Review

Rethinking Public Participation in Forest Policies: A Literature Review of Participatory Techniques

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Rethinking Public Participation in Forest Policies: A Literature Review of Participatory Techniques

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Abstract: Recently, the concept of participatory democracy developed in the early 1970s has come back into fashion to revitalize the public involvement in political decision-making processes. Public participation in forest policy has been fully conceptualized by the scientific community in the late 1990s and early 2000s, but in many contexts the practical application remains unfulfilled. The aim of this study is to identify and analyze the participatory techniques used in literature to increase knowledge and facilitate its transferability into forest policies and strategies. A literature review was carried out to offer an overview of the participatory techniques adopted in the decision-making process. At the end of literature review, 25 participatory techniques were identified based on over 2,000 publications. Afterwards, the participatory techniques were assessed using seven indicators (degree of participation, type and number of participants, time scale, cost, potential influence on policy). The results showed that the type of actors involved in the participatory technique is a key variable for the complexity and usefulness of the process, while the number of participants influences how information is disseminated. The Principal Component Analysis highlighted that the participatory techniques can be divided in three groups: the first group includes those techniques with a high degree of participation and a contextual high potential influence on policies, the second one includes techniques with a costs in terms of resources, while the third one consists of those with a large number of participants and reduced time requirements.

Keywords: participatory democracy; citizen involvement; decision making; inclusiveness; degree of involvement

1. Introduction

In the early 1970s, the concept of participatory democracy spread in the western world as an alternative to representative (or elitist) democracy in order to involve citizens in the political decision-making process [1]. Participatory democracy can be defined as a form of representative democracy, wherein citizens are actively participating in decision-making processes to define the agenda-setting together with policy makers [2]. The conceptualization of the participatory democracy has identified citizens as key actors in the political process and participation as *modus operandi* [3]. However, participatory democracy has often been implemented through a top-down approach to include citizen input into policy decisions from a practical point of view [4]. This approach allows policy makers to decide the level of involvement of citizens and other stakeholders controlling the decision-making process. Alternatively, self-mobilization through social movements or citizens' committees follows a bottom-up approach closer to the ideal of participatory democracy in which power is in the hands of citizens [5]. Between these two extremes, different forms and levels of citizen involvement in political decision-making processes have emerged in the international literature from the 70s of the last century to today. Among the over 2,000 peer-review publications on this topic, only 20 have applied the concept of participatory democracy to the forest sector. The first of these published in

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1990 discusses the reasons behind participatory democracy and outlines the criteria for evaluating public participation in forest management in United States [6]. Afterwards, a proper line of research was developed on public participation in forest planning, management and policy to define the key principles to support policy makers [7-10]. In the forest sector, the first impulse to public participation in decision-making processes occurred in many National Forest Programmes (NFPs) thanks to the principles established during the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992 [11,12]. The UNCED encouraged a broad-based bottom-up approach in the management of natural resources, thus placing public participation fully on the global political agenda [13]. In this sense, the Intergovernmental Panel on Forests (IPF) taking up the UNCED principles recommended to develop NFPs through a participatory process [14]. From the late 1990s to the early 2000s, many NFPs have been developed based on key principles such as partnership and participatory mechanisms to involve interested parties; empowerment of regional and local government structures; recognition and respect for customary and traditional rights of indigenous people and local communities [15,16]. These key principles refer to those of participatory democracy applied to the forestry sector. Similarly, the Ministerial Conferences on Protection of Forests in Europe (MCPFE) asserted that "…develop the conditions for the participation of relevant stakeholders in the development of forest policies and programmes" (Lisbon Resolution L1, MCPFE 1998). Also in 1998, the first EU Forest Strategy stressed the importance of an active participation in all forest-related international processes and the need to improve co-ordination, communication and co-operation in all policy areas of relevance to the forest sector [17]. Recently, the new EU Forest Strategy for 2030 encouraged forest and forestry stakeholders to establish a skills partnership under the Pact for Skills to work together to increase the number of upskilling and reskilling opportunities in forestry [18]. The Pact for Skills is aimed to mobilize and incentivize private and public stakeholders to take concrete actions such as education and training for foresters to the challenges and needs of today's realities [19]. Since 2020, the concept of public participation in forest discourse has slowed down both due to the global situation related to the COVID-19 pandemic and to the difficulty in translating theoretical principles of participation into practice. From late 2019 to early 2020, the Coronavirus Disease 2019 (COVID-19) has spread rapidly becoming a global pandemic [20]. To counter the spread of this viral infectious disease, national governments have promulgated restrictions, requiring citizens to adopt a new lifestyle to counteract the COVID-19 outbreak. The main measures adopted by national governments were based on prohibition of mass gatherings and social distancing in public spaces, use of the mask outdoors and indoors, mobility restrictions leading citizens to stay at home, working from home to avoid crowds in traffic and workplaces [21]. Therefore, the COVID-19 pandemic has tested the resilience of democratic institutions and practices around the world as emphasized by Sorsa and Kivikoski (2023) [22]. In other words, the elitist democracy – where a small minority such as the members of the policy-planning networks holds decision-making power – has taken over participatory democracy [23]. During the pandemic citizen involvement and public participation in political life have been inevitably put aside and there has been a countertrend towards a top-down approach with little involvement of civil society. In addition, the COVID-19 pandemic has had a significant repercussion on participatory processes particularly in techniques based on in-person interaction [24]. The reduction of public participation in political decision-making processes has occurred in all areas including, as mentioned, forest discourse. Therefore, currently it is important to rethink public participation in decision-making processes to ensure that citizens are transformed from passive citizens to responsible and expert citizens [25]. As emphasized by Tikkanen (2018) [26], forest discourse is in the era of participatory downturn, therefore it is fundamental to "find new solutions" oriented towards innovations and creative thinking about the future. Starting from these considerations, the concept of public participation in the forest sector must be rethought and revitalized to keep up with the times. The aim of the present study is to identify and analyze the participatory techniques of involving citizens and stakeholders in decision-making processes used in political, social, planning and environmental sciences to evaluate their suitability for the forest-based sector. The participatory techniques and processes have been identified through a literature review and analyzed considering a set of criteria

