

# Conservation & Society



Volume 9 • Number 2 • 2011

[www.conservationandsociety.org](http://www.conservationandsociety.org)

# South-South Exchanges Enhance Resource Management and Biodiversity Conservation at Various Scales

William D. Heyman<sup>a, #</sup> and Amanda Stronza<sup>b</sup>

<sup>a</sup>Department of Geography, Texas A&M University, College Station, TX, USA

<sup>b</sup>Department of Recreation, Park, and Tourism Sciences, Texas A&M University, College Station, TX, USA

<sup>#</sup>Corresponding author. E-mail: wheyman@tamu.edu

## Abstract

International conservation organisations have invested considerable resources in fostering biodiversity conservation programs in the humid tropics, the most biologically diverse areas on earth. Recent approaches to conservation have centered on integrated conservation and development projects and participatory resource management programs, co-managed between governments and local communities. But these programs have had only mixed success and often suffer from insufficient quantity or quality of participation by local communities. We pose that participatory resource management is more likely to succeed when community members, 1) gain a global perspective on how their social, economic and environmental conditions compare with peer communities in other similar areas of the world, and thus better understand issues of relative scarcity and the benefits of sustainable resource management, and 2) engage as decision-makers at every stage of the conservation process up to reflective program evaluation. This paper examines the role of South-South exchanges as a tool to achieve these intermediate goals that ultimately foster more effective and participatory conservation and support sustainable local livelihoods. The data are extracted from the initiatives of the authors in two different environments—marine and coastal communities in Central America and the Caribbean, and lowland rainforest communities in the western Amazon of South America. We conclude that the exchanges are effective ways to build stakeholder comprehension about, and meaningful engagement in, resource management. South-South exchanges may also help build multi-local coalitions from various remote areas that together support biodiversity conservation at regional and global scales.

**Keywords:** South-South exchange, tropical biodiversity conservation, participatory resource management, ecotourism, scarcity, monitoring and evaluation, Amazon, Caribbean

## INTRODUCTION

The conservation of biological diversity has become an international imperative. The humid tropics contain much of the world's diversity; tropical rainforests and coral reefs, in particular, are some of the most biologically diverse ecosystems on earth (Gaston 2000). Efforts to conserve

biological diversity in the lower latitudes are largely funded by the higher latitudes, e.g., international non-governmental organisations (NGOs) (e.g., The Nature Conservancy [TNC], World Wildlife Fund for Nature [WWF], etc.), national foreign aid programmes (e.g., the U.S. Agency for International Development [USAID], the United Kingdom's Department for International Development [DFID], etc.), and multi-national banks (e.g., World Bank, Inter-American Development Bank [IADB], etc.). Similarly, much of the capital that finances economic development (e.g., agriculture and tourism) in low latitude areas originates from more temperate regions (Woods 2004). Local communities in lower latitudes are often caught between both these external pressures. A pervasive challenge has been balancing the needs and rights of local communities with international conservation and development priorities (Brechin *et al.* 2002; West & Brockington 2006). Many of the

Access this article online	
Quick Response Code:	Website: <a href="http://www.conservationandsociety.org">www.conservationandsociety.org</a>
	DOI: 10.4103/0972-4923.83724

most species-rich environments overlap with long-held and traditionally managed indigenous lands (Posey 1985; Alcorn 1993; Berkes 1999; Maffi 2005). The success of conservation programmes therefore requires the participation and support of local people (Western & Wright 1994; Stevens 1997; Brosius *et al.* 1998).

With the objective of gaining on-the-ground support for resource management, many large conservation organisations have sought collaboration with grassroots organisations and local communities. Such collaboration has often come through Integrated Conservation and Development Projects (ICDPs), including ecotourism and sustainable use of wildlife and other natural resources (Wells *et al.* 1992). As a result, significant flows of capital, technical expertise, and technology have been channelled to local communities with hopes of building local capacity to manage natural resources. In the 1990s, the USAID alone invested more than 2 billion USD in ecotourism (Kiss 2004). In 2006, the IADB invested 19.8 million USD in technical cooperation grants for environmental projects in Latin America and the Caribbean, largely focusing on ICDPs and strengthening local capacity for resource management (Inter-American Development Bank 2006).

These new resources are coupled with the recognition that local peoples should be consulted and intimately involved in conservation planning (Wells & McShane 2004; Inter-American Development Bank 2006). The implementation of participatory management, however, has been problematic for various reasons. These include the inability of dispersed communities to converse with each other, local peoples' lack of global or regional perspective on how the scarcity or abundance of natural resources constrain or enhance socio-economic opportunities, and the lack of inclusion of community members in project decision-making and evaluation (Alpert 1996).

Local peoples' willingness to participate in natural resource management can depend in part on their ability to comprehend ideas of future or relative scarcity. Gadgil *et al.* (1993) noted, for example, how some nomadic hunter-gatherers, who are not tied to any specific resource base and without well-defined territories, may gain little from prudent resource use. The same is true for shifting agriculturalists who migrate to new lands, and have options to move again when resources are locally exhausted.

Hunters and fishers in permanent communities, however, are directly tied to game species and fish, as predators to prey. To be successful predators, they must develop a comprehensive knowledge of their prey, in the context of their environment. The intimate knowledge of their local environments is often referred to as traditional ecological knowledge (TEK) (Posey & Balee 1989; Gadgil & Berkes 1991). Such knowledge is often location specific and held by relatively sedentary peoples who depend on hunting, gathering, and fishing in their immediate surrounds (Gadgil *et al.* 1993). These are the peoples most likely to have accumulated historical observations and knowledge about resources (Berkes 1999). As such, the maintenance of TEK changes with the availability of resources over time and space. The strength of TEK at the local scale

may at times be associated with a relative lack of perspective on global concerns of biodiversity loss and irreversible habitat degradation at the global scale. This is not to imply that strong TEK precludes people from having a global perspective, only that people who have become especially intimate with, and knowledgeable about, a particular place over time, are often the same people who have had little access to global travel, communication, and information, that enables them to see a larger picture.

Though people in many dispersed local communities around the world are involved in conservation programmes, those community members rarely have the chance to talk to or learn from each other. This means they seldom have the opportunity to exchange insights or share grassroots experiences and knowledge. As Becker & Ghimire (2003) have noted, "cultural exchange can be a source of new ideas for solving old problems". This paper poses the value of South-South exchanges for addressing challenges associated with community-based conservation. We define a South-South exchange as a facilitated or semi-facilitated educational tour for local resource users (generally indigenous or local community members in a developing country), who travel to other locations with similar biophysical environments or cultural practices, to meet local counterparts who may have similar experiences with resource management. By 'local', we are referring generally to a geographic space in which people have regular opportunities to talk and interact with each other. In the Amazon regions of our exchanges, 'local' refers to the same riverside community of people who share 10,000–12,000 hectares of forest. In the Caribbean, 'local' refers to coastal communities of 100–4,000 individuals, interacting regularly with each other in coastal and marine spaces of 15,000–100,000 hectares. The Caribbean communities generally have access to more capital than those in the Amazon, allowing them motorised skiffs and thus greater range.

