

Research

Can education and outreach help foster human–sloth bear coexistence?

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Introduction: human–wildlife interactions

Human–wildlife conflict (HWC) is a global issue of increasing concern to local communities, governments and stakeholders [1,2]. It has been defined in different ways (see Box 1) but, broadly speaking, HWC arises where wildlife habitats and human populations overlap, such as at forest edges and in shared landscapes, resulting in competition for resources and the potential for adverse impacts on both wildlife and humans [2–5]. As human settlements and activities expand into natural habitats, wildlife is displaced, killed or forced to adapt in order to survive [6]. When animals seek food and shelter in human-inhabited areas, this can result in crop damage, predation on livestock and pets as well as direct impacts on both humans and wildlife, including injury and death [7–9].

Community support for conservation and its potential benefits is easily undermined by persistently negative interactions with wildlife [2]. Furthermore, disputes often arise between interest groups with diverse opinions about

how to address the situation and different priorities in terms of safeguarding livelihoods and protecting wildlife populations [10]. Finding solutions that are effective, accepted and viable in the long-term therefore calls for not only wildlife management [11] but also working with people through participatory processes (*Editor's note: see the article in this issue on stakeholder collaboration in the Dinaric–Balkan–Pindos region*). Striking a balance between human and wildlife needs is crucial for achieving harmony in conflict-prone zones and resolving HWC typically requires a multi-pronged approach that may include, for example, habitat restoration, waste management, damage prevention, compensation and community-based conservation [4].

Diverse terrestrial and aquatic species, from invertebrates to megafaunal mammals, fish (e.g. sharks) and reptiles such as crocodiles, are involved in HWC worldwide (2,12). Among the groups of animals most often mentioned in respect to HWC are large carnivores, including bears [13]. In this article we examine the case of the sloth bear (*Melursus ursinus*) and its interactions with rural communities in India. Specifically, we focus on efforts

made by the Wildlife and Conservation Biology Research Foundation (WCBRF)¹ in collaboration with Gujarat Forest Department and other organisations to improve human–bear coexistence in the western state of Gujarat through social science, education and outreach.

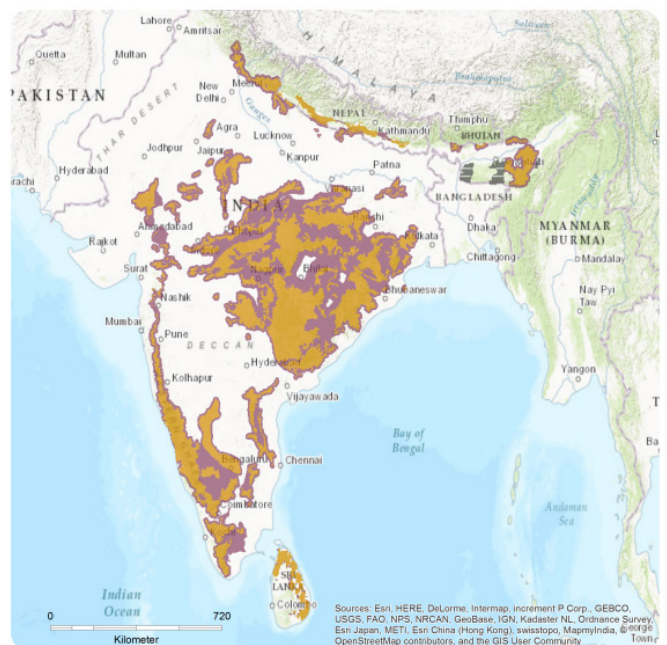
Box 1. Defining and understanding human–wildlife conflict

In a recent briefing document on the topic, the IUCN SSC Human–Wildlife Conflict & Coexistence Specialist Group defined human–wildlife conflict as, “struggles that emerge when the presence or behaviour of wildlife poses an actual or perceived, direct and recurring threat to human interests or needs, leading to disagreements between groups of people and negative impacts on people and/or wildlife”².