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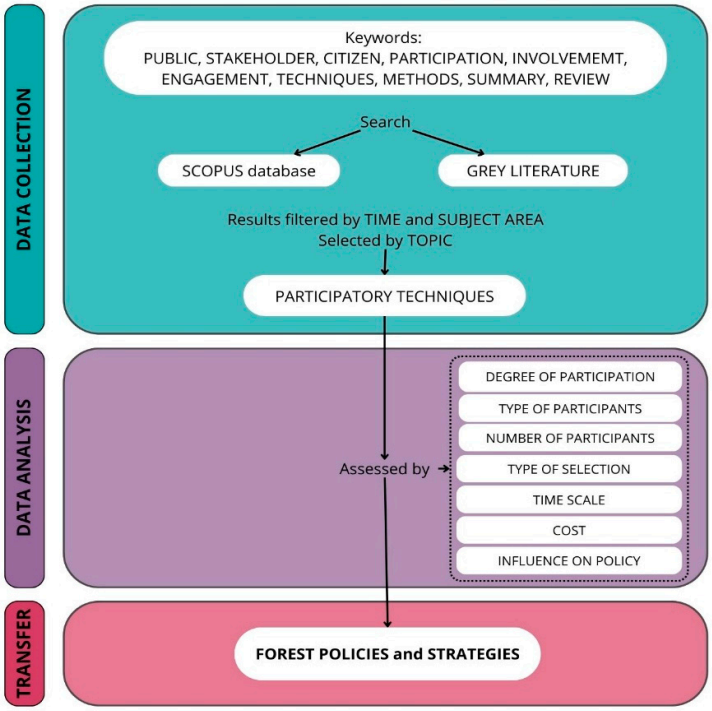
to evaluate their applicability to the forest policies and strategies. To achieve the aforementioned objective, the research questions are the following: (R1) How can the principles of participatory democracy be applied to forest policies and strategies? (R2) What are the most suitable participatory techniques to be adopted to implement forest policies and strategies at different levels (national, regional, local)?

2. Materials and Methods

The study was structured in three steps in order to identify and analyse the participatory techniques used in different disciplinary sectors and evaluate their suitability in the forest-related decision-making process. The structure of the study is described in Scheme 1.



Scheme 1. Framework of the three literature review steps.

2.1. Data Collection

A literature review was carried out to offer an overview of the participatory processes used to involve citizens and/or stakeholders in the decision-making process across different scientific fields. The review was designed following the guidelines proposed by the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) protocol [27]. First of all, the peer-reviewed publications were retrieved from Scopus database (https://www.scopus.com) on April 30th 2024 using the following search query:

("PUBLIC" OR "STAKEHOLDER*" OR "CITIZEN*") AND ("PARTICIPATION" OR "INVOLVEMENT" OR "ENGAGEMENT") AND ("TECHNIQUE*" OR "METHOD*") AND ("SUMMARY" OR "REVIEW*").

The search, conducted without setting a timeframe, returned a total of 11,791 documents. Afterwards, further filtering was applied based on timeframe (from 2000 to 2024 to consider the most recent publications) and subject area (restricted to "Environmental Science", "Business, Management and Accounting", "Multidisciplinary", and "Economics, Econometrics and Finance", to ensure relevance for the contexts being analysed). This refinement reduced the number of documents to

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2,275. In addition, documents from other sources – e.g., Ph.D. and Master thesis, manuals, guides– were included to consider also technical reports and informative publications.

2.2. Data Analysis

The participatory techniques identified through the literature review were assessed considering seven individual criteria [28–31] such as: degree of participation; type of participants; number of participants; selection of participants; time scale; cost; and potential influence on final policy. Five of the seven criteria were successively used to evaluate the participatory techniques through the Principal Component Analysis (PCA) method and the Spearman correlation test. The individual criteria used to assess the participatory techniques are described below. The PCA method is a mathematical procedure that transforms several correlated variables (e.g., participation indicators) into a number of uncorrelated variables called principal components (e.g., groups of techniques) [32]. In this study, the PCA method was applied considering the following variables: degree of participation (from 1=Inform to 5=Empower); number of participants (from 1=small group to 3=large group); time scale (includes duration and periodicity; from 1=less than 1 hour and single event to 6=more days and periodic); cost (from 1=low to 3=high); influence on policy (from 1=low to 3=high). The Spearman non-parametric correlation test was used to verify the relationship between the following four key variables of the participatory techniques: degree of participation, number of participants, cost, and potential influence on policy. All statistical tests were performed using the XLStat 2020 software.

2.3. Criteria to Assess Participatory Techniques

2.3.1. Degree of Participation

To classify participatory techniques based on the level of citizen involvement, the model developed by the [28] Arnstein (1969) has been used as subsequently simplified by the International Association for Public Participation (Figure 1). Therefore, the following five degrees of participation were considered in this study [33]:

- Informing: providing balanced and objective information about new programs or services, and about the reasons for choosing them. Providing updates during implementation.
- Consulting: inviting feedback and suggestions on alternatives, analyses, and decisions related to new programs or services; possibly making adjustments and decisions according to their feedback.
- Involving: working directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered. Letting people know how their involvement has influenced decisions.
- Collaborating: enabling community members to participate in every aspect of planning and decision making for new programs or services. It means sharing responsibilities with citizens, working together, and making decisions collaboratively.
- Empowering: delegating of decision-making and giving the full managerial power over project development and implementation to the stakeholders/public.

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Figure 1. Spectrum of Public Participation, revised by the International Association for Public Participation (https://www.iap2.org/) [33].