A fundamental premise of South-South exchanges is that first-hand, personal experience is important to learning (Kolb 1984; Fazey *et al.* 2006). On-site, interactive workshops allow people from similar cultural backgrounds and environments to visit each others' regions, and see and compare for themselves the lifestyles, socio-economic conditions and opportunities, ecosystem characteristics, and resource management successes and challenges that other communities like their own are facing. Conservationists, academic researchers, and other outsiders often facilitate the exchange of experience and learning in community conservation and development projects (Chicchon 2000; Brosius 2004). When local community members from one area engage in face-to-face dialogue with those from other areas, they gain the chance both to learn from others' experiences and also to reflect on and summarise their own experiences for others. As some development scholars (El Halaby 2006; Mbigi 2007) and social cognitive theorists (Lave 1996) have argued, the best way to learn something profoundly is to teach it to others. An additional benefit arises from the formation of local communities of practice (Lave & Wenger 1991; Wenger 1998) among community members engaged in

community-based conservation programmes, whereby they build both knowledge about, and experience in, working with others on community-based conservation.

Project managers at conservation and development NGOs often treat local communities as ‘target beneficiaries’ for ICDPs, and as co-managers of protected areas (Krishna 2007). Despite an emphasis on collaboration in the past two decades, international organisations seldom turn to local communities as sources of information about what is or is not working, or how to evaluate the impacts of conservation and development efforts (Larson & Svendsen 1995; Hughes & Flintan 2001). With massive funding from multinational development banks, national foreign aid programmes, and conservation organisations supporting participatory resource management and ICDPs in the humid tropics, the success of these programmes has come into question (Oates 1999; Terborgh 1999). Understandably, methods to evaluate the success of these programmes have become standard requirements for funding proposals and reporting, and agencies have invested heavily in the development of measurement tools for community-based conservation projects (Salafsky & Margoluis 1999). Fewer attempts have been made to analyse and compare lessons learnt across various conservation and participatory resource management projects (Stronza & Gordillo 2008) with some notable and positive exceptions (e.g., Margoluis & Salafsky 1998; Conservation Measures Partnership 2007). In those cases where comparative analyses have been done, they have largely been completed by outside academics or conservation administrators. We are not aware of evaluations of community-based conservation projects conducted by peer communities. We do not suggest that local community members should take the place of international evaluators, but we do offer that South-South exchanges might allow community-members from other areas to provide valuable inputs for project evaluations.

In this paper, we discuss the merits of ‘South-South exchanges’ as tools for fostering greater and more effective participation among local peoples in resource management. We argue that such exchanges support participatory resource management in at least three ways: 1) they provide people in local communities the opportunity to talk to their counterparts about the needs, strategies, and potential benefits of sustainable resource management, 2) they provide broad-scale context information on ecological and socio-economic trends to people who are often highly knowledgeable of their own local environments but less aware of conditions in other places, and 3) they enable people to become more critical evaluators of their own projects and to offer evaluations and critiques to their peers’ community-based conservation projects in other areas. Together, these outcomes lay the groundwork for fostering local stewardship of natural resources, and linking local livelihoods with local support for effective conservation.

We evaluate the implementation of participatory resource management programmes in the humid tropics with particular focus on South-South exchanges as experienced and/or led by the authors. We have analysed the impacts of these

exchanges in the short and the long terms by working with and among participants before, during, and after the exchanges. We describe lessons learnt from our experiences in South-South exchanges between fishers in Central American and the Caribbean, and among indigenous peoples, in three community-based ecotourism projects in the Amazon in South America. These data are used to address the following questions:

1. How can exchange trips assist subsistence fishers, hunters, farmers, and other local peoples who are directly dependent on local ecosystems to understand the concepts of relative scarcity?
2. Do people who have travelled in South-South exchanges change the way they think and behave after the trips? Do they implement the new lessons learnt? Do they become more active participants in conservation programmes?
3. Could ‘measures of success’, typically gathered for case studies or external evaluations of community-based conservation programmes through surveys and interviews, be augmented or complemented by the participation and observations of local resource users from other areas via recorded dialogues and focus groups during South-South exchanges?

## METHODOLOGY

We describe 11 exchange trips that we facilitated between fishers, hunters, and farmers in the Caribbean and the Amazon between 2003 and 2010. We first characterise each trip briefly and describe metadata (including the number and description of participants, the desired outcome of the trip, the facilitator, the funding agency, and some outcomes and key lessons learnt) in the form of direct quotations, impressions, and ethnographic stories gathered during and after the exchanges (Table 1). Though participants learnt far more than could be captured in this analysis, we have focused on examples of individual participants:

- Increased understanding of relative scarcity
- Increased capacity or use of new technology
- Reported changes in perceptions and behaviour
- Increased participation in decision-making and co-management process
- Contributions to ‘measures of success’ for conservation and development programmes

The methods for exchanges differ in several ways including the type and extent of facilitation, duration of exchange, number of participants, and the ways in which data were gathered. The methods and sources of the data we present vary accordingly. For all exchanges, communities and/or local NGOs chose the members that participated in the exchanges. Participants were chosen based on the respect afforded to them and the influence they have within the communities in which they reside. While some were selected because they were supportive of conservation and were already community leaders, others were selected based on their strong anti-conservation views, in hopes that the exchange might

**Table 1**  
**South-south exchanges analysed within this paper**

Trip No.	Persons / Group Travelled	Trip Date, Facilitator(s) / Funding Agency	Destination	Purpose	Key Lessons Learnt and Outcomes
1	21 fishers from southern Belize	July 1995 Heyman (the author) and TIDE Executive Director / The Nature Conservancy	5 marine reserves: Hol Chan, Glover's Reef, Half Moon Caye, and Caye Caulker, traveling by boat	For fishers (stakeholders in a proposed marine reserve) to build their understanding of marine reserve benefits to ecology and tourism.	Built long-lasting support for Port Honduras Marine Reserve from local fishers.
2a	3 Belizean fishers	1998 TIDE Executive Director and Deputy Director/The Nature Conservancy	Fishing communities, north coast of Jamaica	For Belizeans to see the possible effects of overharvesting and share experiences with counterparts.	Seeing degraded Jamaican reefs and hearing the fate of the Jamaican fisheries, Belizeans returned home with the realisation that 'the sea can done' (echoing a Kriol parable, 'the sea can't done' which means that the sea's resources are inexhaustible).
2b	3 Jamaican fishers	1998 TIDE Executive Director and Deputy Director / The Nature Conservancy	Hol Chan and Port Honduras Marine Reserves, Belize	For Jamaicans to see the possible effects of conservation and management.	Young Jamaican fishers saw what reefs in Jamaica looked like before they were born. Older fishers reminded of the past, and both saw what might be possible with conservation efforts.
3a	4 Belizeans (1 fishers and 3 NGO representatives)	October 2000 Heyman (the author) and TNC Indonesia Marine Program Deputy Director / The Nature Conservancy	Komodo National Park, Indonesia	For Belizeans to see Pacific reefs; for Belizeans to witness first-hand, what severe overfishing can lead to; to share experiences on the monitoring and management of reef fish spawning aggregations.	Belizeans recognised massive diversity of Pacific reefs yet the dangers of dynamite and cyanide fishing. Belizeans adopted more quantitative measures of spawning aggregations.
3b	3 Indonesians (1 government representatives and 2 NGO representatives)	May 2001 Heyman (the author) and TNC Indonesia Marine Program Deputy Director / The Nature Conservancy	Gladden Spit Marine Reserve, Belize	For Indonesians to see first-hand, how community-based conservation is being implemented; For Indonesians to witness a reef that had not been overfished; to share experiences on the monitoring and management of reef fish spawning aggregations.	Indonesia program of TNC and Government expands community participation in Komodo National Park management.
4a	2 Belizean fishers	April 2007 Heyman (the author) and Professor of Biology Universidad Simón Bolívar, Venezuela / Caribbean Regional Environmental Program of United Nations Development Programme	Los Roques, Venezuela	To identify and map potential fish spawning aggregation sites in Los Roques.	Potential aggregation sites mapped and recorded. Lead to intensive fisher interviews and field studies to verify presence/status of the aggregations.
4b	3 Venezuelans (2 fishers and one professor/conservationist) and 2 fishers from Antigua and Barbuda	May 2007 Heyman (the author) and Professor of Biology, Universidad Simón Bolívar, Venezuela / Caribbean Regional Programme of the United Nations Development Programme	Gladden Spit Marine Reserve, Hol Chan Marine Reserve, Fishing Cooperatives in Belize, and Punta Allen in Yucatan Mexico	For Venezuelans and Antiguans to see healthy and protected multi-species reef fish spawning aggregations, effectively run marine reserves teeming with fish, and cooperative lobster ranching.	Venezuelans and Antiguans increased interest and desire for spawning aggregation conservation management, lobster casitas and cooperatives for fishery product marketing.
5	15 Belizean fishers	February 2004 Executive Director of SEA / Oak Foundation	Punta Allen, Yucatan Mexico	For Belizean fishers to see effective lobster conservation and management including shades and cooperative ownership of fishing grounds.	Belizean fishers convinced about habitat enhancement and most participants have started using 'lobster shades'.

