

## *How India recovered its wild tigers*

Yadvendradev Jhala, Rajesh Gopal, Vaibhav Mathur, Prodipto Ghosh, Himmat Singh Negi, Sunita Narain, Satya Prakash Yadav, Amit Malik, Rajendra Garawad and Qamar Qureshi

Wild tigers are threatened by poaching for several reasons: directly to meet demand from traditional Chinese medicine; and indirectly through the depletion of their prey by bushmeat consumption, and the loss of their habitat to human uses. In 2010, world leaders pledged to double numbers of wild tigers by 2022. Despite this pledge, few countries have since succeeded in stemming decline. However, tigers in India have increased significantly in numbers. In this paper, we share the reforms in policy, management, and resource allocation that made this recovery possible, so that these can be applied elsewhere.

After initial success in the 1970's-1980's with what was called "Project Tiger", poaching began to decimate tigers, and a faulty monitoring system misreported tiger numbers. A Tiger Task Force appointed by the Indian Prime Minister identified failure in protection, management and monitoring, alongside the alienation of local communities as causes for tiger declines. Recommendations of the Task Force led to the formation of statutory bodies, the National Tiger Conservation Authority and the Wildlife Crime Control Bureau; scientific monitoring of tiger populations, resource sharing with communities and incentivized voluntary relocation of settlements from tiger reserves.

Since small populations have a higher chance of becoming extinct, long-term population survival is enhanced by connection through corridors. One tiger conservation strategy, therefore entailed managing landscapes by using reserves as breeding habitats and intervening forests as sub-optimal habitat and corridors, all embedded within human land-uses. However, most communities living within/near tiger reserves were hostile to them, primarily because, tigers kill livestock and sometimes people, while wild herbivores raid crops. But there were

additional reasons too: managers treated local communities in a heavy-handed way, reserves led to restrictions on forest resource extraction, and some communities were evicted forcibly. This hostility made it possible to poach tigers with local help. Gaining community support, then, involved sharing revenues from tiger reserves with local communities, mitigating human-wildlife conflict with compensation for crop loss, livestock and human injury/deaths, and the removal of problem tigers. Forced eviction was made illegal. To create habitat for tigers while simultaneously improving livelihood, an incentive of 1,000,000 Rupees is now offered for volunteering to relocate outside reserves. This initiative has resulted in securing 40,145 km<sup>2</sup> as human free core of 50 tiger reserves. Tiger reserves are managed with an annual investment of ~1000 USD km<sup>-2</sup> with one staff member per 6.5 km<sup>2</sup>.

Monitoring using trail-cameras combined with robust statistical models provided accurate estimates of tiger populations. Stripe patterns on each tiger are unique, like a fingerprint, allowing computer software to identify individuals from thousands of tiger photographs. India's tiger survey of 2018 was a World Record for the largest camera trap-based survey which estimated ~3,000 tigers from 76,651 tiger photographs.

Economic evaluation of tiger reserves based on direct benefits and ecosystem services valued them to have annual benefit flows between 76,900 to 292,300 US\$ km<sup>-2</sup>. Economic value appeals to bureaucrats and politicians who are less inclined to put aside areas for conservation.

Tigers are conservation dependent and require targeted investments for their continued survival. Political commitment and resources become available when people and tigers benefit simultaneously.

Conscious balance between development for rapid economic prosperity and long-term ecological security will ensure that wild tigers and their ecosystems will survive for future generations.



*A rare self-triggered photo of a tigress carrying her young cub obtained from a camera trap. Such images allow scientists to uniquely identify tigers as each tiger has a different stripe pattern and subsequently estimate their numbers in a population. Camera traps also provide information on tiger demography like sex ratio, breeding females, and age structure.*



*A self-triggered photo from a camera trap of a male tiger spraying his urine to scent mark his territory.*

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