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HUMAN-ANIMAL CONFLICT IN RAMPUR BUSHAHR, ANNI AND NICHAR

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ABSTRACT

In the hilly regions of Himachal Pradesh, particularly in the Rampur, Anni, and Nichar areas, human-animal conflict is becoming a bigger problem. All of these regions are characterised by high biodiversity and frequent overlaps between human settlements and forest habitats, which means that people and wild animals frequently interact in ways that can lead to conflict. The purpose of this study is to systematically analyse the causes of any conflict of this kind, identify the most common animal species involved, expand the typology for the various conflict types, such as crop raiding, livestock killing, and human killing, and examine the mitigation measures being implemented by local authorities and residents.

Both primary and secondary sources of data are used to support research. Direct field observations, in-depth interviews, and field surveys are used to gather information from locals, and forest officials. Government publications and earlier studies provide as secondary evidence, which provides context. The analysis looks for trends and the socio-environmental factors that are causing the conflict, such as changes in land use, habitat degradation and scarcity of natural food. It is expected that the study's findings would raise awareness of the human-wildlife conflict situation in these regions and offer helpful suggestions for developing locally relevant, successful mitigation strategies. It is ultimately intended that by improving conflict management policies and raising awareness, this research will help to ensure that people and wildlife can co-habit sustainably.

Keywords:Conflict,Crop Raiding, Livestock killing, Mitigation Measures

CHAPTER-1

1. INTRODUCTION

Wildlife is known animals which are not domesticated, and it also include plants species which survive in their natural habitat but are not cultivated. Wildlife is crucial for numerous human communities as it provides nourishment and, in some cases, it has medicinal uses too. Wildlife and natural environment are also the backbone of tourism in many countries. So, we can say that wildlife and humans are dependent on each other in many different ways.

For decades, human and wildlife are living in harmony. A condition where two or more groups are living together, where they respect their differences and resolve their conflicts non-violently is termed as co-existence. Human and animals co-exist together. Human-animal co-existence means when humans and animals are existing in vicinity to each other, it can be positive, neutral or negative co-existence. Humans are

dependent on animals for various resources which promotes co-existence between human and animals. As growing human population, people infringe on animal habitat which can lead to conflicts.

Recently human-animal interactions have turned into conflict rather than co-existence. In simple words, a conflict is an antagonistic action or state. Human-animal conflict means negative relationship between human and animals. Human-animal conflict can also be described as an event of unpleasant interaction between human or animals which affect them both *(Messmer, 2009, Peterson et al.,2010)*. This causes tension between both human and animals. Woodroffe et at., (2005) precisely termed human-animal conflict as any case where demands of humans for resources and wild animals overlap, which causes competition for food, water, space. Human-animals conflict creates havoc between both humans and animals. Human-animal conflict date back to primitive times *(Berger & McGraw, 2007; Gordon, 2009)* but its gravity and involvement have increased in the modern era *(Madden, 2004; Sharma et al., 2020).*

Mostly this conflict arises particularly in those regions where human and animal co-exist and rely on limited resources *(Amaja et al., 2016; Fairet, 2012a).* In recent years, frequency of conflict has increased due to human activities in forest area. Human-animal conflict also occur when human affect negatively on animal for their needs. Nowadays, human-animal conflict is one of the primary researched topics worldwide *(Dickman, 2010)*. Along with animal, humans are also becoming victims of human-animal conflict. According to Mekonen, human-animal conflict is a “reciprocal process" *(Frank B, Glikman JA, Marchini S.;2019)*. Both human and animals are negatively affected. Urban expansion, increasing agriculture, growing human population and high biodiversity interaction between people and wild animals are the main reasons for human-animal conflict. For example, urban and agricultural expansions allow human invasion in wildlife habitat. In turn animals also approach people`s farm that are closer to their habitat. This overlapping of human and wildlife is making it difficult to differentiate between human and wildlife spaces (*Frank and Glikman, 2019).*

Population expansion has created severe problems around wildlife habitats *(Sukumar R. The Asian Elephant. Cambridge; 1989.p.265)*. Human population invade wildlife habitat which creates fear and stress among animals. Fear and stress among animals make them attack humans. These attacks can be predatory, defensive or territorial in nature. Most of the time an animal attacking a human is in its defence (*Conover and Conover, 2022).* These attacks result in human injury or death due to animal bites, claw and gore. Sometimes, the injuries sustained by a victim are severe but not too severe to cause death, which make them bedridden for their whole life. Injury and death from wildlife attacks create rage among people and they become hostile against animals involved *(Acharya KP, Paudel PK, Neupane PR, Kohl M, 2016)*. Due to this hostility towards animals, humans are compelled to kill animals.

Human-animal conflicts become extremely problematic when people are attacked by endangered and legally protected animal species *(Treves A, Bruskotter J. Tolerance for predatory wildlife. Science. 2014)*. For example, large carnivores like, Royal Bengal tiger *(Panthera tigris tigris)* and the common leopard *(Panthera pardus)* have shown antagonistic behaviour (*DeFries et al., 2010; Zimmerman et al., 2010*), in result humans have tried to harm them. Large mammals are commonly involved in the conflicts, and most of their species are threatened with extinction, so the merciless killings of threatened mammals further increase their extinction risk (*Madhusudhan MD. 2003; Paudel PK, Heinen JT. 2015)*. There are punishments for illegally killing endangered animals, which amplifies the hostile attitude of people towards conservation efforts *(Sillero-Zubiri C, Sukumar R, Treves A. 2007).*

Human-animal conflicts are predominant, but they are not uniform because they are dependent on the presence of wildlife. Different animal species creates different types of damage around the year. The damage caused by human-animal conflict has unpredictable effect on the lives of human *(Mulonga S, Suich H, Murphy C. 2003)*.

The major consequences of human-animal conflict are crop destruction, reduced agricultural activity, competition for grazing lands, water supply, livestock predation, injury and death to human, damage to infrastructure, and increased risk of disease transmission among wildlife and livestock. Livestock predation and crop raiding by animals have a crucial impact on a country`s economy. Developing countries are more vulnerable to crop raiding and livestock depredation because their economy depends on the use of natural resources and their livelihoods depend on agriculture and raising livestock *(Girmay T, Teshome Z. Human*

wildlife conflicts in and around Choffa Forest. 2015).

The major causes of human-animal conflict are agricultural expansion (30%), human settlement (24%), overgrazing by livestock (14%), deforestation (18%), illegal grass collection (10%) and poaching (4%) *(Mekonea, S. Coexistence between human and wildlife: BMC Ecol 2020).* Deforestation, agricultural expansion and human settlement has caused shrinkage of animals habitat, due to which the competition among animals for their resources has increased. Animals are forced to adapt into living in environment that is not suitable for their nature. Deforestation has caused change in climate which has caused sudden changes in animal behaviour. Due to anthropogenic environmental changes the reproductive success and survival of many wildlife species is decreasing *(Milligan, S. R., Holt, W. V., & Lloyd, 2009).*

India is rich in biodiversity, so it is considered a mega diversity nation. India has rich wildlife heritage that is under threat due to the increasing level of human-animal conflict. As India is a developing country and its population is at its peak, the chances of having human-animal conflict increases every day. India has the largest number of Wild Asian Elephants, approximated to be around 30,000. They are losing their traditional foraging environments that is bringing them closer to human habitats, provoking conflicts with humans. According, to a report published in 2020 over 500 humans are killed in encounters with elephants yearly, around 100 elephants have been killed due to poaching for ivory, poisoning and collision with trains *(The Hindu newspaper; March 2, 2024).* Tigers are important part of India`s Wildlife heritage, culture, and it is home to more than 75% of the world`s wild tiger population. The human-tiger conflicts are also increasing day by day. These conflicts are increasing tension among locals if the respective forest departments fail to handle them properly. The (affected) locals` response is to kill tigers *(The Hindu newspaper; March 2, 2020).*

There are measures that are taken to reduce and manage conflicts between human and animal, known as Human-Wildlife Conflict Mitigation Strategy. The aim of these mitigation strategies is to create a world where human and animals can live in harmony, where nature is protected. These strategies ensure the safety and well-being of both humans and animals. Households uses different mitigation measures like nighttime watching, scare devices, watchtower, scarecrows and fencing *(Karanth, K. K., & Kudalkar, S; 2017)*. Several state governments and central governments are trying to prevent the conflicts by various means including digging trenches, experimenting with various types of fences, using radio collars and relocating villages etc. The consequence of these conflicts is that human is becoming hostile towards animal and killing them. To prevent it central government is launching conservation schemes and programs, example, Project Tiger (1973) and Project Elephant (1992).

1.1 AIMS: -

This study's main goal is to examine the dynamics of human-animal conflict in the Himachal Pradesh regions of Rampur Bushahr (1,2)[1], Anni, and Nichar. It will do this by analysing the nature, causes, and effects of these conflicts as well as the efficacy of current mitigation techniques.

OBJECTIVES: -

1. To recognize the different types of human-animal conflict in study area
2. To identify the most commonly involved animals in conflict
3. To investigate the causes of human-animal conflict in the study area
4. To study the different types of mitigation measures taken by residents of study area

[1] 1-Rampur Bushahr town, 2- Sarahan

CHAPTER-2

2. REVIEW OF LITERATURE

Human-animal conflict is one of the most vital threats that most of the wild animals and as well as humans are facing today *(Dickman, A. J. 2010)*. It is a major conservation challenge as animals are at great risk. Due to human-animal conflict human is also at disadvantage because animal poses a great threat to their safety, livelihoods and economy of people. For example, elephants foraging on crops, seals damaging fishing nets or jaguars killing livestock, people can lose their livelihoods *(IUCN Resolution WCC-2020-Res-101 Addressing human-wildlife conflict).* Livestock predation, crop and property damage, and threats to human safety frequently trigger vengeful killing of animals *(; Woodroffe et al. 2005; Dirzo et al. 2014 Ripple et al. 2014; Ripple et al. 2015; Nyphus 2016).* Even when large carnivores like wolves and leopards are not involved in harming people or their property, their lives are in danger because people have become hostile towards them *(Redpath et al. 2015b).* The IUCN Species Survival Commission states that human-animal conflicts are struggles that takes place when presence or behaviour of animals poses an actual threat to human needs which causes dispute between groups of people and negative impact on people and animal. Human-animal conflict is harming animals in various ways, including starvation, causing injuries, fragmenting population, leading to mass death which causes endangerment of entire species. Therefore, human-animal conflict is considered as a global priority *(Manferdo 2015)* and an emerging research field *(Cronin et al. 2014)* as it greatly affects rural people`s livelihood and lives and reduce support for conservation projects from affected people *(Redpath et al. 2013)*. Human-animal conflict is pretty common in both developing and developed countries. The conflict involves a number of mammals, reptiles, insects and fishes, which makes it a very big threat to our biodiversity *(Manfredo, M. J., & Dayer, A. A. 2004)*. This literature review aims to analyse existing research to understand the causes, impact, animals involved in conflict and mitigation measures of human-animal conflict.

