damaged crops. The concept of *animal welfare* emphasizing the ethical and moral duty to animals in conflict is frequently discussed. In contrast to this approach, we find *economic models* emphasizing recreation through tourism and, in extreme cases, trophy hunting of animals. Another essential objective pertains to the *development vs. conservation debate* and focuses on the impact of infrastructural

activities on the conservation of species, especially in protected areas.

While all HWCs are complicated, Zimmerman et al. (2020) codify the Human-Wildlife Conflict into *three levels* based on how deeply they have impacted the perception of the affected communities towards the forest, wildlife and associated institutions. At *level one*, there are simple considerations of safety for life and property. These are visible and well documented as they mainly involve damage by spectacular species of cultural or conservative significance. Human-elephant conflict is an example. The communities at this level are hopeful of institutions and more accommodating to changes required to conserve forest and wildlife. At the *second level* are the implications, which are a result of prolonged and unaddressed symptoms of conflict due to unfit policy measures. These include suspicion towards institutions and hostility towards wildlife in certain instances resulting from a history of disappointments which creates a feeling of “them versus us” in the community towards the forest and its institutions. If the conflict reaches the *third level*, these hostilities and suspicion become

even more severe. The accounts of people would reflect the entrenchment of animosity between people and the institutions. They feel the validity of their identities is deliberately disregarded and that the forest department exists only to increase their transaction costs in sustaining themselves.

Adaptive and inclusive institutions prevent the marginalisation of vulnerable groups from the decision-making process. HWCs are unavoidable, but the policy goal is to prevent escalations of conflict and transform it into cooperation.

Organisation of sections. The report comprises six sections. The first section describes the study area and spatial factors involved in the study. The second section lays down the methodology employed in data collection and analysis. The third section maps the socio-economic context which has bearing on HWCs of the study area. The fourth section looks at the causes of human- wildlife conflict and aspects that impact the affected communities. The fifth section deals with sanctuary governance. Finally the report recommends strategies and action to effectively mitigate HWCs before concluding itself.

Study Area

Located in the Terai forest and grasslands of Uttar Pradesh, the KatarniaGhat Wildlife Sanctuary (KWS) is situated in the Nanpara tehsil of Baharaich district. Bahraich is also an aspirational district as declared by Niti Aayog. KWS extends over an area of 400.09 sq. km, situated between 28°06' N and 28°24' N latitude and 81°02' E and 81°19' E longitudes. Along with another area of reserved forests, the total KWS area in the division is 551 sq. km. This arc shape region is surrounded by the Indo-Nepal border in the north, thereby having connectivity with the Royal Bardia National Park, Nepal, and Dudhwa National Park in the west. Owing to its close proximity to the Indo-Nepal border, there's a highly fluid and recurrent movement across borders between the two regions for both economic reasons like trade, labor, etc., and social reasons like marriages, etc.

The area was declared a Wildlife Sanctuary via the Government of Uttar Pradesh, notification no. 388/14-3-32/1976 dated 31st May 1976. Rich in the fertile alluvial soil of Gangetic plains with rivers like Gerua, Kauriyala, Ghagra, and Saryu, the Terai Arc Landscape is rich in biodiversity and extremely favorable for

agriculture. The sanctuary provides a habitat for tropical deciduous forests, along with around more than a hundred villages located at the periphery of the sanctuary. For the people, a major livelihood challenge is posed by annual flooding during the monsoon months.

The KWS division is further bifurcated into buffer and core areas divided into six ranges. Starting with the Motipur Range, followed by Kakraha Range, Murtiha Range, Dharampur Range, Nishangara Range, and the last and deepest range, the Katarniaghat Range.

Our fieldwork was based on four villages - Gangapur, Gurh, Hansuliya, and Naubna, which fall under the Kakraha Range. The range is spread over an area of 72.1922 sq. km and consists of 8 beats. The present Range Officer is assisted by 5 forest guards, 3 foresters, and two 2 chowkidars. Incidents of human-leopard conflicts are the most common in this range, followed by crop depredation incidents by elephants. Since economic activities are not completely restricted in the buffer zone, the villages differ greatly from each other in terms of economic status and education levels. The

villages have a significant SC, OBC, and Muslim population. Therefore, the question of mitigating Human-wildlife

conflict is intersected by socio-economic considerations beyond the spatial and temporal ones.

Methodology

Aim: To explore the socio-economic factors and institutional framework involved in HWC and Sanctuary Governance in the Kakraha range of the Katarniaghat wildlife sanctuary

Research Questions and Objectives:

Following research questions with the objectives are mentioned below:

RQ 1: What are the socio-economic implications of HWC in conflict-prone villages?

- To explore the relationship between HWC and livelihoods. (What are the monetary and non-monetary costs of HWC)
- To study the impact of HWC on victims and their families, i.e., victims of crop depredation, livestock loss, economic loss, and human life loss.

To explore the role of different stakeholders in mitigating HWC - the IEC strategies, the role of NGOs, SHGs, volunteers, etc.,

RQ 2: What are the challenges to the implementation of Sanctuary Governance in vulnerable villages?

- To explore the perspective of the formal institution (the Forest Department) on HWC - the legal procedures used, its implementation and challenges faced.
- To explore the perspectives of people on environmental governance.

Sampling:

Four Villages namely- Hansuliya, Gangapur, Gurh, and Naubana in Kakraha Range were selected to explore the research questions and objectives. The villages were selected from a list of Vulnerable Villages as identified and compiled by the Forest Department. The department recognises those villages as vulnerable where the possibility of interaction between wildlife and humans is high.

The chosen method of sampling for the study was *purposive sampling* with an aim to delve deeper into the existence and

impacts of HWC incidents in the region. The above-mentioned four villages, which lie in the buffer areas around the Kakraha range, were chosen as the sample for the present study because they are well-inhabited by people as well as act as the roaming and foraging grounds for leopards and other wild animals, thereby making it an appropriate region to study. Since the tiger population has shown improvement through the last decade, the leopards have been pushed to the fringes to buffer areas like those in the Kakraha range; the four villages mentioned above are suitable for the present analysis.

Method of Data Collection:

The Mixed Method Approach was used in the present study. Since it uses both qualitative and quantitative methods, it raises the validity of the results. The combination of two methods makes the findings detailed and comprehensive, which the present study required as socio-economic factors were studied in conjunction with institutional frameworks with a focus on HWC.

For the qualitative part of the study, the instances of HWC were explored via a primary field survey by developing a semi-structured interview schedule. In-person interviews (n = 9) were conducted

with the victims and their families. Focus group discussions (n = 8) were also conducted with the villagers, pradhans, sachivs, and women SHGs to gain an in-depth understanding and strategies for mitigation of HWC. The number of participants per focus group ranged from 3 to 7. Additionally, representatives of the forest department, the DFO, and the Range officer of Kakraha Range were interviewed. A focus group discussion prior to data collection was conducted in Gujrana (n=20) as a means for pilot testing the interview schedule on its coherence and suitability prior to the field visits to the decided four villages. This helped in the further adaptation of the questionnaire according to the research questions and objectives, thereby enhancing its reliability and validity.

Further, for the quantitative aspect of the study, data about different government schemes and socio-economic conditions and HWC were collected from forest officials, BDO office and Government websites (MGNREGA website, NFSA website and e-Gramswaraj website).

Method of Data Analysis:

The present study utilized *'The Coding Manual for Qualitative Researchers'* (Saldana, 2016) to build a thematic analysis

of the interviews conducted. For this purpose, each interview's field notes were transcribed along with verbatims. The transcription of field notes and interview recordings were coded into descriptive codes, which were amalgamated to form analytical codes and themes.

To analyse the quantitative data, descriptive statistics like averages, ratios, etc., were used. These were used to summarize and arrange the sample data to make it lucid. Graphic analysis was also used to enhance the presentability of data and provide important insights.