**Table 1**  
*contd.*

Trip No.	Persons / Group Travelled	Trip Date, Facilitator(s) / Funding Agency	Destination	Purpose	Key Lessons Learnt and Outcomes
6a	16 indigenous leaders from Ecuador and Bolivia (+ 3 NGO representatives, 2 government representatives, 1 journalist, 3 tour operators, 1 indigenous leader from Venezuela, 3 facilitators)	March 2003 Stronza (the author) / Critical Ecosystem Partnership Fund	Native Community of Infierno, Peruvian Amazon	Discussion of ecotourism partnerships and building community capacity for conservation and development.	Ecuadorian partnership adjusted so that the community assumed full control of ecolodge, 5 years after exchanges. Peruvian partners intensified capacity building and hired full-time 'Community Coordinator' to facilitate new projects; within 5 years, a new ecotourism concession legalised to protect 2,000 ha of surrounding forests, and 4 new microenterprises established.
6b	16 indigenous leaders from Peru and Ecuador (+ 3 NGO representatives, 2 government representatives, 3 tour operators, 2 journalists, 3 facilitators)	April 2003 Stronza (the author), Critical Ecosystem Partnership Fund	San Jose de Uchupiamonas, Bolivian Amazon	Discussion of profits-sharing and social, cultural, and economic changes caused by ecotourism.	Peruvian and Ecuadorian delegates co-produce report and hour-long DVD to share with other communities interested in implementing community-based conservation. Local voices represented at international levels on real effects of ecotourism.
6c	16 indigenous leaders from Peru and Bolivia (4 NGO representatives, 2 ecotourism consultants, 2 tour operators, 3 facilitators)	May 2003 Stronza (the author), Critical Ecosystem Partnership Fund	Achuar Indigenous Territory, Ecuadorian Amazon	Discussion about resources for ecotourism and how to manage them.	New hunting restrictions enacted and enforced by community members around lodge in Ecuador. New monitoring and restrictions established in relation to hardwood harvesting and net fishing in oxbow lake.

help change their views, or at least provide them with more detailed information on which to base their opinions. In all cases, it was assumed that by investing in the broader view of influential individuals via exchanges, the impact on the larger community could be maximised. At all times, however, the unit of analysis was the individual so we recognise that views may not be fully representative of the community in each site. Some exchanges were relatively unstructured while others were more formally planned and facilitated. We used a mixed method approach by collecting data from formal interviews, focus groups, participant observations, and impressions of the researchers.

Importantly, both the authors have lived in the participating communities for many years before, during, and after the exchange trips described in this paper. The author Heyman lived and worked in Belize from 1994 to 2004, and has since returned several times per year to interact with and follow the evolution of conservation and development in that country. The author Stronza lived in the study site in Peru for a total of 40 months during various periods of field work since 1993, and also carried out ethnographic research in the Bolivian and Ecuadorian communities for two months each in 2002 and 2003. Most of the data for this paper were gathered through

semi-structured interviews, focus groups, and participant observation in each of the three communities.

In the Caribbean examples, fishers came together in relatively unstructured exchanges with ample opportunity to explore topics, experiences, and places, and to interact with local people as they chose. This approach enabled the fishers to direct their own learning. For example, in one exchange focused on marine reserves, a significant portion of the trip was dedicated to learning about alternative economic activities of counterpart fishers. Many of the fishers from the less-developed southern part of Belize were fascinated by the entrepreneurial pursuits of their counterpart fishers in the north. They met many ex-fishers who now run dive shops and other tourist operations.

In the Amazon cases, the exchanges were more structured. Delegates from three community-based ecotourism partnerships in Peru, Ecuador, and Bolivia were part of a study funded by the Critical Ecosystem Partnership Fund (CEPF). The aim was to gather local perspectives on the benefits and challenges of ecotourism. Local community members were involved in every phase of the analysis and exchange. Together with Stronza (the author), local leaders proposed the idea of conducting a participatory and

comparative analysis to CEPF, helped conduct interviews and workshops, and presented lessons learnt to NGOs and the media during press conferences in Quito and La Paz.

Six delegates from each ecotourism lodge were selected by their communities to participate in three five-day exchanges held in each of the countries. All of the delegates worked in ecotourism in positions such as guides, boat drivers, housekeepers, managers, etc. The same delegates attended all three exchanges. Other participants included representatives from nonprofit, research, government, and private sectors in each country. Having these additional participants (3–4 in each workshop relative to the 18–20 community representatives) allowed for lessons to be learnt not only between the communities, but also among the communities and other ecotourism players in the region.

During the period leading to the exchanges, three researchers from Ecuador, Peru, and Bolivia carried out two months of ethnographic research and semi-structured household interviews among lodge workers and community members. The researchers were selected from a pool of social scientists from Ecuador, Peru, and Bolivia, who had previous experience studying ecotourism in the Amazon. The interviews and participant observation focused on social, economic, cultural, and environmental changes introduced by ecotourism. Respondents from 164 households were interviewed (a stratified purposive sample): 62 from Peru, 67 from Bolivia, and 35 from Ecuador. Each interview lasted two to three hours and focused on demographics, social, and economic characteristics of households, as well as opinions regarding wildlife, conservation, and ecotourism, including perceived advantages, disadvantages, benefits, and changes introduced by ecotourism in respondents' families, households, and communities.

Also in preparation for the workshops, each of the three researchers worked with a community leader in each site, to develop relevant themes and activities for the exchanges. During the exchanges themselves, participants traded experiences and discussed results of the comparative, ethnographic data collected in each of the three sites. The three researchers and the three community leaders guided the community participants through the analysis. In addition to conducting interviews and ethnographic research in each of the communities before the exchanges, the research team facilitated focus groups during the exchanges. These lasted 4–5 hours each and resulted in lists of lessons learnt from each community and lodge.

