



Social participation into regional forest planning attending to multifunctional objectives



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ARTICLE INFO

Article history:

Received 7 November 2014
Received in revised form 22 May 2015
Accepted 23 May 2015
Available online 6 June 2015

Keywords:

Forest multi-functionality
Multi-criteria decision-making techniques
Analytic Hierarchy Process
Stakeholders
Castilla y León (Spain)

ABSTRACT

The main aim of this paper is to determine the adequate forest strategy to fulfil the multi-functional objectives that society demands. To this end, the Analytic Hierarchy Process (AHP) has been applied as a quantitative technique to prioritise various forestry planning measures in the Autonomous Region of Castilla y León, based on the opinion of a group of stakeholders representing the region's forestry sector. The need to promote this forest multi-functionality is a matter of priority for forest policies at international, national and regional levels. The final results indicate that society prefers clearly multi-functional forests, judging from the highly balanced weightings given to social, environmental and economic objectives and action measures.

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1. Introduction

Society's vision of forestry was traditionally that of remote, inhospitable environments, only useful in terms of the exploitable products (fuelwood, raw materials for manufacturing wooden goods, fruits, fodder, game for private family consumption, etc.) (Farcy and Devillez, 2005; Kindstrand et al., 2008). However, changes in the demands of society towards other types of goods and services that forests provide, together with awareness towards environmental protection, led to the recognition of other forest functions. Dieterich (1953) was the first author to distinguish three groups of functions performed by the forest sector: utility, protection and recreation. Since then, literature on forest multi-functionality has been extensive (Kennedy and Koch, 1991; Führer, 2000; Cesaro et al., 2008) and this set of functions is taken into account when creating the different forestry strategies at national and international levels (Buttoud, 2002; Cabbage et al., 2007).

In this way, the concept of forest multifunctionality is understood as the group of functions associated with forests, regardless of whether the goods and services offered are traded in a market. Thus, forest multifunctionality is defined as the capacity to generate a wide range of goods and services of various kinds through joint production processes, whether goods and services susceptible to being traded in markets or others for which there is no market and are considered public goods, like a large proportion of the environmental and social externalities provided by forests (Schmithüsen, 2007; Cantiani et al., 2010). This concept of multifunctionality is also based on the concept of market failure,

insofar as the absence of remuneration received by producers for the generation of public goods and services can lead to less production than what is socially desirable, thereby generating allocative inefficiency (OECD, 2003; Gómez-Limón et al., 2012).

In Europe, the 1998 EU Forestry Strategy emphasized the importance of the multifunctional role of forests and a sustainable forest management for the development of society. This Strategy is based on the UN Conference on Environment and Development held in Rio de Janeiro in 1992, that gave forests an increasingly important role in the context of sustainable development and environmental conservation, recognizing the concept of sustainable forest management as a fundamental guiding principle by all participating countries. The new EU Forest Strategy adopted in 2013 comes to ensure a sustainable forest management, using forests in maintaining their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, without causing damage to other ecosystems.

In Spain, society's conception of forests as mere producers has progressively changed towards the appreciation of other types of functions, mainly related to the need for conservation and protection. In this regard, the first milestone was marked by the first Law on natural spaces, which was passed in 1916 (Natural Parks Law of December 8, 1916). For its part, the Forestry Law passed in 1957 attached a new and special importance to the indirect services provided to society as a whole, underlining the concept of general interest arising from the existence of forestry on reinforcing the concept of public use (Forestry Law of June 8, 1957). Nowadays, marketed and non-marketed functions carried out by forests are taken into the current Spanish Forestry Law (Law 43/2003) that underlines, in its Explanatory Memorandum, the

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contribution of forests to sustainable land development from both socio-economic and environmental perspectives. This Law includes among its priority objectives the need to achieve a balanced fulfilment of forest multi-functionality in terms of its environmental, economic and social values. Legislation also alludes to the need to promote and leverage this multi-functional nature in order to achieve sustainable land development. In this regard, and given the 'public good' character of forests, the resources they generate and their social and ecological values, the pressing need for the population itself to participate in the planning, development and evaluation of forestry strategies is clearly apparent. From this viewpoint, Directive 2003/35/EC of the European Parliament and of the Council establishes explicit measures for civic participation in environmental plans and programmes and determines that the said civic participation must be fostered, as society is entitled to make observations and express its opinions before the corresponding strategies are developed and that the final decisions are made taking the said opinions into account.

Due to the foregoing, the implementation of forest management models that integrate the society's forest-related demands, in addition to those of a merely productive nature, is required (Romero, 1994; Díaz Balteiro and Romero, 2004). Likewise, a social intervention model is required to gather, integrate and take into account the society's perspectives in relation to forest planning (Buchy and Hoverman, 2000; Fernández-Manso et al., 2009; Carvalho-Ribeiro et al., 2010).