Limitations:

The present study has a few limitations too. The limitations are as follows:

- The study covers the four conflict-prone villages of the Kakraha Range. Thus, the findings are applicable to only the Kakraha Range of KWS and not to the whole of KWS. They may, however, find application in other buffer zones of KWS but cannot be generalized to the entire KWS region.
- The present study does not cover all of the victims of HWC because of mobility and time issues associated with interviewing victims of HWC.

The contact details of the victims were not readily available, due to which a meeting with 9 victims could only be scheduled. Thus, the size and scope of the study are limited.

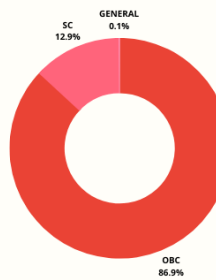
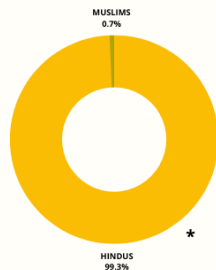
- The interviews were conducted over a period of two days for each of the villages covered in this study, owing to time and other logistical constraints. Thus, a prolonged engagement with each case victim of HWC incidents was not possible.
- Due to the qualitative nature of the study, the existence of several biases on part of respondents, like social desirability bias, acquiescence, etc., cannot be neglected. To address this, the research team practiced inter-researcher reliability. Yet, the results need to be interpreted with caution.
- Since the present study utilizes qualitative methods significantly, the possibility of the researcher's bias cannot be completely ignored. Still, researchers involved in this study have attempted to maintain reflexivity throughout the research process.

Village Demographics

GANGAPUR

HOUSEHOLDS: 805

TOTAL POPULATION 5573
 MALE POPULATION 2876
 FEMALE POPULATION 2697



6 HOURS
ELECTRICITY LOAD SHEDDING

2280 CYLINDERS
UJJAWALA GAS CYLINDER

39 PANELS
SOLAR PANEL

586 TOILETS
SWACHH BHARAT TOILETS

280 HOUSES
AWAS HOUSES

1728 WORKERS
MGNREGA WORKERS

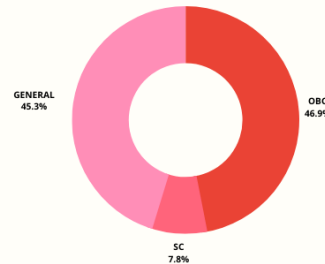
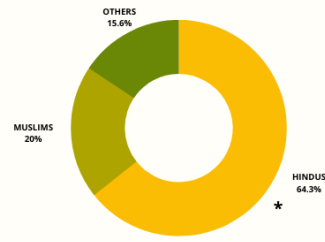
14% HOUSEHOLDS **
FOUR WHEELER

64% HOUSEHOLDS **
TWO WHEELER

GURH

HOUSEHOLDS: 866

TOTAL POPULATION 4631
 MALE POPULATION 2427
 FEMALE POPULATION 2204



7 HOURS
ELECTRICITY LOAD SHEDDING

602 CYLINDERS
UJJAWALA GAS CYLINDER

13 PANELS
SOLAR PANEL

1099 TOILETS
SWACHH BHARAT TOILETS

215 HOUSES
AWAS HOUSES

1617 WORKERS
MGNREGA WORKERS

1% HOUSEHOLDS **
FOUR WHEELER

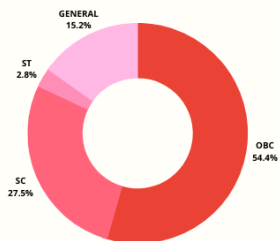
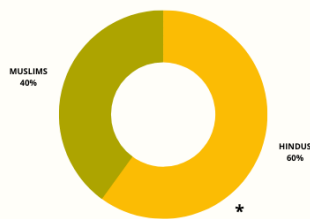
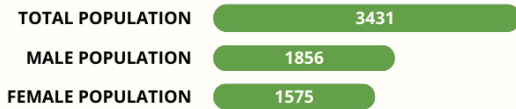
15% HOUSEHOLDS **
TWO WHEELER

*, ** Based on information from Pradhan, Panchayat Sachiv and Locals

Village Demographics

HANSULIYA

HOUSEHOLDS: 621



13.5 HOURS



418 CYLINDERS



37 PANELS



874 TOILETS



128 HOUSES



1614 WORKERS



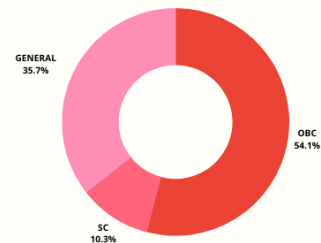
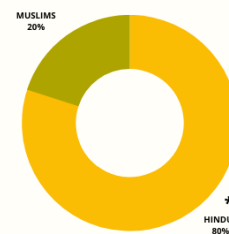
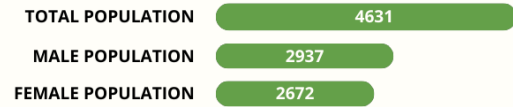
0.5% HOUSEHOLDS **



10% HOUSEHOLDS **

NAUBNA

HOUSEHOLDS: 876



11.5 HOURS



520 CYLINDERS



27 PANELS



738 TOILETS



357 HOUSES



2887 WORKERS



2% HOUSEHOLDS **



18% HOUSEHOLDS **

*, ** Based on information from Pradhan, Panchayat Sachiv and Locals

Findings and Analysis

Socio-economic Outlook to HWC

The four villages studied have their own peculiar characteristics along with certain common elements. Across all the four villages, Hinduism is the dominant religion, with OBC as the prominent caste within it, followed by Islam. With a population falling within the range of 3500-5500, much disparity is visible in access to Ujjwala Cylinders, Awas Houses, Swachh Bharat Toilets, and MGNREGA work, along with capabilities to own private vehicles. The villages also experience an average load-shedding of 8 hours. However, phone networks along with 4G internet facilities are available in all the villages enabling quick communication whenever required. The livelihood opportunities are also limited to a few options, namely farming, livestock rearing, unskilled labour, and skilled work. While the villagers do not involve in forest-based livelihood activities, yet their dependence on it was observed. Health and Education also have varied transaction costs associated with them. These aspects have a direct bearing on mitigating and managing HWC in the area and are studied further in the report.

Farming. Subsistence and commercial farming were most prevalent in the region, employing a significant chunk of the population in the villages under study. While landed farmers were less in proportion, a vast majority of landless households also depended on agriculture, working as agricultural labourers. Owing to its fertile and water-rich environment, the major crops cultivated are wheat, rice, and sugarcane, along with crops like peppermint, maize, and other vegetables. Availability of sources of irrigation and accessible markets also impacted the crop varieties grown in the region. For example, the availability of a large-scale daily wholesale vegetable market (mandi) in Gangapur allowed the farmers to grow a significantly wide variety of crops and vegetables, bringing in better economic opportunities, developed institutional arrangements, and lower transaction costs. However, the proximity of farmlands to the forest poses a constant threat of crop depredation by wild animals, thereby causing enormous losses to the farmers. The impacts of crop depredation as a type of HWC are discussed in the subsequent sections below.

Livestock. Rearing livestock is another important economic activity, often acting as an allied source of income for the farmers in the region. Animals such as cows, buffaloes, pigs, goats, ducks, hens, and mules are chiefly reared by the locals. Caste and religion were significant factors impacting the type of livestock reared in the present study. For instance, goats were commonly reared by Muslim households. Likewise, Hindu households commonly reared cows with dominant OBC castes. Additionally, the present study also observed the role of land ownership in livestock grazing. Those who own land graze their cattle on both their private farmlands and pastures, i.e., resorting to open grazing. On the other hand, the landless, in addition to the pastures in the open, go to forests to graze their livestock, making them and their livestock susceptible to interactions with wild animals. Thus, livestock grazing becomes both a cause and effect of HWC incidents. Livestock loss as a type of HWC and its impacts are discussed in the subsequent sections.