However, the term is often applied only to human–wildlife impacts: negative interactions between people and wildlife in which wildlife poses a direct threat to the safety, livelihoods and wellbeing of people (e.g. damage arising from crop raiding or livestock depredation) and retaliatory actions by people against the species blamed. This narrower focus disregards antagonism between diverse groups (e.g. hunters and/or farmers versus environmental activists) about what should be done to resolve the situation. Such disputes are sometimes referred to as human–human conflicts or conservation conflicts: “situations that occur when two or more parties with strongly held opinions clash over conservation objectives and when one party is perceived to assert its interests at the expense of another” [10].



Fig. 1. A subadult sloth bear showing markings and colouration typical of the species (Photo: WCBRF).



Range

- Extant (resident)
- Possibly Extant & Origin Uncertain (resident)
- Possibly Extant (resident)
- Presence Uncertain

Compiled by:
Wildlife & Conservation Biology Lab, HNG University

© The IUCN Red List of Threatened Species: *Melursus ursinus* – published in 2016.
<http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T13143A45033815.en>

Sloth bear status and conflicts

Sloth bears have a distinctively long black coat, with a white or cream/yellow crescent on the chest and pale muzzle (Fig. 1). They feed mostly on termites and other insects as well as fruit [14]. The species is restricted to the Indian subcontinent (Fig. 2) where it inhabits various habitats including grasslands, tropical forests and savannahs up to elevations of around 1,500 metres [15,16]. It

Fig. 2: Sloth bear (*Melursus ursinus*) distribution in the Indian subcontinent showing the location of the study area (Source: IUCN Red List).

is listed as vulnerable by the IUCN, its distribution being highly fragmented and its numbers declining [15]. Although there are no reliable large-scale population estimates, there are thought to be 7,500 – 8,000 sloth bears in

¹ <https://wcbresearch.in/>

² <https://www.iucn.org/resources/issues-brief/human-wildlife-conflict>

India, approximately 800–1,000 in Sri Lanka and a few hundred in Nepal. There have been no records of occurrence in Bhutan since 2009 and the species has been extirpated from Bangladesh [15,17].

In India, the sloth bear is the most common ursid but its distribution is patchy, especially in the northwest. The western edge of its range is in the state of Gujarat, where it is the only bear present and its numbers have been increasing, with an estimated 358 individuals in 2022 (Gujarat Forest Department unpublished data). Due to its propensity to attack people, causing serious and sometimes fatal injuries, the sloth bear is regarded as one of the most dangerous and unappreciated species in the country [18]. As in other states, sloth bear attacks in Gujarat are on the rise [19,20]. Conflicts typically arise when sloth bears enter human settlements or agricultural fields in search of food and water [9]. Bear foraging behaviour can lead to damage to crops and property, causing economic losses for the local communities. In response, people resort to retaliatory actions to protect their livelihoods or out of fear for their safety, with implications for conservation of the species.

Study area

Central Gujarat, at the western edge of the sloth bear range, is one of the most important corridors for the species [21]. Out of eight administrative districts, sloth bears have been recorded in three: Panchmahal, Dahod and Chhota Udepur (Fig. 3).

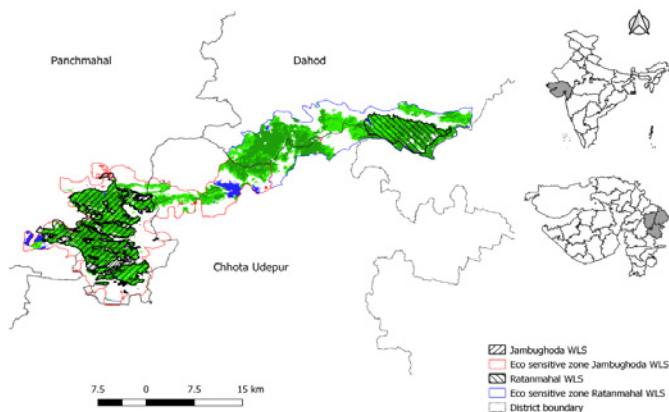


Fig. 3. Location of the study area in the corridor between Jambughoda and Ratanmahal wildlife sanctuaries.