2.3.2. Type of Participants

This indicator refers to the nature of individuals engaged in the participatory process, differentiating between the types of participants and the staff members who enable the process to occur [34]. There are several main categories of actors that can be included in the process such as [30,31]:

- Citizens: members of the community or public directly impacted by the decisions or issues being addressed. Their involvement can range from providing input and feedback to actively co-designing solutions.
- Stakeholders: individuals or groups who have an interest, involvement, or "stake" in a particular project, organization, or issue. Stakeholders can include local businesses, advocacy groups, government agencies, and non-profit organizations [35].
- Experts: professionals or subject matter experts who contribute specialized knowledge and insights to inform decision-making [36]. Experts may provide technical guidance, analysis, or recommendations based on their expertise.
- Policy-Makers: individuals or entities responsible for making final decisions based on the inputs and recommendations gathered through the participatory process. This could include elected officials, policy makers, or project managers [37].
- Supporting Figures: individuals who oversee and guide the participatory process to ensure that it runs properly, remains inclusive, transparent and productive (e.g., facilitators help manage discussions, encourage participation, and maintain a respectful environment).

The composition of participants can vary depending on the specific context and objectives of the participatory method; engaging a diverse range of participants ensures that multiple perspectives are considered.

2.3.3. Number of Participants

This criterion refers to the number of individuals who are actively involved in the participatory process. It can impact the dynamics, effectiveness, and outcomes of the participatory approach [38]. Larger groups may require more structured facilitation to ensure everyone's voices are heard, while smaller groups may enable more intimate and in-depth conversations [31]

Processes in presence can be divided into processes for small groups (up to 25 participants), for medium-sized groups (from 25 to 100 participants), and for large groups (100 and more participants) [30]. There are also flexible types, suitable for groups of participants of different sizes ('variable'), and

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open processes, for which there is an indication of the number of participants involved but not binding [39].

2.3.4. Selection of Participants

The selection of participants can be influenced by the objectives, context, and nature of the project or initiative. The process may be more or less stringent based on the number and characteristics of participants involved. The main selection methods can be summarized as follows [29]:

- Self-Selection: processes open to all stakeholders; those who participate have decided to do so consciously and by their own choice
- Random Sampling: recruitment can achieve a broad representativeness of participants through random sampling and thus reduce the prevalence of specific interests. One approach to ensure a better representativeness is to select a random stratified sample of the affected population [31].
- Targeted Selection: this form of selection is generally open to all stakeholders; however, to achieve a higher degree of representativeness among participants, individuals or representatives from various demographic groups are specifically invited to participate based on factors such as age, gender, education, or professional criteria [40].

2.3.5. Time Scale

The duration of the method varies depending on the project's complexity, potential deadlines, and the desired level of engagement, encompassing both the number of participants and the depth of topics explored. Certain participatory activities – e.g., interviews, focus groups, workshops, or community meetings – can be completed within a short span, ranging from a few hours to several days, while others may extend over months or even years [29].

The present study offers an attempt to provide the average time required by individual participants to take part in the single technique. Due to the absence of standardized durations, this time is often represented as a range. Additionally, since participatory methods frequently involve iterative processes evolving over time, including multiple cycles of consultation and feedback, indications are given as to whether the technique is periodic or ends in a single event.

2.3.6. Cost

The processes should be cost-effective: cost is a significant concern for those organizing a participation exercise, and achieving value for money is a key motivation. For instance, a large public hearing might not be justified for a relatively minor policy decision. Prior to conducting a participation exercise, it is prudent to assess the potential costs of alternative methods in terms of time, human resources and money, and to evaluate how well they meet other criteria. Although monetary costs are objectively measurable, most discussions on participation methods in the literature do not delve deeply into costs [31]. Moreover, due to the wide range of ways each method can be implemented, establishing a precise classification of the "costliness" of procedures is challenging and typically results in only an estimate or deduction [41]; in this case the classification of costs has developed for classes such as: variable, low, moderate, potentially height. These indicators were selected based on literature, prioritizing those frequently mentioned in summary reviews and those most aligned with our objectives. In the same way, the values of the parameters/indicators were assigned to each technique mainly through the data obtained from the literature considering the information obtained for each technique.

2.3.7. Potential Influence on Final Policy

When implemented effectively, participatory methods contribute to more informed, equitable, and sustainable policy development and implementation. It is important to evidence that one major criticism of participation methods is their perceived ineffectiveness. In fact, these methods sometimes are considered as tools used primarily to justify decisions or create the appearance of consultation without genuine intent to act on recommendations [31]. The impact of participatory techniques on

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final policy outcomes relies on the quality of engagement, inclusivity of participants, and the extent to which stakeholder input is integrated into decision-making processes. The degree of influence on policy is indicative because it depends on many factors (including technology). It has been classified as low, moderate, (potentially) high [31].

2.3.8. Transfer to Forest Policies

In the last step, the diffusion of the previously identified participatory techniques in forest policies and strategies was analysed with a further literature review. The data was obtained from the Scopus database using the following queries (either by applying the processes individually or in groups): ("FOREST POLIC*" OR "FOREST STRATEG*" OR "FOREST GOVERNANC*") AND technique name.

The data collected with this further literature review allow to outline which participatory techniques have been used more and less in forest policies, and the trend of practical applications of participatory techniques in forest sector.

3. Results

3.1. Results of Literature Review

A total of 25 participatory techniques, along with the tools required for their implementation, were gathered from the literature review. In Table 1, techniques are described and supported by examples of tools used for its implementation.

The participatory techniques listed cover a wide range of approaches from traditional and well-known methods (e.g., public hearings and surveys) to more innovative and lesser-known approaches (e.g., citizen juries and role-playing games). The description of each technique outlines the modalities of development and the context of the participation process. This description permits to understand the differences, evidencing the importance of tailoring engagement strategies to specific contexts and purposes.

Observing Table 1, the possible tools useful for the application of the technique indicated are showed and emerges that they can be applied in most cases both physical and virtual settings. This adaptability underscores the growing importance of online platforms for public participation, especially considering recent global events.

The choice of the tool certainly has a great impact on many criteria such as costs, number of partners, time scale. From a hand this is an advantage in terms of flexibility of the technique according to the available resources, but from an other hand, this flexibility makes the comparability between techniques more difficult.

Table 1. Description of the participatory techniques identified in literature.

