

# Compensation Payments for Downsides Generated by Protected Areas

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Received: 2 March 2012 / Revised: 28 May 2012 / Accepted: 11 June 2012 / Published online: 6 July 2012

**Abstract** Protected areas are powerful instruments to tackle the biodiversity crises. However, local communities believe that protected areas generate downsides for which they should be compensated. We reviewed (1) problem evolution, (2) the idea of compensation schemes, and (3) practical considerations. We found that compensations for conservation-related losses are insufficiently considered when protected areas are established. Schemes include controversial resettlements of human populations, traditional reimbursements, and recently favored incentive payments to encourage local communities to conserve biodiversity on their lands. The compensation process is typically composed of the verification of losses/facts, estimation of costs, and delivery of payments. Compensation schemes promote tolerance and awareness, and responsibility of the broader society while minimizing confrontations. They have the power to mainstream concern about human welfare in protected area management, and are therefore a key to successful conservation. Verifying the impact of compensations on achievement of conservation goals remains, however, difficult to prove.

**Keywords** Biodiversity conservation · Valuation · Nature reserves · Effectiveness · Stakeholders

## INTRODUCTION

Protected areas are powerful instruments that can help to tackle biodiversity crises (Andam et al. 2008). Their numbers and coverage are globally exponentially increasing [Ervin 2003; Brooks et al. 2004; UNEP-WCMC (United Nations Environment Programme—World Conservation Monitoring Center) 2008]. However, despite this increase, the effectiveness of many protected areas is

questioned due to a continuously decreasing status of their biodiversity (Bruner et al. 2001; Millennium Ecosystem Assessment 2005; Nagendra 2008). Several factors presumably contribute to this controversial situation including limited connectivity (Chetkiewicz et al. 2006; Gilbert-Norton et al. 2009), lacking overlap between ranges of endangered species or habitats (Beresford et al. 2011), and inadequate law enforcement and implementation of conservation measures (Blom et al. 2004). A lack of connectivity and overlap are mostly related to the locations and ranges that were available for conservation, and must often be viewed as a given with little option for improvement (Kingsland 2002; Ando and Getzner 2006). However, law enforcement and implementation of conservation measures can be improved, hence increasing the effectiveness of protected areas (Ervin 2003).

Support from local communities is suspected to influence the effectiveness of protected areas. This support is frequently lacking and generally reflects an unfortunate but prevailing negative attitude toward conservation (Newmark et al. 1993; Fiallo and Jacobson 1995; Ancrenaz et al. 2007). Local communities traditionally perceive protected areas as a burden due to their primary mission of protecting natural resources against use (Almudi and Kalikoski 2010; Salafsky 2011). Protected areas are blamed for downsides in socio-economic relationships (e.g., autonomy freedom, traditional use, local economy) generated by restricted access to resources in addition to the impact of protected areas on surrounding lands (Saberwal et al. 1994; Johannesen 2007; Monney et al. 2010). Both the factors are disturbing (e.g., lack of alternative resources outside of reserves, risk of damage on crop, livestock, and human injuries/lives by animals crossing the reserve border), and causing suffering of significant opportunity costs (James et al. 1999; Weladji and Tchamba 2003; Kideghesho and

Mtoni 2008). Ultimately, the achievement of conservation goals is reduced, or at the very least, delayed (Johannesen 2007).

In the view of local stakeholders, downsides should therefore be properly compensated for (Adams and Infield 2003; Anthony 2007; Ogra and Badola 2008). Little can be achieved by referencing laws and regulations issued by governments (most of which are located distantly), or pointing to property ownerships that would not allow for compensation in the first place. Justifying the situation through a moral commitment by mankind to safeguard biodiversity only fuels the conflict even more so. Society has an obligation to compensate local stakeholders that suffer from strict protection as the latter are those who are required to make the sacrifices (Fischer 2008). In addition, the inclusion of local communities in the designation process and decision making related to compensations is typically overlooked, a situation that further hampers implementation of conservation goals (Abakerli 2001; Trakolis 2001; Liu et al. 2010). Thus, new approaches are forthcoming that link protected areas with the wider landscape and its socio-economic patterns by adopting measures that include the needs of the local people (Locke and Dearden 2005; Naughton-Treves et al. 2005; Tumusiime et al. 2011).

