



A Management Model for Improve the Governance of Protected Areas since an Institutional Perspective and an Empirical Case in a Spanish Natural Park

Mónica de Castro

Universidad Rey Juan Carlos Edificio
Departamental Despacho J38 Campus de Vicálvaro,
Spain

Vicente Urios

Universidad de Alicante Departamento de Ciencias
Ambientales y Recursos Naturales Campus de San
Vicente de Raspeig, Edif. De Ciencias III-
Alicante, Spain

ABSTRACT

This paper propose a management model for improve the governance of protected areas from an institutional perspective. The good governance in protected areas is based in seven principles: Legitimacy, Inclusiveness, Accountability, Performance, Equity, Connectivity and Institutional sustainability. This proposal is based on an overview of work at the institutional framework level and incorporates factors that affect to the efficiency of governance and improve it. A collaborative multi-criteria method is proposed to improve the good governance and ensure the Institutional Sustainability dimension, by integrating the stakeholder preferences in decision making. This model allows for obtain priorities on the management objectives of the stakeholders in a protected area and identify equivalences with IUCN protection categories using a multi-criteria outranking technique. It also presents an application in the Albufera Natural Park in Valencia, a strongly man-modified wetland located in Eastern Spain. This holistic approach allows ensure the incorporation of elements associated with the institutional sustainability that are not sufficiently represented in the governance in protected areas and to lay the theoretical basis for improve the governance for the global network of protected areas. The application of the model in the Albufera Natural Park has identified the V-Protected Landscape / Seascape IUCN category as the equivalent international protection category. The results obtained by the park staff and other stakeholders have no major discrepancies. This suggests that this protection category seems well adapted to the social context of this protected area, moreover, the V protection category usually fits well to ecosystems strongly modified by human activities as is the case of the Albufera of Valencia. This model achieves improve two subdimensions of the Institutional Sustainability in the governance of protected areas: the Institutional Resilience, with a flexible integration of the preferences of the stakeholders and the Institutional Robustness, including the priorities of the stakeholders in the decision making of the protected areas.

Keywords

Management, Good governance, Protected Areas, Multi-criteria analysis, Institutional Sustainability

INTRODUCTION

"Governance" is defined as the interactions among structures, processes and traditions that determine how power and responsibilities are exercised, how decisions are taken and how citizens and other stakeholders have their say (Graham. et al., 2003). The main role of governance of protected areas is to create and maintain the necessary conditions for efficient management (Abrams et al., 2003).

The increase in the surface, number and diversity of protected areas in the last century, complicates the development and implementation of an efficient management model. There have been numerous studies aimed at developing quality management (Stoll-Kleemann, 2010). However, until recently, there has been no interest in defining good governance, which is, ultimately, the structure and the support of the good management.

It is in the last decade that governance of protected areas has gained growing importance in the scientific community and in society. The rapid pace of global biodiversity loss has promoted the adoption of international conventions and agreements in order to stop it. The Convention on Biological Diversity (CBD) is

one of the most important political commitments that have been adopted in these terms. At the latest (10th) Conference, the Parties have highlighted the need for detailed studies to improve governance of protected areas, following the guidelines of the work plan of the Strategy 2011-2020 to reduce biodiversity loss (IUCN, 2010).

At the same time, in recent years ecological systems have been growing in complexity. On the one hand, this has increased the number of agents involved, with greater participation in decision-making. On the other hand, the number of relationships between stakeholders and between them and their environment has risen, and thus created conflict.

The studies that have analyzed the governance of protected areas to date have been defined mainly from an environmental perspective, forgetting to incorporate some aspects that define the institutional component of governance. Until recent years, inadequate attention has been paid to the importance of institutions, and the compatibility of conservation policies with the institutional setting within which they operate, must be analysed. Incorporating institutions increases the chance that implemented policies will have the intended consequences of promoting conservation and sustainable use (Smith et al., 2003).

The framework we propose will help identify relevant variables in the governance of protected areas using an inclusive concept of governance, in which an environmental perspective, providing elements of support for the achievement of conservation objectives and an institutional perspective, providing elements of a culture of good government complement each other. Finally we presents a Collaborative Multi-criteria model to ensure the Institutional Sustainability dimension, incorporating stakeholder preferences. This model allows to obtains priorities on the management objectives of the stakeholders in a protected area and identify equivalences with IUCN protection categories using a multi-criteria outranking technique based in PROMETHEE II technique. It also presents an application in the Albufera Natural Park in Valencia, a strongly man-modified wetland located in Eastern Spain.

