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Community-based approaches for wildlife conservation and livelihood options: a case study from Dampa Tiger Reserve, Mizoram, India

Sushanto Gouda, Ht. Decemson, H. T. Lalremsanga and G. S. Solanki

The traditional practice of shifting cultivation in Mizoram, India is linked to the ecological, socio-economic and cultural lives of the over 86% of its population. Negative impacts are devastating and degrade the environment and ecology, a major concern in conservation biology such as large-scale deforestation, soil erosion, invasion by weeds and exotic species. Studies provide information on the nature and extent due to anthropogenic pressures on species diversity. Active participation of locals is pivotal. Workshops and awareness programmes were conducted with alternative livelihoods to reduce forest dependency. Efforts are on by educating people on preserving tropical forests at the Dampa Tiger Reserve, Mizoram.

Wildlife is an integral part of conservation as flora and fauna are the actual and true assets of any developing country. Conservation has evolved from a callow discipline to one of deep transformation. Finding solutions to conservation can be challenging as they require careful balancing of the wildlife along with the needs of local people. Therefore, involvement of the local community is pivotal. Since any protected area harbours and serves deep interests for the scientific community with functions like centre for eco-tourism; herein, we used Dampa Tiger Reserve (DTR), Mizoram, India as a case study for understanding the rationale for developing a community-based approaches for wildlife conservation and livelihood upliftment in the region.