⁵ Eco-Sensitive Zones are buffers around protected areas intended to reduce developmental pressures by transitioning from higher to lower levels of protection.

The present study was conducted in Chhota Udepur which covers an area of 3,436 km² and includes 757 km² of forest that is potential sloth bear habitat (Fig. 4) [21]. This area has been designated as an Eco-Sensitive Zone (ESZ)⁵ and is considered to be a crucial wildlife corridor linking Jambughoda and Ratanmahal wildlife sanctuaries. The landscape, forest type and availability of fruiting species such as East Indian ebony (*Diospyros melanoxylon*), Mahua (*Madhuca indica*) and Indian jujube (*Ziziphus mauritiana*) provide food and shelter to sloth bears [22,23].



Fig. 4. Sloth bear habitat around Ambakhut village, Chhota Udepur, Gujarat (Photo: Pratikkumar Desai).

Chhota Udepur is also home to several indigenous tribes, including the Rathwa, Bhil, Koli, Baria and Nayaka, who engage in activities such as agriculture, pastoralism and handicrafts. Their livelihoods depend on the forest to provide them with essential resources like food, fodder, fuel wood and medicinal plants which are integral to their traditional way of life [24]. The corridor between Jambughoda and Ratanmahal encompasses around 40 villages.

Social science research

To better understand how local people perceive sloth bears and to gather data on the level and nature of conflicts, we conducted a total of 663 interviews with villagers (from 10 to 80 years of age, 75% males). Additionally, out of 214 identified victims of sloth bear attacks, 120 (56%) from 31 villages were interviewed using a semi-structured questionnaire. Here, we summarise key findings, some of which have been published previously in different formats [17,25,26].

A large majority of interviewees (87%) stated that sloth bears were present in their surroundings, mostly being seen or detected in the forest or on farmland. Misinformation was found to be prevalent: many villagers believed sloth bears to be lazy, slow-moving meat-eaters with poor vision. Slightly over half (55%) those interviewed agreed that sloth bears are a threat to humans, with 22% unsure about this. Less than a third (29%) thought they should be protected, 22% were against protection and half were unsure.

Most (76%) interviewed victims of sloth bear attacks were male. The attacks took place in the forest (59%), on farms (31%) or in villages (10%). Attacks were typically reported to occur in the morning or evening, reflecting sloth bear activity patterns, with victims attacked when they entered the forest to collect fruit or defecate. Among those interviewed, 40–69-year-olds prevailed and farming was the most common occupation. However, migrant workers (few of whom could be interviewed) in the age range 20–39 were also vulnerable to attack. Encounters were frequent in summer, when locals visit forests to collect Mahua fruit and sloth bears seek water and food near villages.

Outreach and education

The presence of many villages directly within an important wildlife corridor means it is very important to raise awareness of the inhabitants about sloth bear presence and to educate them on how to coexist. Moreover, our survey showed a clear need to replace misinformation with accurate, science-based information. Based on these findings, the WCBRF initiated a community outreach and safety education programme in Chhota Udepur for the benefit of both people and bears (Fig. 5).

The WCBRF, in collaboration with Gujarat Forest Department and the Wildlife and Conservation Biology Research Lab at Hemchandracharya North Gujarat University, developed the concept of *Atamavat Sarvabhuteshu*. This is a Sanskrit phrase meaning that one should feel the happiness and distress of others as one's own. In the context of promoting human–bear coexistence, the intention is to link feelings among tribal people living in and around sloth bear habitat with education through authentic information about bears [27]. The main idea of the programme was to engage with local people in a two-way



Fig. 5. Schematic representation of the multi-disciplinary effort by the Wildlife and Conservation Biology Research Foundation to foster human-sloth bear coexistence in Gujarat.

conversation, sharing information with them while also learning about their traditional knowledge (Fig. 6). The primary goal is culturally sensitive education for all ages, fostering coexistence.