2. AN INSTITUTIONAL PERSPECTIVE: INCENTIVES FOR COOPERATION STRATEGIES AND A CULTURE OF GOOD GOVERNANCE

The theory of collective action tries to determine "the collective results in terms of individual motivations" (Hardin, 1982). In turn, it has been observed that determining variables of the quality of institutions, such as reputation, trust and reciprocity positively affect the efficiency of collective action (Ostrom, 2010).

In the last two decades it has been shown that in many areas, management by local communities can be more efficient than other types of management (Alcorn,2010; Hayes, 2006; Ostrom,1999).For this reason, we have considered the participation of local communities, as one of the most important in defining good governance of protected areas. On the one hand, they are the users of the resources and they are the ones who get benefit from these. But they also have the experience and knowledge to optimize the performance of these resources (Ostrom et al., 1999). However, it needs some prerequisites for this to happen. Ostrom (1999) points out as prerequisites for the success of this system a series of institutional conditions necessary to develop appropriate incentives to act upon the behaviour of agents. These incentives are consolidated in the long-term and they are part of the "culture" that governs the operation of the complex socio-economic, political and ecological and intrinsic part of institutional quality.

The institutional failure is derived from problems such as a mismatch between the ecological and socio-economic scale, that occurs as a result of a weak feedback between decision making agents and their natural environment and this leads to inappropriate incentives and a poor and inefficient legal framework for protected areas.

The institutional framework should consider two key issues: i) on one hand, the design of a good governance must be strongly related with the Institutional Quality and ii) on the other hand, good power relationships will allow to develop incentives for agents to choose cooperation strategies and thus achieve an Efficient Collective Action (Vollan and Ostrom, 2010). These two elements are not clearly represented on the principles of good governance defined to date.

THE PRINCIPLES OF GOOD GOVERNANCE IN PROTECTED AREAS

Governance of protected areas is determined by a conservationist ecological dimension and an institutional political dimension. To date, the attributes that define good governance of protected areas have been primarily based on ecological criteria. However, we have identified some improvements to these models related to the institutional dimension of the concept of governance which is described in this section.

To define our conceptual framework, we review not only other theoretical frameworks on governance in protected areas (Abrams et al., 2003; Graham et al., 2003; Griffith et al., 2009; Lockwood, 2010), trends in governance and institutional change (Alcorn et al., 2005; Dearden et al., 2005). The "new governance" in protected areas is characterized by greater involvement of nongovernmental agents, not previously included in the decision-making processes and in a greater decentralization of these processes. It also encourages greater use of formal mechanisms of accountability as a result of numerous legislative and political changes and a greater amount of funds from a greater diversity of sources (Howlett and Rainer, 2006; Kothari, 2008).

This new integrated approach provides a good opportunity for the expansion of the democratic space and for strengthening the institutional structures. However, in this context, the complex decision-making processes, with strong conflicts of interest and a large number of stakeholders, such as those that relate to protected areas, are difficult to manage. It is appropriate, therefore, to design governance evaluation models adapted to this new reality.

Early work on governance of protected areas (Abrams et al., 2003; Graham et al., 2003) designed the principles of good governance, adopting, as the basis of good governance, the principles of the United Nations UNDP (UNDP, 1997). These works constitute a solid base that serve as the basis for further analysis. Lockwood proposes some modifications to these principles, adapting them to the characteristics of the "new governance", attaching greater importance to issues such as participation and equitable representation of all stakeholders and also to the coordination of interactions between agents both within and between levels. Our framework introduces an institutional perspective to define good governance of protected areas.

The dimensions of the good governance of protected areas are defined by seven principles: Legitimacy, Inclusiveness, Accountability, Performance, Equity, Connectivity (Abrams et al., 2003; Graham et al., 2003; Lockwood, 2010) and our proposal, the Institutional Sustainability.

Legitimacy: includes characteristics and perceptions related to the acceptance of the authority of an institution to govern, the integrity and responsibility with which it exercises power and the credibility and trust that agents have in this. It also includes the authority and representativeness and consensus orientation (Abrams et al., 2003).

Inclusiveness: refers to the opportunities of the agents to participate in decision-making processes and actions in an influential manner (Lockwood, 2010).

