

Snake Diversity, Conservation and Community Awareness in Dr. Harisingh Gour University, Sagar, Madhya Pradesh, India

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Abstract—Human-wildlife conflict remains a critical barrier to biodiversity conservation, particularly in regions where venomous snakes coexist with human settlements. This case study documents snake diversity, rescue interventions, and community awareness programs conducted at Dr. Harisingh Gour University, Sagar, Madhya Pradesh, India, an institution located amidst a semi-forested ecosystem. The area supports a wide range of snake species, including venomous snakes such as *Daboia russelii* (Russell’s Viper), *Naja naja* (Indian Cobra), *Bungarus caeruleus* (Common Krait), and *Echis carinatus* (Saw-scaled Viper), as well as several non-venomous species like *Ptyas mucosa* (Oriental Rat Snake), *Fowlea piscator* (Checked Keelback), *Amphiesma stolatum* (Buff-striped Keelback), *Python molurus* (Indian Rock Python), and *Lycodon aulicus* (Common Wolf Snake). This study emphasizes the effectiveness of integrating snake diversity assessments, rescue operations, and community-based awareness in mitigating human-snake conflict. It further highlights how locally driven conservation efforts can reduce snake mortality, enhance human safety, and promote coexistence between people and wildlife.

Index Terms—Human-wildlife conflict, rescue, conservation, Snake Diversity

I. INTRODUCTION

Human-wildlife conflict (HWC) is a major conservation challenge worldwide, often resulting in the loss of biodiversity as well as risk to human life. In India, snakes represent one of the most frequently encountered taxa in conflict scenarios due to their venomous potential and the deep-rooted fear associated with them (Whitaker, R. & Captain, A.; 2004). Among these, the Russell’s Viper (*Daboia russelii*) is of particular concern, being one of the

“Big Four” venomous snakes responsible for the majority of snakebite-related fatalities in the country (Warrell, D.A., 2010; Choudhury, P., 2014). The proximity of human settlements and institutional infrastructure to wildlife habitats increases the frequency of snake encounters, often leading to indiscriminate killing of snakes by uninformed residents (Seshadri, K.S. & Ganesh, S.R., 2012; Singh, S., & Joshi, R., 2012; Sinha, S., 2024). Snakes form an integral part of ecosystems by regulating prey populations such as rodents, thus contributing to agricultural productivity and ecological balance. Madhya Pradesh, due to its central location and mosaic of forested, agricultural, and urban landscapes, supports a high diversity of snake species. Reports from the region indicate the presence of multiple non-venomous species such as the Oriental Rat Snake (*Ptyas mucosa*), Indian Rock Python (*Python molurus*), and Common Wolf Snake (*Lycodon aulicus*), alongside venomous species including the Russell’s Viper, Spectacled Cobra (*Naja naja*), and Common Krait (*Bungarus caeruleus*). Despite their ecological importance, negative human perceptions, driven largely by fear and lack of knowledge, have resulted in indiscriminate persecution of both venomous and harmless species (Whitaker, R. & Captain, A. (2004). Conservation of snakes therefore requires not only rescue and relocation efforts but also a strong emphasis on community awareness and capacity-building (Pandey, D. P., & Pandey, G. S., 2015; World Health Organization, 2016). Community-based conservation approaches have proven effective in mitigating HWC by fostering tolerance, improving knowledge of species, and empowering local people to act as custodians of biodiversity. In the context of

snakes, awareness programs that highlight their ecological roles, safe behaviour during encounters, and species identification are particularly valuable. A critical component of awareness is the ability to distinguish between venomous and non-venomous species (Mohapatra, B., et al., 2011). While detailed taxonomic identification requires expertise, simple features can aid local communities in making safe and informed decisions (Ramesh, C., & Nehru, P., 2019). For example, the Russell’s Viper can be identified by its stout body and characteristic chain-like dorsal pattern of oval spots; the Spectacled Cobra is recognized by its hood with a spectacle mark; and the Oriental Rat Snake, a non-venomous species often confused with cobras, can be identified by its slender body, large eyes, and absence of a hood (Chakma, J. K., Menon, J. C., & Dhaliwal, R. S., 2020). In addition to species identification, community awareness efforts also emphasized preventive measures and first aid in the event of snakebite, which remains a major public health concern in India (Tianyi, F. L., Gopalakrishnan, M.,