Daily-Wage Labour & Migration. Daily wage labour is another source of income for many locals, often working as agricultural labourers, construction, and industrial labourers in or around nearby

villages and cities and engaging in unskilled and semi-skilled labour. A significant portion of labour work is generated via MGNREGA across the four villages. Most work done under it includes the construction of roads, ponds, gaushalas, schools, and toilets, cleaning of drains, sewers, etc., and payments of wages being dispensed directly into the bank accounts of workers. The present study showed that Naubna has the highest number of people (51%) enrolled in the scheme, followed by Hansuliya (48%), Gurh (35%), and Gangapur (31%). In terms of accessibility of the scheme among men and women, data tends to favor men more than women across all four villages. The gap between men and women card holders was particularly stark in Hansuliya, with 257 more men having cards than women. Moreover, women MGNREGA workers in Gangapur reported instances of discrimination in getting paid work despite being card holders. There also appears to be a reluctance to do MGNREGA work among upper caste villagers, especially in Gurh. Instead of taking up manual-construction work, often associated with low caste communities, the upper caste people were willing to take supervisory roles. Several women respondents also expressed a lack of support from husbands in working.

Likewise, low minimum wages of approximately Rs. 213 were seen as inadequate to meet the rising inflation, thereby pushing people to migrate to other cities like Delhi, Mumbai, Chandigarh, Lucknow, etc., for work and take up other alternative daily-labor work paying higher than the wage offered under MGNREGA. Thus, seasonal and perennial migration of locals for employment was commonly observed across all four villages in the present study.

Skilled Labour. The prevalence of skilled labour, particularly those engaged in government jobs, army, engineering, medicine, etc., was scant. Among the four villages, Gangapur had the highest number of people involved in government jobs (21), followed by Gurh (3), Hansuliya (2), and Naubna (1). No local from Gurh, Hansuliya, and Naubna has taken up professional jobs like engineers and doctors. Gangapur remains the only exception in this scenario, with one engineer-doctor each, which is a very low number.

Forest Dependence. Despite living in close vicinity to the forests, locals do not engage in forest-based livelihoods for economic purposes. Yet, their dependence on forests for daily survival remains

unparalleled. Apart from grazing livestock, as discussed above, a chief reason for forest dependence among locals has been fuelwood (also known as “jaloni”) collection. Despite legal sanctions, the Forest Department, often out of benevolence, allows for fuelwood collection like fallen branches and twigs that are subsequently used for cooking, making kachcha homes and sheds/shelters. Further, a caste, class, and gender dimension of fuelwood collection was also observed. Thus, while the landed and upper caste have private trees on their farms for ‘jaloni,’ the landless and lower caste, often women and adolescent girls, have to visit the forest for the same frequently. A chief reason for fuelwood collection remains cooking, as a significant chunk of the population does not use LPG cylinders. Despite the prevalence of PM Ujjwala Yojana in all the four villages of the study, with the provision of at least the first cylinder, the high price of re-filling the cylinder coupled with the low purchasing power of the locals owing to their poor socioeconomic conditions inhibits the reach and access of the scheme.

Thus, the scheme falls short of fulfilling the main agenda of safeguarding the health of women by shifting to cleaner fuels and instead poses a trade-off between

cleaner and healthier fuels and traditional cooking fuels (jaloni). Yet, seasonal shifts to LPG Cylinders were observed, especially during summers, whereas fuelwood was more prevalent in winter. The reliance on fuelwood in the absence of economically sustainable alternate mechanisms in the form of subsidized refilling puts the villagers at risk of human-wildlife interactions and subject to forest offences under the UP Illegal felling of trees Act.

Housing. Access to affordable pucca housing has been another critical factor in determining human-wildlife interactions. Pucca houses provide a sense of safety against HWC. Public housing schemes like PM Awas Yojana-Grameen (PMAY-G) have been monumental in this regard. In the present study, a significant presence of PAMY-G was observed across all four villages. Naubna had the highest number of beneficiaries (357), followed by Gangapur (280), Gurh (215), and Hansuliya, with the lowest at 128. While there were plenty of kutchha houses in each village, most pucca houses in the village were made out of monetary assistance of 1.2 lakhs from the scheme. Nonetheless, most villagers expressed dissatisfaction over the inadequacy of the funds allocated under the scheme, often forcing people to spend extra

from their own pockets to get a house constructed. In most cases, the villagers also questioned the quality of houses as lacking basic amenities like a roof, proper walls, rooms, toilets, etc.

Like all other schemes, villagers across all four villages of the study alleged pradhan favoritism as a critical emerging factor impeding access to the scheme to several villagers having caste and religious connotations. Given the importance of proper housing in a conflict-prone area like Katarniaghat, having access to pucca housing becomes essential for reducing human-wildlife conflict. Hence, the expansion of housing schemes like PMAY-G becomes crucial.

*As per the data from the Block Development Office (2022), PM Ujjwala has reached **less than 50%** of the female population in any of the four villages, the primary beneficiaries of the initiative.*

Health and Education. Health and education are extremely essential services having bearing on the social and economic welfare of the people. In all the four villages under study, i.e., Gangapur, Gurh, Hansuliya, and Naubna, there are high transaction costs in accessing these services and are met primarily by public institutions.

Status of Health Facilities in HWC. In case of an instance of HWC involving human injury, the victims are rushed to Mihinpurwa CHC. In most of the cases probed, the victims were taken to the hospital in a private vehicle. As per testimonies of Pradhans, most people own bicycles or motorcycles. Four-wheelers are rare as they are only owned by the well-off. Unlike Gurh and Gangapur, which are well connected to main roads and the highway, inaccessibility is aggravated in absence of connectivity through metalled roads in the case of

Naubna and Hansuliya. Further, due to the flood-prone nature of the terai region, infrastructural development is hindered in many villages. As can be seen from Table 1, the distance travelled to reach the nearest hospital increases to as high as 25 km for Naubna, followed by Gangapur (16 km), Gurh (13 km), and Hansuliya (5 km). Further, only one private hospital is located in the area, which is in Mihinpurwa, which is quite distant from each of the villages in the present study.

Table 1: Distance from Nearest Health Centre

	GANGAPUR	GURH	HANSULIYA	NAUBNA
Distance from nearest CHC/PHC	16 km	13 km	5 km	3 km
Distance from nearest Hospital	16 km	13 km	5 km	25 km

Min  Max

Source: Sachiv and Pradhan of respective villages; Block Office Mihinpurwa (2022)

Table 2: Details of Nearest School

	Gangapur	Gurh	Naubna	Hansuliya
Literacy level	59%	65%	31.6%	23%
Nearest Primary School	4 Prathmik Vidhayalas in the village	Prathmik Vidhyala + Madrasa In the village	Prathmik Vidhyala in the village	2 Prathmik Vidhayalas In the village

Nearest Secondary School	2 Madhyamik Vidyalaya in the village	In the village	2 Madhyamik Vidyalaya	In the village
Nearest High School	Bhabaniya Fata (3-4 Km)	Simhrana (5km)	Simhrana (10Km)	Mahaboobnagar (800m)
Nearest Intermediate School	Bhabaniya Fata (3-4 Km)	Simhrana (5km)	Simhrana (10Km)	Mahaboobnagar (800m)

Source: Sachiv and Pradhan of respective villages; Block Office Mihinpurwa (2022)

At the community level, the persistence of open defecation was found to have linkages to not just the prevalence of water-borne diseases, but also HWC. In our fieldwork, 2 out of 9 cases of HWC-related human injury and death (refer to Box 1 and 3) were caused by open defecation, practiced by school-going children. This comes to the fore after the existence of schemes like Swachh Bharat Mission- Grameen (SBM-G), which gave the ODF status three years back. On the ground, especially in the four villages of the present study, it was observed that the actual distribution and construction of toilets have been uneven. When compared with the official data, it was observed that the scheme has been over-subscribed in the villages of Hansuliya

and Gurh and has not even covered all households as per Census 2011 in Gangapur and Naubana. Further, the number of toilets constructed falls short of the village-wise official targets. The villagers also expressed dissatisfaction with respect to the provision of building materials and the toilets therefore built. For instance, toilets were often built without a latrine seat, and those built are primitive in nature that frequently gets clogged during monsoon, pushing villagers to resort to open defaecation. Additionally, a section of villagers, especially the elderly and children, prefer open defecation and cannot adapt to the walled toilets owing to the lack of awareness and attitudinal change. Together, these multitudes of factors impacting open

Box 1: Case Study 3 (Naubna) - Aman* (2021)

Aman, a 9-year-old, lives with his mother and uncle's family in Naubna village of Kakraha Range. On 6/08/21, the day of the incident, he had gone to defecate in the open near a sugarcane field adjacent to a road at around 4 pm. This was when Akhilesh was attacked by a leopard hiding amongst the crops. The leopard tried to drag Aman away from the field but was hindered by the farm's fencing. People who were grazing their buffaloes nearby saw this and began shouting. The leopard fled instantly. The forest department was notified, and they arrived approximately 2 hours later. Aman was taken to Mihinpurwa CHC via ambulance. Part of the treatment also took place from a private institution. The victim sustained injuries on his right arm, face and legs. One of his hands was severely injured in the attack. The injured hand had lost much of its function.