Participatory technique	Description	Tools for the application
ADVERTISING AND MEDIA COVERAGE	Channels used to inform audiences mainly visually.	Radio, newspapers, TV, websites, infographics, display, exhibits
CITIZEN COMMITTEES	Group of representatives from a particular community or a set of interests who are appointed to provide advice on an issue. The members meet regularly to provide ongoing input and advice throughout a project.	In presence or virtual meeting platforms
CITIZEN JURIES/PANEL	Deliberative process where a representative group of citizens is randomly selected to consider specific issues or policy questions. Participants engage in informed discussions guided by facilitators, review relevant information and work towards reaching a consensus or majority decision. The outcomes can inform policymakers and contribute to decision-making.	Round table, group in presence, virtual meeting tools

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CITIZEN PROPOSALS/ IDEA COLLECTION	Gathering or soliciting ideas or suggestions from individuals or groups, for the purpose of generating solutions, innovation, or community engagement.	Online platforms, community meetings and forums, social media, blog or formal submission processes
DELPHI METHOD	A forecasting process and structured communication framework based on the results of multiple rounds of questionnaires sent to a panel of experts. After each round of questionnaires an aggregated summary of the last round is presented to the experts, allowing to adjust their answers according to the group response.	Online survey platforms, collaborative decision-making tools, video conferencing and webinar tools
EDUCATION EVENTS	Organized activities like workshops, seminars, or conferences to share knowledge and facilitate learning among participants. The key aspect is active interaction, where participants are encouraged to participate in discussions and apply the knowledge gained to their own contexts.	Workshops, seminars, or conferences in presence; it can be associate with virtual meeting and webinar platforms
EXPERT PANELS	A variety of experts are engaged based on various fields of expertise to debate and discuss various courses of action. Experts make recommendations on complex issues, projects, policies, or research questions based on their expertise to inform decision-making and problem-solving processes.	Round tables, virtual meeting tools, platforms
FISHBOWL	Meeting where a small number of participants sit in a circle or central area engaging in a structured conversation while others observe from outside listening and taking notes.	In presence eventually with audience engagement tools, digital collaboration platform
FOCUS GROUP	Collection of data through group interaction. The group comprises a small number of carefully selected people who discuss a given topic. Focus groups are used to identify and explore how people think and behave, and they throw light on why, what and how questions.	Face to face, virtual tools
FORUM	Structured event where citizens and experts come together to discuss, exchange ideas, and engage in dialogue on specific topics of interest to facilitate information-sharing, collaboration, and collective problem-solving promoting community engagement. When the focus is on a complex societal issue and the goal is to achieve a consensus or shared understanding, they are called 'Consensus Conference'.	Town hall meetings, conferences, online platforms, open forums including presentations, panel discussions; mixed forms online and in presence
INQUIRY	Conducting investigations or research activities where participants are actively involved in defining research questions, gathering and analysing data, interpreting findings, and co-creating knowledge.	Face to face; using virtual tools
INTERVIEW	Structured conversations between an interviewer and one/ more participants with the goal of gathering insights, knowledge, opinions, or perspectives on a specific topic or issue which contributes to the process of research, decision-making, or problem-solving.	Depending on the format (one-on-one, group interviews, or focus group); face to face or with virtual tools
MOST SIGNIFICANT CHANGE	Stories of significant change are collected, systematically selected and then reviewed and analysed to identify key themes, trends, and impacts. Insights into the outcomes and effectiveness of the program from the perspective of those directly affected are provided.	Interviews recorded as audio or video or note-taking, reporting forms; selecting the stories by voting or scoring
POLL	Quick collection and immediate responses from a sample of people on a specific question or topic. Closed-ended questions are used with predefined choices to collect quantitative data and gauge public opinion/preferences efficiently.	Physical polling booths, interactive Displayspostal vote, SMS, email, online vote: social media, community engagement platforms

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PUBLIC HEARING /MEETING	Formal presentation opens to the general public, conducted by an agency, regular authority or organizers regarding plans. Public may voice opinions but has no direct impact on recommendation.	Town-hall meeting, panel roundtable, virtual meeting platforms, presentation followed by questions
REFERENDUM	Direct vote by the electorate on a particular proposal, law, or constitutional amendment. Referenda are used to seek public approval or rejection of a specific decision or policy, allowing citizens to directly influence outcomes.	In person
ROLE/SERIOUS GAME	Participants assume specific roles or characters to engage in simulated scenarios, often used for educational or problem-solving purposes to explore decision-making and interactions in a realistic and interactive setting.	In presence, virtual tools
SCIENCE SHOP	Offers citizens groups free or very low-cost access to scientific and technological knowledge, to help them achieve social and environmental improvement. These organizations mediate between citizen groups and research institutions, and conduct their own research projects, based on requests received from citizen groups.	In presence or virtual tools, e-mail
SITE-FIELD VISITS/TOUR	Visits to physical locations relevant to a project, issue, or study, are organized with the purpose of engaging participants directly in the context of the subject matter.	Opening up a project venue for the public to visit; tour associated with a conference or workshop
SOCIAL MEDIA	Platforms possibly used to actively inform, engage communities, and towards more interactive and user-driven experiences.	Social media platforms
SURVEY	Data collection method aimed at building knowledge on a specific group and topic, with data collected through a population sample targeted by the intervention. Surveys often use a combination of closed-ended and open-ended questions.	Paper survey, telephone, postal survey, SMS, email, online survey, social media, mobile survey app;
WISDOM COUNCIL	A small group with a mix of all hierarchical levels, departments and activities. The group has the task of identifying and working on urgent issues for the organization. In a few days they develop theses and recommendations for the urgent issues.	In presence or virtual meeting platforms
WORKING GROUP	Stakeholders or representatives from different organizations collaborate to address specific tasks, projects, or issues. The group works together to achieve defined objectives, such as developing strategies, making decisions, implementing plans, or solving problems within a focused timeframe.	Round tables, virtual meeting tools, open innovation digital platforms: collaborative editing tools and file sharing, video conferencing
WORKSHOPS (mind mapping)	A structured session where participants actively engage in discussions, exercises, and hands-on activities related to a specific topic or objective with the help of a facilitator. Workshops encourage participation, interaction, and group dynamics to achieve learning outcomes, generate ideas, maps, explore solutions, or develop skills.	Face to face, virtual tools
WORLD CAFE'	Hosting structured conversations in a café-like setting to facilitate dialogue and idea-sharing among participants. This method encourages informal, open discussions in small groups, with participants moving between tables to exchange perspectives on a common topic.	Face to face with available material for annotation

Sources: [31,42-46].