### **Trip 1: Southern Belizean Fishers**

In 1995, during the development of the Port Honduras Marine Reserve, the first reserve in southern waters, the Hol Chan Marine Reserve (HCMR) in northern Belize had been operational for nearly a decade. Many southern fishers opposed the proposed Port Honduras Marine Reserve in part because they thought that they would be restricted from fishing and have reduced access to resources for income

generation. The leader of the conservation programme (the then Executive Director of the Toledo Institute for Development and Environment [TIDE]) realised that none of these fishers had ever seen a functional reserve. The director of TIDE and Heyman (the author) organised a nationwide tour of marine reserves for 21 fishers from southern Belize in July 1995. Southern fishers visited bird rookeries, snorkelled in the famous Blue Hole and the fish-filled waters of the HCMR, and had opportunities to speak with counterpart fishers, reserve managers, shop owners, and ex-fishers who had turned into marine tour guides. Southern fishers witnessed the amount of locally-owned tourism development and heard about the intensive participation of fishers and other stakeholders in the development process of the reserves. By the time they returned home, they were ready participants in the development process of the Port Honduras Marine Reserve.

### **Trip 2 (2a, 2b): Belizean and Jamaican Fishers**

In 1998, the then Executive Director of the TIDE, along with the then Deputy Director, organised a South-South exchange of fishers between Jamaica and Belize. The primary goal of these trips was to encourage fisher participation in conservation and management in both countries. The stark contrast between the status of marine resources in the two countries was noted by everyone and provided a clear indication of relative scarcity. Though Jamaica's reefs were the most productive in the Caribbean in the 1970s, overfishing, upland pollution, coastal development, and several other factors had severely damaged the coastal reefs and fisheries of Jamaica (Carr & Heyman 2009). This realisation shocked participants from both sides into action.

### **Trip 3 (3a, 3b): Indonesian and Belizean Managers and Fishers**

Heyman (the author) and his counterpart, the then Deputy Director of the Indonesia Coastal Marine Program of The Nature Conservancy (TNC), organised an exchange between Belize and Komodo National Park in Indonesia, focused on the conservation and management of reef fish spawning aggregations. Heyman (the author), a fisher, and three Belizean conservationists spent 10 days with rangers and research scientists in Komodo National Park, monitoring reef fish spawning aggregations. In turn, three Indonesians representing government and NGOs involved in the conservation programme came to Belize to participate in monitoring aggregations of reef fish within the Gladden Spit and Silk Cayes Marine Reserve (for description of the area see Heyman & Kjerfve 2008). Based on participant observations and informal interviews by Heyman (the author), the Belizeans were impressed by the health and diversity of the Pacific coral reefs, but disturbed by the use of destructive fishing techniques such as cyanide and dynamite, as well as the harvest of live reef fish, juveniles, and the overall extent of overfishing. The Indonesians were moved by the extent of local ownership of the conservation process in Belize.

#### **Trip 4 (4a, 4b): Belizean, Venezuelan, and Antiguan Fishers**

Heyman (the author) and a counterpart, a Professor of Biology at the Universidad Simón Bolívar in Caracas, Venezuela, were awarded funding from the United Nations Development Programme (UNDP) and a private donor, for an exchange between fishers and park managers from Belize to Los Roques National Park (Trip 4a), and for fishers from Antigua and Barbuda, and fishers and park rangers from Los Roques for the return trip to Belize (Trip 4b). Trip 4a was used to evaluate the timing and location of possible reef fish spawning aggregations in order to initiate a research and conservation programme in Los Roques (Boomhower *et al.* 2010; Romero *et al.* 2011). Trip 4b was designed to examine spawning aggregations, but also to allow the Eastern Caribbean fishers and managers to observe the methods used in conservation, management, and cooperative lobster fishing in both Mexico and Belize.

#### **Trip 5: Belizean Fishers**

The then Executive Director of the Southern Environmental Association (SEA; originally named Friends of Nature), which is the conservation NGO that manages the Gladden Spit and Silk Cayes Marine Reserve and the Laughing Bird Caye National Park, was instrumental in developing and organising several exchanges between southern Belize and Punta Allen in Mexico, as well as many others in Cuba, Jamaica, and elsewhere. An ex-fisher himself, he recognises the value of involving fishers in marine conservation and alternative livelihood programmes. The village of Punta Allen is famous for its lobster cooperatives and ecotourism cooperatives that work intimately with the Sian Ka'an Biosphere Reserve. The lobster cooperatives collectively manage bottom leases for its members over large areas of the nearby sea grass beds. These individuals are allowed to install and manage 'casitas', which serve to increase lobster recruitment and growth, and facilitate their sustainable harvest. The cooperative also buys and markets the product, and regulates the management and conservation of the resource (Sosa-Cordero *et al.* 2008).

#### **Trip 6 (6a, 6b, 6c): Indigenous, Community-based Ecotourism Leaders from Peru, Ecuador and Bolivia**

The South-South exchanges in the Amazon involved indigenous leaders of three community-based ecotourism partnerships in Peru, Ecuador, and Bolivia. The aim was to bring local voices to bear on the assessment and analysis of community-based ecotourism projects in all three areas. The three ecolodges—Posada Amazonas, Kapawi, and Chalalan—are community-managed, though all began as partnerships with either a private tourism company or conservation NGO. Several community members were involved in every phase of the analysis and exchange. Together with Stronza (the author), community leaders proposed to the funder, the CEPF, the idea

of carrying out an exchange. Once funded, six delegates from each site were selected by their communities to participate in three five-day workshops held in the lodges. Leading up to the workshops, coordinators from each of the countries were also selected. Each lived in each others' communities for at least two months to conduct ethnographic research and semi-structured household interviews among lodge workers and community members. The inquiries focused on social, economic, cultural, and environmental changes introduced by ecotourism.

Building on the results of the ethnographic research, the coordinators worked with the community leaders to develop discussion themes and activities for the workshops. Topics of discussion in the workshops included impacts of tourism on communal resources, strategies for distributing tourism profits fairly, and codes of conduct for interacting with tourists. During the workshops, delegates stayed in each others' lodges as tourists, learnt each others' behind-the-scenes operations, and exchanged insights on the pros and cons of managing tourism in their communities. Open-ended discussions and focus groups were facilitated and recorded by the community leaders to build consensus on best practices. At the end of the workshops, the tri-national team organised press conferences in La Paz and Quito, to share lessons learnt with wider audiences. Community leaders made appearances on television and gave interviews to radio and print journalists.

## **RESULTS AND DISCUSSION**

During interviews, focus groups, surveys, and via participant observation by the authors, community members who participated in the South-South exchanges described profound changes that came from their experiences. At a minimum in each case, the intended purpose of the exchanges was achieved. For example, during Trip 2a, Belizean fishers observed degraded reefs in Jamaica and realised that their own reefs might share a similar fate. During Trip 6b, participants from Bolivia and Peru learnt about resource management for ecotourism and hunting from counterparts in Ecuador, and brought these lessons home for implementation. The results of these exchanges, however, were often more profound than the simple intended purpose. In nearly all cases, exchange participants met counterparts in other areas who shared similar or at least comparable experiences. Most participants developed an appreciation for the relative scarcity or abundance of resources in their own areas in comparison with other areas. During their exchange, most participants learnt some new skill or technique for sustainable resource management, and many of them have subsequently adapted these within their own communities. Many exchange participants reported a deeper appreciation for the need for resource management, especially once they had seen the relative scarcity or abundance of resources in other places. Finally, nearly all participants developed an increased interest and willingness to participate in conservation efforts. A number of people vowed to become more actively



involved in managing and monitoring resources in their own communities and spoke about carrying the ideas they had learnt back to their own communities and projects. As one delegate explained, “The exchange was an opportunity to talk frankly, to be totally transparent, and to share the good with the bad.” Specific examples supporting each of these ideas are discussed in the sections below.

