TOURISM'S IMPACT MITIGATION AND FINANCING ENHANCEMENT IN PROTECTED AREAS THROUGH ECONOMIC MEASURES. THE CASE OF MADRID AUTONOMOUS REGION

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I. INTRODUCTION

As environmental degradation raises, there is a growing tendency towards the use and enjoyment of the last remnants of nature, in particular of those less humanised areas, such as protected areas (Prada et al., 2005).

As a result, public use has become a serious problem for many Spanish protected areas (PAs). It also compromises PAs` efficacy as biodiversity guardians they are compelled to by legislation (Roig, 2003). In many of these areas, mainly in the smaller ones, tourism overcrowding may be determinant on certain dates, such as holidays or weekends (Roig, 2003; Rodríguez, 2008).

This study covers the territory of the Autonomous Region of Madrid. This small Region of only 8.021,80 km² constitutes an excellent physical framework for the practical study of the concept «sustainable development». It is the most densely populated Region in Spain (757 inhabitants/km²). It has one of the highest densities of infrastructures of the country and a thriving economy, often opposed to habitats and species' conservation objectives (Rodríguez, 2008). It also enjoys one of the highest income levels of Spain, with (28.064 €/inh.).

As of August 2008, there exist 10 PAs declared in the Region of Madrid. They occupy some 110,000 ha., which represents nearly 14% of the Region's surface.

II. TOURISM AND PAS. A NECESSARY, HOWEVER DANGEROUS RELATIONSHIP

In Spain, public use is allowed for all PAs' categories. In principle, tourism is an activity compatible with the conservation of natural resources. It is economically beneficial to PAs` residents and to the development of the regions, often depressed, where PAs are declared (Pérez, 1999; VVAA, 2004; Sunyer et al., 2006; Pascual, 2007). In this sense, public administrations

very often use PAs as regional development motors (Hernández, 1997), thus promoting tourism in them, even if it is frequently neither planned nor regulated (Mulero, 2002).

The unprecedented raise of public use in Spanish PAs (De Andrés y Blanco, 2006) is causing, however, serious and conspicuous problems to these areas, jeopardising the values they protect (Neil et al., 1999; Mulero, 2002). It causes deterioration of the most exposed zones through mere walking, trampling, noises, rubbish dumping, etc. (De Andrés y Blanco, 2006). If public use is massive, negative impacts boost and interfere also with the quality of the visit experienced by other visitors (Pérez, 1999; Roig, 2003).

PAs` main aim is to safeguard biodiversity and associated cultural resources (UICN, 1994). That is why tourist, recreational or educational use of PAs, though important assets of their designation, are secondary and should be subordinated to the conservation of their natural values (Neil et al., 1999; Múgica y Gómez-Limón, 2002; Mulero, 2002; Pascual, 2007).

As a result, even though *development* and *multiple use* are desirable concepts attached to that of PAs, they should be planned and implemented, if possible, with maximum precaution and guarantee of respect to the resources PAs harbour (Pascual, 2007).

III. METHODOLOGY

In order to know the degree of knowledge, use and appreciation of the PAs of the Region of Madrid by the population directly affected by their designation, 30 phone surveys per each PA were made to residents in municipalities where all or a substantial part of their territories were inside PAs. When the PA was big and comprised numerous municipalities, only the three of them which occupied the bigger surface of the PA were chosen. Inside these, the number of surveys was proportional to their population.

To establish sample size (n), the following factors were considered:

— The population of the Region of Madrid was, in 2007, around 6,000,000 people. That is why the infinite or highly numerous populations` formula was used.
— A confidence level of 95, 5% —2 σ— was set up.
— The estimation error (E) was established at 5, 77%.
— *p* and *q* values were established at 50/50%.

The following formula was applied (Sierra Bravo, 1991):

$$n = \frac{4 \times p \times q}{E^2}$$

were n = 300.

A total of 300 phone surveys was made in 18 municipalities.

The sample was chosen randomly, systematically and stratifyly using the phone guide. The surveys were made during weekdays` evenings between October 2006 and July 2007 to over-18 year old residents.

Absolute frequencies were analysed for the 5 targeted variables:

- Degree of knowledge of the PA.
- Performance of a regular activity in the PA.
- Opinion about public financing of the PA.
- Willingness to pay more taxes to preserve the PA.
- Opinion on the establishment of an entrance fee to the PA.