3.2. Assessment of Participatory Techniques

The participatory techniques are listed in Table 2 basing on the degree of participation (from inform to empower) and are identified considering the descriptive criteria.

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In several cases different grades/intervals are reported. This variability arises from the function assigned and the process implementation (e.g., virtual or face-to-face tools) that are at the origin of the several variants found during document analysis.

The data evidence that processes with a low degree of participation (e.g., informing) can involve many people (more than 100), usually unselected citizens, who are required to participate for a short time on average (a few minutes); this is typical of social media and advertising.

Usually, higher levels of involvement (e.g., empowering) correspond to participatory techniques involving smaller groups, often consisting mainly of selected stakeholders or experts, and the time required for participants is generally longer (hours, periodic events). In this category, it is possible to find examples such as working groups and expert panels.

Exceptions include participatory techniques like referendum, which have a high level of participation while involving the general population and requiring little time, and interviews, which despite having a low level of participation, typically involve relatively small groups.

As noted, higher levels of involvement have a greater influence on policy and this significant relationship is also represented by the PCA analysis; this correlation is easily deduced but is not always verified in reality. Advertising and the media, which have an informative purpose, can indirectly influence policies more than other processes; understanding the potential influence helps in setting realistic expectations and assessing the effectiveness of the engagement process in achieving policy objectives.

Potential stronger influences on policies usually translate into higher costs. It is important to recognize that these costs are not only monetary but also include the need for human resources and time to develop and complete the participatory techniques. In many cases, this parameter has been deduced by considering the possible variability of the tools (e.g., implementing a role in person versus online can have significant differences), the scope of the area of interest (corporate, local, national), and the cases found during the search.

Some processes such as role-playing games and educational events do not follow this connection; in fact, although they have limited effects on policies, they can involve significant organizational costs. It is important to calibrate the use of resources with the purposes, especially if resources are limited.

Table 2. Assessment of participatory techniques based on seven criteria (degree of participation, type and number of participants, selection of participants, time scale, cost, potential influence on policy.

	DEGREE OF PARTICIPATION	PERSONS INVOLVED		NUMBER OF PARTICIPANTS	SELECTION OF PARTICIPANTS	TIME SCALE		COST	POTENTIAL INFLUENCE ON POLICY
		TYPE OF PARTICIPANTS	SUPPORT STAFF			DURATION	PERIODICITY		
ADVERTISING, MEDIA COVERAGE	INFORM	citizens	-	large groups (> 100)	no selection	variable	single event	moderate	low
SOCIAL MEDIA	INFORM/ CONSULT	citizens	-	large groups (> 100)	no selection/	variable	single event	low	moderate, liable to be indirect

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					self-selection				
PUBLIC HEARING/METING	INFORM /CONSULT	citizens	supporting figure, policy maker	large groups (> 100)	self-selection	no longer than 2 hours	single event (sometimes periodic)	low/moderate	low, moderate
ROLE/ SERIOUS GAME	INFORM /CONSULT	citizens, stakeholder	tools' dependents	variable depending on the chosen tool, also large groups (> 100)	self-selection/ targeted	few hours, variable (also depends on tool)	single event	potentially high	low, not guaranteed
SURVEY	CONSULT	citizens, stakeholder	tools' dependents	large groups (> 100)	random/targeted	several minutes	single event (sometimes repeated)	potentially high	indirect and difficult to determinate
IDEA COLLECTION	CONSULT	citizens	tools' dependents	variable, large groups (>100)	self-selected	variable	periodic	low	variable but not guaranteed
INQUIRY	CONSULT	expert	supporting figure	small group (<25)	targeted	approximately one hour	single event	moderate	moderate, liable to be indirect
INTERVIEW	CONSULT	expert	supporting figure	small group (<25)	targeted	approximately one hour	single event	low/moderate	low/moderate
MOST SIGNIFICANT CHANGE	CONSULT	stakeholder	supporting figures	medium-sized groups (25 to 100)	targeted	around 2 days a month for session; more months	periodic	potentially high (time consuming)	low/moderate
SCIENCE SHOP	CONSULT	citizens, expert	expert	large groups (> 100), variable	self-selection	variable	periodic	moderate	variable but not guaranteed
FORUM	CONSULT /INVOLVE	citizens, stakeholder	decision maker, expert, supporting figure	medium-sized groups (25 to 100)	self-selection	1-5 days, weeks (preparatory meetings)	single event (sometimes periodic)	moderate to high	moderate, variable but not guaranteed