### Examples Illustrating How Exchanges Changed Perceptions of Relative Scarcity

A challenge that plagues resource management relates to enhancing individual understanding of resource scarcity with regard to resources used on a regular basis, particularly when they appear to be abundant. We posit that South-South exchanges have helped individuals to place their own experiences within a larger context and have thus allowed them to see scarcity from a new perspective. Exchanges were designed in part to allow participants to experience regional differences in resource scarcity. By talking to counterparts from other areas or countries, and hearing the history of resource status change over time, they were better able to reflect on scarcity in their own communities. In some cases, people were surprised to find they had so much more than others. In others, they were taken aback to discover how degraded or diminished their environments seemed in comparison to others.

Jamaican fisheries were the most productive in the Caribbean during the 1970s, but today are among the Caribbean’s most degraded (Burke & Maidens 2004; Carr & Heyman 2009). Older fishers remember the days of abundant catches and healthy reef, while younger fishers have only heard of such things. Snorkelling the reefs of Belize, within the protected areas of the Hol Chan Marine Reserve and the Port Honduras Marine Reserve, brought tears to the eyes of the young and old Jamaican fishers (Trip 2b). After the exchange, the fishers returned home with a much better understanding of local scarcity of resources in Jamaica and a vision of possible recovery through extensive management intervention. The other side of this exchange brought Belizean fishers to Jamaica. Seeing the degraded state of Jamaican fisheries, made the Belizeans less likely to take their own marine resources for granted (Trip 2a; see also Section 3 for specific examples).

A similar phenomenon occurred when fishers from Antigua and Barbuda and Los Roques, Venezuela visited the HCMR in Belize (Trip 5b). Still wet from snorkelling within the reserve, one fisher candidly exclaimed to author Heyman (the author) and other trip participants, “If a fisherman could take just one quarter of the fish that I see here, he would not have to fish for the rest of the year” (This point was incidentally captured in *A Fisher’s Journey*, a short documentary about the exchange (McAfee 2008).

Prior to their participation on exchange trips, fishers faced with no-take closures expressed diametrically opposed opinions on the subject of scarcity within the same hour-long conversation. Fishers, reluctantly at first, admitted that they have witnessed large declines. Later in the conversation, they

contradicted their earlier statements and said that harvested populations are doing just fine. There is likely some cognitive dissonance between their true experience of declining resources and their simultaneous knowledge that, if a closure goes through, they may lose access to existing fishing grounds. Exchange trips helped fishers to untangle these contradictory feelings by allowing them to see relative scarcity more clearly. Returning from Jamaica, for example, Belizean fishers were terrified by the possibility that their own reefs could be as decimated as those (previously vibrant) reefs that they visited in Jamaica. Their appreciation for the health of their own reefs and the need to protect them was acutely heightened.

In the Amazon workshops (Trips 6a, 6b, 6c), community members from the three regions talked to each other about the resources they depend on—both for tourism and subsistence—and then they discussed the reasons for declining numbers and scarcity of some resources. The representatives from Ecuador were surprised by the sheer abundance of primates (including capuchin and spider monkeys) and cracids (large forest birds including chachalacas, guans and curassows) they witnessed in Peru. In Ecuador, even in areas near the ecolodge, local hunters harvest both primates and cracids heavily. Though Achuar hunters had long acknowledged how much easier it was to find game in the past, they had not yet discussed steps to manage game by restricting their own hunting practices. This began to shift while they were in Peru. One Achuar representative from Ecuador said, “I am seeing the differences: here they do not hunt everywhere, and tourists have a chance to see wildlife. Apart from the river dolphins, we do not have much fauna, even though we have so much primary forest.” In response, a man from Bolivia offered, “Maybe it is because the Achuar hunt so much, and they do not control how much they hunt.”

Similar realisations followed the workshop in Bolivia. One man from Ecuador noted how healthy the forests around the Bolivian ecolodge were. “We saw so many animals—a sloth, a red brocket deer, and lots of monkeys—just 10 m from the lodge. Incredible! The quantity was impressive.” Another man from Peru had the same impression: “The thing that caught my attention was the wildlife. I know that tourists have a lot of opportunity there to see things, much more than we have here. We have to do something to start that here.” Indeed, following the exchanges, the delegates from Peru and Ecuador initiated plans to monitor and patrol the forest reserves in their respective communities.

The comments about relative scarcity or abundance extended to cultural resources. The delegates from Peru were especially impressed by the Achuar’s maintenance of indigenous traditions, even in the context of tourism development and commercialisation. One man said, “I learned a lot from the Achuar. You can see how they value their community, language, and culture. They say, ‘We have to be this way because a lot of people abuse and think we don’t know anything because we are natives. But we have to respect ourselves as we are’. That left an impression on me, and I would like to be like that.” These observations led to newly invigorated efforts in the Peruvian community to revitalise indigenous customs and

traditions, through language workshops and the construction of a new Ese'ejá Cultural Center in the community's reserve.

### Examples of Capacity Building and Technology Transfer

The value of South-South exchanges for conservation depends, in part, on the extent to which trip participants incorporate what they learnt into their own settings, share their experiences with others, and apply their learning within conservation programmes. Though we present a brief set of concrete examples, changes in perceptions and actions are likely far more common than can ever be expressed or documented explicitly. Some of the easiest to document include examples of capacity building and technology transfer.

There are several key institutions, defined here as 'rules in use' (Brosius *et al.* 1998) through which conservation plans can be implemented, including the designation of terrestrial and marine reserves, the creation of zoning areas, implementing seasonal prohibitions on the use of species or areas, allowing access rights for specific groups of individuals, etc. During our research, we documented exchange participant contributions to various types of conservation actions and institutions. Jamaican fishers, for example, after returning from exchange Trip 2b formed a local cooperative to become more directly involved with fisheries management, through activities such as setting prices for seafood products and entering the marine tourism business, which has been traditionally dominated completely by outsiders.

One of the most important tools for conservation management is zoning, to establish different norms of use in different areas—zones for strict protection, tourism, and agriculture and other subsistence and extractive activities. Based on observations and informal interviews with participants before, during, and after the exchange, it was clear that the idea of zoning was accepted and supported by fishers from southern Belize, after visiting the Hol Chan Marine Reserve in the North (Trip 1). Prior to the exchange trip, fishers believed that 'reserves' would keep them out of fishing areas. This sentiment was stated repeatedly during community meetings designed to discuss the proposed Port Honduras Marine Reserve in 1994 and 1995, as witnessed and recorded by Heyman (the author). When they realised the utility of zoning the reserve into some core preservation areas and some multiple use areas, they became much more supportive of the concept in general and participated actively, along with local NGOs and national authorities, in designing the zones for the Port Honduras Marine Reserve.

