The beneficial side of invasive plants

Invasive plants are detested for the ecological devastation they cause, but in rural India, people have adapted to some alien species in unique ways and are reaping benefits, writes Spoorthy Raman

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A thicket of mesquites in Blackbuck National Park, Gujarat. Credit: Ankila Hiremath

massive economic losses. A 2022 study estimates that invasive species—plants and animals—cost the Indian economy anywhere between $127.3 billion to 182.6 billion (₹8.3 trillion to ₹11.9 trillion) in the last 60 years. Across the world, invasive species receive a bad rap for being the Grim Reapers of a healthy ecosystem.

But that's just the well-known side of the story. In a first-of-its-kind study, researchers at the Ashoka Trust for Research in Ecology and the Environment (ATREE) have uncovered the little-known side of invasive species—how they affect the well-being of India's rural households, such as their safety, access to resources and livelihoods.

The researchers peered through nearly 50 published studies on the impact of invasive plants on human well-being, covering 20 species. Their findings were published in the journal *Environmental Development.*

A quarter of India's 650,000 villages are on the peripheries of forests, where people, mostly belonging to Indigenous and marginalised communities, depend on non-timber forest products for food, fuelwood and sustenance. Invasive species that permeated most of India's forests and grasslands have invariably become a part of their lives—a crucial aspect for ecologists to consider while managing these species.

"In India, unlike in developing countries, there are very few inviolate spaces where people and forests (including grasslands and other open natural ecosystems) do not coexist," says study author Ramya Ravi, "Therefore, separating ecological impacts alone cannot be a key focus of biological invasions and their management."

Ecologist Alok Bang from Azim Premji University, Bhopal, who was not involved in the study, says countries like India do not always have updated checklists of invasive species. Hence, studies like this, which bring to light the lesser-known socioeconomic impacts of such species, are essential, he says. "The study is based on ~50 studies done in India, and thus, has synthesised something new—this is a precious knowledge-generation process at the national level."

Many benefits, few harms

Mesquite (*Prosopis juliflora*)—a native Mexican thorny shrub widespread across India—was a significant source of firewood and fuelwood in many parts of the country. In coastal Andhra Pradesh and Tamil Nadu, women preferred fuelwood from mesquites to venturing deep into the forest in search of other firewood. Prosopis-based charcoal derived from the plant, which has a better combustion rate and higher calorific value than firewood, provided supplementary income.

material around croplands and homesteads or for making bullock carts and other agricultural equipment.

On the flip side, mesquites caused slow-healing injuries to people and livestock and became a barrier to accessing natural resources. For instance, in Rajasthan's Keoladeo National Park, these invasive plants increased conflicts among pastoralist communities over available pastures, resulting in some communities giving up pastoralism.

Lantana (*Lantana camara*), a native plant in the American tropics, is used by some communities to make furniture, sculptures, baskets, and medicine. However, when the dense shrub grows in forests, it reduces visibility. It increases people's encounters with dangerous wildlife, as reported by the Soligas living in Karnataka's Biligiri Rangaswamy Temple Tiger Reserve (BRT). The plant also makes it challenging for them to find edible tubers. Lantana expands in forests and reduces the abundance of native forest crops such as Indian gooseberry (amla), soapnut tree, ritha, Indian walnut (haritaki) and Indian frankincense (guggulu)—all of which forest communities collect and sell to make a living.

With their dense mats, aquatic weeds choke water bodies and prevent access to them. In Kashmir, the spreading alligator weed (Alternanthera philoxeroides) has increased costs for fishermen who must remove the plants to help their fishing boats access the lake. In some regions, aquatic weeds hindered the harvest of water chestnuts and Indian lotus, which some communities collect and sell for livelihoods.

"It is very interesting to note a mixed response of invasive plants on people's well-being, especially on how it could positively impact livelihood-related criteria," says plant biologist Geetha Ramaswami from Nature Conservation Foundation, who was not involved in the study. "Maybe we are seeing some human adaptations towards using invasive species."

Implications on managing invasive plants

The study shows that communities in rural India depend on invasive plants for many aspects of their lives. Hence, the management approach to them cannot be just removal, like it has been. "In instances where there are positive impacts, removal and restoration could result in social justice issues," warns Ravi. "Even though the predominant impacts from invasive species are negative, we cannot entirely undermine the positive impacts to people, given that our study also finds that poverty appears to be a key driver of adaptation to invasive species."

The researchers suggest that decisions on invasive species management must consider the social and cultural context and the perception and use of these plants