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Editorial

Social dimensions of tropical conservation

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The current issue of TCS includes nine research articles and one short communication. These papers address social issues in a broad array of conservation topics: on-farm conservation of Cherimoya, a fruit tree species native to the Andean valleys of Ecuador, Peru and Bolivia; wildlife protection in a heavily hunted biodiversity hotspot in the Atlantic Forest of Brazil; reducing rural household income fluctuations through diversification of wildlife use in south eastern Zimbabwe; Botswanan palm basketry among the Wounaan of western Colombia; using local knowledge to track wildlife decline and forest loss in insurgent-affected Similipal Tiger Reserve in India; wildlife exploitation in Nagaland, North-eastern India; the affect of sediment burial on the structure of mangrove forests in northeast Brazil; a study of strobili and seed production of *Dioon edule* (Zamiaceae) in San Luis Potosí, Mexico; the influence of climatic and structural factors on epiphytic bromeliad community assemblage in the Yucatan peninsula, Mexico; and factors affecting big cat hunting in Brazilian protected areas.

Below are brief accounts of each paper in the current issue.

Vanhove and Van Damme used value chain analysis to examine the conservation of cherimoya (*Annona cherimola* Mill.), an underutilized, perennial fruit species native to the Andean valleys of Ecuador, Peru and Bolivia. They investigated the Cumbe variety, registered as a collective trademark, and another group of traditionally produced cherimoya fruits. They report that commercial success has led farmers to purchase Cumbe cherimoya grafts from each other, eroding the cherimoya genetic base, and that value chain approaches should be used to promote the commercial value of other cherimoya varieties.

Flesher and Laufer emphasize that hunting is one of the principal causes of wildlife declines throughout the tropics and that conservation managers have struggled to find effective strategies for addressing the problem. But private wildlife reserves may have an under-appreciated role in wildlife conservation in Brazil. To examine this premise, the

authors focused on the conservation value of the Reserva Ecológica Michelin in Bahia, Brazil. They measured the relative abundances of medium and large mammals before and after the establishment of a program of guard patrols and found that the relative abundance of fauna increased by 72.6 % after the initiation of guard patrols. The authors argue that private reserves can be an effective component of a nation-wide conservation strategy in Brazil.

Poshiwa and coauthors indicate that annual rural incomes in Southern Africa show large rainfall-induced fluctuations, which have serious implications for agro-pastoral activities (crop cultivation and livestock keeping). However, two other sources of rural income – wildlife and tourism – are less affected by fluctuations. The authors investigated the role of wildlife income in reducing rainfall-induced fluctuations in households' annual incomes in southeastern Zimbabwe. They discovered that even though wildlife income is small, it tends to be less volatile than income from the agro-pastoral system, suggesting that revenues from wildlife have some potential to reduce annual household income fluctuations.

In a fourth study, **Bernal and coauthors** report that traditional palm basketry of people from the Okavango delta region in Botswana was introduced in the 1970s to western Colombia's Wounaan aborigines, who quickly adopted the African technique. The Chocoan palm *Astrocaryum standleyanum*, used by the Wounaan in their traditional baskets, produced a high quality new basketry and turned Wounaan *Astrocaryum* baskets into an icon among Colombian handicrafts. The resultant market pressure caused severe depletion of the fiber-producing palm near Indian villages, but educational campaigns and the introduction of an appropriate harvesting tool have subsequently reduced the impact of leaf harvest. The result is that *A. standleyanum* is now used sustainably by the Wounaan. The authors stress that a careful resource management assessment is needed before introducing new market pressures on a traditional plant product.

