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Essays and Perspectives

Combining Eonegotiations and Threat Reduction Assessments to estimate success of conservation: lessons learned in the black-faced lion tamarin conservation program

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ABSTRACT

This study shares the experience of the Integrated Conservation Program for the black-faced lion tamarin, *Leontopithecus caissara*, on measuring its conservation success. We present the program history and evaluate its impact from 2005 until 2014 in the Ariri region, at Cananeia, São Paulo, Brazil. To assess impact we combined an evaluation of the Eonegotiation, a strategy that looks for involve various social segments into conservation through participative forums, with the Threat Reduction Assessment. Eonegotiations analysis made possible to estimate the reduction of direct threats, which is considered the most difficult step in the application of Threat Reduction Assessment. We identified a 20–30% reduction in threats, expressed by better political coherence and use of natural resources within the region. Our study revealed two factors that influence the success of integrated conservation and development projects: (i) the ability to integrate in the local context and influence it to make biodiversity conservation an interest shared by diverse actors and leaders, and (ii) the weight of our biocentric vision in defining the target condition constrains the calculation of Threat Reduction Assessment. As lessons learned, we highlight vital aspects to consider in conservation and sustainability: (i) initial effort to know the territory's social, cultural, and economic profile; (ii) clarity of direction and focus on the program's mission; (iii) consolidation of partnerships at all levels; and (iv) strategy to discuss, understand, and

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overcome conflicts, such as Econegotiations in the black-faced lion tamarin program, can act on critical threats and identify approaches and partnerships to reduce them.

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Integrated Conservation and Development Programs and the black-faced lion tamarin case study

Conservation biology brings with it values, principles, and teachings that have influenced and motivated generations of biologists and professionals in the biodiversity conservation arena (Mulder and Coppolillo, 2005; Meffe et al., 2006). Within the various approaches of this multidisciplinary science, integrated conservation and development projects (ICDPs) incorporate participative and continuous approaches, aiming to integrate conservation of biodiversity with the social and economic development of communities that neighbor environmentally relevant areas (Berkes, 2004; Franks and Blomley, 2004; McShane and Wells, 2004). Despite diversification in past decades (Waylen et al., 2010), these approaches derive from the combination of critical points for sustainable development (decreasing poverty and economic imbalance, empowerment and political participation, and training and process institutionalization) and the conservation of biodiversity (creation and management of protected areas, natural resource management, and protection of threatened species and ecosystems) (Robinson and Redford, 2004).

Since its scientific description in 1990 (Lorini and Persson, 1990), the black-faced lion tamarin (*Leontopithecus caissara*) has been ranked among the critically endangered species (IUCN, 2008). The species conservation status had changed to endangered on last review of the Brazilian official list of threatened species (Ludwig et al., 2014). *L. caissara* conservation status should also change in IUCN red list of threatened species soon. This change reflects the efforts for its better scientific knowledge and conservation, which have been underway since the beginning of the 1990s. We focus here on decade in between 2005 and 2014, and on the ICDP placed at the extreme southern coast of the state of São Paulo, Brazil, in the Ariri region, at the municipality of Cananeia (Fig. 1). The region is part of the largest remnant of the Atlantic Rainforest in Brazil. Beyond being a hotspot of biodiversity, the Lagamar region is recognized as a Biosphere Reserve and World Heritage Site. The Lagamar de Cananeia State Park is part of a mosaic of 43 protected areas between the states of São Paulo and Paraná. Ariri village is the largest community of people within the known limits of the continental distribution of *L. caissara*, containing approximately 80 families.

The challenge we had to integrate biodiversity conservation and local sustainable development at the Ariri region were inspired by the Econegotiation experience in the conservation of the black-lion tamarin (*Leontopithecus chrysopygus*) (Padua, 2004; Padua et al., 2006). The Econegotiation is a participative forum, involving various social segments, aimed to stimulate local actors to form alliances and partnerships to address best practices and decrease pressures and threats to the local

natural heritage. The two-day workshops, mediated by professionals on conflict resolution, were based on the principle that all participants should express their opinions and ideas, discuss socio-environmental challenges, and identify solutions for the sustainable development of the region. Therefore, the Econegotiations were planned as arenas to discuss and overcome challenges, using the conflicts and different interests to negotiate local strategies and policies. Beyond inhabitants and leaders of the Ariri village, leaders from neighboring communities, organizations, and agencies functioning in the region participated in identifying and discussing strategies. An average of 30 participants attended each workshop in 2009 and 2013.

Throughout one decade, besides contributions to better understand the species ecology, we sought the involvement and participation of diverse actors and social interests related with conservation and sustainable development of the region of work. The positive impact of our intervention is based on the assumption that programs that integrate socio-environmental projects for the conservation of biodiversity can contribute to cultural fixation of the sustainability paradigm (McShane and Wells, 2004; Robinson and Redford, 2004).

Impacts of conservation efforts are traditionally assessed through biological indicators, varying from aspects of one population to ecosystem functions, depending on the level of biodiversity of interest (Noss, 1990). Conservation biology awakened to the need to go beyond this and looked for novel ways to measure impacts. Among the strategies to address this challenge, adaptive management should be highlighted (Salafsky and Margoluis, 2004; Foundations of Success, 2009; Dietz et al., 2010) alongside the development of indicators, including cost-benefit and cost-utility indexes (Cullen et al., 2001; Laycock et al., 2011), indexes based on achievements and goals and result chains (Cullen et al., 2001; Brooks et al., 2006; Kapos et al., 2009; Dietz et al., 2010; Howe and Milner-Gulland, 2012; Margoluis et al., 2013), and the Threat Reduction Assessment (TRA) (Salafsky and Margoluis, 1999; Margoluis and Salafsky, 2001; Mugisha and Jacobson, 2004; Anthony, 2008; Matar and Anthony, 2010; Laycock et al., 2011). To contribute to this context, this study aims to: (i) present the Integrated Conservation and Development Program for black-faced lion tamarin (ICDPBFLT) history; (ii) measure its impact combining Econegotiation and Threat Reduction Assessment (TRA); and (iii) share lessons learned.

History of the Integrated Conservation and Development Program for black-faced lion tamarin

The 2005 Lion Tamarin Population and Habitat Viability Analysis indicates that the main threats and gaps of ecological

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