The family does not have access to the paperwork. It took 3-4 months of hospitalisation, for which the family took loans from relatives and friends. The proposal for compensation was sent to the divisional office and is under process. However, in medical reports, the injury was not classified as severe by the doctors. Although the family has a private toilet, it becomes unusable in the rains because it is not connected to a drain. It forces them to opt for open defecation.

On probing from the officer in charge, it was found that the case file had been submitted and is awaiting approval for compensation.

*(*Name changed for confidentiality)*

defecation make the villagers prone to human-wildlife interactions. Not only does this make them more susceptible to potential injuries or deaths, but it also aggravates health and hygiene concerns in the area.

Status of Education. The condition of educational infrastructure was also found to be inadequate, particularly their accessibility. In almost all four villages of the study, schools beyond the primary level were located far off from the village, resulting in higher drop-out rates in subsequent higher classes. This lack of access and transport mobility (particularly during floods) led to a particularly high level of female dropouts in the area. While the enrolment rates are high in all four villages,

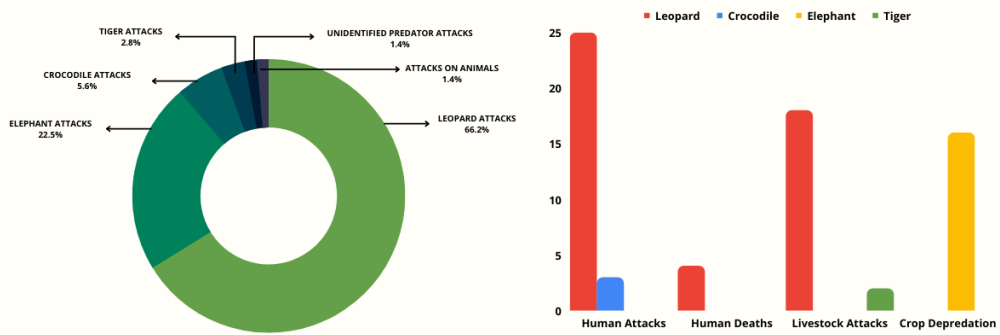
the educational institutes remain plagued with problems like low student-teacher ratio and poor quality education like in other parts of the country. In Hansuliya, for instance, there were only four subject teachers and one 'shiksha mitra' for 416 students enrolled in classes 1 to 8. Further, it was alleged that teachers arrive late to school, skip classes, and are often engaged in non-teaching government duties. Factors such as poverty, gender, caste, and class explain the region's debilitating condition of educational indicators (refer to Table 2). The lack of higher education and vocational training institutions deprives people of opportunities to get skilled and find alternative sources of employment in better-paying sectors. This has created a skill-deficient workforce that is

primarily dependent on agriculture and labour for their livelihood. Overall, the lack of ample educational opportunities devoid locals of better economic opportunities, which further begets forest dependence, lack of awareness and subsequently perpetuates HWC incidents in the region.

Together, the institutions of health and education in their present state cannot mitigate the transaction costs that prevent ready access to these services. These costs are rooted in the social and economic backwardness of these villages.

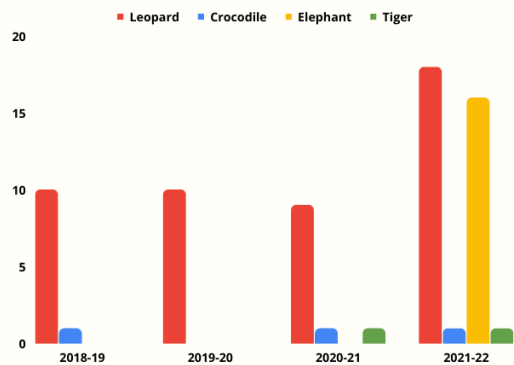
Human-wildlife Conflict in Kakraha Range

71 REGISTERED CASES of HWC between 2018 and 2022



The Kakraha range in the buffer region is more prone to increased interaction between Leopards and Humans. Multiple push and pull factors contribute to it, such as the **Loss of Habitat for Leopards, availability of prey outside the forest, the dependence of nearby villages on the forest and lack of a buffer areas.**

Leopards do not cause harm to crops, as established by data and local interviews. Crop Depredation by elephants is limited to the Kakraha Village only. Whereas, in the other villages in the range, **Wild Boar, Chital, Nilgai, Cows and Monkeys** are more troublesome for the farmlands.



Reported incidences of Human-Leopard interactions have risen from 10 in 2018-19 to 18 in 2021-22. This could be partially due to **awareness about compensation, the declaration of HWC as a state disaster under the State Disaster Management Act and a sudden increase in activity around the villages post the lockdowns.**

Average incidents per year	17.75
Average incidents per sq. km	0.98

In addition to the impact of socio-economic conditions, the distribution of wild animals in the protected area, the legal frameworks in place, the institutions responsible for monitoring and mitigating the conflict, the communities in the region, and their relation with the institutions play a critical role in the HWC management in the place. The following section explores these themes for the Kakraha Range in KWS through the lens of the four villages.

80% increase in leopard-human interactions have been seen in Kakraha Range between 2018 and 2022.

As per the above infographic, the Kakraha range is prone to conflicts between Leopards and Humans. Livestock is the second-most impacted by Leopards in the region, which has indirect consequences on humans. In the last four years, 47 out of 71 reported cases have been of leopard attacks only. Various Push and Pull factors are responsible for increased leopard incidents in the region:

Push Factors: Firstly, Project Tiger has widely contributed to a flourishing tiger population in the KWS. While tigers occupy the core regions of the sanctuary, it pushes out the leopards to fringe areas because they

tend to avoid the area of tigers. Secondly, the lack of adequate prey in the forests and competition with tigers also push leopards to increase their search area.

Pull Factors: Firstly, the nature of the leopard is to hide in tall grasses. Sugarcane, a crop widely grown in the region, serves as a shelter for them. Moreover, since sugarcane fields are frequented by smaller animals such as wild boars, it allows easy prey access. Secondly, reliance on the forest for fuelwood and fodder for the cattle also acts as an enabling factor for HWC incidents.

In the last four years, 47 out of 71 reported cases have been of leopard attacks only.

Therefore, the range has reported an 80% increase in leopard-human interactions between 2018 and 2022. A few cases of attacks by crocodiles and tigers are also found in the range. In the villages where the team conducted interviews, incidences of livestock loss have been more frequent than human attacks. Through its experiences over the years, the forest department also suggests that cases of human attacks are only prone to occur if a nudge is provided by the people themselves, such as throwing

stones or sticks at the animal. However, the threat to livestock, which is easy prey remains.

Table 3: Human-wildlife Cases

	Gangapur	Gurh	Hansuliya	Naubana
Cases of Human attack	1	2	0	1
Cases of Livestock Loss	5	2	2	3
Cases of Crop Depredation	0	0	0	0

Source: List of cases received from Range Officer, Kakraha Range (2022)

The yearly incidents in the range stand at 17.75 (infographic) and those in the villages are in single digits as per Table 1. Moreover, only ~1 incident per sq. km has occurred in the last four years. However, low reporting of incidents, especially livestock or crop damage, has been observed across the villages where the people were interviewed. Some of the reasons for this have been a lack of awareness regarding reporting process and compensation provisions in livestock and crop damage incidents and high transactional costs, wherein sometimes

the reporting cost may exceed the compensation received.