2.1 ANIMALS INVOLVED IN CONFLICT

2.1.1 IN HIMACHAL PRASEDH

A number of animals are involved in human-animal conflict from common mammals of conservation concern like, elephants to large carnivores like, snow leopards and lions. The most common wild cat that is distributed around the world leopard *(Panthera pardus).* Leopards lives in rainforest, savanna, mount elevation dense vegetation and sometimes close to human habitation in order to have easy availability to prey. They eat both large and small prey they track their prey and attack them *(Kumar, 2011).* In Himachal Pradesh, human-leopard conflict is prominent in Bilaspur, Hamirpur, Mandi and Kangra district *(Pandey and Sharma, 2016).*

Snow Leopard *(Panthera uncia)* is the native of central Asian mountains and it is an endangered species. According, to a scientific survey of Snow Leopard Population Assessment in India (SPAI). India is the home to 718 snow leopards in India. It is estimated that Ladakh has the highest number of snow leopards (477) accompanied by Uttarakhand (124), Himachal Pradesh (51), Arunachal Pradesh (36), Sikkim (21), and Jammu and Kashmir (9). The main cause behind human-snow leopard conflict is livestock predation *(Maheshwari, 2013).*

Asiatic Black Bears *(Ursus thibetanus)* are native of Pakistan, Korea, Afghanistan, Iran, China, India and Japan. Most of the Asiatic black bears are found in the Himalayan region and the hill of north-eastern India *(Charoo et al., 2009)*. In India, they are found in Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Arunachal Pradesh, Sikkim, West Bengal, Mizoram, Meghalaya and Tripura. Black bears are omnivorous, and they fed upon fruits, leaf material, grasses, insects and sometimes on other animal matter too. Himalayan brown bear *(Ursus arctos isabellinus)* is found in upper altitudes of North and Western Himalayan Landscapes. Brown bears have been found in 10 protected areas in the Great Himalayan and Trans-Himalayan ranges of Himachal Pradesh *(Sharief et al., 2020)*. Human-brown bear conflicts mostly take place in summers.

Rhesus Monkeys *(Macaca mulatta)* and Hanuman Langur *(Semnopithecus entellus)* have become civilized in different parts of India due to agricultural activities, deforestation, and urbanization *(Chaturvedi et al., 2014; Singh Rajpurohit et al., 2011).* In Himachal Pradesh, rhesus monkey is associated with monkey god Hanuman and langurs are considered as Hanuman`s avatar. Due to this belief, people offer them food which bring monkeys closer to human habitats *(Pirta et al., 1996; Reddy and Chander, 2016).*

2.1.2 IN INDIA

Human-elephant conflict is at its peak in Assam, which is a biological hotspot too. A report was published by Government of Assam`s Ministry of Forests in March 2023, stating that approximately, 70 people and 80 elephants lose their life annually due to these conflicts. According to 2009 handbook of the Assam *Hathi* Project (Project 2009) there are around 5000 elephants in Assam and their number is increasing *(Bhagabati, B., Sarma, K. K., & Bora, K. C. 2024)*. The only source of food, water and shelter for elephants of Assam is forest. Due to deforestation in regions of Assam, there is scarcity of food and water for elephants. People have started to cultivate on forest land. So, herds of hungry elephants emerge out of the nearby forest area and feed on agricultural regions of people. This leads to clash between human and elephants, which causes human injury and agricultural losses *(The Deccan Herald, n.d)*. According to a news published in The Deccan Herald on June 9, 2022, the other reason for rising human-animal conflict in Assam is speeding automobiles on national highway 37 (NH 37) which passes through restricted woods of Kaziranga National Park. Several animals have lost their life due to automobiles.

Another rising human-animal conflict in India is Human-Tiger conflict. It is seen that most of the time when wild tiger populations come in contact with human land, they become danger for livestock rather than humans as they are in search of food. In most region of India people is tolerant for tigers but in some other parts of country show hostile behaviour towards them. For example, in Talda Khet village a tiger had killed a goat outside the Ranthambore National Park, in return villagers had to poison the tiger to kill it. This led to the human-tiger conflict in that village *(Conservation India article by Dr. Ullas K Karanth published on Friday, 4 March 2011)*. The Sunderban biosphere reserve is a UNESCO world heritage site and is the biggest mangrove forest in world, located in India and Bangladesh. Royal Bengal Tiger, one of the known endangered species reside in Sunderban Biosphere Reserve. Deforestation by the villagers is causing tigers to attack them as their habitat is being destroyed. Indigenous people of Sunderban area are dependent on forest for their daily needs like firewood, water and bee products. This interference of human in forests is changing the composition of core, outer core and buffer forests of Sunderban. This has caused increase in human-tiger conflict in Sunderban *(Dhar, S. B., & Mondal, S. 2023)*.

The wild boars\ wild pig *(Sus scrofa)* is one of the most scattered large mammals. It has been always dependent on man, and it destroys human modified land *(Fadeef 1975, Erkinaro et al., 1982).* It is a fast-breeding animal and tolerant to harsh environment, which makes it competent to adapt in new areas *(Erkinaro et al., 1982, Ahmed 1991)*. Wild pigs are big threat to agricultural crops. They attack agricultural fields and destroys the crops by utilizing them for food. The wild pigs are known as universal crops pest also *(Tisdell 2013).*

2.1.3 GLOBALLY

Conflicts between humans and animals are old. They take place in all continents only varying in topography. In Zambia, human-animal conflicts are direct when humans are killed by animals or indirect when animals damage crops and infrastructure (*Chomba., Senzota, R., Chabwela, H., Mwitwa, J., & Nyirenda, V. 2012).* Hippos damage agricultural fields and destroys crops mostly at night. Agricultural fields that are in 10 km radius of riverbanks are more prone to damage. Sometimes hippos destroy fishing gear of locals which causes them property damage *(Chomba., Senzota, R., Chabwela, H., Mwitwa, J., & Nyirenda, V. 2012)*. In Tsavo East National Park that is located in Kenya, lions were responsible for 312 attacks on livestock *(Patterson et al. 2004).*

The Nile crocodile *(Crocodylus niloticus)* is a predator which is found in wetland systems in about 26 sub-Saharan African countries including Zimbabwe. Its survival is threatened due to habitat loss, water pollution and excessive haunting. It is suffering due to human activities, which has caused it to be extinct in some parts of Africa *(Utete, B.2021).*

Human-animal conflict affect commercial cattle ranches as well as it also affects rural and vulnerable communities. *Patterson et al. (2024)* conducted research in Tsavo East National Park in Kenya, where three carnivore species were mainly responsible for attacks on a private cattle ranch. These carnivores were lions, hyenas and cheetahs, which mainly attack domestic animals like cows, bulls, steers and young cattle.

2.2 CAUSES OF HUMAN-ANIMAL CONFLICT

Human-animal conflict take place when the action of one negatively affects the other. These conflicts are recorded around the world in aquatic, terrestrial and aerial environments. These conflicts involve a few animal taxa. There are number of causes of these conflicts including direct attack of animals on humans and livestock and degradation of crops *(Torres, D. F., Oliveira, E. S., & Alves, R. R. N. 2018).*

2.2.1 LANDSCAPE CHANGE

Research done in 21st century shows that, humans have dominated the landscape, with every ecosystem has been influenced by humans activity *(Vitosuek et al. 1997)*. About 40-50% earth surface has been used by humans with 10-15% and used for agriculture, irrigation or urban development, additional 6-8% land has used as grassland for livestock *(Olson et al. 1998; Vitosuek et al. 1997)*. According, to human disturbance index almost three-quarters of earth`s habitable land surface is disturbed by humans *(Hannah et al. 1994; Hannah 1995)*. The anthropogenic spread is a major cause of human-animal conflict. Human activities disturb natural environment which causes habitat loss for many animals that forces them to search for alternative resources. In the mountain range of Central European countries during post-socialist period forests habitats had undergone transitions into build-up areas *(Mustatea, M., & Patru-Stupariu, I. 2021).* In developing countries, public land is being used for road and urban infrastructures, which has a big hand on changing the ecological landscape and provoke human-animal conflict *(Barnes, M.; Craigie, I et al.2016)*.

2.2.2 PROXIMITY TO CONSERVATION/ PROTECTED AREA

Human-animal conflicts are more severe around protected areas because here human and animal overlap each other`s habitat very easily. Villages that are present near protected areas are at great risk to experience human-animal conflicts. As there are many chances to encounter wild animals. Villager's livestock graze forest areas that are in close vicinity to wildlife habitat which make them an easy target for wild animals. Livestock easily attracts large carnivores, even if they are not in forest. Carnivores have great sense of smell which allows them to track livestock and they follow them to nearby villages and sometimes causes injuries to villagers. In India`s Pilibhit Tiger Reserve, tigers stroll around the agricultural fields of locals which causes fear among locals. In Mount Cameroon, according to a research, farms that are closer to Mount Cameroon National Park Southwest Region, are more prone to agricultural damage due to wild animals *(Attia, T. S. N., Martin, T. N., Forbuzie, T. P., Angwafo, T. E., & Chuo, M. D. 2018).*

2.2.3 CROP RAIDING

Most common cause of human-animal conflict is crop raiding by wild animals including large mammals *(Tchamba, 1995)*. Crop raiding and human-animal conflict go hand in hand. Crop raiding has caused food scarcity and income insecurity, affecting the development of affected areas *(Bosco, N., & Sila, W. 2025)*. Agriculture is the backbone of a country. Some wild animals such as, elephants and rodents are known as to raid crop which causes economic losses for farmers. This situation tells us that animals searching for food, directly affect agricultural output and local livelihood *(Attia, T. S. N., Martin, T. N., Forbuzie, T. P., Angwafo, T. E., & Chuo, M. D. 2018).* In areas where crop raiding by animals is severe, locals' attitude towards animals is very hostile *(Li, M., Jiang, W., Li, B., & Butt, N.2023)*. In Serengeti National Park in northern Tanzania, baboons are reported to be the most destructive wild animals for the villages located near these protected areas. They have caused economic loss for different households *(Mwakatope, A., Nyahongo, J., Ntalwila, J., & Roskaft, E. 2024).*

2.2.4 LOCAL VEIWPOINT AND CULTURAL BELIEFS

The viewpoints of the locals and their beliefs causes them to be aggressive or hostile towards wild animals, which causes conflicts. For example, elephants, monkeys and chimpanzees are seen as dangerous which leads people to have negative attitudes towards them. A study was conducted on indigenous people of Korup National Park to understand their relationship with elephants *(Stephenson, 2004).* In some conservation areas in Cameroon, locals believe that elephants transform into humans. They believe that once in a while villagers transform from humans to elephants, bush pig etc to take revenge for some misdeed or unpaid dept *(Stephenson, 2004; Powell, 1998 and Tchamba 1995).*

2.2.5 LACK OF COMPENSATION POLICIES

When the government do not compensate farmers for losses caused by animals, the farmers become hostile towards animals which causes human-animal conflict *(Attia, T. S. N., Martin, T. N., Forbuzie, T. P., Angwafo, T. E., & Chuo, M. D. 2018)*. In most of the cases, legal policies involving land-use and wildlife management are contributing factors for human-animal conflicts *(Madden, F. M. 2008)*. Government officials are responsible for dealing with the whole process of compensating the victims of animal assault and sometimes corrupt officials are involved in this whole process causing delay *(Johnson, M. F., Karanth, K. K., & Weinthal, E. 2018)*. McKenzie F. Johnson et al, argued that compensation policies designed by government are to protect threatened species and not to look after the damages caused by animals to locals (*Johnson, M. F., Karanth, K. K., & Weinthal, E. 2018).*

In the study conducted by Johnson et al, has observed that locals blame governments when they encounter any wildlife.