Accountability: measures the clarity, accessibility and timeliness with which members of the governing body accept and justify their responsibilities. It also considers the transparency of the processes (Abrams et al., 2003; Graham et al., 2003; Lockwood, 2010).

Performance: The governance system works if it is able to generate appropriate incentives for efficient collective action, i.e. to create cooperation strategies between the agents to resolve conflicts.

Equity: involves equality of opportunity for all men and women to improve their welfare and the existence of a legal framework to ensure fairness and to defend and regulate those rights. The decision-making processes are designed and developed with decency, respect for human rights and without humiliating any of the agents (Graham et al., 2003) is adopted as base the principle of "do no harm".

Connectivity: measures the communication and coordination in the interactions mainly deriving from the decision-making processes, between different levels of governance and between the different actors involved in the protected area and the alignment of priorities, plans and activities between organizations on governance (Lockwood, 2010).

3. A NEW INDICATOR : THE INSTITUTIONAL SUSTAINABILITY

Our contribution is the proposal of a new dimension of good governance in protected areas, the institutional sustainability, and a multi-criteria model to ensure it. This dimension measures the balance between the flexibility and the stability of the governance.

INSTITUTIONAL SUSTAINABILITY

Refers to characteristics resulting from the protected areas as long term institutions. Their ability to adapt to the changing environment and the permanence of certain characteristics in a stable way despite changes in the environment, which give identity to the area from an institutional perspective. It measures the balance between agility providing resilience and the stability provided by the institutional robustness.

The main challenge of Institutional Sustainability is to correctly identify the structural and non structural elements of the governance.

Institutional Resilience: Resilience includes aspects which measure the ability of institutions to anticipate changes in society and the environment and the ability to reduce the uncertainty associated with human interaction through mechanisms of evaluation and learning. (Folke et al., 2005). It also provides flexibility to an organization or institution to external changes, such as the return of responsibilities to local and regional authorities, around a stable structure that remains fixed in time (Baral, 2012). Refers to the "adaptability" of governance ("self-reflexivity").

Institutional Robustness: Institutional Robustness refers to the character of an institution which is maintained over time, giving it identity and allowing it to build an institutional culture by itself, around which can other non-structural elements can be modified. Refers to the stability of governance ("self-enforcement").

It has been observed that in the context of conservation of the commons, communities that have been formed slowly and have an important cultural tradition have proved to be more institutionally efficient (Ostrom, 2000). Since collective action is largely based on mutual trust, some self-organized resource regimes in rapid settlement areas have disintegrated within relatively short periods (Clements et al., 2010). The Institutional Robustness measures the stability of the institutional framework within which standards and formal and informal laws of the protected area are developed, the clear assignment of property rights and long-term security offered by the protected area as an institution. It also refers to the value given to the traditions, knowledge and customs of local populations, through the maintenance of determined institutions.

AN EMPIRICAL APPROACH TO ENSURE THE INSTITUTIONAL SUSTAINABILITY

We propose a multi-criteria method to ensure the institutional sustainability in protected areas. Collaborative Multi-criteria techniques are especially useful in getting agreement, since they provide a structured framework for the discussion in the decision-making processes. In the last decade the use multi-criteria analysis to solve problems of MCDM management in protected areas has increased (Brucker et al., 2013; Kijazi and Kant, 2011; Nordstrom et al., 2010; Schmoldt and Peterson, 2000). Multiple attribute decision-making is well suited for park management decision-making because it accounts for multiple attributes of alternative management actions, and can be applied interactively with many participants using computer-based decision support tool, providing a quantitative basis for decisions (Schmoldt and Peterson, 2000). The techniques used are those based on the theory of value and utility and hierarchies. Outranking techniques have been rarely used to solve such problems, probably because they require a background that the staff of a protected area does not always have, although they may be suitable to solve macro-management issues.

There has been a clear increase in participation in decision-making processes that use multi-criteria analysis (Mendoza and Martins, 2006). Furthermore, the use of MCDM in collaborative decision making offers important advantages for the design of public policies: they generate knowledge about the problem and the objectives of the different stakeholders, and provide transparency, fairness and understandability to the process of decision making (Gregory and Keeney, 1994). These methods are suitable to integrate the preferences of agents in decision-making processes, thus can be an efficient tool to ensure the institutional sustainability.

