



# The Conservation Challenge: Environmental and Legal Aspects of One-Horned Rhino (*Rhinoceros unicornis*) Protection in India

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## Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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## ABSTRACT

The natural environment, with its lush landscapes and diverse ecosystems, serves as a vital refuge for a wide array of majestic animals and vibrant plant life, playing a crucial role in maintaining the delicate balance of our planet's ecological systems. One particularly remarkable species, the Greater One-Horned Rhino, faces the serious and pressing threat of being classified as vulnerable by the International Union for Conservation of Nature (IUCN) due to rampant poaching and the relentless loss of its natural habitat. In the Indian subcontinent, home to a significant population of these incredible creatures, the rhino's existence is under severe jeopardy, leading to distressing

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conflicts between human communities and the rhinos as the animals venture beyond protected areas in search of sustenance. Despite the presence of both national and international regulations, the peril to their existence persists, casting a shadow over their future. It is imperative that we take swift and effective measures to safeguard this magnificent species. This paper is dedicated to thoroughly examining the status of the Greater One-Horned Rhinos and to proposing practical and viable solutions aimed at ensuring their protection and survival for generations to come.

*Keywords: Poaching; vulnerable species; greater one horned rhino; conservations; wildlife.*

## 1. INTRODUCTION

The Greater one-horned rhino, also referred to as the "Indian rhino", and scientifically known as "Rhinoceros unicornis" historically distributed throughout the Indian subcontinent's northern areas, their numbers drastically declined due to hunting and being killed brutally. At the start of the twentieth century, there were only two hundred greater one-horned rhinos.[1] The current population of the Greater one-horned rhino is estimated to be approximately 4,000. Though, the population of one-horned rhinos has made an amazing recovery because of the committed management and preservation efforts of Nepalese and Indian conservation officials. With strict protection from Indian and Nepalese wildlife authorities, the population of Greater one-horned rhinos has significantly increased.

During the late 1800s and early 1900s, a trend among royals for sport hunting emerged, resulting in continuous and relentless hunting of Greater one-horned rhinos. Reports indicate that British individuals, particularly military officers in Assam, were responsible for the killing of more than 200 Indian rhinos through sport hunting. Consequently, in 1908, there were just about Twelve of these wild species remaining in Kaziranga National Park.

The conservation efforts for Indian rhinos by the Indian Government have been remarkable. In 1905, there were only 75 rhinos, but by 2012, the population had grown to 2700. Greater one-horned Indian rhinos are unique creatures with thick armour-like skin and a distinctive horn. They are categorized as vulnerable due to lower levels of poaching. These rhinos are currently restricted to two well-known locations: Chitwan National Park in Nepal and Kazi Ranga National Park in Assam. Once on the brink of extinction, Indian rhinos were classified as endangered in 1986. With stringent conservation efforts initiated by the Indian Government and wildlife authorities, the population has rebounded from

around two hundred in the late nineteenth century to over three thousand today.

The Greater one-horned rhino is distinguished by its sole black horn, which is between Eight and twenty-five inches in length and its gray-brown hide, which has folds in the skin that give the appearance of armour. The reproductive rate of greater one-horned rhinos is slower, which is a common trait among mammals of their size. Except when mature rhinos or the ones approaching puberty congregate in grazing or wallows, these rhinos spend most of their lives alone.[2] The geographic ranges of male rhinos are ill-defined, poorly guarded, and frequently overlapped. Their main sources of survival come from lakes, ponds, plants, trees, shrubs, etc.

IUCN collaborates with government and non-government organizations to develop best practices and approaches for effective conservation. Together, they work to help sites achieve high standards, while also informing professional capacity development and influencing national and global policy [3]. Red List is the most extensive global inventory of the sustenance status of animal and plant species. Red List categorizes endangered species, including those that are critically endangered. This highlights the significance of "endangered species" as a specific category of imperilment rather than just a general term (Nanda SK,2019).

The decline in the rhino population is due to the loss of grasslands and human encroachment. This has led to human-Rhino conflict, resulting in fatalities. Poaching for rhino horn remains a major threat despite bans on international trade. [4] Rhino horn is utilized in Traditional Chinese Medicine (TCM) for the treatment of various conditions, such as reducing fever, arresting nosebleeds, and preventing strokes [5].

## 2. MATERIALS AND METHODS

The Greater one-horned rhinoceros has always fascinated as the most intriguing and distinctive

among the five living species of rhinoceroses [6]. Unfortunately, it is exposed with various threats [6].

