

# : An approach for integrating stakeholders' participation in forest management planning in Slovakia

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## ■ ABSTRACT

Forest management planning had been rather a technical task to match capacity with goals and a political one to give experts the responsibility of developing the plan. Recently, there have been calls for alternatives involving stakeholders (including the public) in the planning process, thereby creating an iterative decision-making framework for integrated forest management planning. Notably, the protected or urban forests are targeted for such claims. As forests play an essential role in achieving biodiversity protection, public participation may help to improve and mitigate environmental, economic, or social inequalities in the future. Against this background, the paper aims to develop an approach to stakeholders' participation in forest management planning in Slovakia. The goal is to integrate the concept of participation with the multiple-criteria decision analysis in forest management planning.

## ■ KEYWORDS

**Forest management planning, stakeholders' participation, protected areas, Slovakia**

## ■ 1 INTRODUCTION

Forest management planning and the forest management plan (FMP) have long traditions in Slovakia (Table 1). The planning process nowadays consists of four stages: complex forest survey, strategic planning, detailed forest survey, and tactical planning (Decree on Forest Management and Forest Protection No. 453/2006 Coll.). Although revolutionary political and economic changes occurred after 1989, forest management planning remained relatively unchanged (e.g., Schwartz et al., 2009). The paradigms had been, however, challenged by demands for forest management from newly

established forest owners and various stakeholders (Kovalčík et al., 2012; Sarvašová et al., 2014a; Sarvašová et al., 2014b; Sedmák et al., 2019). Their preferences were not considered in forest management planning (Table 1). In recent decades, however, the non-technically oriented concepts (e.g., the idea of public participation) have been promoted in technically oriented planning procedures. For instance, the EU accession in 2004 and new forest legislation (Forest Act No. 326/2005 Coll.) brought the principles of sustainability adopted at the EU level in the national forestry policies, including the idea of participation in forest management planning (Sarvašová et al., 2013). As a result, forest management planning involves obligatory stakeholders (e.g., governmental agencies, forest owners) and concerned parties (e.g., owners of electrical and other lines, environmental NGOs). The concerned parties can enter the planning process if they claim that their rights may be affected by the FMP. In contrast, public participation is based on Administrative Procedure Act No. 71/1957 Coll. The relevant district office had to approve claims to join the planning. As a result, public participation is relatively absent.

Moreover, protected areas in Slovakia need an additional management plan for protected areas (Nature and Landscape Protection Act No. 543/2002 Coll.). Firstly, the Ministry of the Nature Protection of the SR mandates a qualified person (e.g., a governmental nature protection agency) to propose a management plan for the protected area. Secondly, the district offices in the regional headquarters carry out the official discussion of comments on the proposal. Public participation is somewhat restricted (e.g., min. 500 public signatures). Finally, the final version is approved by the government of the SR.

**Table 1. Historical overview of forest legislation and stakeholders' participation in forest management planning**

Year	Major forest legislation developments related to forest management planning	Public participation	Major political developments
<b>Prior 1426</b>	No regulations (no management, unregulated exploitation of forests)	No	Feudalism - Kingdom of Hungary
<b>1426- 1565</b>	Regulation of king Sigismund (sustainability of harvests, introduction of cutting regulations)	No	Feudalism - Kingdom of Hungary
<b>1565- 1769</b>	Regulations of king Maximilian II. (sustainability of even-flow harvests, introduction of cutting regulations)	No	Feudalism - Austrian, since 1867 Austro-Hungarian monarchy
<b>1769- 1879</b>	Regulations of empress Maria-Theresia (establishment of organized forestry, i.e. forest inventories, time and spatial regulations of harvests, promotion of natural regeneration of stands, development of planned even-aged forestry, introduction of first FMP)	No	Feudalism - Austrian, since 1867 Austro-Hungarian monarchy

<b>1879-1960</b>	Act No. 31/1879 on Forests (sustainability - maximization of volume/late value and even-flow harvests, time and spatial regulations of harvests, introduction of forest tending and silviculture, preference of clear-cuts with gradual increase of using shelterwood and selection system, intensive even-aged forestry)	No	Capitalism/Socialism - Austro-Hungarian empire, since 1918 Czechoslovak Republic, since 1939 Slovak Republic, since 1948 Czechoslovak socialistic Republic
<b>1960-1977</b>	Act No. 166/1960 on Forests and Forest Management (sustainability - promotion of forest production and other functions, shelterwood and selection silviculture system linked to natural regeneration of stands, clear-cutting prohibited, introduction of forest classification and area zonation not based on phytocoenological classification, multifunctional principles, close-to-nature forestry)	No	Socialism - Czechoslovak socialistic Republic
<b>1977-2005</b>	Act No. 61/1977 on Forests, Act No. 100/1977 on Forest Management and State Administration of Forestry (sustainability - promotion of balanced multifunctional forestry, forest classification and area zonation on phytocoenological classification, large-scale less close-to-nature forestry, intensive even-aged forestry - promotion of small-area clear-cutting systems linked to artificial regeneration, shelterwood and selection silviculture system allowed but not supported)	No	Socialism/Capitalism - Czechoslovak socialistic Republic, since 1990 Czechoslovak federal Republic, since 1993 Slovak Republic
<b>Since 2005</b>	Act No. 326/2005 on Forests (sustainability - promotion of shelterwood systems with natural regeneration, small-area clear-cutting allowed but not supported, forest classification and area zonation based on phytocoenological classification, later promotion of close-to-nature forestry)	Restricted	Capitalism - Slovak Republic