In this paper we propose a model to identify IUCN protected areas management categories incorporating stakeholder preferences using closeness values. Closeness values measure the similitude of stakeholder priorities with IUCN priorities for each category of protection. The decision problem is designed in the IUCN framework and its characterization is defined on the basis of seven alternatives, corresponding to the categories of protection, and nine criteria, which correspond to the management objectives. Participation can be incorporated through personal interviews, individual interviews, even through social networks. The ranking

of alternatives is obtained using an outranking technique based on the PROMETHEE II method (Preference Ranking Organization Method for Enrichment Evaluations). The model pursues ensure two goals: Institutional Resilience, with a flexible integration of the preferences of the stakeholders and Institutional Robustness, including the priorities of the stakeholders in the decision making of the protected areas. It has been tested in a valencian natural park Albufera de Valencia, a strongly man-modified wetland located in Eastern Spain.

AREA OF STUDY

The Albufera Natural Park is a protected coastal wetland in Valencia. It was declared a Natural Park in 1986 and included in the Ramsar list of wetlands of international importance in 1991, which recognizes it as a special protection area (SPA). It covers an area of 21120 ha, two thirds of which are devoted to rice cultivation and distributed in small parcels of private property. Anthropic pressure in the last century has been very intense. Furthermore, the use of agriculture, fishing and hunting or general public use have caused conflicts between agents with different interests.

METHODS

The aim is to identify the international category of protection equivalent to the Albufera Natural Park on the basis of the management objectives priorities of a protected area considering the preferences of the stakeholders.

The criteria correspond to the main management objectives in the protection categories allocation system of the IUCN: Scientific Research, Protection of Wilderness, Biodiversity Preservation, Education, Tourism, Protection of natural resources and cultural resources, Ecosystem services, Sustainable Use and Cultural Values and Traditions (IUCN,2011).

The alternatives are predetermined and are the protection categories of the World Network of Protected Areas: Ia: Strict Nature Reserve, Ib:Wilderness Area, II:National Park, III:Natural Monument or Feature, IV:Habitat/species Management Area, V: Protected Landscape/Seascape and VI: Protected Area with Sustainable Use of Natural Resources (IUCN,2011).

Closeness values: The inputs of the evaluation grid are the closeness values. For its calculation we followed the following steps: first, the survey results have been prepared. High tigers were punctuated with priority 1, tights with priority 2, low with priority 3, and the null with priority 0. After words, deviations were calculated in absolute value among the priorities for each stakeholder and priorities for the IUCN.

It has been used the evaluation based in closeness values to calculate the individual results, through the use of PROMETHEE II method. For each individual result, it has been calculated the intensity of preference for one alternative over another for each criterion and for each pair of alternatives; followed by the preference index for each pair of alternatives; and then, the positive and negative flows (Brans and Macharis in Figueira et al.,2005). Finally, the net flow is calculated using the positive and the negative flow for each alternative (Brans and Macharis, in Figueiras et al.,2005), which indicates the overall performance of each alternative according to the decision maker's preference. Based on the net flow information, the rankings of each decision maker are obtained, and the alternatives are ordered in decreasing order of their net flows.

This model uses an evaluation table that includes the degree of similarity between the priorities of the objectives for each stakeholder and the priorities defined by IUCN for each protection category. Fifteen stakeholders were interviewed and included in four groups: Conservationist, Government, Owners and Staff. Two stakeholders belong to the Conservationist group and are members of environmentalist associations. Government is made up of four representatives of municipalities. Owners consist of three representatives of land owner associations. Staff consists of four park technicians and managers.

In order to collect the stakeholder assessments on the importance of management objectives a Likert survey has been designed with four evaluation options: Zero, Low, Medium and High.

In order to obtain final evaluations closeness values are defined. These are based on deviations in absolute value between the priorities of each management objective for each protection category defined by IUCN and evaluated by each stakeholder. After words, the scores of deviations are reversed so that higher closeness

values indicate greater similarity with the IUCN priorities. In this way the value 3 indicates complete agreement between the two priorities and the value 0 indicates complete disagreement.