All three ecotourism lodges (Trips 6a, 6b, 6c) have in place some form of zoning as well. Workshop participants talked about establishing and enforcing codes of conduct so that tourists can contribute to building pride in local culture, rather than disturbing or intruding on local lives and legacies. They noted that such rules should be established to restrict tourists' activities around wildlife, but also to control what tourists see and do within the host communities. They agreed that written rules for resource use and management are not likely to be effective, unless community members were empowered

with authority and capacity to monitor and enforce rules, and to apply locally appropriate sanctions when infractions occur. Both the rules and the sanctions should be defined and understood by the same people who will be obeying, enforcing, monitoring, and sanctioning—namely, members of the community.

After the exchanges, communities began to include regulations on the entrance of new partners to the cooperative company, in order to restrict access. This was implemented to prevent localised population pressure on resources, revive traditional techniques for swidden-fallow agriculture (particularly the practice of maintaining certain wild and cultivated species that are attractive to wildlife). Restricting access also allowed the prohibition of logging, and the introduction of incentives to protect certain microhabitats, such as bamboo patches, or succession areas of wild cane or palms that provide important habitat for many wildlife species. A rule also applied in all three sites prohibiting totally the hunting of certain species, such as the giant otter and the jaguar, animals clearly important to tourism but especially valued as game meat. During the last of the South-South workshops in the Amazon, the participants recommended the creation of different levels of sanctions, depending on the gravity, the species affected, the area where the infraction was committed (i.e., in a reserve or not), and whether the person is a member of the community or not.

Although Caribbean lobster is the most lucrative fishery in the western Caribbean, it is showing signs of decline in most locations. Mexican fishers from Punta Allen, who have been working along with the managers of the Sian Ka'an Biosphere Reserve are managing their lobster populations sustainably (as seen by increasing catch per effort and stable landings between 1992 and 2004). The fishers developed and implemented a zoning plan that includes a mosaic of areas—some with complete protection from fishing and others that are allocated for lobster ranching by individual cooperative members. Members are granted various parcels of sea bottom, within which they alone are allowed to place casitas (lobster habitat) and they alone are allowed to harvest (Sosa-Cordero *et al.* 2008). The cooperative manages both the protected area and the sale from the cooperatively-managed fishery. After visiting Punta Allen, Belizean fishers adopted similar lobster ranching techniques (Trip 5). Indeed, Mexican fishers have come to Belize to assist in technology transfer. The extensive and carefully monitored zoning of lobster concessions in Mexico has not yet been adopted in Belize, and therefore might be considered as incomplete technology transfer.

Marine conservation programmes in Belize, particularly those in the south run by the TIDE and the SEA, are dedicated to community involvement in the conservation process. After the two-way exchange between Belize and Indonesia (Trips 3a, 3b), The Nature Conservancy's Komodo National Park marine conservation programme expanded its efforts to involve local communities in conservation programmes via public consultations and meetings, and changes in management structure.

### Examples of Increased Participation in Conservation

As both the authors have long relationships with the participants in each case, they witnessed changes in participants' behaviour over several years following the exchanges. Most, if not all, exchange participants have become more active participants in resource management and conservation. Upon their return from these trips, fishers generally participated more intensively in marine reserve management and conservation efforts. For example, one of the most vocal opponents to the Port Honduras Marine Reserve participated on a marine reserve trip to northern Belize and another to Jamaica (Trips 1, 2a). He is now one of the country's leading catch-and-release fly-fishing guides and an outspoken supporter of the marine reserve system. A Belizean gill net fisher who stood in steadfast opposition to reserves has sworn off all net fishing and is supporting marine reserves, after seeing the state of marine environments in Jamaica (Trip 2a).

During the ecotourism exchanges, the delegates from Peru and Ecuador were especially impressed by the level of control the community in Bolivia has held over their own tourism operations (Trips 6a, 6b, 6c). When they witnessed such local autonomy, they began to question why they weren't more involved in managing their own lodges. "The most interesting thing about the Bolivia case," one man explained, "is to see an indigenous group assume full managerial responsibilities. This, too, is something we should copy." Another added, "What I saw in Bolivia is that the community-level management is very mature and professional, especially in comparison with how we are [in Ecuador]." Yet another comment was, "In Bolivia, I saw that they really know how to manage their lodge, either in losses or gains. They manage it for themselves." Within four years after the exchanges, the Achuar had changed the terms of the contract with their private company partners and assumed full control of the management and operation of their own ecolodge.

Participants agreed that there are strong linkages between community members' access to ecotourism benefits and their support for, and ownership of, both ecotourism development and conservation processes. Also, in places where residents perceive that they have control of their resources, our findings suggest that residents are more likely to identify and support certain types of restrictions on resource use and extraction. This is particularly true in the case of restrictions on hunting in places where ecotourism is practised, likely because they see that the benefits of a healthy environment will benefit them locally and personally.

Apart from assuming new control over management, participants in the ecotourism exchanges (Trips 6a, 6b, 6c) also became more involved in conservation actions following the tri-national workshops. These included stepped up efforts to regulate hunting and harvesting hardwoods for charcoal. The South-South exchanges were particularly instrumental in spurring conservation action. Exchanges enabled people to identify pressures on resources and to discuss the trade-offs people were facing between conservation and development.

For example, they noted that one new pressure on wildlife resulted from the fact that more people were hunting with rifles instead of arrows in their regions. This led to agreements in the workshops about the need to zone off areas for hunting and areas for other activities, including ecotourism. Following the workshops, these agreements led to new zoning efforts in Ecuador, and the idea to hire two community-based wildlife guards in Peru.

The delegates from Peru identified selective logging as a threat, particularly for *Dipterx*, a hardwood species important for nesting macaws and large raptors. Though macaws and raptors are key attractions in the region for tourists, the collective returns from tourism do not outweigh the profits local harvesters can gain from cutting *Dipterx* and selling it as charcoal. Lengthy discussions comparing the trade-offs involved in protecting *Dipterx* for tourism versus harvesting it for charcoal unfolded during the exchanges. These discussions alone were an important result of the South-South exchange. Local community discussions rarely address conservation/development trade-offs at broad geographic scales, i.e., beyond their own site. These discussions are typically the domain of international conservationists. Here, these broad discussions allowed locals to see a larger picture of the environmental tradeoffs, and it led to new efforts in Peru to monitor and control *Dipterx* harvest.

In summary, the exchanges promoted changes in perceptions and attitudes and perhaps a broader sense of 'community', which in turn encouraged changes in behaviour, greater participation in the conservation process, and the incorporation of new techniques and strategies for conservation and management.

### Examples Illustrating How Exchange Participants can Contribute to 'Measures of Success' for Conservation and Development Programs

The delegates in the ecotourism exchange defined monitoring as 'measuring to know,' and they agreed that monitoring is a critical element of the success of any ecotourism operation, because it helps guide decision-making (Trips 6a, 6b, 6c). As in the case of a park, a community-based ecotourism lodge must have a management plan, especially before it is opened to visitors. To measure the ecological, cultural, economic, and social impacts of tourism over time, a management plan should include a set of indicators and methods monitoring change (Margoluis & Salafsky 1998). Delegates participated actively in the development of management plans for the lodge by identifying important and wide-ranging variables to monitor, including occupancy rates at the lodge, costs of operation and profits, rates of forest disturbance, viewing rates of various wildlife species, local satisfaction with the lodge, and perceptions of well-being in the community. Monitoring allows partners to discern whether they are achieving social, economic, business, and environmental goals, or in fact, creating new problems. Their ability to participate in the management plan development process was enhanced by their

participation in the exchange workshop.