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SITE-FIELD VISITS /TOUR	CONSULT/ INVOLVE	stakeholder, expert	expert	medium-sized groups (25 to 100), variable	self-selection/ targeted	2-4 hours	single event (sometimes periodic)	low	moderate, not guaranteed
EDUCATION EVENTS	CONSULT/ INVOLVE	citizens	expert	large groups (> 100)	self-selection	1 day or multi-days event	single event	potentially high, variable	moderate
FOCUS GROUP	CONSULT/ INVOLVE	stakeholder	supporting figure	small group (<25)	targeted	usually up t 2 hours	single event	potentially high	moderate but liable to be indirect
FISHBOWL	INFORM/CONSULT /INVOLVE	citizens, stakeholders, expert, policy makers	supporting figure	medium-sized groups (25 to 100)	self-selection and targeted	15-20 minutes each thread, total 1-2 hours	single event	low/moderate	moderate
WORLD CAFE'	CONSULT/ INVOLVE	citizens, stakeholder	supporting figure, expert	medium-sized groups (25 to 100), variable (also hundreds)	self-selection, targeted	20-30 minutes to talks; one day (1-4hours) or series of events	single event	low to high, variable (number of participants involved)	low, variable but not guaranteed
POLL	INVOLVE	citizens, stakeholder	-	large groups (> 100)	random	a few minutes	single event, sometimes periodic (weeks for deliberative polling)	potentially high	low/moderate, indirect and difficult to determinate
WORK IN GROUPS, EXPERT PANELS	INVOLVE	expert	supporting figure	small group (<25)	targeted	from a few hours to events on several days	periodic (3-18 months)	moderate to high	moderate, variable but not guaranteed
WORK SHOPS	INVOLVE, COLLABORATE	(citizens)/stakeholders	expert, supporting figure	medium-sized groups (25 to 100) , variable	targeted	from half a day to 5 days	single event	moderate to high, variable	variable but not guaranteed
CITIZEN COMMITTEES	INVOLVE/ COLLABORATE	citizens	-	small group (<25)	random/targeted	1-2 days	periodic	variable	variable but not guaranteed
DELPHI METHOD	COLLABORATE	expert	supporting	medium-sized groups	targeted	approximately one hour	periodic, more rounds	moderate to high (expert and material)	liable to be indirect, but potentially high

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			figure	(25 to 100)			(weeks/month)		
WISDOM COUNCIL	COLLABORATE	citizens	supporting figure	small group (<25)	random	1-2 days	periodic	moderate	variable but not guaranteed
CITIZEN JURIES/PANEL	EMPOWER	citizens, (recruited experts)	supporting figure	small group (<25)	random	4-7 days	single event	moderate to high	high, variable but not guaranteed
REFERENDUM	EMPOWER	citizens	-	large groups (> 100)	self-selection	minutes	single event	variable/low	high

The Biplot (Figure 2) displayed shows the results of the Principal Component Analysis (PCA) based on various numerical indicators associated with different modes of public participation (participation degree, number of participants, cost, potential influence on policy, time scale). The main axes, F1 and F2, explain 48.06% and 20.71% of the total variance, respectively, covering a combined 68.77%.

The results of the PCA evidence that the 25 participatory techniques can be grouped according to three main dimensions. A first group includes those processes with a high degree of participation and a contextual high potential influence on policies such as citizen juries, workshops, Delphi method, and wisdom council. The second group includes processes with a high time requirement for participants and therefore also high average costs in terms of resources (e.g., educational events, working groups). The third group consists of those processes with a large number of participants and reduced time requirements (e.g., social, survey, publicity, public meeting).

As also shown in Table 3, two significant relationships have been identified:

- the direct relationship between the degree of participation promoted and the potential influence of participatory power on policies. This relationship might seem easy to deduce, but in the real-world context, it is not straightforward. In fact, in many cases, influence on policies is not guaranteed, and in others, it can be indirect;
- the inverse relationship between the number of participants and the time scale. This relationship indicates that the greater is the number of people involved, the shorter is the time of participation usually required from each individual. Participatory techniques such as "Idea Collection/Crowdsourcing" and "Poll" are located along this vector, suggesting that they involve a large number of participants but require a short participation time.

The results of the Spearman correlation test (α=0.05) confirm a statistically significant positive correlation between the participation degree and the potential influence on policy (p=0.004), and a statistically significant negative correlation between the participant numbers and the time scale (p=0.001).

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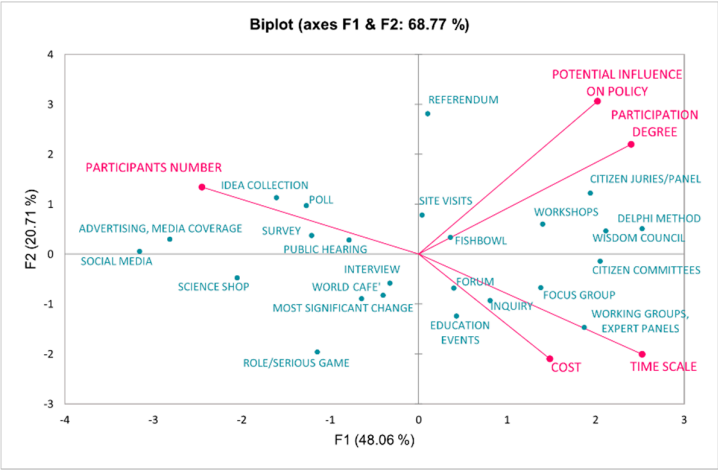

Figure 2. Principal Component Analysis (PCA) biplot**.**

Table 3. Sperman correlation matrix**.**

Variables	PARTICIPATION DEGREE	PARTICIPANTS NUMBER	COST	POTENTIAL INFLUENCE ON POLICY	TIME SCALE
PARTICIPATION DEGREE	**1**	-0.355	0.138	**0.573**	0.452
PARTICIPANTS NUMBER	-0.355	**1**	-0.210	-0.304	**-0.657**
COST	0.138	-0.210	**1**	0.190	0.337
POTENTIAL INFLUENCE ON POLICY	**0.573**	-0.304	0.190	**1**	0.171
TIME SCALE	0.452	**-0.657**	0.337	0.171	**1**

Statistically significant values are in bold (α=0.05).

3.3. . Transfer to Forest Policies

The first publication on participatory processes in forest policy in Scopus database date back to 1976. In Table 4 are shown the number of publications per technique (arranged in descending order) and the year of the first and last publication.

Interviews and surveys are the two most common participatory techniques used in forestry policies and strategies, followed by forums, workshops, and focus groups. These three techniques – although widespread – currently account for about 15-20% of the first two, which are currently the most significant in the context of forest policies. Delphi method, referendum, field visit, working and public group, focus group and advertising are techniques widespread in the forest policy sector in the late 1990s and early 2000s. As shown in Table 5 techniques like social media, role game, citizens committee have grown especially in recent years, emphasizing the increasing complexity and diversification of research approaches.