Let,

$cv_j(a,r) = F_j[d_j(a,r)]$ for all the problem alternatives, where

$$d_j(a,r) = |p_j(a) - p_j(r)|$$

$$0 \leq d_j(a,r) \leq 3$$

and

If $d_j(a,r) = 0$, so $cv_j(a,r) = 3$

If $d_j(a,r) = 1$, so $cv_j(a,r) = 2$

If $d_j(a,r) = 2$, so $cv_j(a,r) = 1$

If $d_j(a,r) = 3$, so $cv_j(a,r) = 0$

Where $cv_j(a,r)$ is the closeness value for the criteria j , $d_j(a,r)$ is the deviation (absolute value) between the priority of the decision maker and the priority of the reference IUCN for the criteria j , $p_j(a)$ is the priority of each management objective for the criteria j and $p_j(r)$ is the priority of the IUCN reference for the criteria j .

In order to determine the input of the evaluation table management objectives priorities are taken as a reference, for each protection category defined by IUCN (López et al., 2007).

RESULTS

Individual assessment

The information collected from stakeholder measured by closeness values and the remaining parameters considered by the analyst (preference functions and threshold parameters) were combined through the PROMETHEE II method to obtain the individual rankings. Table 5 shows the results for the fifteen individual stakeholders. The category V (Protected Landscape / Seascape) obtained the highest number of top positions in the individual results, obtaining score "1" for eleven times. This result shows a clear preference for the stakeholders of the Albufera of Valencia towards this protection category of protection. On the other hand, the highest number of the worse individual positions are in the category Ia (Strict Nature Reserve) with six scores, and in category VI (protected areas with Sustainable Use of Natural Resources) with five scores.

Global Ranking

PROMETHEE II offers conjoint results using a weighted arithmetic mean. Thus, the single results were aggregated to create the global result. The global ranking and the staff ranking is shown and net flow for each alternative can be seen in table 1. The three best positioned alternatives in the global ranking coincide with those of the experts.

Table 1. Staff ranking, global ranking and net flow

Alternative	Staff Ranking	Global Ranking	Staff Net Flow	Global Net Flow
Ia	7	7	-0,17	-0,13
Ib	4	5	-0,03	-0,09
II	2	2	0,12	0,12
III	6	6	-0,09	-0,1
IV	5	4	-0,04	-0,02
V	1	1	0,22	0,22
VI	3	3	-0,02	0,01

Figure 1 show global results, which show a clear preference for the category V (Protected Landscape / Seascape). Global result shows the same structure that individual results. Category V (Protected Landscape/Seascape) is placed first in eleven individual rankings. The second place in the global ranking is

occupied by Category II-National Park, which appears six times in that position in the individual rankings. Category Ia (Strict Nature Reserve) is the last in global and individual results. This brief analysis indicates that the global ranking is consistent with the individual ones, which means that the aggregation of individual results was satisfactory.

