



HUMAN-WILDLIFE CONFLICT IN RANTHAMBHORE NATIONAL PARK (RAJASTHAN) IN REFERENCE OF TIGERS AND LEOPARDS

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ABSTRACT:

We seek for a more comprehensive and Network wide approach for the data related to human-tiger conflicts and to reduction and mitigation. WWF-India is currently working on a broader human-wildlife conflict study, focusing on other wildlife besides tigers too. Since the formation of Ranthambhore Tiger Reserve in 1973, a total of 16 people has been killed by the tigers up to 2012. Among the total of 16 attacks, only 5 attacks occurred outside the park. Out of the total of 5 attacks outside, 3 were on the periphery of the park (very close to the reserve border) one was 14 km away and the other was 2.5 km away from the tiger reserve. Human-carnivore interactions often influence carnivore conservation and result in mitigating conflict. We are going to studied human-tiger (*Panthera Tigris*) conflicts in pastoral villages adjacent to Ranthambhore Tiger Reserve (RTR), Rajasthan, India for 10 years (2012–2022) and characterized and examined the causes of conflicts. The study includes the case of human-tiger conflict and main cause of human tiger conflict and resolutions to prevent this condition and government steps.

KEYWORDS:

HUMAN, TIGERS, LEOPARDS, NATIONAL PARK, HUMAN-WILDLIFE CONFLICT, RANTHAMBHORE NATIONAL PARK.

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INTRODUCTION

Human-Wildlife Conflict (HWC) related killing influences over 75% of the world's wild feline species, as well as numerous other earthly and marine carnivore species, for example, polar bears and Mediterranean priest seals, and enormous herbivores like elephants. HWC is come from battles that emerge when the presence or conduct of natural life presents genuine or saw immediate, repeating dangers to human interests or needs, frequently

prompting conflicts between gatherings and pessimistic effects on individuals as well as natural life. Human-Wildlife Conflict alludes to the negative collaboration among people and untamed life that outcome in misfortunes regarding life, property or assets. Because of a growing human populace, it is practically inescapable that people will infringe into the regular natural surroundings of the collective of animals.

Accordingly, numerous countries have included relief of human-untamed life struggle as a component of their public natural group. Human-natural life struggle is characterized by the World-Wide Fund for Nature (WWF) as "any collaboration among people and natural life that outcomes in pessimistic effects of human social, monetary or social life, on the protection of untamed life populaces, or on the climate." (WWF, Gland, Switzerland) The IUCN SSC Human-Wildlife Conflict Task Force portrays human-natural life struggle as battles that arise when the presence or conduct of untamed life represents a genuine or saw, immediate and repeating danger to human interests or needs, prompting conflicts between gatherings and pessimistic effects on individuals and additionally untamed life.



FIGURE 1: A RANCHER PURSUES A LEOPARDESS OFF HIS FIELD WITHOUT TRYING TO HIDE ON THE FRINGE OF RANTHAMBHORE. STRUGGLE FREQUENTLY BRINGS ABOUT MORE INJURY TO CREATURES THAN TO PEOPLE

In a remote corner of Rajasthan, we went to investigate spots and realities forgotten by history. We worked our direction down into a profound crevasse of the Vindhyan level, and on the ledge saw an ancient human safe house, which had a pictograph of a tiger. The dark red hematite mineral stone craftsmanship board portrayed the tiger, yet in addition the setting of that period. The tiger was encircled and gone after by a band of people with bows and bolts, who were maybe attempting to safeguard their animals or even themselves, so far as that is concerned. The scene portrayed in this ancient cavern continues as before in the current period, yet presently human-natural life struggle (HWC) is as of now not simply a fight for endurance among people and natural life. It is, numerous a period, man-made, and more often than not, saw mistakenly. The new characterizing concern is that we need to save exactly the same species with which we have been in struggle. It is better that we rapidly understand that these species are fundamental for our own drawn-out endurance. They are fundamental to keep up with our valuable environments, and it is on the administrations of these biological systems that our reality is reliant. Rajasthan is the biggest state in India, and covers 10.5% of the absolute region of the country. A large portion of its safeguarded regions (PAs), totalling 3.2% of the degree of the state, are situated in the sloping region of the Aravalli and Vindhyan ranges, while only two destinations are

arranged in the desert region of the state. Rajasthan's economy is essentially dependent on agribusiness and the raising of animals. Around half of the state's region goes under development. The state stands second in the raising of domesticated animals and first in quite a while. Human-natural life struggle in Rajasthan has two viewpoints - one where there is an immediate danger to human or creature life, and the other unfavourably affecting human economy or creature living spaces. Other than **Ranthambhore** and **Sariska Tiger Reserves**, Rajasthan has laid out its 5000 sq. km third tiger save known as **Mukundara Hills Tiger Reserve** in 2013 and 4th one is **Ramgarh Vishdhari Tiger Reserve** and recently 5th one is **Dholpur-karauli Tiger Reserve** in 2023.