Figure 3 shows that the overall number of publications has significantly increased over the years, especially after 2000. The trend of total publication shows a sharp rise peaking around 2020, followed by a decline in the last four years.

Table 4. Participatory techniques adopted in forest policy.

PARTICIPATORY METHOD	NUMBER OF RESULTS	YEAR OF FIRST PUBLICATION	YEAR OF LAST PUBLICATION
INTERVIEWS	452	1976	2024
SURVEY	365	1988	2024
FORUMS	78	1982	2023
WORKSHOP	74	1990	2024
FOCUS GROUP	69	1998	2024
INQUIRY	**24**	**1993**	**2024**
ADVERTISING, MEDIA COVERAGE	20	2001	2021
WORKING GROUPS/EXPERT PANEL	**10**	**1999**	**2021**

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PUBLIC MEETING/HEARING	8	1999	2024
SITE-FIELD VISITS/TOUR	**8**	**2005**	**2021**
SOCIAL MEDIA	7	2019	2022
DELPHI METHOD	**6**	**2001**	**2021**
REFERENDUM	6	2004	2020
MOST SIGNIFICANT CHANGE	**5**	**1998**	**2023**
POLL	5	1976	2019
ROLE/SERIOUS GAME	**2**	**2018**	**2023**
CITIZEN COMMITEES	1	2012	2012
CITIZEN JURIES/PANEL	**0**	**-**	**-**
EDUCATION EVENTS	0	-	-
FISHBOWL	**0**	**-**	**-**
IDEA COLLECTION/ CROWDSOURCING IDEAS	0	-	-
SCIENCE SHOP	**0**	**-**	**-**
WISDOM COUNCIL	0	-	-
WORLD CAFE	**0**	**-**	**-**

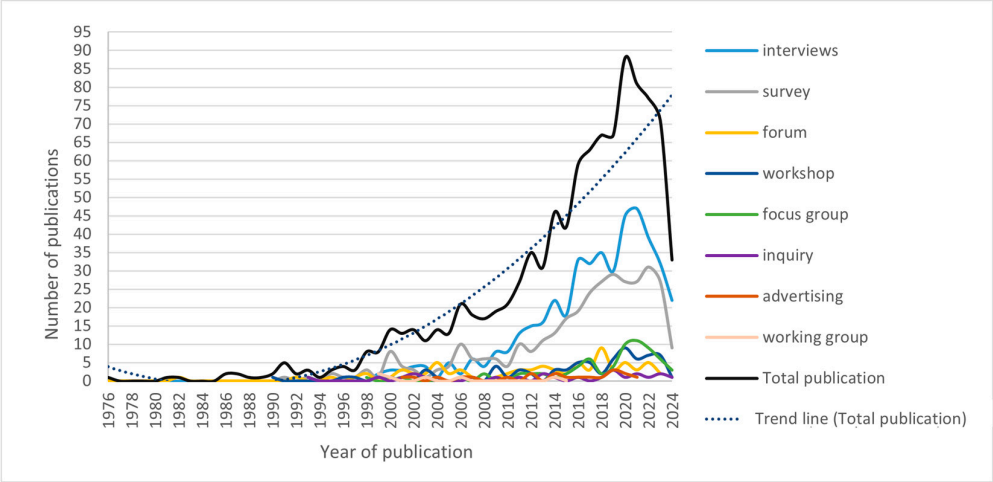

Figure 3. Number of publications over the years (considering only participatory techniques with at least 10 publications).

The number of publications by country considering only the main participatory techniques applied in the forest policy field are shown in Figure 4. Notably, the United States leads with 20.4% of total documents, followed by Germany (11.7%), Finland (9.3%), Canada (9.0%), the United Kingdom (8.0%), and Sweden (7.0%). Collectively, these six countries contribute over 65% of the literature in the Scopus database regarding the participatory techniques adopted in forest policy.

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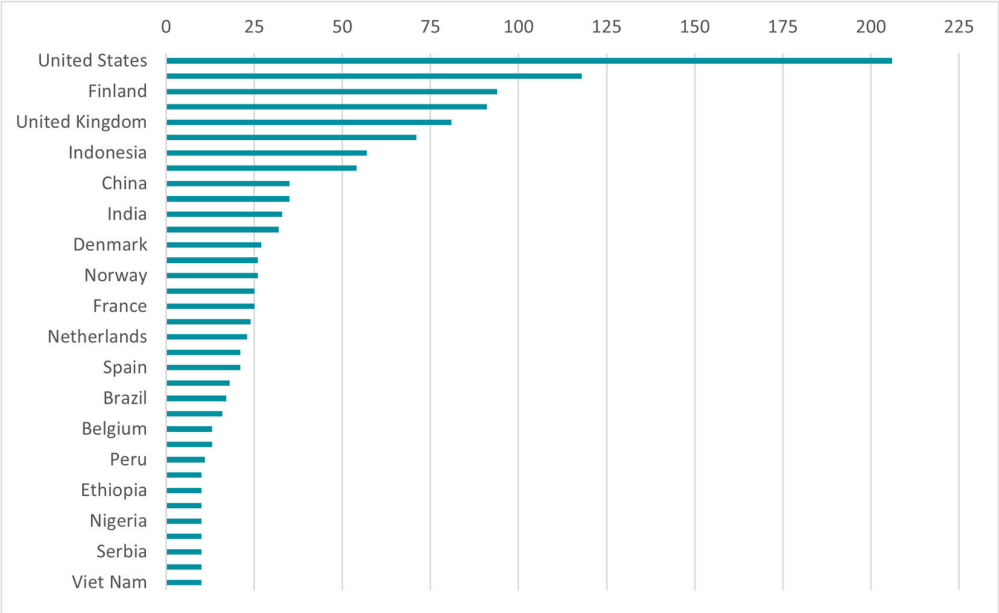

Figure 4. Number of documents published by country (considering only participatory techniques with at least 10 publications).