On the other hand, human cases are mostly reported owing to their severity and the need for a quick response from the forest department. However, these incidents also bring great anguish to the villagers and attract violent behaviour towards the forest officials, often leading to delays in providing assistance to the victim. This can be seen in the case discussed below.

Box 2: Case Study 1(Gangapur)- Lakshmi Devi* (2017)

Lakshmi Devi* , a 70 years old resident of Gangapur Kheri was attacked by a leopard on a winter morning around 10 am. The leopard entered her house, dragged her to the verandah (common porch-like area) of her kutchra house, attacking her gravely on her arm, neck and chest, ripping her skin off and fracturing her ribs. According to the family of the deceased, the forest department (FD) came after the incident in the evening, however, according to the FD, their staff was present soon after the first incident took place in the village. They assisted the family in getting the treatment done in Bahraich district hospital, following which the lady was referred to Lucknow. Hereafter, the costs were borne by the family themselves. She sustained the injuries for a month post which she succumbed to them. As informed by the family, no immediate monetary support was provided to them for medical treatment purposes. They, therefore, resorted to informal credit like taking loans from local moneylenders, seeking monetary help from neighbours and locals, and selling of livestock to meet up their expenses. They even had to hire a lawyer to speed up the process of seeking compensation post her death and post-mortem. Overall, it took them 2 years to get full amount of compensation i.e., Rs. 5,00,000 out of which the family spent close to INR 80-90,000 on the entire process.

On probing the Range Officer, it was reported that lack of cooperation and support from the crowd which was not allowing the forest department to take Lakshmi Devi to the hospital led to the fatal delay in the operation and her treatment. According to the officer, the crowd was so agitated and dense that, it was impossible to get an ambulance to the house and they had to carry the injured on their shoulders to the main road. And finally, it was in lieu of family-related disputes that delayed dispensation of compensation. The economic and psycho-social costs of the trauma borne by the family continue to remain source of their animosity towards the department. Since the family, depends on daily wage labour, with no landholding, the high transaction costs make trade-offs for them in situations like these highly disproportionate and extreme.

*(*Name changed for confidentiality)*

Impact of HWC on People

The most imminent impact of HWC is in the aftermath of death or injuries due to human-animal interaction. For those who survive, the injuries are at times so grave that they lead to physical disability. In the case of two victims interviewed, one from Gangapur aged 70+ and a 12 years old boy from Gurh, it led to a permanent disability in their hands, inhibiting their daily capacity to perform tasks. It also leaves a deep impact on the psyche of the survivors. For the

families of those who succumb to the attack, grief and anger are paramount.

Economically, an incident's aftermath brings massive costs for the victim and their families, who are already ridden with poverty in the region. The forest department also can only facilitate help for treatment till the district hospitals. Any further costs are borne by the families themselves and can go into lakhs based on the severity of the injury. It may also exceed

the compensation that shall be provided later. Moreover, there are no provisions for providing financial relief to the victims for treatment in cases of minor injuries. The logistical and hospital expenses add to the transaction costs of the family. Also, due to the lack of vehicles and primary response teams, the time costs increase for the families and the forest department. Sometimes, the ambulance cannot reach the victim on time, costing precious time. Additionally, most people rear livestock such as goats, oxen, and pigs for trade purposes. However, incidents of livestock deaths by wild animals cause losses in terms of the amount foregone, which would have otherwise added to profits.

The incidents also impact the livelihood and educational opportunities of the family, especially in severe cases. For example, as in the incident in Gangapur, the grandson had to leave college to attend to his grandmother. Therefore, the transactional and opportunity costs of an HWC on the people are incredibly high in the region, having a ripple effect on the people's lives.

Relief and related-Challenges

The policies on compensation are based on government orders (GO). Currently, the

relief guidelines are based on GO 668/14-4-2010 according to which the government mandates ex-gratia for the inherent impact HWCs have on the livelihood of the people residing in villages close to forests. The current relief provided is as follows:

Table 4:

Incidence of attack on human	Relief (in INR)
Death	500000
Complete Disability (Invalid)	400000
Partial Disability	100000
Severe Injury	100000

Ex-gratia support mandated as per GO

Table 5:

Incidence of Livestock Death	Relief (in INR)
Cow	15000
Horse	40000
Mule	40000
Camel	10000
Bull (>3 yrs)	15000
Buffalo (>3 yrs)	15000
Calf (based on age)	500-8000
Donkey	5000
Goat/Sheep (\geq 1 yr)	3000

Ex-gratia support for livestock as per GO

For crop depredation, the relief is paid based on Minimum Support Prices.

However, the monetary relief often cannot make up for the actual loss incurred by the victims. Further, in cases of human victims, the guidelines only provide relief for severe injury without defining what the severity entails. The department thus relies on doctor's reports for determining severity. This, therefore, leads to exclusion errors and avoidable delays in the procedure. In incidents of livestock deaths, certain relief is provided based on age (as seen in Table 4) which excludes several victims as leopards are more likely to attack younger animals. This also results in a high tendency of non-reporting of younger livestock death cases.

In Hansuliya, only two complaints were formally recorded and provided relief from 2018-19 to 2021-22.

With regards to crop depredation, most monetary losses are incurred due to stray cows, wild boars, and *Nilgai* and *Chital*. However, the order mandates relief only if it's established that the damage was caused by an elephant or rhino, which does not

occur in all villages. Only recently, wild boar has also been added to the list.

Moreover, inadequate paperwork and lack of information on relief provisions also cause hindrances, as observed in the case of Varun* (see Box 2). In none of the interviews any follow-up mechanism was found to be in place.

The lacunae in the guidelines and relief provisions result in unintended consequences both for the people and the animals. Lengthy procedures and delays in relief causes great anguish to people leading to retaliatory measures such as setting up traps around the fields or poisoning the livestock, which may harm the protected animals such as tigers or leopards in the long run. Therefore, high transaction costs for the people and retaliatory measures adopted make it a 'lose-lose' case both for the people and the forest department.

However, the declaration of HWC as a 'state declared disaster' under the State Disaster Management Act (SDMA) by the Uttar Pradesh Government has brought partial relief to the people and the forest department. The implications of this institutional shift will be discussed in the subsequent section.

Box 3: Case Study 2 (Gurh) - Varun Kumar* (2022)

On 7th may 2022 Varun Kumar, an 8 year old, returned home from school at 12 pm. After which he headed to the pond at around 12:30 with his friends to defecate. The child according to the mother went without her discretion. The pond was known to have crocodiles for a long time. At the pond when Virendra was was attacked by the crocodile, his friends started to scream. Followed by which, the villagers gathered and tried to save him but Virendra had already got pulled into deep water. The Forest Department was informed immediately. Despite hours of searching, the boy's body could no not be found. The crowd had turned agitated and blocked roads creating a huge traffic congestion calling for a day-long 'chakka-jaam'. Finally, the body was found at 11pm after being forced by the villagers to continue the search operation. The body had bite marks on shoulders and back. The family claims that they have not received the interim relief of 10,000/- mandated by law. They also haven't been informed of how much compensation is due to them and the time it would take for them to get it. A lawyer approached the family and promised speedy dispensation of the compensation money for a fees of 50,000. The family negotiated and hired him at 30,000. The pond remains to be crocodile infested as the forest department could only catch one of the two crocodiles. Villagers proclaim that the Pradhan has approached the Forest Department several times requesting them to catch the crocodiles to mitigate the dangers of such instances. However, the response of the forest department has been limited to giving warnings.

