INVITED VIEWS IN BASIC AND APPLIED ECOLOGY

Evaluation of management effectiveness in protected areas: Methodologies and results

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Abstract

Protected areas (PAs) play an important role in biodiversity conservation and the implementation of ambitious multilateral environmental agreements, like the 2010 targets of the Convention on Biological Diversity (CBD). In the CBD's Programme of Work on Protected Areas, it is requested that each country conduct management effectiveness evaluations of at least thirty percent of its PAs by 2010. This article compares the most common methodologies of PA management effectiveness evaluations, such as the *Rapid Assessment and Prioritization of Protected Area Management* (RAPPAM) Methodology, the *Management Effectiveness Tracking Tool* (METT) and UNESCO's *Enhancing our Heritage* (EoH) Toolkit. These and other methodologies can help to (1) examine overall effectiveness of PAs, (2) identify factors influencing the effectiveness and (3) determine common threats and their seriousness.

However, the outcomes of major studies concerning overall effectiveness as well as success and failure factors for PA management are partially contradictory. Different results can be due to the approach (e.g. number and type of indicators or assessors included in the evaluation process) or to the individual context of the PA (e.g. age, region, IUCN category) and therefore these factors need to be considered when comparing results of management effectiveness studies.

Research indicates that increased attention should be paid to regular monitoring of conservation activities in PAs including systematic social science studies with a socio-economic and socio-cultural focus. Unfortunately, the outcomes of the management effectiveness studies are not easily accessible and have not yet been widely shared or distributed among the conservation community.

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Zusammenfassung

Schutzgebiete spielen eine wichtige Rolle sowohl für den Schutz der Biodiversität als auch für die Umsetzung ambitionierter multilateraler Naturschutz-Abkommen, wie z.B. die "2010" Ziele des Übereinkommens über die Biologische Vielfalt. Das "Arbeitsprogramm Schutzgebiete" der Biodiversitätskonvention fordert, dass jedes Land bis 2010 die Managementeffektivität von mindestens 30% seiner Schutzgebiete evaluiert.

Dieser Artikel vergleicht die gängigsten Evaluierungsmethoden für Managementeffektivität von Schutzgebieten, wie z.B. die *Rapid Assessment and Prioritization of Protected Area Management* (RAPPAM) Methode, das *Management Effectiveness Tracking Tool* (METT) und das *Enhancing our Heritage* (EoH) Toolkit der UNESCO.

Diese und andere Evaluierungsmethoden können Aufschluss über (1) die durchschnittliche Effektivität eines Schutzgebietes, (2) Faktoren, die die Effektivität beeinflussen und (3) Gefahren für Schutzgebiete, geben.

Die Ergebnisse der wichtigsten größeren Studien werden vorgestellt und in ihrer Widersprüchlichkeit diskutiert. Unterschiedliche Ergebnisse können auch auf die Methode (z.B. Umfang und Art von Indikatoren oder befragten Personen) oder auf Aspekte des Schutzgebietes selber (z.B. Alter, Region oder Schutzgebietstyp) zurückzuführen sein und sollten daher nur in diesem Zusammenhang verglichen werden.

Forschungsergebnisse zeigen, dass regelmäßigem integrierten Monitoring von Aktivitäten in und im Umfeld von Schutzgebieten mehr Aufmerksamkeit zukommen sollte. Dabei sollte die Einbeziehung von systematischen sozialwissenschaftlichen Studien mit sozioökonomischem und soziokulturellem Fokus im Mittelpunkt stehen. Leider sind die Ergebnisse von Managementeffektivitäts-Studien noch wenig bekannt und haben so auch unter Naturschutzpraktikern, die hier eine wichtige Zielgruppe darstellen, bisher noch keine weite Verbreitung gefunden.