2.3 TYPES OF CONFLICT

Humans and animals interact with each other in various ways. Our species has used animals for food, musk, feathers and furs for many years. Human have destroyed wildlife habitat and used lands for agriculture. Human and animal conflict have negative impact on animals and as well as on humans too *(Gemeda, D. O., & Meles, S. K. 2018).*

2.3.1 ECONOMIC LOSS

Human-animal conflict causes pronounced economic losses. Farmers must face financial losses due to herbivore crop raiding and livestock predation. This causes poverty and food scarcity *(Gemenda et al., 2018)*. In most of the rural area's agriculture is the main source of income, animal attacks on crops causes financial losses to farmers *(Thakur et al., 2022).* When carnivores attack on livestock it further causes financial loss *(Karanth et al., 2002).* According, to the Directorate of Agriculture, Himachal Pradesh, some reports shows that farmers have forced to stop growing crops on 19,563 hectares of land due to animals raiding their farms *(Bharti et al., 2025).*

2.3.2 DANGER TO HUMAN SAFETY

There is a big question for human safety when it comes to wildlife, as animal are great threat to human welfare. There are numerous cases of human fatality due to animal attacks. Wild animals like bears, monkeys, leopards and wild boars are the most common type of animals that are the causes of human death. According, to a report presented by HP Forest Department statistics, between 2004 and 2015 there are 356 cases of human injuries and deaths per year *(Shivakumar et al., 2023).* The encounters with wild bear are very rare so, they cause minimum injury as compared to other animals *(Gulati et al., 2021).* Latest population estimation and assessment of human- animal conflict by ZSI 2024 states that there are 22 cases of black bear attacks on people and 16 leopard attack on people *(Sharma, 2024).* Monkeys also show offensive behaviour towards people when they feel unsafe. From 2014, there are 1,326 annual bite attacks from monkeys, and it is recorded that around 3.6 macaque bites are reported in Shimla town *(Thakur et al., 2020).*

2.3.3 SOCIAL AND MENTAL STRESS

Victims may suffer from fear uneasiness, due to animal attacks which have great impact on their psychological health and their social behaviour *(Raycraft, 2023).* Animal attack causes trauma and anxiety. For example, victims suffer from post-traumatic stress disorder (PTSD) and anxiety. These incidents cause emotional pain *(Barua et al., 2013).* These incidents may restrict daily activities of victims *(Yeshey et al., 2022).* Social stress can be the cause of psychological problems including anxiety and depression which can lead to antisocial and violence related behaviours. Human studies have shown that people with high aggression traits exhibit increasing inflammatory cytokine levels and unstable immune responses like slower wound healing *(Takahashi, A., Flanigan, M. E., McEwen, B. S., & Russo, S. J..2018).* Cytokines are also known to cause reductions in activity, food intake, and social interaction with increased sleep and anhedonia *(Larson & Dunn, 2001; Dantzer et al., 2008).* Cytokines are released due to psychological stress and evidence have shown its important role for immune system in regulating negative emotional states as well as personality *(Black,2003; Zalcman & Siegel, 2006; Dantzer et al., 2008; 2009; Reus et al., 2015).* Long-term fear of animal attacks can restrict daily activities of victim *(Thakur et al., 2024).* Damage to crops and livestock due to animal attacks can cause financial loss which leads to mental stress. Situations like severe anxiety and stress can arise due to long-term worry for food and finance *(Yeshey et al.,2022).* Continuous encounter with wildlife can lead tribes to relocate.

2.4 MITIGATION

To avoid human-animal conflict or to minimize the loss from these conflict people take some measures. Mitigation strategies for human-animal conflict depend on location and type of conflict *(Somu, Y., & Palanisamy, S. 2023).* Migrating problematic animal is also a way to avoid human-animal conflict, but migration can decrease a species survival rate *(Somu, Y., & Palanisamy, S. 2023).* Physical barriers such as, electric fencing, man-made walls, chain fences can be used to avoid contact with animals *(Mishra, 1997).* Fencing can be expensive, and it is not a suitable preventive measure for some areas *(Choudhury, 2004).*

Insurance schemes and compensation both are given from government for loss of crops and livestock to avoid human-animal conflict. The amount of payment is decided by the degree of loss *(Karanth and Ranganathan, 2018).* Compensation lessens the hostile behaviour and vengefulness of people towards animals *(Bulte and Rondeau, 2005).*

Human-animal conflicts are serious concern for our world. The most common causes for rising human-animal conflict are habitat destruction, agricultural expansion, climate change etc. This literature review focuses on impacts, animal involved in conflicts and mitigation strategies to avoid this conflict. For the betterment of our community and animals, compensation policies should be improved, and mitigation measures should be developed. By doing these things we are making sure to have minimum encounters with animals and a good compensation will make people less hostile towards animals. General awareness should also be spread to make people aware about human-animal conflict.

CHAPTER-3

3. METHODOLOGY

3.1 STUDY AREA

The study is being conducted in the three areas of Himachal Pradesh. The three areas are: -

3.1.1 RAMPUR BUSHAHR (1,2)

Rampur Bushahr (1,2) is in Shimla district of Himachal Pradesh. It is about 130 km from Shimla. Geographically Rampur Bushahr (1,2) is located at 31.45°N to 77.63°E. It has an elevation of about 1021 meters from sea level, which is 4429 feet. It is located on the left bank of Satluj river. It is one of the 17 tehsils of Shimla district. There are 220 villages and 2 towns in Rampur Bushahr (1,2) tehsil. According to census India 2011, Rampur Bushahr (1,2) tehsil has 18484 households with the population of 77,542 out of which 40,683 are males and 36,859 are females. Out of total population, 86.7% of populations lives in urban area and 13.3% lives in rural area. Daranghati Sanctuary is also located in Rampur Bushahr (1,2). It is a home to many pheasants like Monal, Tragopan, Koklass and Kalij. Musk deer and Goral enrich the fauna of the area.

FIG 3.1 - Map of Shimla district showing Rampur Bushahr

FIG. 3.2 - Image of Rampur Bushahr

FIG. 3.3 - Image of Sarahan

3.1.2 ANNI (TOWN)

Anni town is located 44 kms north of Narkanda in Kullu District of Himachal Pradesh. It extends from the

latitudes approximately 31.43º N to longitudes 77.41º E. It has an elevation of about 1228 meters from sea level which is 4029 feet. This place is in the border of the Kullu and Shimla District. Anni is an urban area. According to census India 2011, Anni tehsil has total population of 56,917, out of which 29,077 are males 27,840 females. In 2011, there were total 12,292 households in Anni tehsil. Anni tehsil has temperate forests to mixed deciduous forest which makes great home to different animals species.

FIG 3.4 - Map of Kullu district showing Anni tehsil.

FIG 3.5 - Image Anni town.

3.1.3 NICHAR

Nichar is a village located in the Kinnaur district of Himachal Pradesh, situated at an elevation of 2100 metres along the historic Hindustan-Tibet Road. Geographically it is located at 31.55ºN to 77.94º E. According to census India 2011, total population of Nichar is 27,683. Nichar is one of the three administrative divisions of Kinnaur district. The area is rich in biodiversity and known for its variety of flora and fauna, including species such as antelopes, gorals and leopards. Nichar is surrounded by alpine forests that's why it is called as green valley. The temperature of Nichar remains moderate throughout the year.

FIG 3.7 – Image of Nichar

showing Nichar village

FIG 3.6 – Map of Himachal Pradesh

3.2 DATA COLLECTION

This study is primarily based on both primary and secondary source of data collection. It mainly focuses on three regions of Himachal Pradesh: - Rampur Bushahr (1,2), Anni (Town) and Nichar. Secondary data had been gathered from already existing reports, research papers and forest department records to study the extent of human-animal conflict in these areas. Primary data had been collected through the various methods of primary data collection such as questionnaires, interviews, and field visits. A questionnaire containing questions related to frequently involved animals in conflict, causes, impact of conflict and mitigation measures was circulated through the various means of social media in form of google form. The respondents of the questionnaire were people living in study area itself. Further, the interviews with the victim of human-animal conflict were also taken to examine the extent of damage caused by animals. Interviews of government officials of Forest department were also taken (DFO).

Table 3.1

Selected questionnaire items and types of answers

Question items	Types of responses
1. Place of residence	Rampur Bushahr (1,2), Anni (Town), Nichar
2. Do you and your family have encountered any conflicts with animals?	Yes/No
3. If yes, which one?	Human injury or death, crop damage or livestock predation, fear or disturbance, all of these
4. Which animals are most commonly involved in conflicts in your area?	Monkeys, leopard, bears, dogs, monkey and bear
5. What do you think are the main reason for human- animal conflict in your area?	Habitat loss and deforestation, scarcity of natural food and water, encroachment into

	wildlife area, all of these
6. What methods are used in your area to manage wildlife conflict?	Lethal methods/ non-lethal methods/ both/ none
7.what non-lethal methods are used to reduce human-animal conflicts in your area?	Fencing, watchtowers, animal deterrents, government or NGO support
8. what lethal methods are used in your area?	Hunting, poisoning, trapping and killing, none

An interview had been conducted with the Divisional Forest Officer of Rampur Bushahr division as a part of primary data collection. That interview helped to gain authoritative information on human-animal conflict in the study area. The interview was partially structured with main focus on main causes of conflict, most frequently involved animals in conflict, impact of habitat loss on human-animal conflict, protocol that forest department follow when animals are killed or harmed by locals, and measures taken to mitigate human-animal conflicts by forest department.