Here, we review the experience with compensation payments for the downsides in socio-economic relationships generated by protected areas. In doing so, we are exploring the following topics: (1) evolution of negative attitudes of stakeholders arising from the establishment of protected areas, (2) existing models of compensation schemes, and (3) practical considerations for implementation of compensation schemes.

## METHODS

We accessed the collection of scientific articles at Science Direct (<http://www.sciencedirect.com>) and Web of Science (<http://www.isiknowledge.com>) to search for journal articles that fit the search phrase “protected area reserve compensations” and were published until 2011. We limited our review to peer-reviewed journals and omitted gray literature to ensure a consistent quality of information. We also limited our investigation to countries in transition and developing regions by drawing on experience and evidence from Asia, Africa, and South America. Based upon the difference in socio-economic conditions between developing and developed countries, we did not consider the latter in our review. However, we were aware that local residents in such countries do share their key perceptions, regardless of their origin (i.e., economic situation, history, and power balance between stakeholders) (Wallner et al. 2007).

Nonetheless, we did include nine studies from Australia (3), North America (3), and Europe (3) in cases where we were unable to identify respective references from other continents. We also considered 13 review studies, each of which lacked a specific geographic context.

We focused our review on terrestrial-protected areas and used the term protected area in a broad sense; areas were considered protected when they were described as such. This included various national protection categories (e.g., natural areas, conservation areas, game reserves, wildlife sanctuaries) including those not specified as well as those labeled by global standards (e.g., IUCN Protected Area Management Categories, UNESCO Biosphere Reserves, World Heritage Sites, Ramsar Sites). Compensation in the sense of this review was defined as restoration of livelihood or income, property or life value of those individuals and/or their families that were affected by implementation of conservation goals.

## EVOLUTION OF THE NEGATIVE ATTITUDE OF STAKEHOLDERS ARISING FROM THE ESTABLISHMENT OF PROTECTED AREAS

Mainstreaming concerns about human welfare in conservation efforts were shown to create remarkably positive human attitude toward nature, but conservation is often thought in terms of wildlife welfare rather than human welfare (Sifuna 2010). Hence, compensation for restoration of human welfare should be considered among the principles for good protected area governance to account for fair distribution of costs and benefits (Lockwood 2010). However, with the exception of displacement of a settled local population from designated areas, compensation is rarely considered when proposals to establish protected areas are submitted to decision makers (Madsen et al. 1998; Aagesen 2000; Ferraro 2002). Surprisingly, the issue of compensation appears to be inadequately addressed even by the IUCN. Although for governments not binding guidelines on establishing of protected areas are provided, compensation is only mentioned with respect to population displacement in category II (National Park), and in privately established protected areas and surrounding lands (buffer zones, stepping stones, corridors) (Dudley 2008).

In regions with experience in democratic governance, expected benefits are emphasized and placed at the forefront of arguments promoting the foundation of protected areas, while the matter of compensation is not discussed. Positive examples from other regions are sold to involved parties as granted to illustrate successful stories (Thackway and Olsson 1999; Sims 2010; Wilson et al. 2010). Adjustments related to a specific local situation are rarely considered. Protected areas in other regions are typically



declared by governmental decrees and local stakeholders are excluded from the decision-making process (Pathak and Kothaki 1998; Zhou and Grumbine 2011). In both the cases, this practice creates mistrust with subsequent negative impact on the implementation of conservation goals.

Any reserve administration that is commissioned to manage a protected area is typically established during the course of the area's implementation. Daily business of protected area administration includes to a great extent the enforcement of laws and regulations that often shift traditional socio-economic relationships (Mbaiwa 2005; Liu et al. 2010). Unfortunately, socio-economic relationships are not always recognized by protected area managers due to the lack of local knowledge, attention, and understanding (Hill 2004; McElwee 2010). Although knowledge of the socio-economic aspect is crucial to fostering a suitable context for conservation, including damage prevention and compensation (Sarkar and Montoya 2011), a professional background in the social sciences is rarely required for protected area managers. In contrast, standard job requirements for these positions include experience in the biological sciences or natural resource management. Moreover, the lack of local knowledge is often related to the fact that protected area managers get appointed or hired at the regional or even national job markets because of the requisite political credibility, along with a technical education. Thus, protected area managers possessing knowledge of traditional socio-economic relationships, along with knowledge of local customs, habits, and concerns, is the exception rather than the norm (Thapa and Chapman 2010).