On probing the officer incharge, it was reported that the agitated crowd/mob situation in the village led to a subsequent delay in the response, as the only highway for commuting was blocked. The department lacked the necessary equipments to carry out the operation. Hence, it was only later in the night that the team of rescue swimmers could find the body after the crowd at the pond had got lesser. While one crocodile was caught successfully, the second one could not be captured instantly. Overtime, the second crocodile had moved away from the lake from the connected stream. The officer further reported that the compensation amount has been approved and will be dispensed to the aggrieved soon.

(*Name changed for confidentiality)

HWC - A State Disaster under SDMA

Initially, HWC was perceived only as a conservation issue pertaining to its impact on nature and wildlife. From the 1970s and 1980s, the political ecology of HWCs became central and identifying structural, political, social, cultural, and economic drivers became an essential prerequisite while approaching HWC. Thus, a disaster management lens is in line with the broadening of the understanding of HWCs today.

The government of Uttar Pradesh in 2018 brought human deaths and injuries due to HWC under the ambit of the State Disaster Relief fund, i.e., the dispensation of relief shifted from the forest department to the revenue department through the SDRF. The measure has helped in decreasing transaction costs due to delayed dispensation of ex gratia and preventing retaliatory measures, as informed by the forest officials.

Gaillard et al. (2018) argue that the threats associated with wildlife are a seriously neglected type of small and frequent hazard. Small and frequent hazards such as HWCs are prone to be neglected as a

policy concern because they fall between the cracks as isolated incidents themselves do not appear to be severe, and their intensity only becomes visible over a period of time. They are not well documented and differ much based on local coping strategies.

In Katarniaghat wildlife sanctuary, 47 cases of human death and 194 cases of human injury have been registered in the last five years, amounting to a maximum of INR 4,29,00,000 of relief. On average, INR 85,80,000 per year is required only for relief measures.

Table 6:

Incident	No. of incidences	Relief	Total Relief
Human Death	47	500000	23500000
Human Injury	194	100000	19400000
Total			42900000

HWC Incidents and total relief granted

In Kakraha alone, 4 cases of human death and 28 cases of human injury were registered. The forest department has very limited funds at its disposal to dispense the required money timely. Thus stepping in of SDRF with a more giant kitty of resources makes the process less taxing for the victims while at the same time relieving the burden

on the Forest Department. The GO also mandates dispensation of relief within 24 hours. It has enabled a comparatively quicker dispensation of relief.

However, while fostering inter-department coordination, the new system still faces specific issues. Firstly, out of the 5 lakh mandated as ex gratia, the Forest Department is still required to recoup 1 lakh. Moreover, livestock deaths are still compensated by the FD, which is burdened with budgetary problems. In the Kakraha range, livestock death and injury cases are rampant and constitute much of the total monetary losses that occur in the range. Since 2020 none of the accepted compensation proposals have been given out for livestock loss, with a total pendency of over 6 lakhs since 2017 in KWS. Secondly, crop depredation by several animals that cause significant loss for farmers is not included in the government order. Even then, there is a pendency of over 2 lakh in the disbursement of accepted proposals in the last 5 years. Lastly, while the approval for dispensation of relief is quicker, the actual transfer in the bank accounts may take more time. These cases represent only a minuscule fraction of the losses villagers face perpetually. Budgetary constraints of the Forest Department are likely to nip any

intention of widening the scope of animals covered.

Mitigation

Mitigating HWC becomes essential owing to its large-scale costs, including financial and opportunity costs due to the presence of wildlife (Dickman, 2010). Previous literature on mitigating HWC has highlighted several technical approaches for limiting damages and minimizing costs (Thirgood et al., 2005 & Breitenmoser et al., 2005). These approaches include a *physical*

separation between conflict-inducing species and resources, *safeguarding assets* such as crops and farmlands, *attitudinal and behavioral modifications* among vulnerable communities, etc. While a complete, long-term resolution of conflict is uncommon, the extent of success of such mitigation strategies depends upon several contextual factors, such as the strategies employed by key stakeholders of the conflict, i.e., **the Community** and **the Forest Department**.

Table 7: Basic Demographic Details of HWC IncidentsCases

Village	HWC Case Type	Date of Attack	Time & Season of Attack	Place of Attack	Predatory Wild Animal	Victim	Ex-Gratia Support
Gangapur	Human Injury	7/12/2017	10-11 am; Winters	Mustard Farm	Leopard	Arun Kumar*	None
Gangapur	Human Death	7/12/2017 Death: 29/12/2017	10-11 am; Winters	House	Leopard	Lakshmi Devi*	5 lakhs
Gangapur	Human Injury	7/12/2017	10-11 am Winters	Outside House	Leopard	Surya Kumar*	1 lakh
Gurh	Human Death	7/5/2022 Death: 7/5/2022	12:20 pm Summer	At pond	Crocodile	Varun Kumar*	5 lakh (in process; not received yet)

Gurh	Human Death	8/2/2019 Death: 8/2/2019	5 pm Winters	Farm	Leopard	Biswas Kumar*	5 lakhs
Gurh	Human Injury	April 2021	1-2 pm Summers	Farm road nearby	Leopard	Pramod Kumar*	None
Naubna	Livestock Loss - Pig	June 2022;	Midnight Summers	Farm	Leopard	Ram*	None
Naubna	Human Injury	6/8/2021	Morning; Summers	Sugarca ne Field	Leopard	Aman*	In process (not received yet)
Naubna	Livestock Loss- Calf	16/6/2021	11 pm; Summers	Back of House	Leopard	Raghav Yadav*	None

**Name changed for Confidentiality*

Community-driven strategies. In Kakraha Range of KWS, the most common strategy employed by the people is the use of fire and firecrackers, movement in groups (in and around forests) and using sticks or stones to create noise. In order to protect the farms, the farmers and their families undertake rotational guarding duties on elevated watchtowers called ‘huntis’ and ‘machans’. Women and children guard the fields during the day while men stay on the farms during the night. Fencing the farms using wired fencing and sari fencing, costing between INR 20000-50000/ ha and INR

3500-4000/ ha, respectively. To protect the livestock, the villagers resort to their own temporarily-devised measures like constructing underground shelters/sheds within homes to keep them out of sight from predatory animals. A few households have also installed private solar plates to increase lighting around their houses and farms to inhibit the entry of wild animals. Past literature, too, repeatedly highlights the efficacy of solar lighting as an adequate deterrent to the movement of wild animals (WWF, 2019). However, owing to their high cost, the penetration of solar panels is

limited. In isolated cases, villagers also resort to retaliatory attacks as well which may harm the wild animal.

Forest Department driven Strategies. The FD has a local forest station and forest guard who are the first line of action in case of any incident. The FD also conducts certain awareness programmes, guiding villagers on best practices such as going to forests and farms in groups. They also distribute firecrackers to scare away the animal. Along with it, the FD suggests farmers to cultivate aromatics such as peppermint and tumeric which repel wild animals. However, these methods were reported to be ineffective and unsustainable in the long-run. Such as, moving in groups is practically impossible due to various reasons such as different timings, small families. In case of aromatic farming, the farmers expressed discontent on peppermint farming for it increases their costs and is only feasible for three months in a year.

The FD further employs community and trust-building measures through Joint Forest Management Committees¹ (JFMC)

¹ A JFMC is a “village-based community institutions” consisting of village residents (adults) established for the management of forests in a village jurisdiction area.

by conducting entry point activities and through initiatives such as “Leopard Safety Month” to sensitise people. Along with this, wall paintings, pamphlets, and posters are used to spread information regarding measures to be followed to mitigate the cases of HWC. However, despite these measure, a trust-deficit and unawareness could be seen amongst the villagers. With the new initiative, “Ek Range, Ek Din, Ek Gaon”, it is hoped that the existing gaps shall be bridged to some extent.

In the aftermath of an incident, the department also deploys camera traps at several sites to track the movement of leopards and tigers. The FD also partner with non-governmental organisations for initiatives such as Bagh Mitras² or Primary Response Teams (PRT)³ or providing community support in the form of the installation of solar lights and community toilets. These outsourced interventions are undertaken to cover for the various budgetary, personnel and administrative

² Bagh Mitra are local volunteers who help in relaying information, controlling crowds during HWC incidents. In collaboration with WWF, Bagh Mitras are provided preliminary training and given kits with basic equipment like torch, caps, etc., useful for navigating HWC incidents.