Poaching,[7] a perpetual threat to wildlife, has been a primary factor in the decline of the Indian rhino population. While legal hunting was prohibited in India in the early 20th century to implement wildlife conservation measures, including those for rhinos, poaching remained a significant threat. Between 1980 and 1993, 692 rhinos fell victim to poaching, bringing the Indian rhino species at the verge of extinction by the mid-1900s. Even in recent years, poaching has continued to pose a major concern. The most common method used for poaching rhinos is shooting. Sharpshooters are hired by rhino horn traders and are supplied with firearms and ammo to perform illegal hunting [8]. Poachers also employ electrocution by attaching an insulated line to an electrical cable from a high-voltage power supply line that crosses over a zone of protection. Spearing is another method, which has only been documented in Chitwan National Park for Indian rhinos.[9] Poachers may also dig pits to trap rhinos, ensuring there is enough space for movement to easily saw off the horn. Additionally, poachers use pesticides and zinc phosphide as poisons on salt licks and deploy nooses to strangle rhinos. It is possible to link the removal of alluvial plain grasses to the notable fall in the rhino population.

These days, the species is seriously threatened by the growing demand for area from an increasing number of people. There are some protected areas where rhinos reside that have reached their carrying capacity, resulting in conflicts between humans and rhinos as the animal's venture outside these areas in search of sustenance. Reports indicate [10] that rhinos in India and Nepal are responsible for several human fatalities annually. In regions characterized by high population density, a correlation exists wherein lower breeding rates are observed.

### 3. RESULTS

Greater one-horned rhinos have a slower reproductive rate, a common trait among

mammals of their size. Female rhinos carry their young for around 15 to 16 months and independently care for their calves for at least one and a half years. In healthy conditions with an abundance of potential mates, a female rhino will give birth to a single calf every two to three years [11].

However, there were no reported rhino poaching incidents in Assam in 2022, contrasting with 27 incidents in both 2013 and 2014. Despite no recorded poaching incidents last year, two cases were reported in 2023, with one occurring in Kaziranga National Park and the other in Manas National Park, as per the IRF statement.

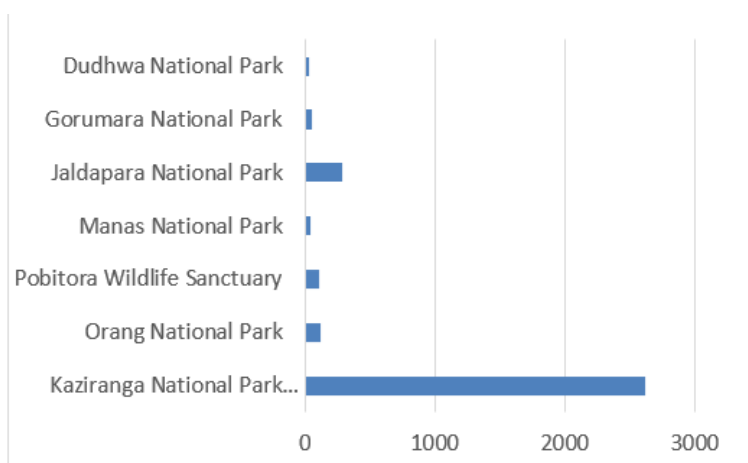
The greater one-horned rhino (*R. unicornis*) holds a status of Vulnerable on the IUCN Red List. Recent surveys conducted in 2022 have confirmed a notable increase in their population in Assam, India, with an estimated 2,885 individuals across four populations as of April 2022. This marks a significant rise from the 2,650 individuals reported in February 2018. Notably, Kaziranga National Park in Assam conserves the majority (81%) of India's population, and the numbers continue to show an upward trend. Additionally, India has successfully re-established a population in Manas National Park since 2008, with the park currently sustaining 40 greater one-horned rhinos, and the birth rate offsetting previous poaching losses. Furthermore, there has been a notable increase in the rhino population in Uttar Pradesh, with numbers rising from 32 to 38 since 2015. In West Bengal, the latest counts as of March 2022 show an increase from 255 to 339 rhinos since 2015. It is also worth noting that the most recent wild rhino translocation in Assam occurred in 2021, with a male and female being relocated to Manas National Park.