A shift of socio-economic relationships regularly creates a demand for compensation of local stakeholders/communities for various kinds of hardship. However, any compensation is typically viewed hesitantly, and tends to remain insufficient or lacking (Maikhuri et al. 2000; Wang et al. 2006; Ogra and Badola 2008). In some cases, the economic benefits created by protected areas (e.g., the value of tourism) are outweighed by losses from damage caused by species such areas are meant to protect (Tisdell and Zhu 1998). Conflicts ultimately arising from such situations tend to accumulate step by step, go unaddressed, and often do not become apparent until several years or even several to decades later. The logical consequences of hesitantly dealing with emerging conflicts are ad hoc decisions and hastily drafted compensation schemes reflecting lack of planning and perspectives. Once mistrust is created between local stakeholders and protected area managers it can persist for a long time, even when compensation measures that would have sufficiently mitigated any conflict from the start are later identified and implemented. Consequently, conservation goals are again compromised.

To summarize, participation of local stakeholders in the course of protected area planning, establishment, and development is crucial for the successful implementation of the conservation goals (Wells and McShane 2004; Bobo and Weladji 2011). Ignorance and insufficient consideration of socio-economic shifts seed mistrust within the local populace, leading to a negative influence upon the implementation of conservation goals. A lack of participation by stakeholders in the decision-making process is a major hindrance to determining what may constitute appropriate compensation (Maikhuri et al. 2001; Wang et al. 2006). In the absence of appropriate compensation, attitude and support for conservation among the local people continuously degrade (Trakolis 2001; Maroney 2005; Kideghesho and Mtoni 2008), a situation that can reach far beyond protected area boundaries (Treves et al. 2006).

## EXISTING MODELS OF COMPENSATION SCHEMES

Compensation schemes promote efficient protection of biodiversity by maintaining positive attitudes toward and support for conservation initiatives among stakeholders. Existing models are based on compensation in cash or goods including land and rights for conservation related losses to livelihood, income, property, health, or life (Table 1). Recent studies advocate heterogeneous approaches to compensation that take into account spatial variations in factors influencing conservation success, even within a single protected area (Adams et al. 2010; Nagendra et al. 2010; Thapa and Hubacek 2011). It must be noted, however, that compensatory schemes do not always suffice to satisfactorily solve disagreements among stakeholders (Avci et al. 2010).

Resettlement of communities tends to be successful only if implemented on a truly voluntarily basis (Cernea and Schmidt-Soltau 2006; Schmidt-Soltau and Brockington 2007). Resettlement provides a solution that is based on a preventive separation of people and biodiversity-related issues and fully addresses the root of the problem. In certain situations, resettlement can be deemed the most cost-effective and practical solution (e.g., situations involving high human densities and potentially dangerous wildlife). However, this option is arguably the most controversial compensation option (Karanth 2007) and is subject to compliance with international agreements, including Article 10 of the Declaration on the rights of indigenous people (UN 2007).

Traditional reimbursement for restrictions and damages is the compensation model most widely used today (Tchamba 1996; Treves et al. 2006; Wang and Macdonald 2006). Reimbursements are paid to directly compensate for

**Table 1** Models for compensation schemes

Type	Characteristic	Processes/logistics	Timing	Typical costs
Resettlement	Physical relocation of inhabitants of the protected area	Evaluation of situation and its finalization before protected area establishment	One-time action	High
Reimbursement	Traditional payments with varying adjustment for restrictions of access or economic activity, and damage to crops, livestock, property or health	Demand based after establishment of the protected area, but estimation of sufficient funds or alternative means for compensation needs to be quantified in advance	Payments upon request	Low/moderate
Provision of incentives	Local stakeholders receive compensation conditionally based upon the status of predefined conservation parameters (i.e., performance based)	Assessment of conservation needs before or after establishment of the protected area; goals to be incorporated in management plans	Permanent payment	Moderate

the adverse impact of natural processes generated within or by protected areas on the surrounding landscape (e.g., predation on game, domestic livestock and people, browsing on buds, bark peeling on forest trees, bark-beetle infestation, grazing on crop, depletion of honey, wild fires, flooding caused by beaver dams, etc.). The impact of protected areas on the lifestyle of the human populace on surrounding lands can also be subject to compensation. The establishment of a protected area, for example, can prevent local communities from the traditional use of resources that are now located inside of the protected land (e.g., collecting non-timber forest products or wood, cattle grazing, hunting for food) (Fraser and Chisholm 2000). In such situations, activities that are considered harmful to the conservation goals of the new protected area (Nevin and Gilbert 2005; Loveridge et al. 2007) will no longer be desirable and will therefore be restricted (e.g., application of pesticides and/or mowing regime by neighboring land users (i.e., beneficiaries/right holders), sport activities such as recreational hunting and fishing, canoeing, rock climbing, etc.).