HIGHLIGHTS FROM THE INTERVIEW INCLUDE: -

Causes of conflict - He underlined habitat loss and encroachment as prime cause of conflict. He stated that "building road, highways, infrastructural projects, and hydro power project has caused fragmentation of animals habitat which led to interface between human and animal". He highlighted a case of Shahdhar gram panchayat of Sarahan (Rampur Bushahr) where a bear was continuously attacking cows. Later, it was found that the bear was a nursing mother who was attacking the cow shed.

On animal involved - According to DFO apex predators like bear leopards mostly cause conflict. Monkeys and snakes also cause conflict. He said that occasionally small mammals, birds, and other small animals are seen killed on road due to speeding.

On mitigation measure – The DFO mentioned that changing of cropping pattern around the forest fringes can help to prevent wildlife coming closer to human settlement, for example fruit bearing crops should not be planted near forest fringes as animals are attracted to them as food source. By making sure that forest is sufficiently stocked with prey will not allow animals to come out. He also mentioned that government has declared that under active afforestation programmes there should be 60% species of wild fruit bearing plants that are to be planted in forest. He stated that "under passing and overpassing should be made on highways for wildlife''.

On Forest Department Protocols for human caused animal death- He emphasized that the law is very strict when it comes to human caused animal death. According to wildlife protection act there is imprisonment of about 3-4 years and hefty fines for causing any harm to animal. He stated that "wildlife protection act is biggest deterrent and support for wildlife managers to ensure punishment for people who cause harm to animals''.

FIG 3.8 – Interview with Divisional Forest Officers

FIG 3.9 - Forest Department Rampur Bushahr

3.3 MOST COMMONLY INVOLVED ANIMALS IN CONFLICT

3.3.1 BEAR

Asiatic black bear *(Ursus thibetanus)* is a major contributor to human-animal conflict taking place in Rampur Bushahr (1,2) (Shimla), Anni (Town)) and Nichar. This species is forest inhabitant found between 1200m and 3300m above sea level in India *(Prater,1980).* The Asian black bear is omnivorous. In 1970s, Asian black bears were reported to kill and eat Hanuman langurs in Nepal *(Gursky-Doyen, S., & Nekaris, K. A. I. 2007)* It is also known as Asian black bear, moon bear and white-chested bear. It is a medium size bear species habitual to arboreal way of living. The breeding season of Asian black bear starts from mid-June to mid-August. Females give birth by mid-January. By October, the uterine horns of pregnant females grow by 15-22mm. The embryo weigh 75gms by December. An adult female bear normally has their first litter at the age of 3 years. Asian black bears have late implantation. An adult female generally give birth in winters or early spring after a gestation period of 200-240 days. It is recorded as vulnerable on the ICUN Red List and in danger by deforestation and poaching for its body parts. According to recent wildlife census titled Population Estimation and Assessment of Human-Wildlife Conflict released by Zoological Survey of India (ZSI), 2024, approximately black bears are responsible for conflicts in 18.65% of the affected areas. This report highlights that bear usually attack sheep, goats and cattle.

FIG 3.10 - Image of Bear

3.3.2 LEOPARD

Another animal that is well-known to cause human-animal conflict in Himachal is leopard. The scientific name of leopard is *Panthera pardus.* Its body is slender and muscular reaching a length of 92-183cm with a 66-102 cm long tail. It has a pale yellowish to dark golden fur with dark spots grouped in rosettes. The leopard is a solitary and territorial animal, living at altitudes between 3000 and 5000 meters. The leopard is a carnivore. In most of the areas, leopards mate all year round, for example: In Manchuria and Siberia, they mate during January and February. The female's oestrous cycle lasts about 46 days, and she is in heat for 6-7 days *(Sadleir, R. 1966).* Gestation lasts for 92-105 days. Cubs are generally born in a litter of 2-4 cubs *(Eaton, R.L. 1977).* According to wildlife census report released by Zoological Survey of India leopards mostly prey upon sheep in Himachal Pradesh accounting for 21.3% of predation incidents, followed by goats (20.1%), cattle (9.4%), dogs (3.4%), and horses (2.4%). According to this report, in Anni (Town) higher number of attacks are on cattle and mules by leopards *(Times of India, Rohit Mullick, Oct15,2025).*

FIG 3.11- Image of Leopard

3.3.3 MONKEY

Monkeys are widespread animal that are most commonly involved in conflicts with humans. As they are ubiquitous their encounter with humans is constant. *Macaca mulatta* commonly known as Rhesus macaque is most common species of monkey found in Himachal Pradesh. It is a sub social species of monkey as it is also called 'commensal' primate in India *(Southwick and Siddiqi 1994, Bishop et al. 1981)*. Rhesus macaques are found in dry scrub forest of lower altitude to as high as 3000 meters above sea level in Himachal Pradesh. Rhesus macaques are omnivore. Females of this species attain puberty at the age of 3 and they start reproducing at the age of 3.8 on the other hand males attain puberty at the age of 4 but attain adulthood at the age of 8 years. Most of the mating take place between October and December, and births happen at the end of rainy season *(Lindburg 1971).* Gestation lasts for about 164 days. Most common conflict between humans and macaques in Himachal Pradesh is loss of crop and property *(Pirta et al. 1997).*

FIG 3.12 - Image of Monkey

3.4 TIMELINE OF CONFLICT

Human-animal conflict in Himachal Pradesh is a crucial raising issue. These conflicts arise when human or animal become harmful to each other *(Mekonen 2020).* In Himachal Pradesh it is a growing issue. Carnivores are involved in many conflicts with human including predation on human and livestock *(Chakrabarti, 1992; Chellum and Johnsingh ,1993; Daniel, 1996; Woodroffe 2000, Ginsberg, 2001)*. The conflict between human-leopard has recently grown during last decade in Uttarakhand *(Negi, 1996 and Mohan, 1997).* According to study conducted by Wildlife Institute of India (Dehradun) human injury and livestock predation by leopard has taken place to varying extents in five forest divisions of Mandi district during 1988-2007. In Mandi district human injury due to leopard attack have taken place every year from 1888-2007. Shimla district is also involved in human-leopard conflict.

The increase in human population and developments have caused increase in human bear interactions *(Beckman and Berger 2003).* According to a Interim report submitted by Zoological Survey of India, Kolkata in 2021 on Human-Wildlife Conflict Management Baseline Survey and development of comprehensive strategy for its mitigation in selected district of Himachal Pradesh Human-Asiatic black bear conflict was highest in the Shimla and Bilaspur district in year 2006-2010.

Human-monkey conflict is intensifying day by day as monkey is a commensal animal so is habituated to human activities. Dolhinow and Lindburg reported forest rhesus macaque population to be between 60,000-70,000 for entire Himachal Pradesh using vehicle survey in 1980. *Pirta et al (1997)* conducted another survey after 10 years 1988-1990 and reported 1,55,080 macaques in forests and 67,934 macaques in non-forest area. According to the census 2020, the estimated population of rhesus macaque in Himachal Pradesh is 1,36,443.

3.5 MITIGATION

3.5.1 FOR BEAR

In recent year human-bears conflicts have intensified decreasing the tolerance of locals for the species and seriously affecting the motivation of local communities to protect black bears. So, development of effective majors for mitigating human bear conflicts is important to protect black bears. Mitigation generally means reducing the risk of loss from the occurrence of any undesirable events. The most common measures that the locals are taking for reducing human bear conflict are watching their livestock when grazing, bursting crackers, livestock guardian dog. At present, there is still a lack of research on the mitigation measures of human-bear conflict, but the forest department is still trying to find different ways to mitigate human-bear conflict. This includes planting fruit bearing trees like *Pyrus pashia* and Oak trees in forests to provide food sources.

3.5.2 FOR MONKEY

In Himachal Pradesh human-monkey conflicts are growing which mostly includes human injury and crop damage. The farmers are also facing threat to their livelihood as their crops are being damaged by monkeys. So mitigating human-monkey conflict is very important. Local people raise dogs to scare away monkeys from their fields. People use fencing around their fields and homes for protection from monkeys. Recently, government is developing new technology to prevent human-monkey conflict like developing electric fences. Himachal Pradesh Forest Department have started a programme of monkey sterilization to control the population of monkeys. To encourage monkey catchers, the state pays an incentive of Rs 500 per monkey trapped. The target for monkey sterilization in the year 2015-2016 was 28,800.

3.5.3 FOR LEOPARD

The most effective measure for mitigating human-leopard conflict is habitat restoration. Leopard requires space, water and prey, so protecting their habitat will keep them away from human residential areas. Because of this human will have minimum chances of encounter with them. Humans can prevent their livestock from wandering in areas with high leopard risk to prevent their interaction. Government provides financial compensation for the victims of leopard attack. These compensation erase anger and hostility of people towards leopards and reducing human-leopard conflict to a certain extent.

CHAPTER – 4

4. RESULT

To present a clear understanding of human-animal conflict in the regions of Rampur Bushahr (1,2), Anni (Town) and Nichar, this chapter presents a detail examination of the primary data collected during the study the data, was collected through questionnaires and interviews, showing local experiences with conflict, including crop damage, livestock predation and other forms of wildlife interference. This chapter also explains types of conflict locals are experiences, animal involved in conflict, causes of conflict and mitigation measures taken to avoid conflicts.

4.1 PROBLEM STATEMENT: -

The interaction between human and animals in Rampur Bushahr (1,2), Anni (Town) and Nichar has resulted in various types of conflicts, as shown in the responses of local residents. These mainly include crop damage, livestock predation, fear or disturbance and even human injury. Some have faced all these conflict all together and some have not faced them at all. The following table presents the nature and extent of these conflicts.

Table 4.1 Type of human-animal conflict in Rampur Bushahr (1,2), Anni (Town), Nichar

Type of conflict	Rampur Bushahr (1,2)	Anni (Town)	Nichar
Human injury or death	13.58%	3.30%	6.90%
Crop damage and livestock predation	37.04%	50.81%	44.82%
Fear or disturbance	17.28%	11.47%	20.69%
All of these	28.40%	26.22%	25.87%
None	3.70%	8.20%	1.72%

Table 4.1

Table 4.1 shows the responses of the respondents regarding types of human animal conflict in Rampur Bushahr (1,2), Anni (Town) and Nichar localities of the study area. Total 200 respondents were involved to respond on the above said question. Out of which larger participation were found in case of Rampur Bushahr (1,2) (81), followed by Anni (Town) (61) and Nichar (58) respectively.