FIGURE 2: RADIO-COLLARED RESCUED TIGER MAKES A LEAP FOR FREEDOM

Tiger reserves area in Rajasthan:

(<https://www.bigcatsindia.com>)

Name of Tiger Reserve	Declared in	Core Area	Buffer Area	Total Area
Mukandra Hills	2013	417.17	342.82	759.99
Sariska	1978	881.11	332.23	1213.34
Ranthambore	1973	1113.35	297.93	1411.29
Ramgarh Vishdhari	1982	481.6	1019	1537.6
Dholpur-Karauli	2023	368	690	1058



FIGURE 3: A TIGRESS WANDERS INTO THE BUSTLING TOWN OF KHANDAR OUTSIDE OF RANTHAMBHORE IN BROAD DAYLIGHT.

IMPORTANCE OF STUDY:

Dark black stripes with a brownish shaded body, a social symbol or an image of force? A tiger is all of that thus considerably more. The presence of this subtle large feline effects even those without a special interaction to them. As a cornerstone animal variety, without them, whole biological systems could fall. Tigers and their natural surroundings give tremendous advantages to the environment, individuals and untamed life. Frequently perceived as charming yet fierce, tigers are perhaps the most remarkable hunter. how these famous species help save such a huge amount around us!

1. SAVE TIGERS, SAVE FORESTS, AND GRASSLANDS

Tigers and woodlands are well established together. They live, breed, and chase in forests, and as dominant hunters, these magnificent species are an indication of a sound environment. Safeguarding tigers additionally helps defend a scope of basically significant living spaces and environments. In like manner, every hectare safeguarded as a tiger territory has a huge number of monetary advantages.



FIGURE 4: TWO FEMALE BENGAL TIGER CUBS PLAYING IN THE RANTHAMBORE NATIONAL PARK, RAJASTHAN.

2. HELPS SUSTAIN THE FUTURE OF A MULTITUDE OF WILDLIFE

Tiger is the biggest feline on the planet and is a top hunter. It helps actually take a look at the number of inhabitants in herbivores while keeping up with the soundness of a backwoods or field that they call home. By safeguarding their realms, we are getting the future for other untamed life!

3. A CULTURAL ICON FOR MILLIONS

For centuries, tigers are symbolically embedded in the Indian culture. From ancient folklore, children's books to scriptures, this feline has been largely depicted in our

culture since time immemorial.

4. SIGNIFICANT TO PACIFY CLIMATE CHANGE

Tigers assume a huge part in moderating environmental change. Tiger scenes store more carbon than some other timberland in any area. Safeguarded backwoods in the tiger save in Asia are the best carbon stores in the whole world.

5. ECONOMIC ADVANTAGES FOR COMMUNITIES

Moderating these glorious enormous felines takes special care of numerous monetary advantages. Tiger holds support human existence by safeguarding fish nurseries and farming grounds, giving clean drinking, and water system water. These territories are an aid for networks monetarily!



FIGURE 5: A FEMALE BENGAL TIGER GROOMING HER CUB IN THE RANTHAMBORE NATIONAL PARK, RAJASTHAN.

OBJECTIVES

The main objectives of the study were

1. Study of villager's perception and attitudes towards human-tiger/leopards conflict.
2. To analysis causes of increasing the rate of tiger/leopard attack
3. To study the solution to decrease the conflict between human and tigers/leopard
4. To analysis changing in topography of Ranthambhore national park.
5. To identify conflict mitigation efforts of the forest department and farmers.
6. To study the govt action taken to decrease the human and tigers/leopard conflict.