The programme built on interviews with local residents and forest field staff to understand sloth bear perspectives. It established a cross-sector collaborative framework involving the university, local community and forest department for conservation. Restrictions imposed due to the COVID-19 pandemic precluded initial outreach meetings. Instead, a virtual awareness campaign was implemented and proved highly successful as younger people prefer digital communication and, during lockdowns, older people were also able to participate in online meetings and activities [28]. When restrictions were lifted, visits to schools were conducted as well as street education, training for forest staff and building relations with locals.

To help spread information effectively, awareness and education materials were prepared in Gujarati and En-



Fig. 6. WCB Team interacting with local people (Photo: Pratikkumar Desai).

glish and given to villagers. An information booklet for local people was prepared on *Living in the sloth bear landscape*⁴. For children, there is an activity booklet and a comic-style leaflet (Fig. 7). The latter was based on entries to a writing competition aimed at engaging local people by inviting them to describe their personal experiences or to write a fictional story with a meaningful message. The aim was to create a two-way exchange of knowledge about the sloth bear and to publicise it in a creative form. A broad range of contributions were received in various languages and the best three were included in the community education programme. The first-placed entry was made into an animated film on sloth bear conservation⁵.

We invited people across the world to send us short clips of themselves talking about bears. We compiled many of these into a video, *Speak for the bears*⁶, which was launched, together with the animated film, during a virtual meeting with students and stakeholders to celebrate International Happy Bear Day on 10th May 2021. By spring 2022 the animated film had 1,841 views and *Speak for the bears* had 572 views, which is encouraging in terms of our project goal of promoting human–bear coexistence. Several other virtual programmes were organised such as radio talks, webinars and live feeds on Facebook.

Online events have been very useful in spreading and collecting knowledge while doing conservation outreach. In addition, a sloth bear conservation outreach centre was set up at Ratanmahal wildlife sanctuary, which was a pioneering move in India [27]. This centre provides educational resources about the ecology and behaviour of sloth bears, suitable for both locals and visitors (Fig. 8). A documentary titled *Sloth bear: the bear of the Indian subcontinent*, with a message from legendary Bollywood star Amitabh Bachchan, has been shown at the centre as well as in schools and at various gatherings. Its reach has been further expanded by making it available on YouTube in Hindi, Gujarati and English⁷.

The WCBRF team visited schools to engage with students, provide basic information about the sloth bear and other wildlife in the area such as the leopard (*Panthera pardus*), show the animated film and distribute child-friendly educational activity booklets to foster appreciation of sloth bears (Fig. 9). During the first year of the programme (2021–2022), 18 schools in 13 of the 40 villages in the area were included in the outreach education programme. A total of 367 children (up to 10 years old) and 26 teachers from primary schools plus 400 students (aged 11–17) and 31 teachers from secondary



Fig. 7. Awareness-raising and education materials for school children.

⁴ https://www.researchgate.net/publication/359237626_Living_in_Sloth_bear_landscape_An_information_booklet_for_locals

⁵ <https://www.youtube.com/watch?v=q9WRWkcoH5I>

⁶ https://youtu.be/X81XO2K_y9Y?si=Mf4v1RNWU84GzyL

⁷ <https://youtu.be/y5EqLlza0TQ>



Fig. 8. Sloth bear conservation outreach centre at Ratanmahal wildlife sanctuary (Photos: Pratikkumar Desai).

schools were involved. Most (60%) of the primary school pupils indicated (when completing the activity book) that they had seen sloth bears in their locality; of these, 76% said they liked them while 19% disliked them. A small minority (4%) of them reported that a family member had been attacked by a bear [17].