In Rampur Bushahr (1,2), the most commonly reported type of conflict is crop damage and livestock predation by animals cited by 37.40% of respondents. Further, the second most common response is all of these includes, human injury or death, crop damage and livestock predation and fear or disturbance stood at 28.40%. Fear or disturbance was reported by 17.28% while only 3.70% of respondents reported no conflict.

In Anni (Town), crop damage and livestock predation are predominant with 50.81% of respondents identifying it as the main conflict. All of these option was selected by 26.22% of respondents, and fear or disturbance by 11.47%. Human injury or death was the least reported (3.30%) and 8.20% respondents reported no conflict.

In Nichar, crop damage and livestock predation are the leading type of conflict with 44.82% followed by fear or disturbance (29.69%) and all of these (25.87%). Human injury or death was reported by 6.90% and only 1.72% faced no conflict.

As per the above table it is pertinent to mention here that the comparison of the study area showed that Rampur Bushahr (1,2) reported highest number of respondents experiencing direct harm from the wildlife,

with 13.58% indicating human injury or death. In contrast, Nichar accounted for 6.90% and Anni registered the lowest at 3.30%. Crop damage and livestock predation emerged as the most reported issue across all three regions. Anni recorded the highest number respondents identifying this as their major concern by 50.81% of respondents. Nichar followed closely with 44.82%, while Rampur Bushahr (1,2) reported 37.04%.

When it comes to psychological and indirect impacts, Nichar had the highest proportion of respondents (20.69%) citing fear or disturbance caused by wildlife presence. Rampur Bushahr (1,2) followed at 17.28%, and Anni (Town) was again the lowest at 11.47%. This suggests that residents of Nichar may experience more frequent wildlife sightings or disturbances that, while not directly harmful, affect their sense of safety and well-being.

A moderate number of responses revealed that respondents have experienced all types of conflict (injury, crop loss, and fear), Rampur Bushahr (1,2) had the highest proportion (28.40%) of respondents affirming multiple conflict types, followed by Anni (Town) (26.22%) and Nichar (25.87%). These responses showed that Rampur Bushahr (1,2) faces a broader spectrum of human-animal conflict issues**.**

A small number of respondents indicated that they experienced no conflict. Where Anni (Town) has highest number of respondents accounting for 8.20% responses where respondents have not faced any conflict with animals, followed by Rampur Bushahr (1,2) with 3.70%, Nichar with 1.72%.

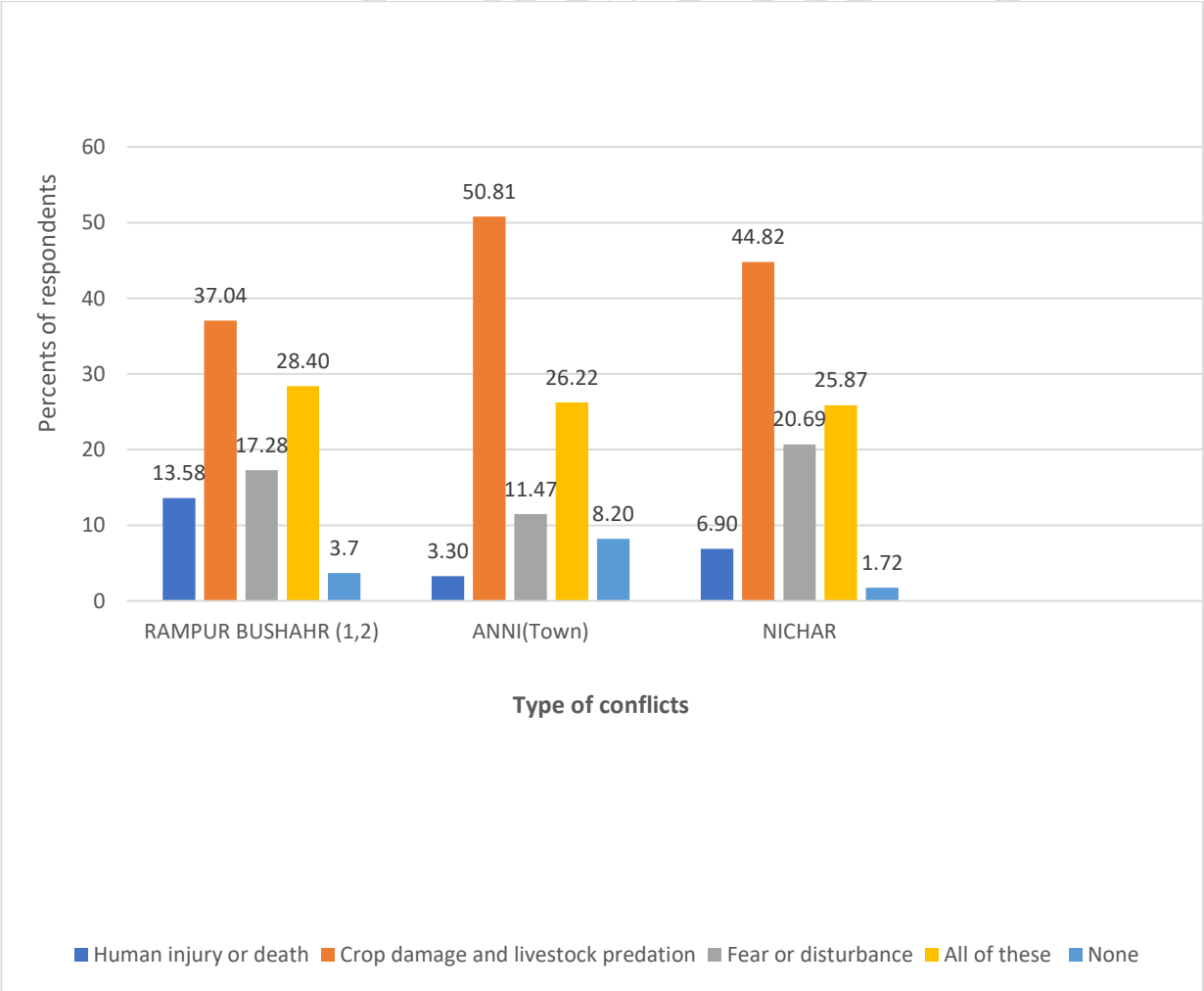

FIG. 4.1

4.2 PROBLEM STATEMENT: -

Human-animal conflict is serious growing challenge in rural as well as in urban areas, here the movement of animals into human settlements has led to direct encounters. These conflicts cause damage to property,

poses a great threat to human safety, and affect the local livelihoods. The table below outline the specific animals that are most commonly involved in conflicts based on responses collected from the residents of the study areas.

Table 4.2 Animals involved in human-animal conflict in Rampur Bushahr (1,2), Anni (Town), Nichar

Animal involved	Rampur Bushahr (1,2)	Anni (Town)	Nichar
Monkey	**44.44%**	**36.07%**	**18.97%**
Leopard	**8.65%**	**6.55%**	**24.13%**
Bear	**9.88%**	**11.48%**	**25.87%**
Dog	**3.70%**	**8.20%**	**5.17%**
Monkey and bear	**33.33%**	**37.70%**	**25.86%**

Table 4.2

The responses in table 4.2 are categorized based on the animals involved in human-animal conflict. In Rampur Bushahr (1,2), monkeys are identified as the most commonly involved animals in conflict, reported by 44.44% of respondents. This was followed by monkey and bear combined (33.33%). Bears are involved in 9.88% of the cases, while leopards accounted for 8.65%. Dogs are the least reported conflict animal in this region with 3.70%.

In Anni, monkeys and bears are predominant in causing conflicts with 37.70% followed by conflicts with monkeys alone (37.07%). Responses suggested that bears are causing conflicts in 11.48% of the cases, while dogs and leopard are involved in 8.20% and 6.55% of the conflicts, respectively.
In Nichar, bears are the leading cause of conflict, with 25.87% of responses. This was followed closely by monkey and bears (25.86%) and leopards (24.13%). Monkeys are involved in 18.97% of cases, while dogs are least involved animal (5.17%).

Data presented in table 4.2 reveals about the animals involved in conflicts in study area. According to the above given table Rampur Bushahr (1,2) reports the highest number of conflicts involving monkeys, in percentage term which is 44.44%. A large number of respondents identifying them as the main problem species. Anni follows with 36.07% in percentage term while, Nichar has the lowest percentage that is 18.97%.

When it comes to Leopard as animal in causing conflict, Nichar recorded the highest conflict level involving leopards with 24.13% from respondents. Rampur Bushahr (1,2) and Anni (Town) showed lower concern regarding leopard as conflict causing animal with 8.65% and 6.55% respectively. Nichar again leads in bear-related conflict in percentage term as well as in absolute term. In percentage it is recorded 25.87%, followed closely by Anni (Town) with 11.48% in percentage number while, Rampur Bushahr (1,2) stood last in case of bear as animal causing conflict with 9.88% in percentage number.

Conflict involving dogs was minimal across all three regions, with Anni (Town) showing the highest at 8.20%, followed by Rampur Bushahr (1,2) (3.70%) and Nichar (5.17%).

A notable percentage of respondents reported experiencing conflict from both monkeys and bears Anni (Town) had the highest rate at 37.70%, indicating a dual-threat scenario, Followed by Rampur Bushahr (1,2) at 33.33%, and Nichar at 25.86%.