A representative from an international conservation NGO attending one of the ecotourism exchanges said, “Community members help a lot. They make you see whether what you’re planning to do is going to be effective or not, and they help you concentrate on the things that will be of most interest and relevance to the community. So, in this aspect, the exchange was very useful. Normally, a whole project comes from outside, and the community contributes nothing. But in this case, having the participation of community members on the team, we were able to understand and plan everything clearly.” This quotation demonstrates that the international NGO perspective is that they are guiding a process with heavy participation from locals. While it might be ideal that this (and other similar projects) be driven locally, the sincere dedication of the NGO representative to meaningful participation, is laudable. Community members clearly also feel a greater sense of ownership.

Sentiments of broad inclusion and meaningful participation were also expressed from government representatives that participated in the exchanges. A government representative from Peru said, “What I liked the most about the exchange was that it wasn’t limited to the upper rung. Usually these kinds of workshops occur in the higher levels of the NGOs. We always say we want to hear the opinions of the communities, but it’s one thing to want to hear it, and it’s another thing to have to hear it. There were times when someone would say something and we would all accept it, ‘Yeah, that’s just common truth’, and things like that, and the community members would stand up and say, ‘No, it’s really not like that, it’s like this’.” As a result of the exchanges, delegates from the communities in Peru and Bolivia participated in the production of an hour-long DVD about the social, economic, and environmental effects of ecotourism. Produced entirely in Spanish, the film offers lessons learnt, and recommendations to other communities about how to implement and manage ecotourism to benefit both community development and conservation (Pyke & Stronza 2005).

The exchange between Belizeans and Indonesians (Trips 3a, 3b) involved participation in each other’s biological data collection efforts, as well as community meetings regarding park management. After the exchange, Belizeans adopted better training for data collectors and more rigorous methods to monitor reef fish spawning aggregations. The techniques include underwater visual assessments of fish length and training using model fishes both on land and underwater. Similarly, Venezuelans modified and adapted their monitoring of reef fish spawning aggregations in Los Roques after the exchanges (Trips 4a, 4b). Accurately recording the numbers and sizes of each species within aggregations of keystone predatory reef fish species allows monitoring of the health of these populations, and by extension, the health of the coral reef ecosystem. After seeing community involvement in Belize, Indonesian Park managers adopted a more participatory approach to resource management in the Komodo National Park.

In one case, a fisher from Antigua, who participated in an exchange to Belize, was so moved that he gave a speech about his experience at an international conference—the Gulf and Caribbean Fisheries Institute Meeting (Samuels *et al.* 2008). Over 200 people from around the Caribbean heard his moving personal account, and a short film documenting the exchange was also produced (McAfee 2008). These events illustrate both the value of the exchanges themselves, and the value added by the participants sharing their experiences both in person and through video.

## CONCLUSION AND RECOMMENDATIONS

We conclude that South-South exchanges provide valuable contributions to community-based conservation efforts at local levels in various ways. As a result of the exchanges, participants and their communities better understand relative resource scarcity, increase their participation in the conservation process, and learn new conservation and ecotourism techniques and skills from their counterparts. South-south exchanges can also enhance the quality of evaluations of community-based conservation projects.

The conservation of biodiversity in the global tropics is an international imperative, largely funded by the global North. Recognising the links between community-based conservation and sustainable economic development, a growing number of ICDPs over the last 20 years aimed at increasing local participation in resource conservation and management, while simultaneously contributing to local livelihoods. The language, funding and goals of initiatives have been intermingled (Campbell & Vainio-Matilla 2003). However, Berkes (2006) articulates that local conservation issues are rarely free from the influences of drivers acting at larger scales, and conservation solutions can rarely be enacted at the local scale alone. This study focused on the conservation impacts of South-South exchanges on conservation at local or community scales. These exchanges promote increased perception of resource scarcity, which in turn enhances ownership, and leadership of the conservation process among local community members and indigenous peoples in dispersed small communities. The exchanges also increase awareness of global conservation issues in these dispersed grass-root communities, thus contributing to a growing community of conservation practice (Lave & Wenger 1991).

Pauly *et al.* (2002) argued that the global fisheries crisis can only be solved by replacing large-scale industrial fishing fleets that now dominate global harvests and policies, with small scale fishers using areas of limited access within networks of marine reserves. Exchanges among grass-roots fishers adds to a growing collective of knowledgeable and articulate small-scale fishers that can participate in, and lead efforts towards, sustainable community-based fisheries management. The same may be true for exchange participants who live in tropical rainforest environments, whereby exchange participants may support global accords on rainforest protection or climate change. Indeed, the existence of a growing body of

enlightened community-based conservation activists from diverse communities around the world, who have participated in exchanges may be the most important large scale and long term benefit of the exchanges.

We recommend that South-South exchanges be increasingly considered within the funding portfolios of development banks, NGOs, and other supporters of conservation programmes. To the extent that these experiences can be leveraged, e.g., via video documentation (e.g., McAfee 2008; Pyke & Stronza 2005), presentations to the media to highlight the exchanges and the lessons learnt (e.g., Trips 6a, 6b, 6c), or presentations at international conferences by exchange participants (e.g., Samuels *et al.* 2008, after Trip 4b), the expense of the exchange trips will provide added value for larger audiences and thus contribute to conservation at larger scales.

### ACKNOWLEDGEMENTS

We wish to acknowledge funding from The Regional Coordinating Unit of the Caribbean Environment Programme of the United Nations Environment Programme (UNEP-CAR/RCU), the Summit and Oak Foundations, The Nature Conservancy, the Critical Ecosystem Partnership Fund, and NSF-Integrated Graduate Education Research Traineeship (IGERT) grant to Texas A&M University for the Applied Biodiversity Science Program (<http://biodiversity.tamu.edu>). We further wish to acknowledge the important roles played by W. Maheia and L. Garbutt from Belize, J. Posada from Venezuela, K. Waddell from Antigua and Barbuda, J. Gordillo from Peru, M. I. Endara from Ecuador, G. Mariaca from Bolivia, and the community members who participated in the exchanges and were willing to share their experiences and insights.