The Indian Rhino Vision 2020 has already had a considerable impact on the species and is poised to continue to do so in the future. This initiative aims to facilitate the intermingling of DNA from rhinos located in Kaziranga National Park and Pobitora Wildlife Sanctuary, thereby establishing a robust and self-sustaining rhino population for the long-term preservation of the species.

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Lest Concern    Near Threatened    Vulnerable B2ab(iii).    Endangered    Critically Endangered    Extinct  
in the Wild    Extinct

\* As per the Assessment Report of IUCN, Greater One Horn Rhino falls under vulnerable category [12].



**Fig. 1. Population of greater one-horned rhinos in India: 2022 report**

In its report, the International Rhino Foundation (IRF) highlighted that despite the growing population of the One-Horned rhino, poaching continues to pose a significant threat to all five rhino species. Additionally, the report emphasized an increase in poaching activities in regions that were previously unaffected.

The IRF 2023 report also admitted that the population of the greater one-horned rhino is experiencing growth; however, the species is still classified as Vulnerable. Poaching continues to pose a significant threat, resulting in the species being displaced from many of its historic habitats. The species' potential recovery is contingent upon not only safeguarding existing rhino populations but also reintroducing them to areas from which they have vanished. Additionally, the prevalence of invasive species represents a remarkable landscape-level threat to greater one-horned rhinos, as these invasive species stifle native rhino food plants and diminish available habitat [13].

**Constitutional aspects:** During the drafting of the Constitution of India, the Constituent Assembly engaged in deliberations concerning the classification of forests and wild animals into the Central, State, or Concurrent List. Subsequently, upon the adoption of the Constitution, forests, birds, and wild animals were categorized under the State List.

In 1976, an amendment was made to shift the subjects of forests and the protection of wild animals to the Concurrent List under the 7th Schedule (Article 246) of the Indian Constitution. This amendment empowered the Indian Government to enact laws about forests and

wildlife. In the event of any inconsistency between State and Central laws, the Central law holds precedence. For example, in cases where the State Forest Act conflicts with the Indian Forest Act of 1927 or the Forest (Conservation) Act of 1980, the latter takes precedence over the State law.

- The State shall make every effort to secure and intensify the natural world, as well as to save the nation's forests wildlife, according to Article 48A of the DPSP in the Indian Constitution.
- The right to life is protected under Article 21 of the Constitution as a fundamental right. Life cannot be enjoyed without the preservation and protection of the environment, ecological balance free from air, water, and sanitation pollution, and the right to a life with human dignity are all included in the enjoyment of life and its attainment [14].
- Article 13 stipulates that no law, rule, or ordinance that derogates or abridges any of the Fundamental Rights can be enacted. Should such a law be enacted, it would be void to that extent.
- Article 19(1)(a) guarantees speech freedom and Expression concerning public affairs, allowing activists to freely express their opinions on Government Policies or decisions and critique the actions of Officials.
- Article 19(1)(b) bestows the right to assemble peacefully and without arms,

empowering activists to stage protests against any decision of the Government or the Department.

- Article 19(1)(c) enables freedom to form associations, allowing activists to establish trusts or societies to conserve wildlife, forests, and the environment.
- Article 19(1)(e) empowers every citizen to move freely and reside/settle anywhere in the country. Hence, individuals wishing to voluntarily opt for re-settlement outside a PA cannot be stopped by a majority resolution of the Gram Sabha or under the sections of the Forest Rights Act.

It is essential to comprehend those reasonable restrictions that have been prescribed to ensure that these fundamental rights are exercised without infringing upon the sovereignty, integrity, security, or Public Order, or causing defamation.

- Article 51A(g) of the Constitution now states, in addition to the Fundamental Freedoms, that it is every citizen's fundamental responsibility to preserve and enhance the natural environment, particularly forests and wildlife. Additionally, Article 51A(i) declares that residents have a fundamental obligation to protect public property, including forests [15].

The Directive Principles have been used by the Supreme Court in several rulings to broaden the scope and content of Fundamental Rights, making them subject to legal action [16]. The Apex Court has acknowledged the preservation and protection of ecology and the environment as a component of the "Right to Life," a fundamental right, in several precedent-setting rulings. It supports the idea that ecology and the environment are gifts from nature that should be protected in trust for coming generations rather than being something that may be owned.

Furthermore, the Supreme Court,[17] by invoking its inherent powers under Article 32, has established a procedure enabling every citizen to approach the SC in the public interest when the Fundamental Rights of a citizen are violated. A similar provision is conferred under Article 226, empowering State High Courts to issue such writs in response to petitions seeking enforcement of Fundamental Rights or Statutory

Rights within their geographical jurisdiction. As such, the scope of Article 226 is broader than that of Article 32.