Introduction

The Convention on Biological Diversity (CBD), signed by almost 190 parties, aims to achieve by 2010 '*a significant reduction of the current rate of biodiversity loss at the global, regional, and national level.*' (Secretariat of the Convention on Biological Diversity, 2005, decision VI/26). Numerous indicators have been proposed to track progress towards the "2010 Target" (e.g. Balmford et al., 2005). One of these indicators is the coverage of protected areas, generally seen as key instruments in biodiversity protection (Naughton-Treves, Holland, & Brandon, 2005). However, as empirical evidence has shown, legal designation does not necessarily guarantee the protection of biodiversity values (Liu et al., 2001; WWF, 2004; Nellemann, Miles, Kaltenborn, Virtue, & Ahlenius, 2007; WWF, 2007).

A proposed solution involves focusing beyond the mere number and extent of protected areas and suggests including their management effectiveness in the equation (Chape, Harrison, Spalding, & Lysenko, 2005). Management effectiveness evaluation (MEE) is defined as "*the assessment of how well the protected area is being managed – primarily the extent to which it is protecting values and achieving goals and objectives*" (Hockings, Stolton, Leverington, Dudley, & Courrau, 2006). At CBD COP 7, a decision was made to include the request to assess management effectiveness of 30% of the world's protected areas until 2010 (terrestrial) and 2012, respectively (marine) in the Programme of Work on Protected Areas. This is an ambitious target, especially considering that the World Database on Protected Areas (WDPA) now contains more than 120,000 protected areas globally (UNEP-WCMC, 2008).

The assessment of management effectiveness in protected areas using a variety of tools has been steadily increasing over the last 10 years (Leverington, Hockings, & Lemos Costa, 2008a). Due to the variety of methodologies, studies and results worldwide, it is helpful to sum up the key aspects of the global process of management effectiveness evaluation. This paper focuses on the methodological and empirical context of management effectiveness evaluation. The most widely used approaches and comprehensive international studies are presented to give an introduction to the status-quo and challenges of management effectiveness evaluation in protected areas.

Methodological approaches to evaluate PA management effectiveness

In particular, the IUCN World Commission on Protected Areas (IUCN-WCPA) has led management effectiveness assessment work over the past decade. Its "Management Effectiveness Evaluation Framework" has formed the basis for many evaluation systems around the world (Hockings, 2003; Hockings et al., 2006). The framework identifies context, planning, inputs, processes, outputs and outcomes as the crucial elements in a good management cycle. Each of the six elements need to be assessed to identify weaknesses and thereby capacities for improvement. Hence, indicators based on these elements need to be selected for every protected area site or system and be measured (Hockings et al., 2006).

The drive for evaluation has spurred the development of assessment systems across the planet. To date, more than forty methodologies have been described by Leverington, Hockings, Pavese, Lemos Costa, and Courrau (2008b) and this list is still growing, with a notable range of approaches found in Latin America (Cracco et al., 2006) and Europe (Stolton, 2008). This methodological diversity reflects the wide variety of purposes and scales of evaluation that exist. These include the appraisal of concrete measures and projects, the assessment of management bodies for individual sites and comprehensive perspectives on regional and national systems of protected areas (Cracco et al., 2006). It also mirrors the interests of the various actors involved in the process: whereas site managers wonder how they can plan for more appropriate management processes, national agencies and NGOs tend to look for strengths and weaknesses of whole protected area networks. International donors, reflecting their financial priorities, push for management evaluation to make sure their money is well spent. Three internationally acclaimed and widely used evaluation approaches, all based on the IUCN-WCPA framework, illustrate these multiple perspectives:

- The *Rapid Assessment and Prioritization of Protected Area Management* (RAPPAM) Methodology was designed by the WWF to quickly identify management strengths and weaknesses for whole protected area systems. Its data allows for a comparison across sites and can assist in setting policy priorities for governments and NGOs at the national level (Ervin, 2003). With more than 1595 assessments in more than 56 countries (Leverington, 2009), RAPPAM is currently the most widely implemented methodology for assessing management effectiveness of protected areas.
- While RAPPAM looks at whole networks, the *Management Effectiveness Tracking Tool* (METT) was developed to monitor management progress of individual project sites over time (Stolton et al., 2007). Based on simple score-card questionnaires, its data is used by donors and national treasuries to promote accountability and transparency; it does not, however, necessarily allow for comparison across sites. METT is being used by the World Bank, WWF and GEF as a mandatory monitoring tool in areas where they are involved and has been applied extensively in more than 1255 assessments in over 85 countries (Leverington, 2009).
- In contrast to these rapid assessments, UNESCO's *Enhancing our Heritage* (EoH) Toolkit takes a much closer look at individual protected areas. Originally created for adaptive management in natural World Heritage sites, its twelve tools, which can be combined in a flexible manner, allow for an in-depth, participatory assessment of key values and management appropriateness. *EoH* can require considerably more resources than RAPPAM or METT, but it generates a richer body of information from which site managers can directly draw to improve their own management strategies (Hockings et al., 2008).

Most methodologies, which are applied worldwide to evaluate management effectiveness in PAs, use questionnaires with indicators for various management aspects (Leverington et al., 2008b). The overall effectiveness is determined by adding the scores for all indicators. As scoring depends on subjective judgment, interactive workshops or discussion groups are organized which ideally include protected area managers, representatives of various stakeholder groups and external consultants. However, the extent to which ideal methodological implementation occurs varies with resource availability. The quality of evaluation results therefore differs due to the highly flexible nature of implementation of the methodologies. Quantitative scoring systems as used for RAPPAM and METT are beneficial for comparing results, but their expressiveness is limited to numbers. In contrast EoH uses quantitative, qualitative and descriptive scoring. The complex scoring system entails difficulties in comparison, but allows more detailed and individual analysis, which is advantageous when results are primarily intended for the use by protected area managers. Consequently, the methodological approach and depth of MEE largely depends on its purpose and the resources available for the evaluation.

A synthesis of MEE studies worldwide was undertaken by an international research group in 2008 (Leverington et al., 2008a, referred to in the following as the 'Global Study'). The specialty of the 'Global Study' is the development of a "common report format" (Leverington et al., 2008a), which consists of headline indicators based on the six elements of the IUCN-WCPA framework. Headline indicators are higher-level indicators belonging to a specific management aspect. MEE studies using different methodologies and thus, different indicators can be compared by transforming the indicators of each methodology to the headline indicators. This enables us to analyze effectiveness of PAs, strengths and weaknesses of management and priority actions at national, regional and global levels, even though the evaluation is based on different methodologies. Detailed versions of the 'Global Study' have been conducted at a regional level in Latin America (Cracco et al., 2006) and have just been completed in Europe (Nolte et al., 2010).

Results of PA management effectiveness evaluations

In the scientific and professional literature, considerable disagreement exists with respect to the question of whether protected areas are effective or not. In their highly debated study on the impacts of anthropogenic threats on 93 protected areas, Bruner, Gullison, Rice, and da Fonseca (2001: 125) conclude that "the majority of parks are successful at stopping land clearing and are – to a lesser degree – effective at mitigating logging, hunting, fire, and grazing" This is in

line with Nagendra (2008): she demonstrated that protected areas had significantly lower rates of clearing in comparison to their surroundings and that lower clearing rates are related to the initiation of protection. Thus, protected areas do appear to be effective in limiting overall land-cover clearing, which however largely differs with the region (e.g. protected areas from Asia had the highest rates of land-cover clearing).

The effect of protected areas on conservation values can only be assessed over time or by referring to surrounding areas without protection status. Two studies examining the impact of protection status on deforestation in tropical forests of Costa Rica (Andam, Ferraro, Pfaff, Sanchez-Azofeifa, & Robalino, 2008) and Sumatra (Gaveau et al., 2009) have suggested that effectiveness of protected areas is often overemphasized. They state that low deforestation rates in protected areas can often be explained simply by their remote location. Moreover, enhanced deforestation on adjacent unprotected land can be a result of compensation of logging restriction in the protected area. Although controlling for these biases, both studies found reduced logging activities within protected areas.