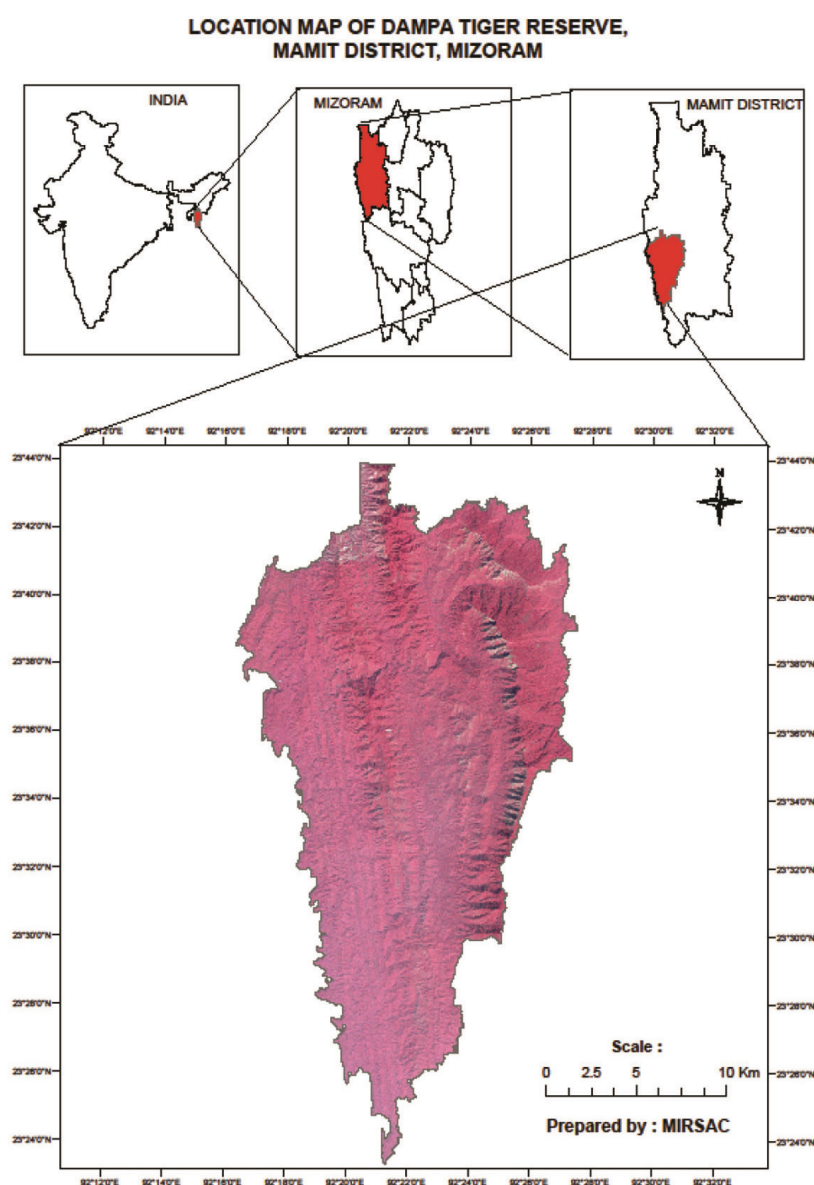
Brief background

DTR is the largest wildlife sanctuary in Mizoram covering an area of 988 sq. km (core 500 sq. km and buffer 488 sq. km) and stretching from 23°20'–23°47'N to 92°15'–92°30'E (Figure 1). Its elevation ranges from 235 to 110 m. The Sanctuary was declared a Tiger Reserve in 1994. Administration of DTR is managed under the Phuldungsei and Teirei ranges. It harbours rich flora and fauna and is natural home to leopards, Indian bison, barking deer, sloth bear, gibbons, langurs, slow loris, rhesus macaques, Indian python, wild boar and a variety of avifauna including reptiles and amphibians. It is the least explored area of North East India, with only a few records of fauna richness^{1–4}. Forests

are broadly categorized into three types; tropical wet evergreen, tropical moist deciduous and montane subtropical⁵. The site is dominated by mountain ridges with high-ground, non-floodable rainforest standing on a slightly undulating terrain^{6–9}. Mizo, Bru and Chakma tribes inhabit the Reserve (buffer area) and practice jhum cultivation for their livelihood. Tribals around the DTR are predominantly meat-eaters. Primates are hunted in summer and winter and ungulates in winter and monsoon. Porcupines are hunted during winter and bears in summer. Villagers rear livestock for meat, but prefer bush meat due to its delicacy¹. Non-timber forest products (NTFPs) such as wild edibles include vegetables, fruits (*Artocarpus heterophyllus*, *Embllica officinalis*, *Mangifera indica*, *Musa paradisiaca*,

Table 1. Participants during the two-day livelihood options awareness workshop

Village beat	Household	Participants	Attendance
Damparengpui	700	Village council members The Mizo Hmeichhe Insiukhawn Pawl (MHIP), a local women's organization Young Mizo Association (YMA) Mizo Upa Pawl (MUP)	70 (38 males and 32 females)
Teirei Forest	107	Village council members MHIP YMA MUP	40 (30 males and 10 females)

**Figure 1.** Study site: Dampa Tiger Reserve (DTR) in Mizoram, India.

Protium serratum and *Rhus javanica*), spices and condiments. Reported species of edible tubers (*Amomum dealbatum* and *Diocorea alata*) are eaten either boiled or

roasted and rhizomes (*Arisaema leschenaultia*) are eaten as boiled vegetables². Such extractions from the Reserve have resulted in deforestation of adjacent areas

for livelihood alternatives. Such resources extractions from the reserve may result in severe deforestation and loss of forested lands. A recently discovered local species, i.e. *Begonia dampae* endemic to Dampa belonging to the family Begoniaceae by Odyuo *et al.*¹⁰ is also threatened by fuel wood collection, cattle grazing and frequent forest fires. Hence, immediate conservation action plan is the need of the hour, which can be achieved by providing adequate resources to the villagers while regulations and bringing a balancing solution for conservation of forests in the region.

Local-based outreach conservation

An awareness programme was conducted at Teirei Forest and Damparengpui village, which was attended by about 110 individuals from different social groups. The Government of India schemes under entrepreneurship and skills development include those under health and insurance for rural areas. Sharing of information and a participatory approach by local communities are imperative for the conservation and management of resources in any protected area¹¹. Thereby understanding the views and needs of the locals are crucial for framing future management plans and their proper implementation. Mitigation of conflicts is important in conservation. It is achievable at different levels through field training to strengthen traditional systems adopted, which in turn is cost-effective. Considering the above, a conservation educational programme was organized for local councils (Table 1). The workshop focused on crop damage by wild animals around DTR, including mitigation measures to be adopted. Wild animals such as Asian elephant (*Elephas maximus*), wild boar (*Sus scrofa*), rhesus macaque (*Macaca mulatta*), barking deer (*Muntiacus*