Successful implementation of reimbursements for restrictions and damages is dependent upon site-specific conditions that include deep-rooted social identity and the occupation of local communities, and is therefore notoriously difficult to generalize (Naughton-Treves et al. 2003; Ogra 2008). Reimbursements might work well if provided generously. However, this is rarely the case because of problems associated with monetary valuation and its potential misuse (Madhusudan 2003; Ogra and Badola 2008). Moreover, some studies even document negative results of compensations including the lowering of wildlife stock and a net welfare loss for local people (Bulte and Rondeau 2007).

Performance- or incentive-based compensation payments for easements, stewardships, and sustainable co-management [i.e., payments for conservation outcomes or ecosystem services (PES)] have received increased attention

(Vanclay 2007; Asquith et al. 2008; García-Amado et al. 2011). These mechanisms were introduced to translate external, non-market values of the environment into financial incentives for local participants to provide ecosystem services (Nelson 2009). Buyers can be the users of these services or others (typically the government) acting on behalf of such users (Ferraro 2001; Engel et al. 2008). PES includes as an example the conservation easements for private-protected areas, buffer zones, stepping stones, and voluntary agreements for private- or community-based conservation programs in which certain ownership rights are created in exchange for conservation or the sustainable use of resources (Sánchez-Azofeifa et al. 2009). Payments are made to farmers for preserving elements of habitat (e.g., snags, hedges), allowing for breeding sites of rare species, harvesting crops with respect to conservation needs (e.g., during limited seasonal periods using specific techniques), etc. Thus, farmers receive incentives conditional to abundance or occurrence and strive at the same time to reduce the probability of damage to their assets. Performance-based compensation in advance can broaden the portfolio of a farmer's household by directly improving the welfare of local residents. Fiscal transfer to compensate municipalities for the existence of protected areas is used on the state level in Brazil (Ring 2008).

Performance-based compensation was traditionally used for habitat protection (e.g., maintaining intact forests to ensure good water quality) in developed countries, but is equally useful to conserve biodiversity in general and merits greater attention in developing countries (Ferraro and Kiss 2002). The effectiveness of tropical-protected areas was indeed found to be correlated inter alia with direct compensation to local communities (Bruner et al. 2001). Performance-based payments are also believed to be more effective than traditional compensation because they help to relieve social costs (Schwerdtner and Gruber 2007; Breck et al. 2011). For example, local farmers might be



free of sleepless nights resulting from their efforts to ward off damage causing animals when they know they will receive financial reward for living with such animals (Jackson et al. 2008). However, performance-based compensation payments cannot be viewed as panacea to tackle conservation problems, especially if the underlying causes for habitat degradation (i.e., uneven land tenure and lack of participation by local communities) remain in place as shown in Vietnam (McElwee 2011).

## PRACTICAL CONSIDERATIONS

### Core Elements

Compensation schemes typically include (1) verification, (2) estimation of costs, and (3) delivery of payments. All three elements are complementary and interlinked.

Verification is a challenging problem because losses that are not verified can lead to over or under compensation. For example, in wildlife–human conflicts, evidence of the species that caused damage does not last long, and tracks are often blurred and not necessarily unique. Hence, distinguishing among the culprits may be difficult. This is a critical issue, however, because the incentives of compensation payments may lead to intentional reporting of damage by wild animals that in reality may be attributable to domestic animals (Sekhar 1998). Verification of claims is also associated with additional costs of the transaction and decision making (i.e., administrative costs), which may be substantial depending upon the temporal and spatial distribution of damages (Schwerdtner and Gruber 2007).

Consulting independent specialists for the verification of damages and desired biodiversity status (which would justify performance based compensation) is helpful in building trusting relationships and avoiding clashes between protected area managers and local farmers (Inskip and Zimmermann 2009). Thus, advantages through independent experts are substantial (although not tangible) and might outweigh the higher administrative costs related to hiring such consultation. Independent scientific documentation is also important in the process of separating perceived conflict from that which actually occurred (Siekhs and Struhsaker 1999). For example, death, injury, or the disappearance of livestock or even humans is not necessarily related to predators but can be caused by various factors including crime, lightning, avalanche, or rock fall (Rasmussen 1999). In some cases, however, biodiversity conservation increases the likelihood of the occurrence of other damaging environmental factors (e.g., snags easily break in a wind gust, or burn under dry conditions).