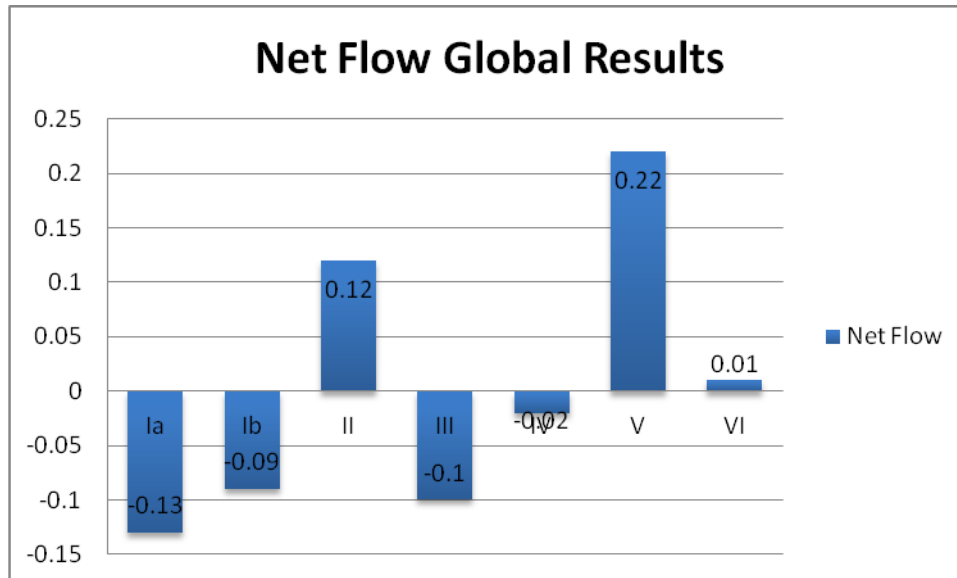


Fig. 1. Global Net Flow according to Categories of Protection

Finally, a sensitivity analysis was performed to evaluate the behavior of the results if the representatives of government had assigned a higher priority to the criterion which evaluates the category II. This specific analysis is not related with the conflict resolution state, since it was assumed that all decision makers agreed on final result and this stage was suppressed. An increase was provoked in the weights assigned by the government representatives (STK4, STK5, STK6 and STK10) to 70 % in the conjoint of the stakeholders; ie 17.5 % by each government stakeholder and 2.7 % by all rest stakeholders and the global ranking was not changed, emphasizing the strength of the other representatives in constructing the final decision. These results show the robustness of the ranking.

5. CONCLUSIONS

In this paper we have presented a management model that improve the governance of protected areas from an institutional perspective. We have based our work upon the frameworks presented so far, studying the trends shown in governance over the past two decades.

The proposal is based on the importance that governance and management function as an integrated system has, to achieve the social goals and the conservation of protected areas. Our model attaches particular importance to the institutional sustainability of the protected area, i.e. their ability to persist in time, developing and maintaining flexibility mechanisms and maintaining stable those institutional characters that will define its own identity and allow the development and maintenance of the traditions, knowledge and customs of the local population. Thus, we present a new dimension of the good governance: the Institutional Sustainability, based on the Institutional Resilience and Institutional Robustness. To ensure this dimension is required the participation and representation of all actors in decision-making processes thus, the participation of stakeholders in defining management objectives of a protected area provides transparency to the design of public policies and helps to improve the governance of the area. Moreover it allows to identify the management targets that present the greater conflicts and the affected stakeholders. Often stakeholder interests are contrary to this objective and is impossible to achieve consensus solutions. Collaborative multi-criteria analysis can offer an efficient tool to ensure the Institutional Sustainability in the governance of protected areas. The application of this model in the Albufera Natural Park has identified the category V-Protected

Landscape / Seascape as the equivalent international protection category. The results obtained by the staff and other stakeholders have no major discrepancies. This suggests that in addition this protection category seems well adapted to the social context of this protected area. The category V prioritizes the protection of natural and cultural resources, tourism and maintenance of natural and cultural attributes. As second priority it considers scientific research purposes, conservation of biodiversity, conservation of ecosystem services, education and sustainable use of resources. This international protection category usually fits well to ecosystems strongly modified by human activities as is the case of the Albufera of Valencia.

The information generated can provide support to develop specific management strategies for each protected area and improving the current state of governance in the global network of protected areas.