### REFERENCES

- Alcorn, J. 1993. Indigenous peoples and conservation. *Conservation Biology* 7(2): 424–426.
- Alpert, P. 1996. Integrated conservation and development projects. *Bioscience* 46: 845–855.
- Becker, C.D. and K. Ghimire. 2003. Synergy between traditional ecological knowledge and conservation science supports forest preservation in Ecuador. *Conservation Ecology* 8(1): 1. [online]. <http://www.consecol.org/vol8/iss1/art1/>
- Berkes, F. 1999. *Sacred ecology: Traditional ecological knowledge and resource management*. London: Taylor & Francis.
- Berkes, F. 2006. From community-based resource management to complex systems: the scale issue and marine commons. *Ecology and Society* 11(1): 45.
- Boomhower, J.P., M.A. Romero, J.M. Posada, S. Kobara and W.D. Heyman. 2010. Prediction and verification of possible reef fish spawning aggregation sites in Los Roques Archipelago National Park, Venezuela. *Journal of Fish Biology* 77(4): 822–840.
- Brechin, S., P. Wilshusen, C. Fortwangler and P. West. 2002. Beyond the square wheel: Toward a more comprehensive understanding of biodiversity conservation as social and political process. *Society and Natural Resources* 15(1): 41–64.
- Brosius, J.P. 2004. Indigenous peoples and protected areas at the World Parks Congress. *Conservation Biology* 18(5): 609–612.
- Brosius, J.P., A.L. Tsing and C. Zerner. 1998. Representing communities: Histories and politics of community-based natural resource management. *Society and Natural Resources* 11: 157–168.
- Burke, L. and J. Maidens. 2004. *Reefs at risk in the Caribbean*. Washington DC: World Resources Institute.
- Campbell, L.M. and A. Vainio-Mattila. 2003. Participatory development and community-based conservation: Opportunities missed for lessons learned? *Human Ecology* 31(3): 417–437.
- Carr, L. and W.D. Heyman. 2009. Jamaica bound? Marine resources and management at a crossroads in Antigua and Barbuda. *The Geographical Journal* 275(1): 17–38.
- Chicchon, A. 2000. Conservation theory meets practice. *Conservation Biology* 14(5): 1368–1369.
- Conservation Measures Partnership. 2007. Open standards for the practice of conservation. Version 2.0. Conservation Methods Partnership. 35pp. [http://conservationmeasures.org/CMP/Site\\_Docs/CMP\\_Open\\_Standards\\_Version\\_2.0.pdf](http://conservationmeasures.org/CMP/Site_Docs/CMP_Open_Standards_Version_2.0.pdf)
- El Halaby, D.E. 2006. An interview with Kingo Mchombu. Knowledge sharing in Africa: The key to poverty alleviation? *Knowledge Management of Development Journal* 2(1): 119–127.
- Fazey, I., J. Fazey, J. Salisbury, D. Lindenmayer and S. Dovers. 2006. The nature and role of experiential knowledge for environmental conservation. *Environmental Conservation* 33: 1–10.
- Gadgil, M. and F. Berkes. 1991. Traditional resource management systems. *Resource Management and Optimization* 18: 127–141.
- Gadgil, M., F. Berkes and C. Folke. 1993. Indigenous knowledge for biodiversity conservation. *Ambio* 22(2/3): 151–156.
- Gaston, K.J. 2000. Global patterns in Biodiversity. *Nature* 405: 220–227.
- Heyman, W.D. and B. Kjerfve. 2008. Multi-species reef fish spawning aggregations at Gladden Spit, Belize. *Bulletin of Marine Science* 83(3): 531–551.
- Hughes, R. and F. Flintan. 2001. *Integrating conservation and development experience: A review and bibliography of the ICDP literature*. London: International Institute for Environment and Development.
- Inter-American Development Bank. 2006. Annual report. Inter-American Development Bank. Washington DC.
- Kiss, A. 2004. Is community-based ecotourism a good use of biodiversity conservation funds? *Trends in Ecology and Evolution* 19(5): 231–237.
- Kolb, D.A. 1984. *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.
- Krishna, A. 2007. For reducing poverty faster: Target reasons before people. *World Development* 35(11): 1947–1960.
- Larson, P. and D.S. Svendsen. 1995. *Participatory monitoring and evaluation: A practical guide to successful ICDPs*. Social Science and Economics Program. Washington DC: WWF.
- Lave, J. 1996. Teaching, as learning, in practice. *Mind, Culture, and Activity* 3(3): 149–164.
- Lave, J. and E. Wenger. 1991. *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Maffi, L. 2005. Linguistic, cultural, and biological diversity. *Annual Review of Anthropology* 34: 599–617.
- Margoluis, R. and N. Salafsky. 1998. *Measures of success: Designing, managing, and monitoring community-oriented conservation projects*. Covelo, CA: Island Press.
- Mbigi, L. 2007. A vision of African management and African leadership: A southern African perspective. In: *Prophecies and protests: Ubuntu in glocal management* (eds. van den Heuvel, H., M. Mangaliso and L. van de Bunt). Pp. 22–51. Amsterdam: Rozenberg Publishers.
- McAfee, C. 2008. *A fisher's journey*. Daring or Nothing Productions. <http://www.youtube.com/watch?v=8rpTvtmLG5A>. Accessed on June 15, 2011.
- Oates, J.F. 1999. *Myth and reality in the rainforest: How conservation strategies are failing in west Africa*. Berkeley, CA: University of

- California Press.
- Pauly, D., V. Christensen, S. Guénette, T.J. Pitcher, U.R. Sumaila, C.J. Walters, R. Watson and D. Zeller. 2002. Towards sustainability in world fisheries. *Nature* 418: 689–695.
- Posey, D. 1985. Indigenous management of tropical forest ecosystems: The case of the Kayapó Indians of the Brazilian Amazon. *Agroforestry Systems* 3(2): 139–158.
- Posey, D.A. and W. Balee. (eds.). 1989. *Resource management in Amazonia: Indigenous and folk strategies. Advances in Economic Botany* 7. New York: New York Botanical Garden.
- Pyke, E. and A. Stronza. 2005. *Amazon exchange: Effects of ecotourism on indigenous culture*. Distributed by International Ecotourism Society. 57 minutes. Spanish with English subtitles.
- Romero, M.A., J.P. Boomhower, J.M. Posada and W.D. Heyman. 2011. Identificación de sitios de agregaciones de desove de peces a través del conocimiento ecológico local de los pescadores en el Parque Nacional Archipiélago Los Roques, Venezuela. *Interciencia* 36(2): 88–95.
- Salafsky, N. and R. Margoluis. 1999. Threat Reduction Assessment: A practical and cost-effective approach to evaluating conservation and development projects. *Conservation Biology* 13(4): 830–841.
- Samuels, D., T. Mata, G. Ortega, V. Griffith and K. Waddell. 2008. Interchange of experiences between fishers of Antigua, Barbuda, Venezuela, Belize and Mexico. *Proceedings of the Annual Gulf and Caribbean Fisheries Institute Meeting* 60: 167–168.
- Sosa-Cordero, E., M.L.A. Liceaga-Correa and J.C. Seijo. 2008. The Punta Allen lobster fisheries: Current status and recent trends. In: *Case studies on fisheries self-governance* (eds. Townsend, R.E., R. Shotton and H. Uchida). Pp. 149–162. Rome: FAO.
- Stevens, S. 1997. *Conservation through cultural survival: Indigenous peoples and protected areas*. Washington DC: Island Press.
- Stronza, A. and J. Gordillo. 2008. Community views of ecotourism: Redefining benefits. *Annals of Tourism Research* 35(2): 444–468.
- Terborgh, J. 1999 *Requiem for nature*. Washington DC: Island Press/Shearwater Books.
- Wells, M.P. and T.M. McShane. 2004. Integrating protected area management with local needs and aspirations. *Ambio* 33(8): 513–519.
- Wells, M., K. Brandon and L. Hannah. 1992. *People and parks: Linking protected area management with local communities*. Washington DC: World Bank Publications.
- Wenger, E. 1998. Communities of practice: Learning as a social system. *The Systems Thinker* 9(5): 1–5.
- West, P. and D. Brockington. 2006. An anthropological perspective on some unexpected consequences of protected areas. *Conservation Biology* 20(3): 609–616.
- Western, D. and M. Wright. 1994. *Natural connections*. Washington, DC: Island Press.
- Woods, D. 2004. Latitude or rectitude: Geographical or institutional determinants of development. *Third World Quarterly* 25(8): 1401–1414.
-