In literature regarding this, there are a good number of works that try to quantify the demand of the population towards some of the functions of forests. For example, for the Spanish case the work of Bernabéu and Samos (2014) can be mentioned, which estimate the value that the public give to the recreational use of a natural park, or the work of Otrachshenkoy (2014) which determines the passive use of the Mediterranean forest. Other studies focus on analysing public demand towards the many attributes that characterise a forest, as in the case of Riera et al. (2013), Barrio and Loureiro (2010) or Bengochea et al. (2007).

In this context, the main objective of this paper is to determine the main lines of intervention of the forestry strategy of the Autonomous Region of Castilla y León, in accordance with the demands of the sector players involved. In order to achieve the aforementioned objective, a quantitative multi-criteria decision-making methodology will be used, the Analytic Hierarchy Process (AHP), a very useful technique for weighting comprehensive data sets. Likewise, the aim is to evaluate the multi-functionality of the forests of Castilla y León from an economic, environmental and social perspective based on the results achieved.

The choice of Castilla y León as a case study was not a random one, but was rather justified by the non-existence of a Regulation implemented by the Forestry Law recently passed in the region (Law 3/2009 of 6 April). For this reason, this study aims to provide legislators with technical information based on a methodology that allows weighting of different strategic alternatives in accordance with the opinions expressed by stakeholders associated with the forestry activity in the region.

It must be noted that, although the results obtained cannot be extrapolated to other geographical areas, the multi-criteria methodology for social participation (AHP) can be. Further, it is considered an innovative project, to the extent that very few initiatives at national level have used this methodology to design the possible forestry strategy to be implemented in a certain geographical area. Finally, it is estimated that this study can constitute an additional contribution to the study of forestry policies and the development of action strategies in this sector.

2. Material and methods

2.1. Study area

Castilla y León is located in the northwest of Spain and, occupying nearly 9.5 million ha, is the most extensive autonomous region in the

country and also has the greatest surface area of forest in absolute terms. Thus, according to data taken from the Third Forest Inventory (FI3) of 2002, forest land in the region occupies 51% of the total surface area (compared to the 54% of the national average), although forest surface area only occupies 31% of the region, representing 15% of Spain's forest land (Junta de Castilla León, 2005).

2.2. Research framework

There are several methods available to determine the relative importance or weight that a decision centre gives each criterion when taking into account of the decision-making. These methodologies include systems for allocating points, the Analytical Hierarchy Process, the estimation of trade-offs, the SMART method, the swing weighting or regression models (Weber and Borcherdig, 1993). Several authors have attempted to assess which of these methods provides the best results. However, as noted by Pöyhönen and Hämäläinen (2001), no significant differences in these comparative studies have been revealed, so they recommend that the researchers themselves should choose the method to be used depending on the particular characteristics of the empirical study to be implemented. In this regard, a weighting method has been chosen for this research that fits properly to the hierarchical structure of objectives and alternatives to be included in the forest strategy for the territory being studied. Moreover, that is applicable in a realistic manner to a panel of experts from disparate origin and training. Both circumstances justify that the AHP method has been finally chosen, also in this way following the recommendations by Hall et al. (2004).

2.3. Analytic Hierarchy Process (AHP)

AHP is a quantitative methodology designed to make decisions within a multi-criteria context (Saaty, 1980). Several environmental and forestry initiatives have used this technique to prioritise action measures within forestry planning of a certain geographical area, highlighting those applied to forestry sector in Finland: Varis (1989), Pukkala and Kangas (1993), Kangas (1994), Alho and Kangas (1997), Kurttila et al. (2000) and Silvenninen et al. (2001). This same methodology has also been used in countries such as Australia (Ananda and Herath, 2003; Herath, 2004) or the United States (Rauscher et al., 2000; Mau-Crimmins et al., 2005). In Spain, worthy of note are the papers by Cardells (1995) and Reyna and Cardells (1999), which use AHP methodology for strategic forestry planning in the Autonomous Region of Valencia and for assessing the multi-functional uses of forests, respectively. Díaz Balteiro and Romero (1998) apply AHP to a group of experts to include their preferences in a logging modelling process in a multi-criteria context. All of these papers highlight the capacity of this technique to weight complex alternatives, in many cases conflicting and immeasurable. Additionally, significant results can be obtained with just a sample of individuals or groups of individuals who are experts in the object of study (Ananda and Herath, 2003; Dwivedi and Alavalapati, 2009), compared to other statistical techniques that require large samples to obtain relevant results.

In order to implement this technique, several phases must be undertaken (Saaty, 2001) which, in the case of this paper, can be summarised as follows: a) identification and definition of the problem; b) identification of objectives and action measures; c) hierarchical structure of the decision-making model; d) identification of the players or stakeholders that intervene in the decision-making process; and e) evaluation of alternative models by means of pairwise comparison to obtain the corresponding weightings.

In this manner, and following the planned order, the problem being analysed is defined as the need to develop a forestry strategy to be implemented under the recent Forestry Law of Castilla y León and that will take into account various purposes. Objectives and action measures were subsequently proposed to find a solution to the problem under study. Thus, a total of eight objectives were proposed after summarising

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