REVIEW OF LITERATURE:

Extension of human exercises into safeguarded regions has brought about an expansion in human-natural life clashes (Woodroffe 2000; Stahl et al. 2001; Conover 2002; Treves and Karanth 2003; Packer et al. 2005), and there is expanded concern when human-natural life clashes include carnivores. Frequently, these contentions bring about mortalities of the carnivore due to retaliatory or evacuation activities as security and preventive measures (Woodroffe and Ginsberg 1998; Bekoff 2001; Treves and

Karanth 2003). These mortalities can contribute to declines of carnivore populations (Nowell and Jackson 1996; Butchart et al. 2010). Human-wildlife conflict region is a not kidding the executives' issue for preservation endeavors due to resistance and prejudice for huge carnivores by individuals in human-overwhelmed scenes (MacLennan et al. 2009). Globally, human-wildlife conflicts revolve around livestock depredation (Stahl et al. 2001; Graham et al. 2005) or attacks on humans (Wang et al. 2006; Goodrich et al. 2011). Identification of conflict areas can help to develop management strategies to reduce conflicts (Treves and Karanth 2003; Treves et al. 2004; Packer et al. 2005; Woodroffe et al. 2005). Among the large carnivores, tigers (*Panthera Tigris*) depredate livestock and kill humans (Nyhus et al. 2010). Because of the loss of human life and livestock, attitudes towards tiger conservation are often negative in areas where conflicts occur (Barlow et al. 2010; Nyhus and Tilso 2010; Goodrich et al. 2011). This leads to an increase in mortality of tigers and may have contributed to the extinction of three subspecies including the Bali tiger (*Panther Tigris Balika*), Caspian tiger (*Panther Tigris virgata*), and Javan tiger (*Panther Tigris sondaica*) (Hoogerwerf 1970) and the decline of the Sumatran tiger (*Panther Tigris Sumatra*) (Boomgaard 2001). As a wide-ranging species and its presence in human dominated landscapes, tigers come into contact with humans (Treves and Karanth 2003), which can be detrimental to tiger populations (Woodroffe and Ginsberg 2000). A common conservation solution to reduce conflicts is to create protected landscapes for the existence of these carnivores. Although protected areas, in principle, are shielded from most human activities, the spatial extent of protected areas alone is not sufficient for long-term viability of a wide-ranging carnivore population (Woodroffe and Ginsberg 1998; Dinerstein et al. 2007). Human casualties and livestock killed by tigers have been reported frequently (Karanth and Gopal 2005; Miquelle et al. 2005; Barlow et al. 2010; Goodrich et al. 2011), but the motivation for conflicts is poorly understood (Goodrich et al. 2011). Conflicts could be influenced by local environmental conditions e.g., rainfall; (Woodroffe and Frank 2005), prey abundance (Mizutani 1999; Polisar et al. 2003; Goodrich et al. 2011), habitat or by socio-ecological factors (i.e., livestock's husbandry practices; Madhusudan 2003; Nyhus and Tilson 2004; Karanth et al. 2012). There are very little data available in the peer-reviewed literature which analyse the factors responsible for conflicts. If managers understand the causes for human-tiger conflicts, it may be possible to improve the attitude and understanding of local people towards tigers, thus reducing conflicts (i.e., fewer attacks on humans and livestock; Carter 2012). In India, the western most population of tigers is distributed in Ranthambhore Tiger Reserve (RTR), Rajasthan, western India. The RTR is one of the most important protected areas in India because there is a high biomass of wild prey that can support high carnivore densities (Karanth and Nichols 2000; Reddy 2008) and, most significantly, the tiger population it supports is genetically unique. Because RTR is at the

western most distribution of their range, the population is sensitive to stochastic causes of reduction at the population or genetic level. Tigers inhabit only 344 km² of forest within a 1,394-km² reserve (Jhala et al. 2008), which is surrounded by >300 villages within 5 km of the park with >150,000 people and their livestock (Bagchi et al. 2003). Such reserves surrounded by dense human populations often are a main source of large carnivore mortality and are susceptible to species loss (Brashares et al. 2001). Some proportion of the tiger population in RTR roams outside the reserve because of a shortage of space within the reserve (Singh 2011). Around five to ten individuals have been located regularly outside the reserve in fragmented ravines over 3 years (Singh 2011). Land use practices outside RTR include intensive agriculture, and because there is a lack of native ungulates in the buffer area of RTR that constitutes tiger habitat, village livestock are the primary prey available for tigers in these areas (Singh et al. 2011). Therefore, we characterize the extent and distribution of human-tiger conflicts by examining the seasonality of attacks, livestock depredation type, place of attack, cause of attacks on humans, and response of humans after attacks and analyse causes of conflicts during 2005–2011. These data will help understand human-tiger conflicts and assist with tiger conservation

HYPOTHESES

Based on our psychological framework we formulated three hypotheses concerning the relationships between tigers and people living near Ranthambhore National Park: (1) The effect of past interactions with tigers on preference for future tiger population size is mediated by beliefs and perceptions about tigers. (2) Perceptions of tiger-related risks are strongly influenced by beliefs about tigers and tiger-related risks. (3) Preferred future tiger population size is strongly influenced by beliefs about tigers, tiger-related risk, and perceptions of those risks.