The Constitution of India empowers the Supreme Court the authority to issue directions or writs to authorities to fulfil a public duty that they are obligated to, such as taking action to protect wildlife or abstain from actions that are not warranted, like granting permission for mining in a Protected Area. Through the Omnibus Godavarman Forest case [18] the Supreme Court has maintained an open case for nearly 25 years under 'Continuing Mandamus', issuing significant orders for the conservation of forests and wildlife.

**Legal aspects:** To protect wildlife, important legislations such as the Wildlife (Protection) Act of 1972 were passed, encompassing three main objectives [19].

- o Uniform Legislation on wildlife in India;
- o Setting up of maintenance for National Parks and Sanctuaries;
- o Prevention of Illegal trades in wildlife.

Since the inception of the Wild Life (Protection) Act of 1972, several amendments have taken place to strengthen the significance and implementation of laws. This law emphasizes the protection of wild animals by prohibiting hunting, with exceptions granted for specific cases and special purposes as detailed in Sections 11 and 12, respectively.

Under Section 51 of W.P.Act 1972, any person committing a breach of any of the conditions listed down in the Act shall be punished with imprisonment which may extend up to 3 years, or with a fine which may extend to 25,000 rupees, or with both.

**Judicial aspects:** In T.N.Godavaran Thirumulpad v. Union of India's case,[20] the Apex Court of India suggested that legislation resembling the US Critically Endangered Species Act be taken into consideration. This would protect vulnerable species, which are expected to become endangered shortly, as well as species which are at the verge of extinction, over all or a substantial portion of their range. Even if a species may not be endangered as a whole, the term "species" includes fish, wildlife, and plant species and sub-species, as well as geographically isolated groups of vertebrate wildlife. In its opinion, this matter receives

serious attention from the appropriate authorities in Parliament.

The Calcutta HC issued an order in the case [21] dated 13/10/2023 where it addressed the issue of protecting wildlife from senseless killings. On February 20, 2023, the High Court established the "Humane Committee" at the district level for five districts— Bankura, Jhargram, Murshidabad, Purulia and Paschim Medinipur. In a noteworthy decision, the division bench emphasized that the senseless killing of animals for pleasure or false display of prowess is just as severe and blameworthy as the offence of murder under the IPC (1860).

The Apex Court held in *Animal Welfare Board of India v. A. Nagaraja & Ors.* [22] that compassion for all living things encompasses consideration for their pain and welfare. The Court considered Article 51A (g) to be the foundation of Indian animal rights legal theory, together with Article 51A (h)'s obligation to foster scientific temperament.

**International aspects:** There are countless international accords about wildlife at the regional as well as global levels that could have an impact. While this study focuses on domestic laws, this section briefly outlines principal global agreements, which have significantly contributed to national legislation.

The Convention on International Trade in Endangered Species of Wild Flora and Fauna, also known as CITES [23], was established in Washington in 1973 to safeguard endangered species. This crucial agreement imposes restrictions and regulations on international trade through export permit systems. To protect species threatened with extinction from the impacts of trade, the granting of export permits is strictly regulated and only allowed under exceptional circumstances. Likewise, a permit is needed to import certain species, guaranteeing that CITES rigorously prohibits trade in these species for purposes other than commercial ones.

Established in 1979 at Bonn, the Convention on the Conservation of Migratory Species of Wild Animals is a major international agreement [24] that necessitates cooperation between "range" states that host migratory species that frequently cross international borders. In the case of endangered species, states have legal obligations to aggressively protect and restore

their habitats, avoid, eliminate, or reduce any barriers to their movement, take action to stop, lessen, or manage risks to the species' welfare, and outlaw their exploitation. Additionally, for other species with an unfavorable conservation status, range states commit to entering into agreements to uphold or enhance the prevention status of the concerned species.

Adopted in Rio de Janeiro in 1992, [25] national laws are progressively incorporating the Convention on Biological Diversity. According to the Convention, particular tactics are used for the awareness of biodiversity conservation and sustainable use. Relevant concerns must be incorporated into plans, programs, and policies, with the sustainable use of biodiversity being a key consideration in national decision-making.