& Pinfield, T., 2025). Historically, due to lack of awareness and deep-rooted fear, local residents tended to kill snakes indiscriminately, regardless of whether they were venomous or harmless, resulting in unnecessary snake mortality and disruption of ecological balance (V. Narendra, Harney., 2011). This study highlights how initiatives focused on diversity assessment, conservation practices, and awareness generation within the campus of Dr. Harisingh Gour University can serve as a model for mitigating snake-related human-wildlife conflict

II. MATERIALS AND METHODS

Study area

The main campus of the DHGUS is in Sagar City on Patharia hills, sprawling over 28000 Acres of land. The climate of campus has humid subtropical climate with hot summers, a somewhat cooler monsoon season and cool winters. Very heavy rainfalls in the monsoon season from June to September.

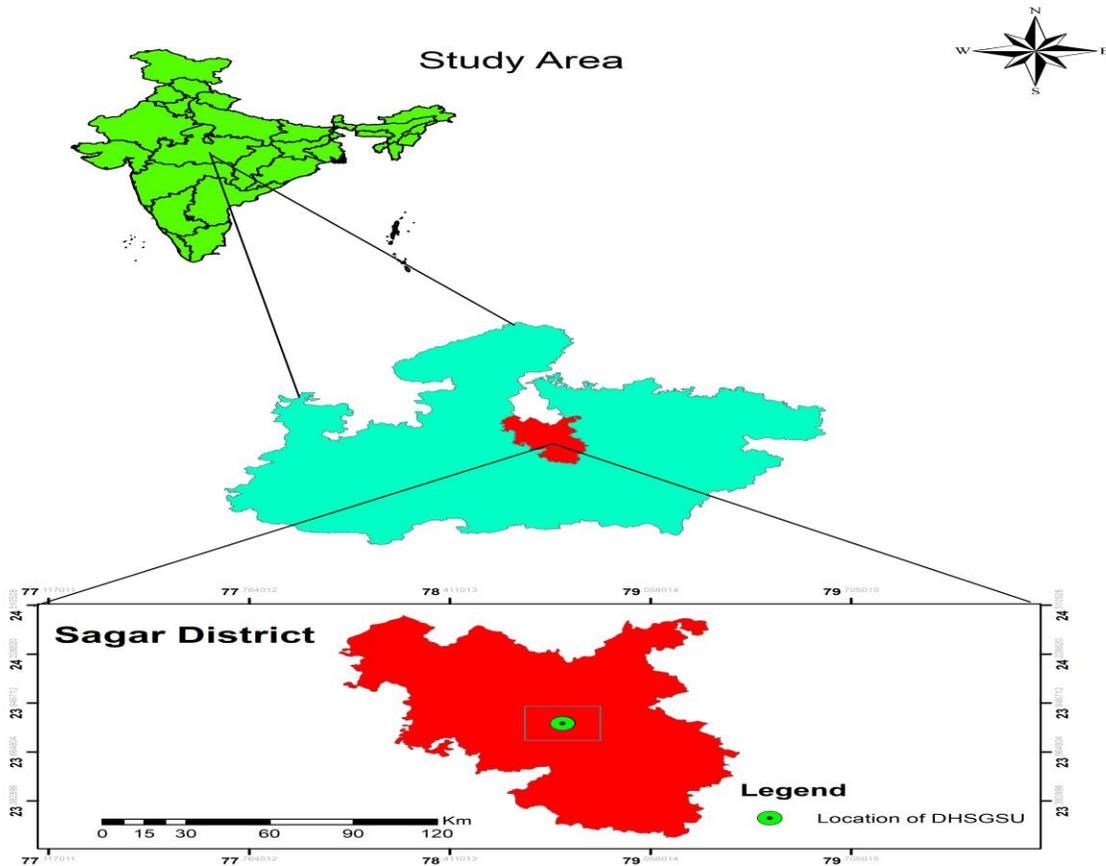


Fig. 1 Study Area map

Survey Methods used

Following three methods were used to collect the data on existence of snake species in the University area during June 2022 to May 2025.