RESEARCH METHODOLOGY

The data has been collected from both primary and secondary sources, primary data has been collected from questioners, observation, field work, personal interviews and others qualitative skills. Secondary data has collected from numerous institutions, research centres and public organisation such as the Ministry of Environment and Forest and Climate Change (MoEFCC), National Tiger Conservation Authority (NTAC) established under the Wildlife (Protection) Amendment Act 1972, National Atlas and Thematic Mapping Organization (NATMO), Indian Remote Sensing Satellites available with National Remote Sensing Agency (NRSA), Hyderabad, The Department of Forest (Government of Rajasthan), Ranthambhore Van Vibhag, Wildlife Institute of India (WII), The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The secondary and primary data has been collected and scrutinized for data analysis. In this process, NATMO districts maps draw for forest reserve boundary and the mosaic to create a single plate which is a most essential part of data analysis. After digitization of

the study area, create a boundary of corridor as well as village boundaries also. In the methodology, there has been taken five variables for physical indicators to assess the vulnerability of tiger corridor as a Relief, Ndvi, Streams, Lucl and Forest density of village wise factors (1499 villages). The demographic data obtained from village directory 2011 and has been attached to the digitized map and raster maps will be created using those demographic attributes. The physical indicators are collected in raster formats. Using all the raster maps the final delineation of the corridor has been done through spatial overlay analysis using the raster calculator tool in ArcGIS and ERDAS IMAGINE. The software used for the purpose are Erdas 14 and ArcGIS 10.2 The data collected through a primary survey which was analyzed using the software like Microsoft Excel 2010 and SPSS 15.0. Linkert scale has been also be used to quantify the perception of respondents.

DATA COLLECTION

Data collection Records of human-tiger conflicts were collected and compiled by the offices of the RTR, Rajasthan Forest Department, and we collected supplemental data during intensive monitoring of the tiger population from January 2012 through December 2022. Conflict information included date and location of each attack, nature of attack involving injury or death, and amount of compensation paid after the conflict. Conflicts were categorized as depredation on domestic animals or an attack on humans. Livestock kills made by tigers were verified by a team made up of a local park official, a veterinary officer (i.e., an official posted in a village to regulate livestock related issues), and the head of the village, by observing marks on livestock from the attack, pugmarks, and scrape marks from the predator. We trained park officials to identify the predator responsible for livestock killing using a combination of signs (e.g., pugmarks, scrapes, scats, and marks on prey). We tallied the result of each conflict related to injuries and deaths of humans, domestic animals, and tigers. We divided the year into four seasons: winter (December-February), summer (March-June), monsoon (July-September), and post-monsoon (October-November). Due to open, thorny forest and regular tracking of tigers by forest officials in RTR, we were able to record tiger age, sex, health, history of conflicts by animals, and whether the cubs were orphaned for each incident. We assessed the health condition of problem tigers using opportunistic sighting and deployment of camera traps as part of this study (Singh et al. 2013a, 2013b; Singh et al. 2014a, b), specifically we monitored the health of orphan cubs during our study period (Singh et al. 2011). When humans were injured, we personally met with the person attacked or their family to collect information about their activity and behaviour during the attack and time and asked about tiger behaviour to clarify causal factors. We categorized attacks as provoked (i.e., the tiger was intentionally approached or shot by people), an accidental encounter (i.e., a person and a tiger became too close accidentally,

which provoked an aggressive response from the tiger), a predation attempt (i.e., a tiger approached and attacked a person without any apparent provocation), or female tigers attacked a person while defending cubs. We compare the conflicts between periods of low tiger density (2005-2007; Chauhan et al. 2005; Singh et al. 2007) and high tiger density (2008-2010; Jhala et al. 2011; Singh et al. 2012) using a post hoc t test ($P < 0.05$) between attacks and human depredation pattern in different seasons.

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