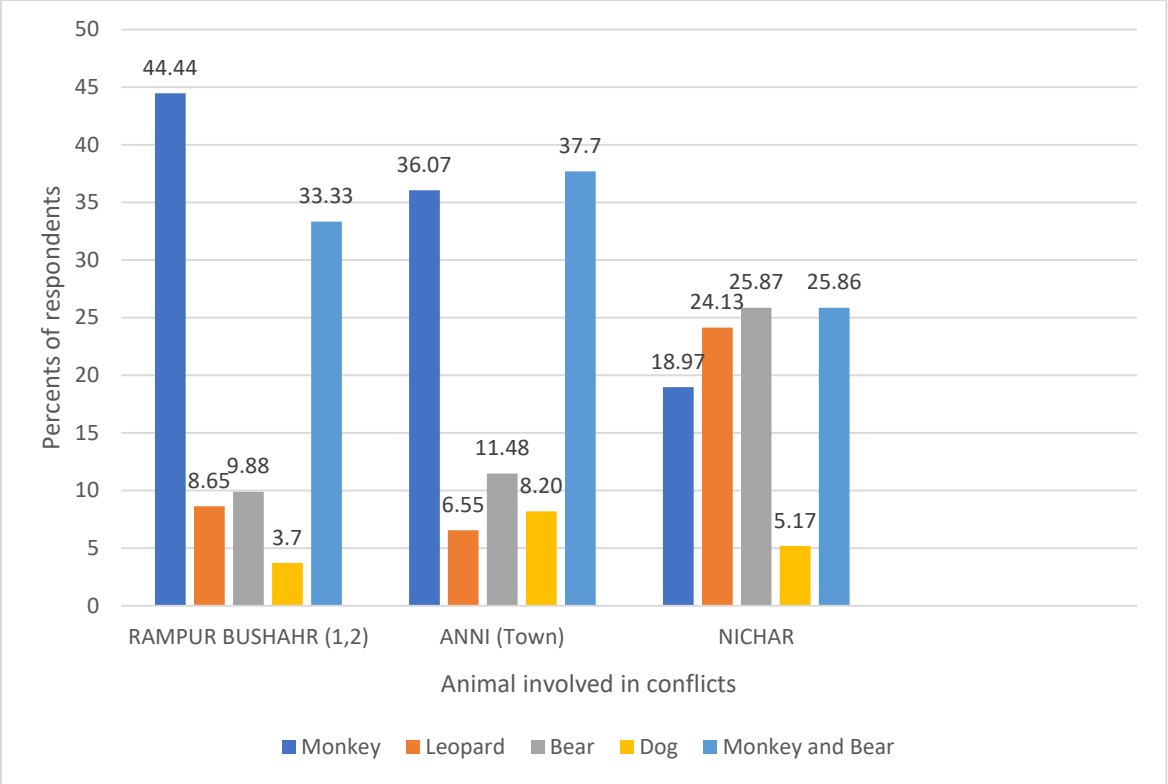

FIG. 4.2

4.3 PROBLEM STATEMENT: -

The growing interactions between human and animals in study areas (Rampur Bushahr (1,2), Anni (Town), Nichar) have become a pressing issue, affecting both resident's livelihoods and wildlife conservation. The causes of these conflict are complicated varying from habitat degradation, limited natural resources to human encroachment into forest. The following data represents the responses from the people living in study area about the causes of human-animal conflict.

Table 4.3 Causes of human-animal conflict in Rampur Bushahr (1,2) Anni (Town), Nichar

Causes of conflict	Rampur Bushahr (1,2)	Anni (Town)	Nichar
Habitat loss and deforestation	9.88%	8.19%	15.52%
Scarcity of natural food and water for wildlife	37.04%	22.96%	34.49%
Encroachment into wildlife area	4.94%	4.92%	5.17%
All of these	48.14%	63.93%	44.82%

Table 4.3

The table 4.3 represent the results of survey conducted to identify causes of human-animal conflict. In all study areas, most of the respondents identified all listed causes namely habitat loss and deforestation,

scarcity of natural food and water for wildlife, and encroachment into wildlife areas as collectively responsible for the conflicts. This option was selected by 48.14% in Rampur Bushahr (1,2), 63.93% in Anni and 44.82% in Nichar.

When analyzing specific causes, the scarcity of natural food and water for wildlife appeared as the most common specific cause in Rampur Bushahr (1,2) (37.04%) and Nichar (34.49%). In Anni (Town), this cause was also significant, accounting for 22.96% of the responses.

Nichar records the highest percentage of respondents (15.52%) identifying habitat loss and deforestation as a key driver of conflict, followed by Rampur Bushahr (1,2) (9.88%) and Anni (Town) (8.19%). This suggests that Nichar is experiencing more visible land-use changes, possibly due to infrastructure development or forest degradation, leading to the displacement of wildlife into human settlements.

Encroachment was cited by the smallest proportion of respondents in all three regions. Rampur Bushahr (1,2) and Anni (Town) report nearly identical levels of concern, at 4.94% and 4.92%, respectively, while Nichar shows a slightly higher percentage at 5.17%. Although the numbers are low, this still points to the presence of human expansion into wildlife habitats, which could be triggering defensive or territorial responses from animals.

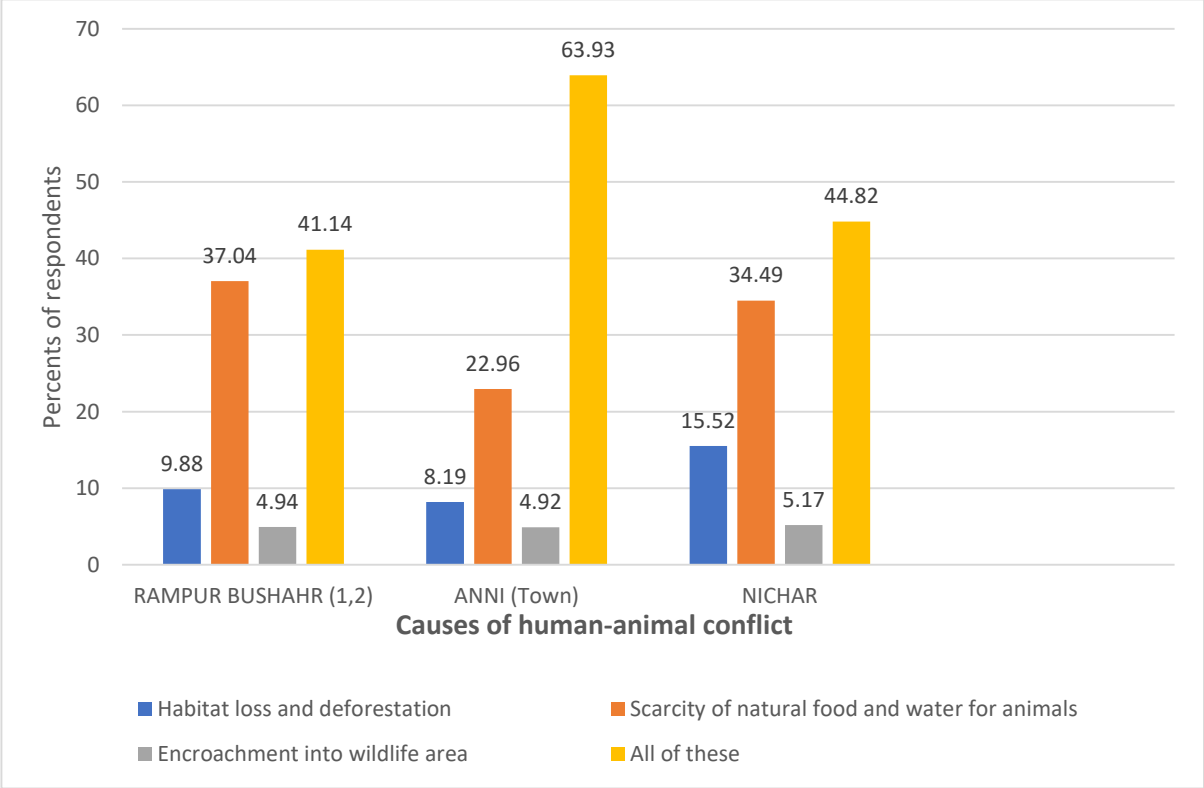

FIG. 4.3

4.4 PROBLEM STATEMENT: -

The increasing number of human-animal conflict in study area has compelled locals to adopt sustainable mitigation strategies. As the locals face challenges like crop damage livestock predation, and threat to safety, non-lethal mitigation measures have evolved as important tools for controlling these conflicts. The table given below explains the various non-lethal measures taken by residents of study area to control human-animal conflict. .

Table 4.4 Non-lethal mitigation measures for human-animal conflict in Rampur Bushahr (1,2) Anni (Town), Nichar.

Non-lethal mitigation measures	Rampur Bushahr (1,2)	Anni (Town)	Nichar
Fencing	**32.10%**	**22.95%**	**25.87%**
Watchtowers	**3.71%**	**3.28%**	**6.89%**
Animal deterrents	**14.81%**	**13.12%**	**8.63%**
Government or NGO support	**6.17%**	**3.27%**	**1.72%**
None of the above	**24.69%**	**16.39%**	**31.03%**
1,2 & 3	**18.52%**	**40.99%**	**25.86%**

Table 4.4

The table 4.4 illustrates the responses of non-lethal mitigation measures adopted in study areas to avoid human-animal conflict. In Rampur Bushahr (1,2), fencing is the most commonly used non-lethal mitigation measure, recorded by 32.10% of conflict cases. Other measures such as animal deterrents (14.81%) and a combination of fencing, watchtowers, and deterrents (18.52%) are also used to a moderate extent. However, 24.69% of the population do not take any mitigation measure, indicating that watchtowers and government/NGO support are least used methods with 6.17%.

In Anni (Town), the most preferred way used to avoid human-animal conflict is the combination of fencing, watchtowers, and deterrents with 40.99%. Here fencing is used in 22.95% cases, followed by animal deterrents (13.12%). Only 16.39% reported using no mitigation measures.

In Nichar, 31.03% of respondents reported using no mitigation measures, followed by fencing (25.87%) and then combination of multiple methods (25.86%). Animal deterrents (8.63%) and watchtowers (6.89%) are used people a small group of people and government/NGO support (1.72%) is least preferred method of non-lethal mitigation.

The table 4.4 shows different types of non-lethal strategies are used to mitigate human-animal conflict in all three study areas where Fencing is the most widely adopted non-lethal strategy in all three areas. Rampur Bushahr (1,2) shows the highest percentage of respondents using this method (32.10%), followed by Nichar (25.87%) and Anni (Town) (22.95%). This suggests that physical barriers are commonly seen as an effective initial line of defense against intruding wildlife, particularly in areas like Rampur, where large-scale crop damage is more prevalent.

Watchtowers are the least utilized mitigation method, with low adoption rates across the board. Only 3.71% of respondents in Rampur Bushahr (1,2), 3.28% in Anni (Town), and 6.89% in Nichar reported using them. The slightly higher usage in Nichar may reflect a need for visual monitoring due to challenging terrain or more frequent nocturnal wildlife activity, but overall, watchtowers are not widely preferred due to either cost or practical inefficiency.

Animal deterrents (like noisemakers or light-based systems) are moderately used. Rampur Bushahr (1,2) reports 14.81%, Anni (Town) 13.12%, and Nichar 8.63% of respondents utilizing such methods. These figures indicate a varied but limited reliance on sensory-based deterrents, potentially due to their effectiveness being species-specific or short-lived as animals become accustomed.

Governmental or non-governmental support appears to be minimal, especially in Nichar, where only

1.72% of respondents acknowledged such involvement. Rampur Bushahr (1,2) and Anni (Town) fare slightly better, with 6.17% and 3.27%, respectively. This limited presence of institutional support highlights a critical gap in policy implementation or outreach programs, suggesting the need for increased intervention from organized bodies.