In contrast to the above-mentioned studies, numerous examples show the inefficiency of protected areas. Nellemann et al. (2007) found that illegal logging occurred in 37 out of 41 protected areas of Indonesia. A study on more than 200 forest protected areas also supports the notion that legal protected area status does not necessarily indicate that site-specific natural values are protected (WWF, 2004). An extreme example is represented by the Chinese Wolong Nature Reserve, one of the world's first "Panda Parks", where degradation since the Reserve's establishment in 1975 has actually increased to levels higher than in areas outside the park (Liu et al., 2001).

Due to the complexity of management effectiveness studies, contradictory results need to be compared with care. Bruner et al. (2001) measured the effectiveness of parks in protecting tropical biodiversity. Their study provides examples illustrating some major difficulties in examining the overall effectiveness of protected areas. As there are numerous parks in the Tropics and the effectiveness can vary for example with region, IUCN category and age of the park (WWF, 2004), a representative sample needs to be studied. Instead of choosing the parks randomly, Bruner et al. (2001) asked experts to select the sampling parks (Vanclay, Bruner, Gullison, Rice, & da Fonseca, 2001). Making a fair and balanced assessment of the parks effectiveness based on people's subjective views is a major challenge of MEEs. Particularly when the assessment is carried out by a single person, it is essential to undertake some form of control to eliminate or minimize bias due to the person's position or relation to the park. Lastly, the calculation of the effectiveness and its underlying indicators can significantly influence the results. According to Vanclay et al. (2001) the indicators chosen by Bruner et al. (2001) (clearing, burning, grazing) are not necessarily a result of the park itself and therefore, cannot be used for the effectiveness index.

Evaluating management effectiveness, however, has to go beyond simply asserting whether PAs are effective or not; assessments also have to provide information on how to improve management. Several studies have thus attempted to identify crucial success and failure factors for PA management – again with contradictory results.

The METT Study by Dudley et al. (2007) is the largest single-methodology study, considering 330 sites. It reveals that the strongest correlation exists between biodiversity conditions and the following items: law enforcement, control of access, resource management, monitoring and evaluation, maintenance of equipment, budget management and the existence of annual work plans. An insight that confirms the results of Nagendra's (2008) above-mentioned study is that there appears to be little correlation between international designations (e.g. World Heritage Sites, Biosphere Reserves, Ramsar Sites) and effectiveness. These designations seem to be more important for governments than for individual protected area managers, who continue to do their best, regardless of the designation in place. However, Dudley et al. (2007) stress that if international designation really reflects the 'best of the best' in terms of biodiversity conservation, then the lack of any significant improvement as compared with other sites may give cause for concern. The main threats identified in this study are consumptive biotic resource use (legal and illegal), habitat conversion and modification of ecological processes.

The 'Global Study' recorded over 6300 assessments of management effectiveness from 100 countries. Original data was obtained and analyzed for about half of these assessments and nearly fifty evaluation reports were reviewed. In contrast to the METT study, the major insights from the 'Global Study' (Leverington et al., 2008a) are that the most critical management factors needing attention are (in descending order): appropriate programs of community benefits and assistance, communication programs, management effectiveness evaluations, natural resource and cultural protection measures and the involvement of communities and stakeholders. The most serious threats identified were: hunting/fishing/logging/wood harvesting/gathering non-timber forest products, recreational activities and activities on adjacent lands. Interestingly, in both Dudley et al. (2007) and Leverington et al. (2008a), invasive species is at the bottom of the list of threats. Climate change only appears as a minor threat causing "habitat shifting & alteration" (Leverington et al., 2008a) but is not even listed in Dudley et al. (2007). The threat analyses in both studies are based on the classification of the Conservation Measures Partnership (CMS, 2006) which has included different indicators for climate change. However, Dudley et al. (2007) included evaluations from 2004 to 05 not using predefined threats, so evaluators identified the threats themselves. It is likely that in the past the appearance for instance of "habitat shifting & alteration" was interpreted as a natural process or result of direct anthropogenic interferences. The perception and interpretation of threats can change over time and can also be influenced by the

design of the survey instrument. Both should be considered when comparing results.