1. Direct encounter method: In this method during walk in area during day time and night time the snakes encountered on the way for the researchers and the requested volunteers (five volunteers residing in the campus assisted in reporting snake encounters). were recorded. By actual visit to the area reported for the occurrence of snake was immediately visited for the confirmation of species. Mobile phone communication was mostly used in this study.
2. Directed and time bound observations of snake habitats: Three days/week during 6.00 – 9.00 a. m.; evening 7.00 – 9.00 p.m. and 11.00 p.m. – 1.00 a.m. the snake species were searched in the selected study area. Each day the number and type species encountered were recorded.
3. Public reports for the snake occurrence: For the people in the University campus and three villages around the University campus Patharia, Gawlipura, Near SFL Lab, Nepal palace, and Boys and Girls Hostels the author provided

mobile phone number to the villagers to inform the presence of snake species in their respective areas.

III. RESULTS AND OBSERVATIONS

These results show the diversity of snake in study area has 10 different type venomous and non-venomous snake are found during the survey and rescue time. Present study has 10 snakes species belongs to 04 special families (Viperidae, Elapidae, Pythonidae and Colubridae) were noted. Among the snake species Wolf snake (*Lycodon aulicus*), Rat snake (*Ptyas mucosa*), Checkered Keelback (*Xenochrophis piscator*) non-venomous while Indian Cobra (*Naja naja*), Russell’s viper (*Daboia russelii*), Common Krait (*Bungarus caeruleus*) and Saw-scaled Viper (*Echis carinatus*) which is venomous snake were frequently found in this region. The present study reveals that the non-venomous snakes were found in greatest number as compare with the venomous and semi-venomous snakes. The detail information about the snake is given in table 1, Scientific name, family, common name Category and Typical habitat.

Table 1: List of snakes found in study area

S. No.	Scientific Name	Family	Common Name	Category	Typical Habitat
1	<i>Ptyas mucosa</i>	Colubridae	Oriental Rat Snake	Non-venomous	Open fields, near human habitation, agricultural areas
2	<i>Xenochrophis piscator</i>	Colubridae	Checkered Keelback	Non-venomous	Freshwater bodies, ponds, wetlands
3	<i>Dendrelaphis tristis</i>	Colubridae	Bronzeback Tree Snake	Non-venomous	Forest edges, trees, shrublands
4	<i>Amphiesma stolatum</i>	Colubridae	Buff-striped Keelback	Non-venomous	Grasslands, agricultural fields, gardens
5	<i>Lycodon aulicus</i>	Colubridae	Indian Wolf Snake	Non-venomous	Human settlements, rocky crevices, old houses
6	<i>Python molurus</i>	Pythonidae	Indian Rock Python	Non-venomous	Forests, grasslands, near water bodies
7	<i>Naja naja</i>	Elapidae	Indian Cobra	Venomous	Agricultural fields, human habitations, forests
8	<i>Daboia russelii</i>	Viperidae	Russell’s Viper	Venomous	Open fields, scrublands, agricultural land
9	<i>Bungarus caeruleus</i>	Elapidae	Common Krait	Venomous	Human settlements, fields, termite mounds
10	<i>Echis carinatus</i>	Viperidae	Saw-scaled Viper	Venomous	Dry scrublands, rocky areas, arid zones



Fig.2 Category of Snake



Fig. 3 Snakes rescues by author

Some Case Description

In July 2025, a Russell's Viper was killed within the university premises by local residents, reflecting a prevailing fear-based response to snake encounters. Upon receiving this information, the author initiated an awareness campaign targeted at campus residents and local workers (fig.3).

The campaign focused on:

Identification of venomous vs. non-venomous snakes, Ecological significance of snakes (rodent population control, ecosystem balance), Safe practices during snake encounters, Reporting mechanisms for snake rescue instead of direct confrontation.

During the subsequent weeks, several interventions took place:

1. Rescue of Oriental Rat Snakes (*Ptyas mucosa*) – Multiple individuals entering campus shops were safely rescued and released into the adjacent forest.