REFERENCES

- [1] Abrams, P., Borrini-Feyerabend, G., Gardner, J. and Heylings, P., 2003. Evaluating Governance. A Handbook to accompany a participatory process for a protected area. PARKS CANADA and TILCEPA—Theme on Indigenous and Local Communities, Equity and Protected Areas of IUCN CEESP/WCPA.
- [2] Alcorn J., B. Luque, A. and Valenzuela, S., 2005. Global Governance and Institutional Trends Affecting Protected Areas Management: Challenges and Opportunities Arising from Democratization and Globalization Durban, South Africa: Governance Stream of the Vth World Parks Congress; 2005.
- [3] Alcorn J., 2010. Indigenous People and Conservation. Theme on Governance, Equity, and Rights of the World Conservation Union Commission on Environmental, Economic, and Social Policy. McArthur F. White Paper Series.
- [4] Baral, N., 2012. Empirical analysis of factors explaining local governing bodies' trust for administering agencies in community-based conservation. *Journal of Environmental Management* 103, 41-50.
- [5] Brans, J.P., Mareschal, B., 2005. PROMETHEE Methods, chapter 5 in Multiple Criteria Decision Analysis, State of the Art Surveys. Edited by Figueira, J.; Greco, S. and Ehrgott, M. Springer. pp.163-195
- [6] Brucker de, K., Macharis, C., Verbeke, A., 2013. Multi-criteria analysis and the resolution of sustainable development dilemmas: A stakeholder management approach. *European Journal of Operational Research* 224: 122-131
- [7] Clements, T., John, A., Nielsen, K., An, D., Tan, S. and Milner-Gulland, E.J., 2010. Payments for biodiversity conservation in the context of weak institutions: Comparison of three programs from Cambodia. *Ecological Economics* 69, 1283-1291.
- [8] Dearden, P., Bennett, M. and Johnston, J., 2005. Trends in Global Protected Area Governance, 1992-2002. *Environmental Management* Vol 36: 89-100.
- [9] Folke, C.; Hahn, T.; Olsson, P. and Norberg, J., 2005. Adaptive Governance of Social- Ecological Systems *Annual Review of Environment and Resources* 30, 441-473.
- [10] Graham, J, Amos, B and Plumpton, T., 2003. Governance Principles for Protected Areas in the 21st. Century. Fifth World Parks Congress, South Africa in September 2003.
- [11] Gregory, R., Keeney, R.L., 1994. Creating Policy alternatives using stakeholders value. *Management Science* 40:1035-1048
- [12] Griffith, R, Davidson, J and Lockwood, M., 2009. NRM Governance for change: Revisiting good governance through an adaptive lens. *Land and Water Australia*, April 2009.
- [13] Hayes T., 2006. Parks, People, and Forest Protection: An Institutional Assessment of the Effectiveness of Protected Areas. *World Development* 34, 2064-2075.
- [14] Hardin, G., 1968. The tragedy of the commons. *Science* 162, 1243-1248.
- [15] Howlett, M., and Rayner, J., 2006. Convergence and divergence in new governance arrangements: evidence from European integrated natural resource strategies. *Journal of Public Policy* 26 (2), 167-189.
- [16] IUCN, 2010. Enhancing the contribution of Protected Areas to Biodiversity Conservation. The role of the CBD Programme of Work on Protected Areas (POWPA) Tenth Meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP10), 18-29 October, 2010, Nagoya, Japan.
- [17] IUCN and UNEP-WCMC, 2011. The World Database on Protected Areas (WDPA): January 2011. Cambridge, UK: UNEP-WCMC.
- [18] Kijazi, M.H., Kant, S. 2011. Social acceptability of alternative forest regimes in Mount Kilimanjaro, Tanzania, using stakeholder attitudes as metrics of uncertainty. 2011. *Forest Policy and Economics* 13: 242-257
- [19] Kothari, A., 2008. Parks 17: Protected areas and people: the future of the past. N° 2 Durban +5.
- [20] Lockwood, M., 2010. Good governance for terrestrial protected areas: A framework,
- [21] principles and performance outcomes. *Journal of environmental management* 91: 754-766.

-
- [22] López Ornat, A., Pons, A. and Noguera, M. 2007. Utilización de las categorías de gestión de áreas protegidas de UICN en la región mediterránea. Consejería de Medio Ambiente de la Junta de Andalucía, Sevilla, España y UICN, Gland, Suiza y Málaga, España. 211 pp.
- [23] Mendoza, G.A., Martins, H., 2006. Multi-criteria decision analysis in natural resource management: A critical review of methods and new modelling paradigms. *Forest Ecology and Management* 230 : 1–22
- [24] Nordstrom, E., Eriksson, L.O., Ohman, K., 2010. Integrating multiple criteria decision analysis in participatory forest planning: Experience from a case study in northern Sweden. *Forest Policy and Economics* 12: 562-574
- [25] Ostrom, E.; Burguer, J.; Field, C.B.; Norgaard, R.B. and Policansky, D., 1999. Revisiting the commons: Local Lessons, Global Changes. *Science* 284, 278-282.
- [26] Ostrom, E., 2000. Collective Action and the Evolution of Social Norms. *Journal of Economic Perspectives* 4, 137-158.
- [27] Ostrom, E., 2009. A general Framework for Analyzing Sustainability of Social-Ecological Systems. *Science* 325, 419-422.
- [28] Ostrom, E., 2010. Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change* 20, 550-557.
- [29] Smith, R. J., Muir, R.D.J., Walpole, M.J., Balmford, A. and Leader-Williams, N., 2003. Governance and the loss of biodiversity. *Nature* 426, 67–70.
- [30] Schmoldt, D.L., Peterson, D.L., 2000. Analytical group decision making in natural resources: methodology and application. *Forest Science* 46: 62-75
- [31] Stoll-Kleemann, S. 2010. Evaluation of management effectiveness in protected areas: Methodologies and results. *Basic and Applied Ecology* 11: 377-382
- [32] UNDP, 1997. Governance for sustainable human development. A UNDP policy document.
- [33] Volla, B. and Ostrom, E., 2010. Cooperation and the Commons. *Science* 330, 923-924