The estimation of costs to compensate for losses of livelihood or income, property, health, and life is difficult

when the assets in question do not possess direct market values. This is often the case with conservation parameters used to determine performance-based compensation (Fraser and Chisholm 2000). Some sophisticated methods have been developed to assess monetary value of conservation parameters [contingent evaluation, willingness-to-pay (WTP), etc.], and have been tested in the valuation of ecological quality of protected areas (e.g., Morro do Diabo State Park, Brazil; Adams et al. 2008). However, there are still constraints associated with their widespread use, constraints that are attributed to methodologies that are not fully understood, poor transparency, a lack of acceptance by researchers and policy makers, and conceptual problems (Redford and Adams 2009). For example, limitations can be related to calculations of total economic values (TEV), double counting, a transfer of benefits that is automatically assumed, biases that are either inherent to or generated by the survey process, and uncertainties in natural systems under various scenarios (Hadker et al. 1997; Chee 2004; Kosoy and Corbera 2010). In addition, some of the intrinsic values of nature (e.g., natural beauty, the intrinsic value of existing species, values of sacred places to faith groups, etc.) cannot be determined at all (Maguire and Justus 2008).

Conversely, assessing the monetary value of direct compensation payments is rather straightforward in cases where assets with market value have been lost. Direct compensation for the loss of resources may also include land prices paid to locals by the government, which include any discount rates (e.g., 10 %, James et al. 1999). Determining the value of losses and the subsequent compensation for assets with market value are nevertheless challenging when such losses are perceived emotionally and associated with hardships that are difficult to prove. For example, the value of livestock is dependent upon age and individual performance. The owner of a young depredated cow may have claimed it was intended for sale when it reached maturity, or the owner of a horse with good breeding performance may declare it irreplaceable. In both the cases, reaching an objective decision on compensation value for the killed animal is difficult and subject to a great deal of trust in the testimony of the farmer involved. With regard to injuries or loss of human life, the issue gets even more complicated as it is difficult to place a value on either (regardless, insurance companies that regulate traffic accidents do so regularly).

The quick and efficient delivery of compensation payments after damage is assessed and approved demonstrates that the issue is taken seriously by protected area managers (Rao et al. 2002; Madhusudan 2003; Jackson and Wangchuk 2004). Such prompt action helps to prevent the development of negative attitudes and frustration-affected parties, which is often associated with complaints (including unwanted publicity by the media) and retaliation toward wildlife. Transparent delivery and equitable

distribution of compensation funds helps to further set the stage for the development of mutually trusting relationships between protected area managers and local stakeholders (Ogra and Badola 2008).

Funds established for compensation payments need sufficient long-term resources to back them including cash, goods, and available land. As the need for compensation can fluctuate substantially due to biodiversity status, wildlife density, seasonality, weather, etc., it is crucial to have sufficient resources available at all times. An alternative measure to compensate for losses could be the settlement of rights (e.g., collecting fuel wood and fodder within designated parts of the protected area), which takes the edge off the need for long-term availability of funds (Sekhar 1998). Compensation resources such as goods and available land should be of at least the same quality as what will be compensated for.

### Eligibility Criteria

Eligibility for compensation is generally limited to the owners or lessees of property (e.g., livestock, crops, land) or the rights of indigenous locals (e.g., grazing, fire wood collecting). Performance- or incentive-based payments can be made at the household level or channeled to communities, the latter of which have the authority to decide on payment use (e.g., internal distribution, funds for schools, hospitals, etc.) (Zabel and Engel 2010). Payments at the community level generally offer the advantage of “peer pressure” (e.g., a farmer who kills an endangered animal is responsible for the reduction of benefits for the whole community).

Eligibility criteria for compensation may depend on whether an infraction occurred inside or outside of the protected area, and whether preventive measures were employed (e.g., using guards or corrals against livestock predation, erecting fences to protect fields from trampling or grazing by wildlife) (Okello 2005; Marchai and Hill 2009). The latter is intended to prevent the misuse of compensation funds, but is at the same time a controversial issue in and of itself. Preventive measures could be perceived as too costly and not worth implementing unless they are subsidized (Thapa 2010). Forcing local residents to minimize their risk by insisting on deductibles may, however, be controversial as well (i.e., why should a local farmer carry the burden of even partial costs on behalf of society or those that value conservation).