As a result, the strong emphasis on expertise in forest management planning, especially in protected and urban areas, could miss many interests at stake (e.g., Folke et al., 2005; Bodin and Crona, 2009). The alternatives involving public stakeholders in planning have been observed in the scientific literature (e.g., Weiss et al., 2002; Martins and Borges, 2007; Baskent et al., 2008; Nordström et al., 2010; Stojanovska et al., 2013; Nikinmaa et al., 2023). Their search for answers to the question, is forest management simply a technical task to match capacity with goals or a political one that gives the administration a range of responsibilities of applicable laws, and how they are fulfilled depends on experts? Or there is an alternative, such as involving public stakeholders in the planning and creating an iterative decision-making framework for integrated forest management planning. This approach does not rely on formal means of management and control, centralized around authority, but on informal standards of governance and discretion (Weiss et al., 2002). Public participation is not just about holding a public meeting to review a proposed plan or talking to people to see what they want and incorporating those preferences or concerns into the planning process. It is a participatory process involving ecological, financial, organizational, and political aspects. The result would be a new approach to planning in forestry, combining the conventional fact and expert-based

decision-making process with decision-making processes based on the preferences of the public stakeholders involved. A few examples exist where the public stakeholders are already included in the planning process within a clear formal framework (Weiss et al., 2002). In this context, it is necessary to ask how to (formally) ensure the stakeholders' representativeness (incl. responsibility) in forest management planning. The aim of the paper is thus to develop an approach to stakeholders' participation in forest management planning. We use a case study from Slovakia to illustrate the development of an approach for integrating stakeholders' participation with multiple criteria analysis in forest management planning. For that purpose, we start characterizing stakeholder participation and stakeholder analysis. This approach aims to innovate and provide an alternative to Slovakia's forest management planning.

## ■ 2 CONCEPTUAL BACKGROUND

### 2.1 Stakeholders' participation characteristics

Stakeholders are any group of people, organized or not, who share a common stake in a particular problem or system (Grimble and Wellard 1997). Stakeholder participation could be generally characterized as sharing an understanding and involvement in decision-making, e.g., forest management planning. The first classification of the public's influence in the participatory process was elaborated by Arnstein (1969). Arnstein's (1969) "ladder of participation" described a continuum of increasing stakeholder involvement, from passive dissemination of information (which she called "manipulation") to active engagement ("citizen control"). Currently, in the literature, there are many different classification systems of participation level (Pimbert and Pretty, 1997; Chess, 2000; Jones et al., 2000; Tabbush, 2004). The participation level commonly distinguishes between unilateral, bilateral, and multilateral forms of participation and is based on the deep involvement of each stakeholder group (Herwig, 2008): i. Information: the level of participation which provides the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities, and solutions (e.g., fact sheets, websites); ii. Consultation: the level of participation which obtains public feedback on analysis, alternatives and decisions (e.g., focus groups, surveys, public meetings); iii. Collaboration: the level of participation which engages the knowledge and resources of stakeholders (i.e., site-based events); iv. Co-decision: the level of participation which shares power and responsibility for the decisions being made and their outcomes creating management groups.

### 2.2 Stakeholders' analysis

The stakeholders' analysis could be characterized as a holistic approach or procedure for understanding a system and assessing the impact of changes by identifying the key stakeholders and evaluating their interests in the system (Grimble and Wellard, 1997: 175). The outcome of the analysis is knowledge of stakeholders in forest management planning, e.g., their involvement, interests, and conflicts (e.g., Hermans and Thissen, 2009; Marttunen et al., 2017). Popular in many fields, including natural resources management (Bryson, 2004; Prell et al., 2009; Reed et al., 2009), the analysis is often applied ad hoc.

To systematically perform, the stakeholders' analysis ought to be a process that defines the phenomena affected by the decision-making, identifies stakeholders who are affected or could be affected by the decision-making concerning the phenomena, and prioritizes identified stakeholders in participation in decision-making (Reed et al., 2009).

### 2.2.1 Methods used in stakeholders' analysis

Normative versus instrumental approaches to stakeholder analysis have emerged in the scientific literature (Hwang and Lin, 1987; Coughlan and Armor, 1992; Reed et al., 2009). Within the normative approach, participation means the democratic right to participate in environmental decision-making (Reed, 2008). On the contrary, it is possible to identify, explain and manage the stakeholders involved to achieve the desired result through instrumental approaches. The participation of interested stakeholders could accomplish the goal with better quality decisions. Whether it is a normative vs instrumental approach, Reed et al. (2009) identified various methods suitable for their application in the field of management of natural resources: stakeholders' identification - methods focusing on the individual (in-person interviews, Delphi method) or the interaction between actors (brainstorming, group interview/workshop); stakeholders' categorization - methods focusing on analytical vs reconstructive categorization; stakeholders' analysis - methods such as actor connection matrix, Social Network Analysis (SNA), and knowledge mapping.