Nevertheless, these contradictions should not discourage efforts at measuring effectiveness, but indicate the need for future research. In particular at the regional level there is still a potential for detailed analysis to inform regional policies and programs for PAs.

Conclusions

Conservation practitioners have come to recognize that the CBD Programme of Work's ambitious goal of implementing management effectiveness evaluations of at least thirty percent of each member party's protected areas by 2010 (for marine protected areas, the deadline is 2012) has, unfortunately, proven to be unrealistic in light of the sheer magnitude of the task, given the fact that more than 115,000 terrestrial and 5000 marine sites are protected around the globe (UNEP, 2009). The workforce and time required, not to mention the financial resources, are simply not available. Despite the information contributed by the studies on management effectiveness summarized above, there still is a clear lack of knowledge about the degree of achievement of protected area objectives (Bertzky & Stoll-Kleemann, 2009). Bertzky and Stoll-Kleemann (2009: 9) conclude that "... *although protected areas cover only one aspect of the CBD 2010 target, considering the current status of our knowledge, there is a substantial probability that, by 2010 and a few years past, we might not even know whether the 2010 target has been achieved or not. This would be very harmful for conservation as it reduces the reputation of our global conservation management agencies further*".

Increasing attention is therefore being paid to monitoring conservation activities and their outcomes on site-level. One aim could be to standardize the methodology of ecological monitoring and natural science-based research in order to make systematic comparisons among PAs possible. In general, more interdisciplinary research including social science-based monitoring are needed to enhance our conceptual and practical knowledge of people–nature relationships and the true consequences of biodiversity conservation, with some experts claiming that this knowledge is a *sine qua non* in efforts to achieve management effectiveness in PAs (Lotze-Campen, Reusswig, & Stoll-Kleemann, 2008; see also Hockings, Stolton, Dudley, & James, 2009).

Yet amidst the worldwide drive for evaluation, one central question remains: does the evaluation of effectiveness actually bring about better management? Given the variety of objectives and audiences of assessments, a simple answer seems impossible. However, one issue is obvious. The improvement of protected area management goes beyond the evaluation itself. Evaluation results need to be considered and integrated in the management process to make the protected areas work more effective. Studies on strengths and weaknesses of protected area networks can assist in priority setting and lobbying. Thus, resource allocation or additional funds due to MEE can assist in long-term improvement of the park's quality. Leverington et al. (2008a) assume that better results in repeated METT assessments might be an effect of donor funds which are often related to such assessments. The most tangible effects can be anticipated where evaluation is requested by the local management bodies themselves, fully integrated in the project management cycle (Margoluis & Salafsky, 1998) and probably, based on systematic and open dialogue with staff, stakeholders and external experts. Toolkits rooted in practical experience at ground level, such as the EoH, draw their strength from their direct relevance to local decision makers (Hockings et al., 2008). At the current state of knowledge, however, the majority of these positive effects can only be assumed. As yet, no systematic study has been undertaken to analyze whether evaluations actually delivered the outcome they were set up for: better protected areas.

Although the results of these assessments have generated a rich source of information, they are not readily accessible in one place and have not yet been widely shared or distributed among the conservation community. Providing an avenue to this information is essential to maximizing benefits from this work by ensuring that key issues related to protected area management are identified and addressed. It will also allow the conservation community to partake in the experience gained to date and to profit from current ideas on management effectiveness, as well as to obtain advice from 'lessons learned' that can be applied in the ongoing endeavors to improve conservation on ground.

Acknowledgement

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