Members of the Convention are required to administer and control them, detect, and control potential sources of adverse impacts on biodiversity, restore vulnerable species, and implement laws for the preservation of endangered species. Furthermore, initiatives that are anticipated to have "significant adverse effects" on biological diversity must undergo environmental impact evaluations.

The Sustainable Development Goal (SDG) of United Nations 15.7 calls for swift action to prevent the illegal hunting and smuggling of endangered plant and animal species [26]. This encompasses the comprehensive approach to tackling both the demand and supply of illegal wildlife products. The pervasive threat of wildlife poaching imperils biodiversity and conservation endeavours at large.

**Other relevant aspects:** Several independent organizations energetically carry out conservation and rescue initiatives for endangered animals. However, the lack of funding and authoritative constraints poses challenges for these volunteers and organizations in upholding their unwavering commitment to animal welfare.

#### 4. DISCUSSION

It is imperative to discern the prevailing gaps and implement practical solutions in order to gain a comprehensive understanding of the current status of this species.

#### 4.1 Existing Lacunas

There exists a substantial disparity between the enactment of laws and their enforcement. Regrettably, a significant number of wrongdoers either evade punishment altogether or are subject to minimal sentences. The relevant authorities persist in employing traditional methods, further perpetuating a wide chasm between the extant issues and the implementation of effective remedies.

#### 4.2 Tentative Solutions

Indian rhinoceroses have been designated as rare under the CITES since 1986. However, the International Union for Conservation of Nature (IUCN) Red List revised their classification in the year 2008, redesignating them as vulnerable. The progression from endangered to vulnerable status involved the implementation of stringent measures and policies by the government in collaboration with organizations such as the World-Wide Fund for Nature (WWF) and other non-governmental wildlife conservation entities. Despite a marked reduction in poaching incidents, the endeavour to safeguard Indian rhinoceroses is ongoing.

Despite the stringent measures and policies, poaching continues to present a considerable threat to Indian rhinoceroses. The "Indian Rhino Mission 2020" was introduced by the Assam government in 2005 in partnership with the Bodoland Territorial Council, the World-Wide Fund for Nature (WWF), the International Rhino Foundation, and the U.S. Fish & Wildlife Service. By 2020, the motive of this project was to have at least 3000 Indian rhinoceroses living in seven Assamese protected areas. In order to provide them with enough space for breeding and long life, Indian rhinoceroses were moved under this program from heavily populated habitats like Kaziranga National Park and Pobitora Wildlife Sanctuary to protected locations.

As indicated by the International Rhino Foundation (IRF), between 2005 and 2008, they collaborated with pertinent authorities and local people to increase the prevention of Indian rhinoceroses. They maintained a comprehensive census of the extant population and erected patrol routes, guard posts, and bridges to facilitate effective monitoring of the rhinoceros population.

Commencing in 2008, the translocation of rhinoceroses was initiated. By 2012, a total of 18 greater one-horned rhinoceroses were successfully relocated to Manas National Park from Pobitora Wildlife Sanctuary and Kaziranga National Park.

Furthermore, eight more rhinoceroses were conveyed to Manas National Park to conserve and rehabilitate animals. In all, 14 calves have been born in Manas since the relocation. Following measures may improve the situation, these are as follows.

- I. It is important to conduct various research initiatives to enhance the breeding of Rhinos under the guidance of competent authorities.
- II. Regular medical assessments of this vulnerable species should be diligently supervised.
- III. Establishing an efficient and skilled workforce for the management and maintenance of Rhinos is vital. It is advisable to involve local individuals with relevant knowledge about the habitat of these species.
- IV. A critical challenge in maintaining these species is the lack of proper fund allocation. Therefore, the concerned governments need to prioritize fund allocation for this purpose.
- V. Furthermore, it is important to focus attention on the need for deep study, case analysis, and the development of effective solutions to address the situation faced by vulnerable species.

#### 5. CONCLUSION

The Constitution of India ensures fundamental rights and duties for its citizens. It is incumbent upon the judiciary, government, and the citizens to collectively shoulder the responsibility of protecting the environment, including wildlife. Furthermore, the notion of sustainable development entails establishing a connection between the environment and development. It is an undeniable truth that every species on this planet embodies not only biological diversity but also provides valuable contributions to nature and humanity. Sustainable development is the process through which mankind should

responsibly utilize resources, not only for present generations but also for the benefit of future generations. Therefore, all stakeholders need to collaborate and take concerted action to safeguard vulnerable and endangered species from extinction.

#### DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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