A significant proportion of respondents reported not using any of the listed measures. Nichar had the highest at 31.03%, followed by Rampur Bushahr (1,2) (24.69%) and Anni (Town) (16.39%). This finding indicates that many communities remain vulnerable and may lack access to effective resources or awareness about available mitigation strategies.

Surprisingly a number of respondents in Anni (Town) reported 40.99% using a combination of all three main mitigation methods (1, 2 & 3), suggesting a more proactive and integrated approach. Rampur Bushahr (1,2) and Nichar had lower, but still noteworthy adoption, at 18.52% and 25.86%, respectively. This combined approach likely reflects higher awareness or greater incidence of conflict requiring layered solutions.

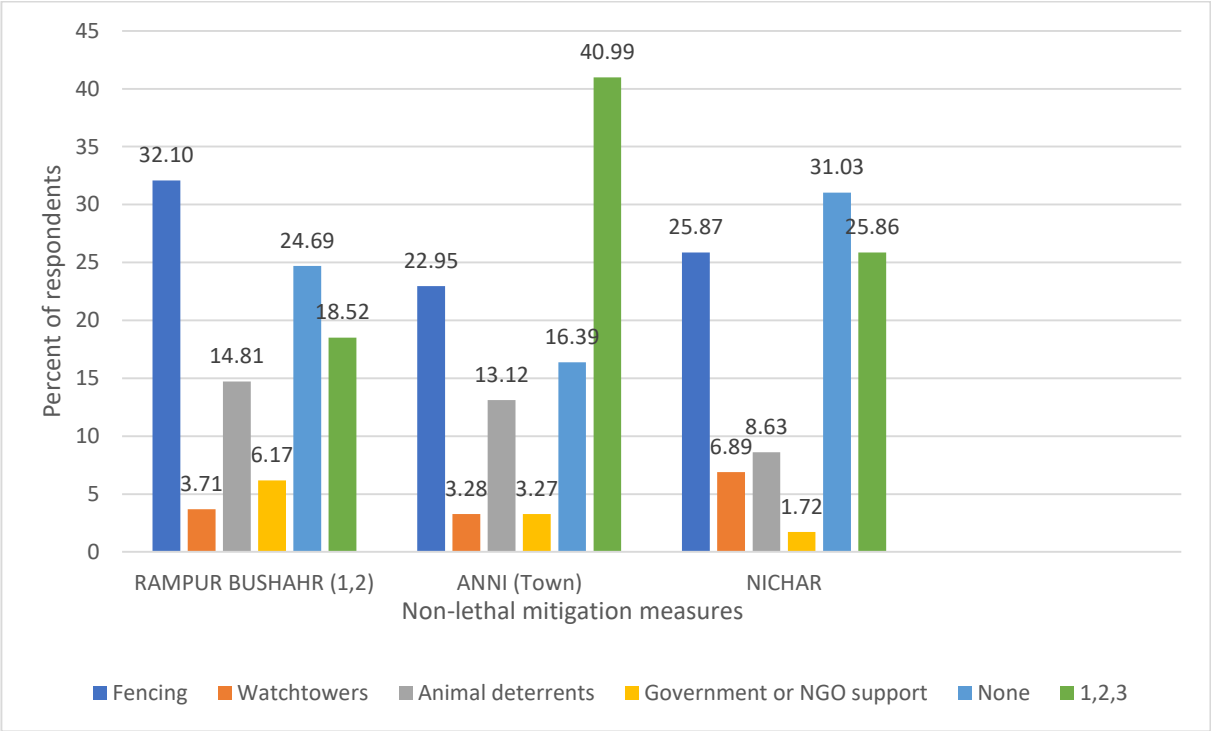

FIG. 4.4

4.5 PROBLEM STATEMENT: -

The growing human-animal conflict has created different problems for locals. These problem include economic loss, threat to safety etc. Locals adopt different mitigation measures to control these conflicts or to prevent them. Mostly they prefer using non-lethal mitigation measures but sometimes they are compelled to use lethal-mitigation measures to control or prevent these conflict. The table given below explains the lethal-mitigation measures taken by the locals of study area to prevent these conflicts.

Table 4.5 Lethal mitigation measures for human-animal conflict in Rampur Bushahr (1,2), Anni (Town), Nichar.

Lethal mitigation measures	Rampur Bushahr (1,2)	Anni (Town)	Nichar
Hunting	**3.71%**	**8.20%**	**3.44%**
Poisoning	**6.17%**	**6.55%**	**6.89%**

Trapping and killing	**8.64%**	**6.55%**	**12.07%**
Shooting animals in self-defence	**22.23%**	**21.32**	**13.80%**
None	**59.25%**	**57.38%**	**63.80%**

Table 4.5

The table 4.5 shows the responses of respondent from the study area about lethal mitigation measures for human-animal conflict. In Rampur Bushahr (1,2) majority of respondents (59.25%) reported not using any lethal mitigation measures. Among those who did, shooting animal in self- defense was the most common response, accounting for 22.23 % of the cases. Other forms of lethal action included trapping and killing (8.64%), poisoning (6.17%) and hunting (3.71%).

In Anni, the responses are similar with 57.38% of respondents stating they do not use lethal mitigation however, shooting in self-defense (21.32%), and hunting (8.20%) appear more frequent than in Rampur Bushahr (1,2). Poisoning, and trapping and killing both accounted for 6.55% each.

In Nichar, the majority also reported not using any lethal mitigation measures with 63.80%, followed by shooting animal in self-defence with 13.80% and then trapping and killing with 12.07%. Poisoning and hunting are reported by fewer individuals with 6.89% and 3.44%.

Table 4.5 examines the extent to which local communities in Rampur, Anni, and Nichar depend on lethal methods to manage human-animal conflicts. The table shows that majority of respondents across all regions reported abstaining from lethal mitigation. Nichar had the highest percentage of individuals who did not resort to any lethal means (63.80%), followed closely by Rampur Bushahr (1,2) (59.25%) and Anni (Town) (57.38%). This widespread avoidance suggests either strong awareness of wildlife protection regulations or a general preference for coexistence and non-violent approaches.

Among the lethal strategies used, shooting animals in self-defence was the most frequently cited in all three areas. Rampur Bushahr (1,2) leads with 22.23%, closely followed by Anni (Town) (21.32%), and Nichar (13.80%). These figures indicate that when lethal force is used, it is typically reactive rather than premeditated likely occurring in moments of immediate threat or danger.

Nichar showed a relatively higher reliance on trapping and killing (12.07%) compared to Rampur Bushahr (1,2) (8.64%) and Anni (Town) (6.55%). This trend may reflect a greater frequency of specific problem animals or a lack of access to rapid response mechanisms, pushing residents to take proactive but lethal measures.

Use of poisoning as a mitigation tool appears fairly consistent across all three regions, with Rampur Bushahr (1,2) at 6.17%, Anni (Town) at 6.55%, and Nichar at 6.89%. These close figures indicate that poisoning, while present, is not a dominant method but may still pose ecological and ethical concerns, especially due to its indiscriminate nature.

Hunting remains the least adopted lethal measure in all three regions. Only 3.44% of respondents in Nichar, 3.71% in Rampur Bushahr (1,2), and a slightly higher 8.20% in Anni (Town) reported using this method. Its lower prevalence could be attributed to legal restrictions, cultural disapproval, or logistical difficulties.

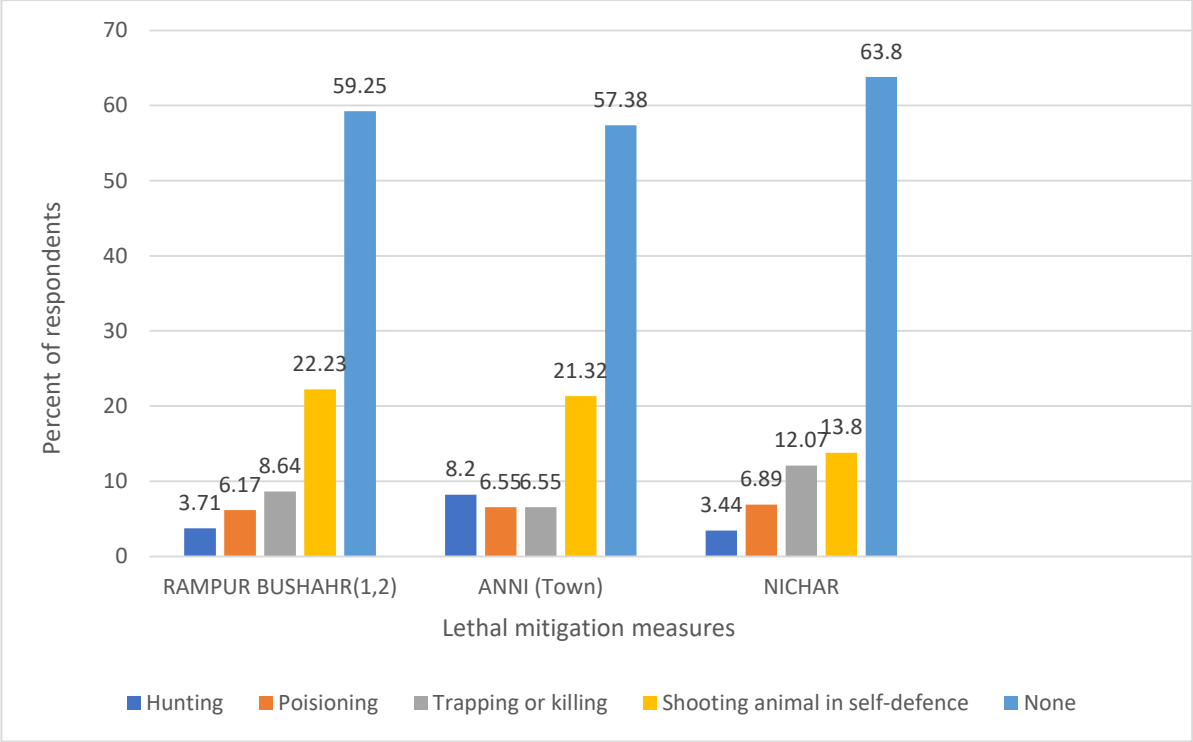

FIG. 4.5

CHAPTER-5

5. DISCUSSION

This chapter mainly focuses on analyzing the findings related to human-animal conflicts across the three study regions- Rampur Bushahr (1,2), Anni (Town), and Nichar. This discussion combined data on the type of human-animal conflict, animals involved, causes of conflict, and mitigation strategies (both lethal and non-lethal). To highlight regional patterns and differences.