³ PRTs are constituted in highly conflict-prone areas and are trained by Wildlife Trust of India personnel to handle situations of HWC.

challenges to mitigation that the department faces.

Challenges to mitigating HWC

Budget. One of the major hindrances to mitigation is the lack of adequate finances to undertake various initiatives. The funds allocated for the KWS come from six different schemes. In the last five years, the allocated budget for the sanctuary has been consistently decreasing.

The reduced budgetary allocations leaves little scope for the department to spend money on providing civic amenities such as solar lighting and toilet facilities which help prevent HWC. The budgeting cycle also impacts the time taken for compensation dispensation. Cases closer to the end of the financial year are compensated faster than those which take place closer to the beginning of the financial year.

Personnel: There is major shortage of personnel in the FD. In Kakraha Range consisting of eight beats, at least one forest guard is required per beat. However, at present, there are only five forest guards in service in the range. Overall three section officers, three foresters, and two

For 2021-22, the total budget allocated for the KWS was INR 4 cores 37 lakhs.

chowkidars look after a total area of 7219.22 hectares covering the Kakraha range. The range officers often have to depend upon reinforcements from adjacent ranges for help. This increases the average response time in the case of HWC. This understaffing leads to overburdening of the forest officials who are expected to perform multiple duties - conserve the forests and wildlife, check the cases of forest crimes, and work for mitigation of HWC. Further, an overburdened staff cannot work at full-efficiency.

Administrative: Along with their duties as conservators of the forests, the FD personnel is also supposed to undertake various administrative duties including intensive paperwork. While checks are required to maintain accountability, the lengthy documentation processes and an

overburdened staff with no division of labour leads to avoidable delays. For example, a response team is formed only in the aftermath of an incident leading to an increase in response time.

The above factors cumulatively prevent setting up of a dedicated HWC response team and ambulance services. Further, lack of equipment leads to delay in responding to cases of HWC, thereby angering the mob. This could be seen in Varun's case (Box 2) wherein the range officer had to arrange

boats, divers, and generators on the spot. An angered mob also only adds to the problems of the FD preventing quick resolution of the conflict.

Therefore, while the FD is engaging in various outsourcing programmes, it is pertinent that the fundamental challenges faced by the department are adequately addressed in order to increase their capabilities in addressing the HWC. The section on recommendations tried to suggest some measures to enable the same

Sanctuary Governance

Several laws and legal provisions guide the governance of protected areas (PAs) like KWS. Section 26A(b) of the Wildlife (Protection) Act 1972 defines a Sanctuary as,

“any area comprised within any reserve forest or any part of the territorial waters, which is considered by the State Government to be of adequate ecological faunal floral geomorphological, natural or zoological significance for the purpose of protecting, propagating or developing wild

life or its environment, is to be included in a sanctuary”

The Katarniaghat Wildlife Sanctuary, much like other PAs is subjected to several restrictions on movement and practices such as banning of illegal felling of trees, illicit trade of trees, poaching of animals, etc. Several laws and acts guide the workings of the Forest Department to regulate these practices and govern the sanctuary area in smooth manner.

Sanctuary governance, therefore, includes in totality the contribution of all the stakeholders in decision making about the judicious use of forest resources for the conservation of wildlife and their habitats. As a crucial part of protecting wildlife and reducing human wildlife conflict inside the conserved forest area, sanctuary governance requires active participation of different stakeholders including formal institutions such as forest department, grass-root level organisations such as SHGs, NGOs etc and the community. The present section deals with formal institutional mechanisms involved in protection and conservation of animals and their habitats.

Legal Provisions

There are three major laws which provide the rules and regulations for the buffer and core areas of KWS namely Wildlife (Protection) Act 1972, Indian Forest Act 1987 and U. P. Protection of Trees Act 1976. Other than these, the functioning of the forest department is also determined by the government orders and circulars issued by the relevant authorities from time to time. A few sections of the aforementioned acts which, as observed in the present study, have relevance in

instances of HWC and forest crimes are explained as follows:

Wildlife (Protection) Act 1972: The act protects wild animals, birds, plants, and matters that ensure India's ecological and environmental security. It provides for a prohibition on the use of animal traps except under certain circumstances.

It has six schedules which give varying degrees of protection

- Species listed in Schedule I and part II of Schedule II get absolute protection — offences under these are prescribed the highest penalties
- Species listed in Schedule III and Schedule IV are also protected, but the penalties are much lower
- Schedule V includes vermins i.e. the animals which may be hunted
- The plants in Schedule VI are prohibited from cultivation and planting.

The act contains several sections which are essential in instances of HWC. **Section 27(3)** of this act states that “*No person shall, with intent to cause damage to any boundary-mart of a sanctuary or to cause wrongful gain as defined in the India Penal Code, 1860 alter destroy, move or*

deface such boundary-mark.” The act prohibits any change, as defined in the India Penal Code, 1860, in the boundary of a sanctuary

Section 9 focuses on the prohibition of hunting of wild animals. **Section 50** provides rules of entry, search, arrest, and detention. Any vehicle which enters the forest reserve area can be stopped by the forest department for the checking purpose without any search warrant.

Section 51(1C) of this act states that an offence, including hunting, related to tiger reserve or altering its boundary is punishable on the first conviction with imprisonment for a term of 3 to 7 years with a fine of INR 50000. A second conviction is punishable by a term of 7 years or more with a fine of INR 5 lakhs to 50 lakhs.

The Indian Forest Act (1927): This act is a federal act. Many states have enacted similar forest acts but with some modifications. The Act categorises forests into three categories:

Reserve forest: These forests are constituted by state governments on any forest land (the land where the government has property rights). As a result, these forests are the most restricted. The locals are

strictly prohibited in these forests until they are allowed by a forest officer.

Protected forest: Any site other than reserved forests may be designated by the state government as protected forests over which it has exclusive ownership rights. In "Protected Forests," the government retains the authority to establish regulations governing their use as well as the authority to reserve particular tree species inside those forests. This authority has been utilised to create state control over trees whose fruit, timber, or other non-wood items have the potential to provide income.

Village forest: ‘Village forests’ are the ones in which the State Government may assign to any village community the rights of Government to or over any land which has been constituted a reserved forest.

Under this act, **Section 26(1A)** (a) protects the forest against damage from trespassing, grazing, cultivation and construction activities. A forest officer can evict a person engaging in such activities from the forest and can demolish construction done on the reserved forest lands.

Under **Section 41**, the state has the power to make rules to regulate the transit of

forest produce. **Section 42** contains the provisions for the penalty for breach of rules made under section 41.

U. P. Protection of Trees Act, 1976:

Section 4 of The U. P. Protection of Trees Act, 1976 is a recurrently used law. **Section 4** restricts felling and removal of trees apart from those which are dead or have fallen without human intervention. **Section 10** contains the penalty for felling or removal of trees in contravention of Section 4. As per section 10, a person may be imprisoned for up to 6 months or fined up to INR 1000 or both. 18 cases were registered between 2018-2022 under this section in the villages under study.

Under **section 13**, a forest officer (not below the rank of a forest ranger or a police officer) can make arrests without a warrant, if there is a reason to believe that any offence under the Act has been committed. Further, the forest officer can seize goods (including timber from trees felled illegally) and compound offences, under section 14.

General Bail procedure: As per forests department officials' when arrested under relevant sections, a person spends anywhere between 15 days to 3 months in

jail awaiting bail since typically High Court passes a bail application in practice. The bail application is a costly and lengthy affair. If the bail is rejected and the person is incriminated then, as per department officials, a person generally spends a year in jail.

Common Offences

The most prevalent offences in the Kakraha range are of ***illegal felling*** or harming of protected (or prohibited) trees, ***trespassing*** and ***illegal hunting***.

The cases of illegal felling or harming of trees are usually registered in connection with collection of fuelwood or "jaloni" from forests by villagers.