Eligibility for funds should be viewed generously rather than strictly as the ultimate goal of compensation is to promote conservation (Nyhus et al. 2000). Compensation schemes, however, may be ineffective without the application of appropriate preventive measures and public outreach (Rao et al. 2002). Generous compensation schemes that do not request any protective measures be taken may

also be mistaken for general insurance which ultimately generate incentives for slack preventive measures. By providing the prospect for income through compensation, such schemes could even develop additional conservation problems by influencing more local residents to become farmers, for instance (Bulte and Rondeau 2005). Farmers and other stakeholders could also persist in keeping their status and/or negative attitudes toward conservation, even if alternative sources of income (e.g., working for protected area administrations or nature-based tourism) or adequate compensation payments are offered (Gusset et al. 2009).

### Liability Issues

The right to claim compensation for damages related to various aspects of biodiversity is usually regulated by applicable rules and legislations, regardless of whether a protected area is involved or not (Mishra 1997). Compensation for such damages is further regulated by government programs, such as in cases involving large carnivores (Sindiga 1995). In the absence of governmental responsibility or its limitation, conservation-based non-governmental organizations (NGOs) frequently fund these programs or provide matching or balance funds (Hemson et al. 2009; Agarwala et al. 2010).

### Insurance Industry as a Model

Experiences gained by the insurance industry may benefit compensation schemes by increasing the effectiveness of their management and their long-term viability (Madhusudan 2003; Wang and Macdonald 2006). Ultimately, distinguishing between high- and low-risk clients would be necessary to develop reasonable cost-benefit ratios for premiums. Nonetheless, the core question still persists, regardless of the existence of non-subsidized insurance program with reasonable premiums: Is it not society as opposed to the local farmer who should bear the cost of the premium? Without a satisfactory answer, local farmers may feel right to exercise self-administrated justice and their own “insurance policy” by killing animals that cause them damage (Holmern et al. 2007; Kiringe et al. 2007; Hemson et al. 2009; Kendall 2011).

### Preventing Measures to Minimize Needs for Compensations

Scientific research into alternative approaches, their broader testing, and the assessment of cost-effectiveness is a basic pre-condition for minimizing the needs for compensation, and thus improving the effectiveness of protected areas by gaining support from local communities (Ferraro and Simpson 2002; Sitati and Walpole 2006; Torri



2011). The focus of alternative approaches should preferably include conflicts related to farming and problematic animal species. Both the areas of conflict represent the most common issues associated with compensation for the downsides generated by protected areas. In addition, ongoing monitoring of adopted compensation schemes is necessary to assess their effectiveness for conservation (MacLennan et al. 2009).

## CONCLUSIONS

Mainstreaming concern about human welfare regarding protected area management is the key to successful conservation efforts. Effective compensation schemes promote tolerance and raise awareness about community concerns by shifting the responsibility to the broader public. Compensation facilitates discussion pertaining to the prevention of conflicts between people and protected areas. Moral persuasion such as commitment by mankind to safeguard biodiversity and conservation-based education may also be more effective if compensation funds are designed generously. In contrast, deficient or insufficient compensation payments foment clashes and confrontations that significantly threaten actual conservation goals. Instances of defamation, actions of revenge and retribution, and poaching, all of which undermine conservation efforts, become more likely. At the same time, however, verifying the impact of compensation schemes on the achievement of conservation goals remains difficult to prove. The development of rigorous methods and monitoring programs, which compare the achievement of conservation goals in protected areas with and without varying compensation schemes by combining biological, economic, and social data, are necessary. These methods and programs must deal with a diversity of parameters that range from natural factors that influence biodiversity (e.g., weather, diseases) to poaching, which is notoriously difficult to monitor due to its clandestine character.

**Acknowledgments** We thank the Deutsche Gesellschaft fuer Internationale Zusammenarbeit GmbH—Centrum fuer internationale Migration und Entwicklung (GIZ-CIM) for supporting the position of PP. Funding for this project (No. 2010KYYW13) was kindly provided by the Chinese Research Academy of Environmental Sciences (CRAES). Five anonymous reviewers provided valuable comments on the previous version of this manuscript. We thank Paul Radley for thorough English editing.

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