5.1 TYPES OF HUMAN-ANIMAL CONFLICT

The types of human-animal conflict observed in the study regions- Rampur Bushahr (1,2), Anni (Town), and Nichar vary significantly based on local geography, wildlife presence, and land use practices. Among the most prevalent types of conflict reported is crop raiding, especially in the regions of Rampur Bushahr (1,2) and Anni (Town), where monkeys are a major source of concern. These animals frequently invade agricultural lands, destroying crops like maize, vegetables, and fruits, which leads to considerable economic loss and food insecurity. The problem intensifies during harvest seasons and periods of food scarcity in forests, compelling monkeys, and other herbivores to rely on human-grown crops. In some cases, bears are also responsible for crop damage, particularly in Anni (Town), where respondents reported multiple animal species contributing to this conflict.

In contrast, Nichar predominantly experiences livestock predation, attributed to the presence of large carnivores such as leopards and Himalayan black bears. These animals pose a significant threat to domestic animals like goats, sheep, and cattle, often attacking them during nighttime or when unattended in forest-adjacent areas. The loss of livestock not only impacts household income but also affects the emotional and social well-being of the communities, especially for families that rely entirely on animal husbandry. Though livestock attacks are less frequently reported in Rampur Bushahr (1,2) and Anni (Town), they are nonetheless present and pose a recurring challenge in certain fringe villages.

Another emerging form of conflict, particularly in Nichar, is the threat to human safety. While not as common as crop or livestock loss, incidents involving bear attacks or leopard sightings near settlements have been documented and contribute to fear and anxiety among villagers. In Rampur Bushahr (1,2) and Anni (Town), aggressive behavior by monkeys, such as chasing people or entering homes, has also been noted. Though less severe in terms of physical harm, these interactions still negatively impact the perceived safety of communities and occasionally lead to revengeful actions against wildlife.

Finally, property damage was also reported as a type of conflict, although less frequently. Overall, these various types of conflict underscore the need for region-specific conflict management strategies. Areas like Rampur Bushahr (1,2) and Anni (Town), would benefit from enhanced crop protection measures and monkey population control, while Nichar requires focused efforts on safeguarding livestock and reducing encounters with large carnivores. Education and community awareness also remain critical across all areas to mitigate fear and promote coexistence.

5.2 ANIMAL INVOVLED IN CONFLICT

The nature and intensity of human-animal conflict in the surveyed regions are heavily influenced by the types of wildlife species present. The data clearly show that monkeys are the most frequently reported problem animals in both Rampur Bushahr (1,2) and Anni (Town), where they are responsible for significant crop damage. In Rampur Bushahr (1,2), nearly half of the respondents identified monkeys as the main source of conflict, reflecting the severity of their intrusion into agricultural fields. These animals are known for their intelligence and adaptability, which makes it challenging for local farmers to deter them effectively. In Anni (Town), alongside monkey-related damage, a considerable number of respondents reported conflict involving bears and combinations of multiple species, such as monkey-bear interactions, further complicating mitigation efforts. This suggests a more diverse conflict scenario in Anni (Town), compared to Rampur Bushahr (1,2).

In contrast, the situation in Nichar is characterized by the presence of large carnivores, particularly leopards and Himalayan black bears, which account for a significant share of the conflict. These animals primarily target livestock and occasionally pose threats to human safety, especially in forest-adjacent settlements. The prevalence of these species in Nichar can be attributed to its dense forests, rugged terrain, and proximity to wildlife corridors.

Interestingly, a notable proportion of respondents in Anni (Town), reported conflict involving multiple species, indicating the complexity of managing overlapping wildlife threats. These findings highlight that the species involved in human-wildlife conflict vary not only by region but also by ecological and geographical conditions, necessitating localized management approaches that consider the behavioral traits and ecological niches of the animals involved.

5.3 CAUSES OF CONFLICT

The underlying causes of human-animal conflict in the studied regions are complex and multifaceted, with both environmental and anthropogenic factors playing critical roles. A key driver identified across all three regions Rampur Bushahr (1,2), Anni (Town), and Nichar is the scarcity of natural food and water within forested habitats, which forces wild animals to venture into human settlements in search of sustenance. This was particularly evident in Rampur Bushahr (1,2) and Nichar, where a significant portion of respondents cited this factor as the primary cause of conflict. As natural resources within forests become increasingly limited due to seasonal changes or ecological degradation, wildlife begins to depend more heavily on cultivated crops and livestock, leading to direct competition with human activities. Additionally, habitat loss and deforestation emerged as a major concern, especially in Nichar, where developmental pressures and forest fragmentation were seen as contributing to increased encounters between humans and large mammals such as bears and leopards.

Another important factor highlighted by the data is human encroachment into wildlife habitats, although this was less frequently cited as a standalone reason. Nevertheless, it remains a significant indirect cause, as expanding agricultural fields and settlements into forest boundaries disrupt animal movement and access to natural foraging grounds. Notably, respondents in Anni demonstrated a higher level of awareness regarding

the multifactorial nature of conflict, with the majority acknowledging all the listed causes including resource scarcity, deforestation, and encroachment as contributing simultaneously. This broader perspective indicates a growing understanding of the interconnectedness between environmental changes and wildlife behavior. Overall, the causes of conflict reflect a deteriorating balance between human expansion and ecosystem stability, underlining the urgent need for sustainable land-use planning, habitat restoration, and community-based conservation initiatives.

5.4 NON-LETHAL MITIGATION MEASURES

The data collected from Rampur Bushahr (1,2), Anni (Town), and Nichar reveals that communities predominantly rely on non-lethal methods to manage human-animal conflict, reflecting a preference for coexistence over confrontation. Among these, the most commonly reported approach is the use of physical barriers, such as fencing particularly to protect crops from frequent monkey raids. This method is prevalent in both Rampur Bushahr (1,2) and Anni (Town), where crop damage constitutes the primary form of conflict. Another widely practiced technique is active guarding, where farmers keep watch over their fields, especially during peak seasons. This method, although effective, demands significant time and labor and is more common in regions like Anni (Town), where residents face pressure from multiple wildlife species.

In areas such as Nichar, where large carnivores like leopards and bears are responsible for livestock attacks, people have adopted preventive measures such as keeping livestock in enclosed sheds at night and using noise or light deterrents to scare away predators. Respondents across all three regions also reported driving animals away using traditional methods like shouting, banging metal objects, or using firecrackers methods that are effective in the short term but may lead to habituation if overused. Interestingly, a portion of the population reported doing nothing, either due to a lack of resources, awareness, or belief that such incidents are part of forest life.

However, most respondents expressed a willingness to cooperate in future conflict prevention efforts. The widespread use of non-lethal measures highlights the community's resilience and adaptability, but also points to the need for more structured support from wildlife and forest departments. Educating local populations about humane and effective deterrents, providing financial and material assistance for fencing or livestock shelters, and encouraging community-based monitoring systems can significantly enhance the effectiveness of non-lethal strategies. Ultimately, these measures reflect a growing recognition that long-term conflict resolution depends not on removing wildlife, but on promoting safe and sustainable coexistence.

5.5 LETHAL MITIGATION MEASURES

While non-lethal approaches dominate human-wildlife conflict management in the study areas, the data reveals that lethal mitigation measures, although less frequently practiced, do occur under certain circumstances. These include actions such as poisoning, trapping, or killing problem causing animals, typically in response to severe economic losses or perceived threats to human safety. In particular, a small number of respondents in Nichar admitted to supporting or knowing of incidents where leopards or bears were targeted following repeated livestock killings or aggressive behavior near settlements. However, these responses were in the minority, suggesting that lethal actions are not a preferred or commonly endorsed solution among most villagers.

In Rampur Bushahr (1,2) and Anni (Town), where monkeys are the primary nuisance animals, direct killing is rarely reported, partly due to legal restrictions and cultural or religious attitudes toward certain species. Nevertheless, frustration over recurring losses sometimes leads to indirect or passive lethal outcomes, such as setting up traps that can unintentionally injure or kill wildlife. The data also show that a notable proportion of respondents rejected the idea of any lethal response, citing either moral reasons, legal consequences, or lack of confidence in its long-term effectiveness.

Overall, the limited use of lethal measures underscores both legal awareness and a growing conservation ethic in the region. However, the presence of even isolated cases suggests a need for better support systems, such as timely compensation schemes and rapid-response teams, to prevent revengeful killings. Strengthening education about wildlife laws and offering viable alternatives to address recurring conflicts can help shift community responses entirely toward non-lethal and sustainable practices.

CHAPTER-6

CONCLUSION

The study of human-animal conflict across the regions of Rampur Bushahr (1,2), Anni (Town), and Nichar reveals a dynamic and region-specific interaction between human populations and wildlife. The findings underscore that while the conflict is a widespread phenomenon, its nature, causes, and impacts vary considerably depending on local geography, wildlife species, and human land use. Rampur Bushahr (1,2) and Anni (Town), are predominantly affected by crop raiding, especially by monkeys, whereas Nichar faces more serious challenges from large carnivores, including leopards and bears, which primarily target livestock and occasionally endanger human lives.

The causes of conflict identified in all three regions are multifaceted. The most commonly cited reasons include food and water scarcity in forests, habitat degradation due to deforestation, and human encroachment into wildlife areas. These drivers are often interrelated, reflecting broader environmental changes and the pressures of development. Anni (Town), stands out for its more complex conflict dynamics, with a higher frequency of multi-species interactions and a broader recognition of the underlying causes.

Communities across all regions predominantly adopt non-lethal mitigation measures such as fencing, active guarding, and scare tactics. These methods, while widely used, are often labor-intensive and limited in their long-term effectiveness without institutional support. In contrast, lethal responses are rare and generally discouraged, appearing only in extreme cases where human safety or repeated economic loss is involved. Respondents across the study areas largely favor humane and preventive approaches, indicating a strong potential for collaborative conflict management programs.

Overall, the research highlights the urgent need for localized conflict mitigation strategies that account for the specific types of wildlife, landscape characteristics, and socio-economic conditions of each region. There is also a critical need for awareness campaigns, infrastructure support, and wildlife management policies that bridge the gap between conservation goals and the livelihood security of local communities. Only through a balanced and inclusive approach can long-term coexistence between humans and wildlife be achieved in these ecologically sensitive regions**.**

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TABLE OF PLATES

PLATE-1 Image of victim of monkey attack.

PLATE-2 Figure showing monkey bite wound of victim (Circle on red).

PLATE-3 Wire fencing installed for protection against monkey and animal intrusion.

PLATE-4 Monkey in agricultural field causing crop damage.