The residents who did not know the PA closed to where they lived (variable 1) were not surveyed on variables 2-5. Therefore, frequencies for variables 2-5 refer to the number of residents knowing the PA, not to all people surveyed.

To determine variables 4 & 5, the contingent valuation method was used in a dichotomist way (yes/no), so not the amount residents would be ready to pay was analysed but their willingness to pay for conservation.

Additionally, relative frequencies were analysed for each of the 5 variables depending on sex —M/F— and age group -18-39 years old, 40-60 and over 60 years old-.

IV. ECONOMIC-TYPE MEASURES FOR PUBLIC USE IMPACT MITIGATION AND ENHANCED FINANCING IN PAS

There are, in general, four types of measures to mitigate public use impact in protected areas. They are shown synthetically on the table below:

Measures	*Normative*	*Economic*	*Educative*	*Active management*	
Variables		Hard (entrance fees)		Direct (surveillance, quotas, authorizations)	Indirect (signaling, interpretation)
Efficiency	Intermediate	Intermediate	Intermediate	Low	High
Efficacy	High	Immediate	Low	Immediate	Immediate
User`s perception	Intermediate	Bad	Good	Bad	Good
Application	Difficult	Difficult	Easy	Difficult	Easy

Even though only economic-type measures are treated in this study, other more easily implemented and better perceived measures should be given short-term priority, emphasizing normative and, most of all, educational and active management-type sort of measures to control public use related problems in Spanish PAs. Nevertheless, their unpopularity should not impede their experimental implementation in PAs where the implementation of other type of public use mitigation measures has not been successful.

«Hard» economic-type measures such as entrance fees are badly perceived and accepted in general. «Softer» measures, such as donations or the selling of products or services are better perceived by the Spanish population, used to enjoy PAs with no direct cost. Both

measures, however, contribute to the market internalization of the PAs` inherent values. These measures —«hard» ones— act as a filter, reducing both the quantity and selecting the quality of visitors. They also enhance PAs` appreciation and diminish problems associated with the indiscriminate usage of common resources.

Additionally, both economic-type measures could mean an extra income for PAs and be used, then, to enhance their financing, currently deficient and entirely on the public budget (Mulero, 2002). That would imply that all —or at least some— of the privately-collected income is invested in the own PA.

V. CONCLUSIONS

The degree of knowledge of the PAs of the Region is moderate -68%-. There are, however, big differences among PAs, ranging from 100% of the Hayedo de Montejo to 10% of the Soto del Henares.

56% of residents knowing PAs execute a regular activity in their adjacent PA. The most «used» PAs would be the Soto del Henares —100%— —the scarcity of replies makes this data uncertain— and the Pinar de Abantos y Zona de la Herrería —88%—. The least used PA would be el Regajal-Mar de Ontígola —0%—.

Most residents in or near PAs of the Region of Madrid appreciate considerably their PAs:
— 96% agrees on the public financing of PAs.
— 66% agrees on paying higher taxes to preserve the Region's PAs.
— 38% agrees on the establishment of an entrance fee to the Region's PAs, without mentioning its financing enhancement possibility and the plausible tax reduction derived from the pay-for-use. There exists, however, an inverse relationship for most PAs between performed activity in the PA and the establishment of an entrance fee to it.

By sex, four out of five men —80%— living in or around a PA know their adjacent PAs by slightly over three out of five —62%— women. Of these, 64% are against the establishment of an entrance fee to the PAs, while the percentages of men are almost equal —49% for and 51% against it—.

By age group, activities performed in PAs diminishes with age —68%, for 18-39 year old; 47%, for 40-60 year old; and 36%, for >60 year old). Youngsters are the most enthusiastic regarding public financing of PAs —99% in favour— and the most willing to increase their tax contribution for conservation —74%, for it, which doubles the figure of the aged group, 37%—. With regard to entrance fees, there are not notable differences among age groups —42%, 37% and 40% in favour, respectively—.

Negative results towards the implementation of an entrance fee to PAs —62% against it— currently limits the implementation of public use mitigation economic-type measures on the PAs of the Region. That is why other types of measures, mainly educational and active management ones, should be explored and implemented in the short term to solve the serious public use problems in some PAs of the Region. We believe that mixed public use regulation measures adapted to the specific needs of each PA would best help to solve the problem.

It is necessary to further analyse the role that economic-type measures such as those presented in this paper could play in the regulation of public use in PAs, as well as in the enhancement of their financing and of their appreciation both by residents and by visitors.