COMMENTARY

Table 2. Some major schemes under the Government of India

Scheme	Work	Beneficiary	Reference
Mizoram State Rural Livelihoods Mission (MzSRLM)	Strategy to reach out to these communities to help them come out of poverty and achieve sustainable social, economic and political development	About 1503 women in 2019–2020	Rural Development Department Government of Mizoram
Community-based Repayment Mechanism (CBRM)	Development for ensuring zero non-performing assets in bank branches financing self help groups (SHGs) through community initiatives and peer pressure to prompt repayment of bank loans	Women (57 nos) of SHGs in 2019–2020	Rural Development Department Government of Mizoram ¹²
Integrated watershed Development Programmes	Sustainable development of natural resources, environment protection, and improvement of socio-economic conditions of the resource poor sections on participatory approach	Farmers and other backward sections of the society	13
Village Forest Development Committees (VFDCs) under the National Afforestation Programme (NAP)	Involvement of local people in the planning, implementation and monitoring of schemes for forest management such as plantations, patrolling path, fencing, etc.	Village youth	Environment, Forests and Climate Change Department, Mizoram
Intensification of Forest Management Scheme (IFMS) under Forest Fire Prevention and Management Scheme (FPM)	The programme focuses on prevention of forest fires and related issues through construction of water storage structures, maintenance of fire line, controlled burning, awareness, etc.	Village youth and local farmers	Environment, Forests and Climate Change Department, Mizoram
Green India Mission (GIM) under National Action Plan on Climate Change (NAPCC)	Promoting alternative fuel energy and eco-restoration of degraded open forests. Women are also supplied with biogas, solar devices, LPG, biomass-based systems, etc.	Women from over 10,200 households are already involved in the schemes	Environment, Forests and Climate Change Department, Mizoram
Mizoram Sloping Agriculture Land Technology (MiSALT) under New Land Use Policy (NLUP)	Reduced soil run-off and enhanced soil health promote pineapple, mandarin orange and poultry preparedness	It has improved the livelihoods of 6269 households	Department of Agriculture (DoA), Department of Horticulture (DoH), Government of Mizoram
Indian Council of Agricultural Research and Department of Agriculture, Mizoram	Conversion of shifting cultivation into terraced fields for Iskut plantation and oil palm	10,800 local farmers from seven districts have been benefitted under the scheme	14, 15

Table 3. Feedback provided by participants at Damparengpui

Question A	Question B	Respondent	Feedback
What have you gained by attending the National Mission for Himalayan Studies (NMHS) workshop?	Any further suggestions regarding future NMHS workshops	Lalramnghaki	A. Learnt new ideas
		Lalbiakliana	A. Expert suggestions are comprehensible
		Lalramenga	B. Frequent demonstrations needed
		Zohmingthanga	A. Learnt about the significance of biodiversity
		Lalthanpuia Meska	B. Save natural forests and free gas connections
		Thanarawia	A. Importance of hard work
		Vanneiha	B. Workshop to be conducted frequently
		Rohmuaka	A. Learnt how to channelize office work
		Lallawmsanga	B. Benefitted from the workshop
		Vanlalzauva	A. Informative and practicable ideas
			B. Organize at night hours for convenience
			A. Practicable livelihood options
			B. Appreciated for all schemes
			A. Encouraging workshop. Schemes applicable for needy
			B. Government should emphasis more on minorities
			A. Now know how to apply for available options
			A. Aware about livelihood options
			B. Workshop be conducted from time to time

Table 4. Feedback provided by participants at Teirei Forest

Question A	Question B	Respondents	Feedback
What have you gained by attending the NMHS workshop?	Any further suggestion regarding future NMHS workshop	Lalsawmliana	A. Learnt new ideas B. Concerned departments should be supportive
		Lalnuntluanga	A. Domestic livestock are the best option B. Keep organizing such programmes
		Samuela	A. Resource persons are commendable
		Biakchhungi	A. Achievable with help of government support
		Lalchhandami	A. Need to tap potential B. Should be effective in letter and spirit
		Zotawna	A. Opportunity should be equal for all categories
		Remthangzela	A. Start rearing livestock B. Suggestions agreed
		Lalrinpuia	A. Know conservation better B. Learnt more about capacity building