Besides materials for children and the general public, a pocket guide on *Working in the sloth bear landscape* was



Fig. 9. Visits to schools for conservation education and distribution of sloth bear fun learning activity booklets help to foster greater appreciation for the sloth bear (Photos: WCBRF).

also produced specifically for forest field staff (Fig. 10) and a manual is in development for those trained to monitor sloth bear populations. Moreover, a simple set of instructions and safety measures was developed for people

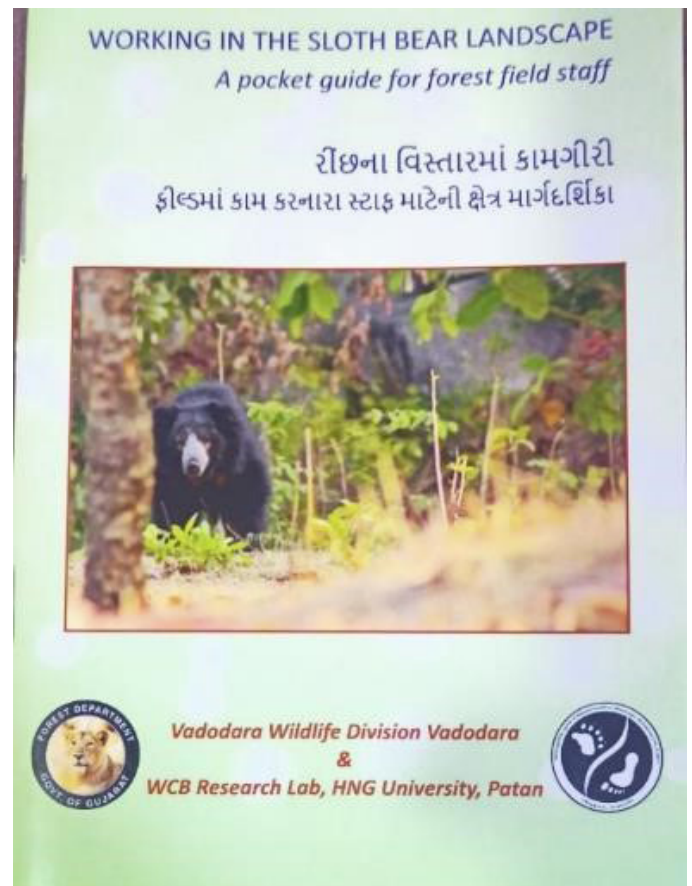


Fig. 10. A field guide for forest staff in sloth bear areas.

living, working or recreating in areas with sloth bears (Fig. 11).



Fig. 11. Instructions and safety measures for people in sloth bear range.

Conclusions, discussion and future direction

Local people in the Chhota Udepur district of Gujarat, India, were engaged in the process of conflict resolution through the development of community-based initiatives in order to foster a sense of ownership and responsibility. A programme of education and awareness enlightened residents about the ecological importance of sloth bears and the significance of their conservation. Participants were also taught how to respond appropriately and safely when encountering a sloth bear, reducing the likelihood of confrontations leading to attacks. The effectiveness of the community outreach programme should be evaluated in terms of the extent to which there is a measurable

change in local people's attitudes toward sloth bears and other predators and a decline in the number of attacks. These findings should guide further improvements to the programme, which can be replicated in other conflict-prone areas.

Coexistence of humans and sloth bears is a multi-faceted challenge that demands innovative and adaptable strategies. Conflict mitigation strategies can vary significantly depending on their nature, the location and context [29]. While passive, non-intrusive prevention measures are generally preferred, there are often situations where active intervention becomes necessary [30,31]. Regardless of the specific approaches chosen, the most effective solutions typically involve engaging local communities in their planning, execution and ongoing maintenance.

It is often essential to adopt a regional approach [8], customising the response to the specific situation at hand. Technology can play a pivotal role in the early detection and prevention of conflicts. For example, the development of Smartphone applications that allow communities to report sloth bear sightings or incidents quickly can facilitate a rapid response from wildlife authorities (*Editor's note: see the article in this issue on establishing a bear smart community in Romania*).

In conclusion, to address human-wildlife impacts and conflicts successfully warrants a multi-pronged strategy, incorporating both ecological and socio-economic dimensions. By involving local communities in the decision-making process, their traditional knowledge and perspectives can be integrated, leading to more culturally sensitive and locally acceptable solutions and refining mitigation strategies to ensure long-term success in minimising conflicts and promoting more harmonious coexistence [18,32].

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