Similipal Tiger Reserve is a large, insurgent-affected protected area in the northern Eastern Ghats, India, with a resident tribal population of about 12,500. Working in this reserve, **Sahoo and coauthors** surveyed conservation attitudes among 217 men and women (>20 years old) and documented their perceptions of wildlife and forest decline over a 20-year period from 1997-2007. Most of the respondents were primarily agriculturists (79%), and all households collected fuel-wood from the forest; 13% hunted and 49% fished. Respondents' recollections of Bengal tiger and Asian elephant sightings over a 20-year period indicated a drastic decline in their numbers, and their perceptions of forest loss were supported by assessments of dense forest cover indicating an annual deforestation rate of 1.56 percent per year over a 20-year period. Their study suggests that forest dwelling communities have an acute awareness of disappearing forests and wildlife, and informant-based surveys can be a useful indicator of the status of wildlife and forests.

Growing human population, increased accessibility to remote forests, and adoption of modern tools have turned hunting into a severe global problem, particularly in Nagaland, a Northeast Indian state. **Bhupathy and coauthors** note that while Indian wildlife laws prohibit hunting of virtually all large wild animals, many indigenous tribal communities ignore such laws due to cultural traditions of hunting for meat, perceived medicinal and ritual value, and community ownership of forests. The authors report the results of a survey of wild animals sold at Tuensang town of Nagaland. Their results show that, in addition to molluscs and amphibians, 1,870 birds (35 species) and 512 mammals (8 species) were found in the samples. They estimate that annually 13,067 birds and 3,567 mammals were sold in Tuensang market alone and point out the importance of this activity for the local economy. They stress that conservation strategies aimed at sustainable wildlife harvesting need to be implemented within the framework of traditional local uses of wild resources.

Investigating anthropic effects on the vegetation of the mangrove forest of Bucatú lagoon microbasin in northeastern Brazil, **Alves and coauthors** observed a great number of dead plants, which caused siltation in the mangrove area, alterations of water flow, and severe negative impacts on the mangrove ecosystem as a whole. The authors note that the coastal lagoons are generally located in or near urban areas, where they are readily accessible to people, and that anthropic stressors differ in origin and degree and occur directly at the local level, such as the cutting down of mangrove trees, accumulation of garbage, and human invasion. The authors also emphasize that many human traditional communities live close to estuarine areas and are directly dependent on resources from the mangrove swamps, and that the ecological and social importance of estuarine environments for people's livelihoods needs to be the focus of conservation policies.

Mora and his colleagues describe strobilus and seed development in a *Dioon edule* (chamal, palma, dameu') population characterized by low seedling and high adult tree density, in order to improve conservation decisions for this endangered cycad species. They found that larger strobili have higher seed potential and report that major seed loss was attributable to abortive ovules and seeds, possibly due to ineffective pollination. They also report that seedling survival in greenhouse conditions was 100 percent after one year, concluding that in the wild low seed production affects the population structure and hinders its conservation. They report that major seed loss was attributable to abortive ovules and seeds, possibly due to unsuccessful pollinators, lack of synchronicity in the pollination-receptive process of strobili, and low male:female sex ratio .

Arguing there is a lack of knowledge on the factors driving epiphytic community assemblage in water-limited environments, **Cach and coauthors** investigated epiphytic bromeliad and host communities in a range of vegetation types in the Yucatan Peninsula in Mexico. They found that epiphytic bromeliads were common in the lower canopy strata of all but the wettest sites. Epiphyte richness increased with annual precipitation, while bromeliad species density decreased with vapor pressure deficit and increased with host species density. They conclude that diversity and structural integrity of the canopy may be

as important as climate in the conservation of epiphytic composition in water-limited environments.

Factors affecting big cat hunting in Brazilian protected areas were studied by **Carvalho and coauthors** by interviewing managers of 297 reserves. One-third of respondents reported that jaguars and/or pumas have been hunted within the last two years in their reserves, resulting in the deaths of at least 60 cats. Data analysis revealed that degree of restriction to human use in the reserve was the most important factor affecting the probability of a manager reporting big cat hunting, with hunting reported three times more frequently in the less restrictive reserves than in the more restrictive ones. The authors stress that their study confirms that hunting is widespread and represents a threat to carnivore conservation within Brazilian protected areas.

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