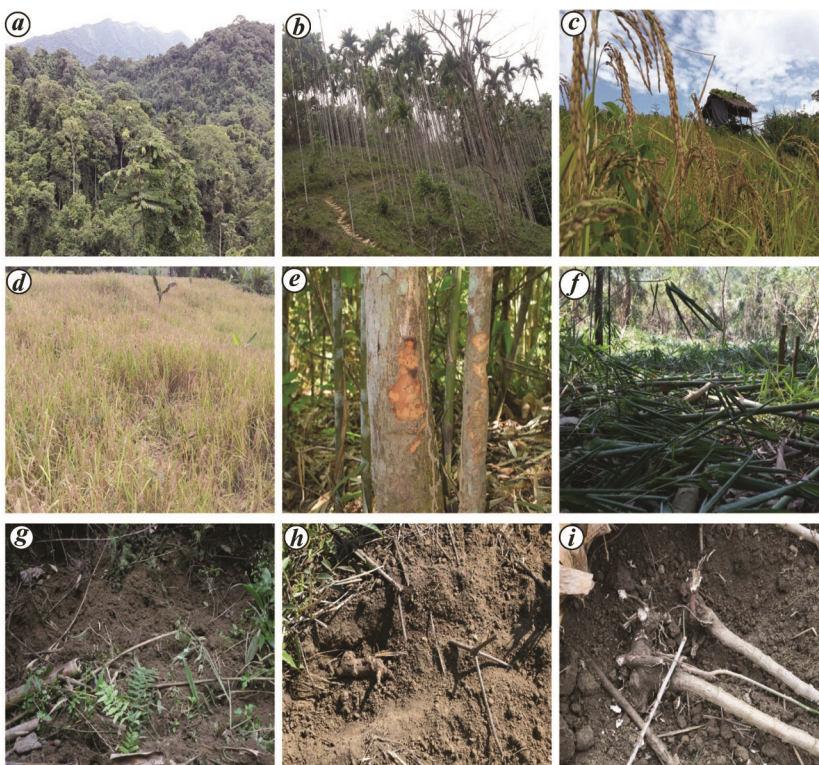


Figure 2. *a*, Tropical forest of DTR. *b*, *Areca catechu* plantation. *c*, Paddy harvest at Tuipuibari. *d*, Wild boars raiding paddy at Khawhnai. *e*, Sambar territory mark on tree bark. *f*, Bamboos crushed by wild elephant. *g* and *h*, Soil loosened by wild boar. *i*, *Manihot esculenta* uprooted by wild animals.

muntjak) and Asiatic black bear (*Ursus thibetanus*) were found to damage the crops (Figure 2). Villagers resort to traditional deterrents like chasing dogs, scare crow, trapping or small-scale hunting. However, the forest department policy on strict implementation of forest laws is the primary issue for the locals.

Plausible suggestions

Resource persons presented methods of crops raiding protection and alternative live-

lihood options: (1) Mixed farming of cash crops – regular patrolling of crop fields, preventing storage of harvested granary and crops in huts, avoiding working at night, playing music at low volume while working in crop fields were some of the suggested measures for mitigating crop depredation. (2) Timely financial aid – formation of groups under village councils to authenticate loss of actual crops and submission of compensation applications in bulk directly to the concerned authority. (3) Intensify human vigilance – components

of crop and livestock protection through groups of youth patrolling in crop fields during harvest season. Alternative plantations like betel, rubber, teak which serve as a natural deterrent for wild animals. (4) Visual and olfactory deterrents – use of natural pheromones and other deterrents such as strong pungent chilli powder were also suggested to the local farmers to keep away wild animals like bears, ungulates and elephants as they are proven and already applied in other parts of the country.

Community-based livelihood options

For creating awareness among villagers and stakeholders about alternative livelihood options, workshop and awareness programmes were organized at Damparengpui and Teirei Forest in the presence of resource persons, forest officials, veterinary doctors and members of the local community. Details of participating village, groups and participants are provided in Table 1.

Various efforts of forest conservation were referred from prominent examples including community-oriented biodiversity conservation movements across the country and other successful initiatives undertaken at regional level in India. Importance of eco-tourism for generating sustainable revenue among the rural community was emphasized as researchers and wildlife freelancers visit DTR every year. Successful conservation events such as social movements (Chipko movement, Uttarakhand), developing community-owned forest (Jharkhand, Nagaland and Meghalaya), and suggesting use of synthetic hornbill's feather for use by local tribes in Arunachal

Pradesh are some of the classic examples of human-wildlife coexistence. The need to protect endemic species in DTR was highlighted. Audio-visual mode of integrated fish farming was demonstrated. According to an assessment of the Fishery Department, Government of Mizoram, 40% area is suitable for fish farming around DTR because of the availability of perennial water. Rearing poultry and pig-gery was encouraged to take up livestock farming. Table 2 lists the major schemes under the Government of India. Videos were played on the basics of livestock management, common diseases and vaccination as preventive measures. Major constraints raised by the participants were non-availability of funds as represented in Tables 3 and 4. Efforts are on through research and educating the local community to undertake mixed farming and diversify the agricultural practise rather than following the traditional shifting cultivation. Effective conservation-oriented businesses and NGOs play increasingly important roles for improving people's knowledge, promoting pro-conservation by involving the public for sustainable development initiatives. The idea behind this drive is to gradually divert the minds of local population around DTR to alter livelihood options from traditional to sustainable means. Systematic planning and evaluation with effi-

cient collaborations will help in conserva-

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