Local communities who live close to protected forests often depend on forests for fuelwood as their main source of energy (Sassen, 2015). At the same time, as per the forest department, the collection of fuelwood can harm forests especially when the collected fuelwood belongs to a legally protected class of trees. As aforementioned, the forest department, on humanitarian ground, allows collection of branches and twigs of leaner variety for personal or household use. However, if the constraints on fuelwood collection are breached or the

trees are illegally felled without proper permissions, then it can lead to arrests under section 10 of The U. P. Protection of Trees Act, 1976 as aforementioned.

In cases of trespassing in protected forests, as observed in the present study, the major factor is cattle grazing. A restriction on easy ingress and egress of humans and cattle preserves the habitat of wild animals. There are provisions for imprisonment of the person responsible and impounding the cattle under relevant section of Indian Forest Act (1927) and other laws for the instances of trespassing.

Even though there were only 2 registered cases of illegal hunting in the time period between 2017-2022, they pose a severe threat. These cases fall under section 9 of Wildlife (Protection) Act 1972 and other relevant laws. Further, It was observed in the present study that hunting can have some unintended consequences. When a hunter lays traps and nets, then apart from catching the intended animal they can cause harm to other wildlife present in the area.

Administrative Challenges in Sanctuary Governance

The forest department faces several challenges in its functioning. As stated

earlier, the major impediment for the department is the availability of funds. Management of forests need ample resources for investing in monitoring systems, infrastructure, fuel for transportation etc. The present study observed that the forest department, has been facing a cash crunch to the extent that the salary of many of its personnel has been pending for close to 11 months.

Additionally, as mentioned earlier, the department also faces personnel shortage. It affects the ability of the department to deal with new incidents of HWC all the while fulfilling day to day responsibilities like patrolling and surveillance of forest range.

It was observed in the present study that the rigid structure of the laws necessitates their strict application. However, the forest department shows a certain amount of leniency in their operations. The flexibility in implementation of laws helps in gaining trust of people which in turn incentivizes them for contributing in forest conservation and governance. In other words, there is an aspiration for balance between conservation and judicious utilisation of forest resources among the stakeholders involved in

governance of the sanctuary. The evolving structure of governance has come to include the role of community in governance. It has

provided greater space for dialogue between stakeholders of forest management subject to various challenges.

Recommendations

Community Coping Strategies and Involvement of Village Institutions for in situ conservation and mitigation of HWCs.

1. Provision of Conflict Management Training for Villagers via Volunteers
2. Expanding the volunteer network (PRTs) to more villages of KWS, particularly the conflict-prone areas.
3. Need to include active village institutions like women of SHGs for *in situ* conservation as well as mitigation of HWC-related incidents.
4. Information dissemination through Community education on wildlife conservation as a preventive measure against HWCs.
5. Expansion of confidence building measures with more initiatives like 'Ek Range Ek Gaon Ek Officer'.

Landscape-specific Strategies for Addressing Instances of Crop Depredation and Livestock Loss.

1. Need for a region-wise eligibility criteria for compensation based on past instances in each village such

that the most prevalent cases are addressed and compensated.

2. Inclusion of unlisted animals like Nilgai, Wildboar, and Chital in the guidelines which cause maximum damage to crops and livestock in that region.

Reforms to Ex Gratia guidelines to retain trust of community and prevent retaliatory killings.

Compensation amount for crop loss should be determined more comprehensively as MSP does not reflect the true loss incurred by people.

Compensation amount should reflect the cost and duration of treatment in case of human injury and human death.

Human Resource Building and Staff Training to Respond Efficiently to instances of HWCs.

1. Expanding Primary Response Teams to include specialists like doctors and veterinary staff to reduce the response time when HWC incidents occur. Such teams should solely be responsible for managing HWC incidents.

2. Constituting a 24 x 7 dedicated task force accessible with toll free number for speedy communication of the incident to the authorities.

Improving Access to Civic Amenities and Public Institutions for Timely Access to Treatment, Resources and Information.

1. Implanting more solar lights as well as investing in their maintenance, in areas close to forest boundaries such that these can act as effective deterrent for wild animals to keep them away from human settlements.
2. Proper implementations of the schemes like Swachh Bharat Mission to prevent open defecation induced

HWC cases, which emerged as chief reasons for HWC-related incidents.

3. Bolstering Ujwala Yojna to mitigate gender based burdens of HWC as well as to reduce the fuelwood collection which enhances forest dependence of people.
 4. Ensuring essential peripheral services like health, education and transportation for effective mitigation of HWC incidents in the region.
 5. Collaborating with NGOs and other government departments to address these peripheral issues, which feeds into the HWC instances.
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Conclusion

HWC is a significant worldwide conservation concern, influencing both rural and urban settings. In the Kakraha range of Katarniaghat Wildlife Sancturay, we observe cases of human and livestock depredation by carnivores and crop depredation due to other wild and stray animals. This directly impacts the local communities, who bear the cost of living with the wildlife.

An in-depth analysis of HWC shows that it is not just a wildlife conservation issue but is also a socio-economic issue. The lack of basic civic amenities like access to pukka houses, toilets, and LPG cylinders, lack of skilled labour and alternative livelihood opportunities increase the dependence of local communities on the forest for their survival, thereby increasing the scope for conflict. Thus, making people prone to attacks by wild animals. Inadequate access to quality education and healthcare, further add up to high transaction costs involving HWC.

In order to mitigate the impacts of HWC, various measures are adopted by the communities and forest department alike. Through steps such as compensation

dispensation, the forest department plays a vital role in mitigating the impacts of HWC. The conflict incidents, however, are underreported due to a lack of awareness among people regarding compensation provisions, high transaction, and opportunity costs, and bureaucratic hurdles. The forest department, which performs the dual roles of conservation and mitigation, faces the challenges of a shortage of budget and personnel, which restricts its efficient functioning.

Further, the connection between HWC and wildlife crime is complex. Poaching, illicit trade of wildlife, and illegal felling of trees are significant threats to conservation efforts. Often a delayed and inadequate response to damages by large herbivores and carnivores creates an environment favorable for poaching. The forest department, backed by various legislative provisions, has been working to reduce the instances of such crimes and punish the offenders.

Human-wildlife conflict is, therefore, both a development and conservation issue. Any steps aimed to mitigate HWC must

look at the problem holistically by taking into consideration the role of key institutions and stakeholders involved. There is a need to work towards coexistence between people and wildlife. Various institutions such as the forest department, NGOs and civil society groups, panchayats, and SHGs can act as a

bridge to fill in the existing gaps. We must adopt a strategy that addresses the fundamental reasons behind the conflicts while creating comprehensive, context-specific solutions with the impacted communities as complete, active partners in the process.

Contributions

Name	Work Done
Harshal Chavhan	Methodology, Socioeconomic Outlook to HWC (Livelihoods), Sanctuary Governance, Recommendations
Ishwar Bandal	Methodology, Socioeconomic Outlook to HWC (Livelihoods), Sanctuary Governance
Mukul Anand	Methodology, Socioeconomic Outlook to HWC (Livelihoods), Sanctuary Governance
Nishtha Gupta	Introduction, Study Area, Socioeconomic Outlook to HWC (Health and Education), Human-Wildlife Conflict: Reasons, Relief, and Mitigation (Relief-related challenges, HWC-A State Disaster under SDMA), Recommendations
Vasu Saha	Introduction, Socioeconomic Outlook to HWC (Health and Education), Human-Wildlife Conflict: Reasons, Relief, and Mitigation (Mitigation and Challenges), Conclusion
Vrinda Khera	Socioeconomic Outlook to HWC (Schemes), Human-Wildlife Conflict: Reasons, Relief, and Mitigation (Conceptualising HWC, Impact of HWC on People), Infographics, Editing and Designing (Cover Page, By Page)
Yashasvi Khurana	Study Area, Socioeconomic Outlook to HWC (Schemes), Human-Wildlife Conflict: Reasons, Relief, and Mitigation (Conceptualizing Mitigation and Challenges), Editing, Acknowledgments

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