### 2.2.2 Methods for multi-criteria decision making

If a new approach to forest management planning in forestry had to be applied (e.g., combining the conventional process with the stakeholders' preferences), a wide range of often conflicting management goals must be considered. It means that either the desired level of goal achievement or different goal preferences must be specified (e.g., Mendoza and Martins, 2006; Kangas et al., 2010; Nordström et al., 2010). Several discrete approaches could be identified in the scientific literature aimed at solving decision-making regarding several problems. These include various approaches for multicriteria decision-making, such as Analytic Hierarchy Process (AHP), simple multi-attribute evaluation technique (SMART), outranking methods, voting theory or stochastic multicriteria acceptability analysis (SMAA) (Martins and Borges, 2007; Ortiz-Urbina et al., 2019; Nilsson et al., 2016). The advantage of new decision-making approaches is the provision of additional knowledge and a way to achieve a compromise between management goals and the stakeholders' preferences (Baskent et al., 2008; 2020). Involving experts and public stakeholders in forest management planning would facilitate the development of socially acceptable plans with specific management goals. On the other hand, when promoting a new approach to forest management planning, one should not forget the sharing of rights and (financial) responsibilities between stakeholders (Baskent et al., 2008; 2020; Estévez et al., 2013; Bruña-García and Marey-Pérez, 2014). That means that participatory decision-making is financially and time-consuming.

### ■ 3 INTEGRATING STAKEHOLDERS IN FOREST MANAGEMENT PLANNING

Integrating participation and multi-criteria optimization in forest management planning is familiar in the scientific literature. What is relatively new is its utilization of such an approach in planning (Diaz-Balteiro and Romero, 2008). Although focusing on the numerical properties of multi-criteria decision analysis in the evaluation of participation, the approach's stress should also be placed on the quality of the participatory process. For this reason, we propose a two-phase approach to stakeholder participation. Firstly, based on the stakeholders' analysis, an exploratory in-depth interview with public stakeholders and analysis with Social Network Analysis (SNA) could assess the key stakeholders, their extent of participation and their preferences concerning forest management goals. The stakeholder analysis is important, especially at the beginning of the participatory process (Nordström et al., 2010). Thus, not to leave important stakeholders behind, deliberate selection and the "snowball method" will be applied to the identification of stakeholder panels (e.g., Reed et al., 2009). Data collection itself will take place through in-person interviews (Lamnek, 2010; Hendl, 2016). The goal of in-person interviews is the identification of key stakeholders in the forest management planning process and their forest management goal preferences. Data will be analyzed via SNA assuming that relationships between interactive stakeholders are meaningful (Wasserman and Faust, 1994; Lienert et al., 2013; Bodin and Crona, 2009). The core of the analysis is a systematic and quantitative analysis of stakeholder relations (Lienert et al., 2013; Paletto et al., 2016). That is, the structural importance of the stakeholder will be assessed through the degree of centrality, which considers the links that the stakeholder shares with other stakeholders. The more centrally located the stakeholder – key stakeholder, the better it is integrated into the network and can influence the planning process. Secondly, the stakeholders' preferences for management goals will be numerically evaluated based on multi-criteria optimization, particularly on the Analytical hierarchical framework (AHP). AHP is a measurement theory through pairwise comparisons and depends on the judgment of actors to assign priorities on a scale (Saaty, 1980). It is a methodology tool for modelling problems concerning assessing preferences for multiple criteria (Alho et al., 2020; Franca et al., 2020). A critical step in using AHP for preference structure modelling is the calculation and consistency ratio (e.g., Kangas, 1992; 1999). A consistency ratio  $\leq 0.01$  indicates a reasonable level of consistency between comparison pairs. Otherwise, it suggests an inconsistency and the original value in the pairwise comparison matrix should be reevaluated and revised. In-person meetings are recommended to avoid any misinterpretation of the alternatives (Nordström et al., 2010).

### ■ 4 CONCLUSION

In the last decades, forest management planning in Slovakia has been challenged by various factors, ranging from climate change to increasing societal demands towards forests. Notably, the protected or urban forests are targeted for such claims. For instance, claims have been made for more biodiversity or recreation services. To deal with all these challenges simultaneously, developing new alternatives for handling

complex and often competing interests in forest planning situations is necessary. A promising approach has been proposed integrating participation with multi-criteria analysis in forest management planning. Applying multi-criteria analysis could ensure and mathematically elicit the preferences of various stakeholders concerning their desired management goals. It could support transparent, participatory forest planning, thus mitigating interest conflicts. However, practical, and financial guidelines for conducting and assessing the proposed approach could be removed after conducting the case study in Slovakia. The functional outcome considering specific areas could provide an alternative, efficient, realistic plan to current forest management planning.

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