Public demonstrations were conducted during rescues to highlight their non-venomous nature and harmless behavior.

2. Rescue of a Russell's Viper (*Daboia russelii*) – A viper found inside a university department building was carefully captured and relocated back to its natural habitat. Special emphasis was placed on explaining handling techniques, potential risks, and the need for coexistence.

3. Rescue of a Bronzeback Tree Snake (*Dendrelaphis tristis*) - A Bronzeback Tree Snake was rescued from the Department of Botany building, and awareness regarding its non-venomous nature was provided to students and staff during the operation.

4. Community Response – A few days later, residents who had previously killed a Russell's Viper reported encountering another specimen. Unlike earlier incidents, they did not attempt to kill it. Instead,

informed by prior awareness efforts, they allowed the snake to retreat safely into the forest without harm.

IV. DISCUSSION

This case study highlights the critical role of community-based awareness in reducing human-snake conflict and promoting coexistence. Fear and misinformation have historically driven indiscriminate killing of snakes, yet targeted education and demonstration of safe rescue practices proved effective in reshaping local attitudes. The observed shift where residents chose to spare a Russell's Viper instead of killing it illustrates a meaningful behavioural change and a direct conservation outcome. Snakes, as key regulators of rodent populations, contribute significantly to agricultural stability and ecological balance. Nevertheless, their conservation is frequently challenged by deep-rooted cultural fears and lack of knowledge. By integrating awareness on snake identification, safe encounter behaviour, and snakebite prevention with practical rescue interventions, this initiative demonstrates how community driven approaches can simultaneously safeguard human lives and conserve biodiversity. The findings reaffirm conclusions of earlier studies in India, underscoring that long-term success in snake conservation and snakebite mitigation requires not only medical preparedness but also sustained community engagement. Thus, locally tailored awareness and rescue programs present a scalable model for addressing snake-related human-wildlife conflict across similar landscapes.

V. SUGGESTION AND RECOMMENDATION

- ✓ Strengthened Human-Snake Coexistence: The case highlights that even small-scale interventions at a grassroots level can lead to meaningful conservation outcomes.
- ✓ Ethical Considerations: All rescue and release activities were carried out with utmost care to ensure the welfare of both humans and snakes. Handling of venomous and non-venomous species was conducted using standard safety equipment and techniques, thereby minimizing the risk of injury to both the rescuer and the animal. Snakes were released into ecologically appropriate habitats within forested areas away from human settlements, ensuring minimal stress and maximum survival potential.

VI. CONCLUSION

Present study, it is concluded that campus of Dr. Harisingh Gour University, has 10 snakes species belongs to 04 special families (Viperidae, Elapidae, Pythonidae and Colubridae) were noted. Among the snake species Wolf snake (*Lycodon aulicus*), Rat snake (*Ptyas mucosa*), Checkered Keelback (*Xenochrophis piscator*) non- venomous while Indian Cobra (*Naja naja*), Russell's viper (*Daboia russelii*), Common Krait (*Bungarus caeruleus*) and Saw-scaled Viper (*Echis carinatus*) which is venomous snake were frequently found in this region. The present study reveals that the non- venomous snakes were found in greatest number as compare with the venomous and semi- venomous snakes. This research demonstrates that localized conservation initiatives, combining rescue operations with awareness and community engagement, can significantly reduce human-snake conflict. Prior to these efforts, both venomous and non-venomous snakes, including species such as the Russell's Viper, Common Krait, Saw-scaled Viper, and Oriental Rat Snake, were frequently killed out of fear and misinformation. Following awareness and demonstration-based interventions, however, snake mortality within the study area was markedly reduced, with community members increasingly choosing coexistence over persecution. By transforming fear into informed understanding and equipping people with knowledge of snake identification, safe encounter practices, and snakebite prevention, it becomes possible to safeguard both human lives and ecologically

important species. Such small-scale, campus-based interventions, when adapted and replicated across broader landscapes, hold substantial potential to advance biodiversity conservation and strengthen human-wildlife coexistence.

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