4. Discussion

The participatory democracy is based on active and creative participation in policy making in which stakeholders and citizens have the possibility to participate in the political sphere and public life [47]. The application of the participatory democracy principles to forest policies and strategies presupposes that all the actors – from public authorities to citizens – are actively involved in decision-making processes at all the different levels (from national to municipal), but not necessarily in the same way. In reason of this, the choice of the most suitable participatory technique to adopt in a decision process is linked to a number of variables which are listed below:

- the objective of the participatory process;
- the spatial scale of the process;
- the kind of information needed to develop the process.
- the kind and number of actors who should be involved more or less actively;

The objective of the actors' involvement and the type of contribution desired from participants are the first aspects to consider before structuring a participatory process [43]. In fact, results of the present study highlighted that some participatory techniques are designed to inform participants about a topic (e.g., advertising, social media, public hearing), while others are aimed at collecting opinions to gather public feedback on policy alternatives and suggestions that could potentially influence decision-making (e.g., survey, inquiry, interview, science shop). In other cases, the decision-making process actively involves citizens and/or experts in shaping final policies to achieve more effective and efficient outcomes through collaboration (e.g., wisdom council, citizen juries). In the international literature, several authors have emphasized how a clear and well-defined participatory objective is fundamental to legitimize the process itself [9,48]. In some cases, the main participatory objectives can be: i) improve and facilitate the decision-making process increasing the level of trust among participants [49,50] or reduce the conflicts between opposing interest groups [51]; ii) include marginalized categories of social actors in the process and choices [52]; iii) create a sense of community in the management of common goods/natural resources [53]. If the priority objective is to increase the level of mutual trust between participants, it is necessary to adopt techniques based on dialogue and mutual discussion in periodic meetings supported by a facilitator such as working groups. Conversely, if the priority objective is to include the opinions and point of views of the

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marginalized social actors in the final choices, also single events supported by a facilitator may be appropriate.

The results of the literature review showed that the kind and number of actors involved in the participatory process are two key variables to take into consideration. The actors to be involved depend primarily on the spatial context or scale (national, regional, local) and on the kind of information/data to be collected [54]. Regarding the spatial scale, the issues dealt with the participatory process may be of interest to local, national and transnational policies [30,31]. The spatial scale where the participatory policy process is applied influences not only the technique but also the tools, the number of stakeholders/citizens, the participants' selection modalities, and the time. In fact, the definition of a national forest policy should engage multiple stakeholders but with a medium-low degree of participation (i.e. consultation or involvement). Instead, a regional forest program or a landscape forest planning should engage only those who have a "stake" related to the territory but with a high degree of participation (i.e. collaboration or empowerment).

Regarding the kind of information, if specialized – e.g., technical or scientific – information is needed for the policy process, only experts are involved. On the other hand, if the objective is to inform or to implement a comparison, it is necessary to involve both experts, stakeholders and citizens. In addition, the data collected can be either quantitative (the data are numbered, numerable or measurable), qualitative (the data are interpretative, descriptive and language-related) or both [29]. Besides, different tools can be used depending on the level of detail of the information requested. In general, techniques can be developed in presence (face-to-face), via online tools, or in hybrid mode [46, 55].

The results of this study showed that some participatory techniques involve multiple types of actors (experts and citizens in science shop; experts, citizens and policy makers in fishbowl), while others focus only on one type of actors (citizens in wisdom council, experts in Delphi method and expert panels). In literature, some authors have highlighted that the engagement of different types of actors could be more efficient when the topics are complex [36,56]. In fact, experts can play a role in translating stakeholder/citizen discourses into policy options [36] and improving knowledge transfer through cross-scientific collaboration and coalitions with stakeholders [57]. Furthermore, the results highlighted that increasing the types of actors involved in the process, increases the complexity, but can also increase the usefulness of the data for policy implementation such as Citizen Juries/Panel and Fishbowl. Conversely, the number of participants is a good indicator when the participatory process aims to collect or disseminate information (e.g., citizens or stakeholders' needs, expectations, knowledge), while it can be counterproductive when such information must be included in policies (information overload). In fact, adverting and social media are the two techniques with the highest number of participants, but with a low level of influence on policies. As emphasized by Słupińska et al. (2022) [58], social media are a new tool for communicating and promoting sustainable forest management towards society.

The results of the PCA confirm the direct relationship between the degree of participation and the potential impact of participatory power on policies. More is the involvement of the actors, more the corrective power of the participation process emerges. When multiple actors are involved, and degree of participation is high, participatory process have great force in correcting the societal power imbalance. In fact, when actors that have different power positions in the society are engaged in the process, this imbalance is in part addressed and leveled [59]. The participatory techniques and processes identified in the forest policies and strategies framework confirmed that participatory processes have increased their spread in the forestry sector in the wake of the Rio Conference and the Intergovernmental Panel on Forests in the late 90s and the early 2000s.

It is important to remark that the choice of the most appropriate participatory technique to implement in a decision process is fundamental. In fact, the adoption of techniques that are inappropriate for the participatory method chosen or for the specific phase of the process, or unsuitable for the social and cultural context of the forest policies application can conduct to the failure of the process. Furthermore, the implementation of a participatory technique that has not a strong link with technical aspects of policies at stake is another cause of failure. In fact, those

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responsible for participation need to have in-depth knowledge of issues dealt with forest policies and strategies and to maintain continuous and close contact with the context where forest policies are implemented throughout the entire process. Otherwise, participatory process and policies implementation proceed along two separate tracks.

Finally, another common mistake – that it is easy to fall into either accidentally or intentionally – is linked to the kind and number of actors who should be involved in the process. When some of the actors are neglected, the result is that opinions, point of view and requests are not considered and the process loss transparency and openness.

5. Conclusions

The comprehensive overview of various participatory techniques of public participation offered in the present study has the advantage of considering critical factors related to the various techniques. In reason of this, the overview can better support decision-makers and practitioners involved in public engagement initiatives. In fact, it helps to select the most appropriate method based on the desired level of participation, available resources, and policy objectives, enabling informed decision-making and maximizing the impact of public participation efforts.

It is important to remark that the adoption of participatory techniques represents an opportunity for the implementation of forest policies and strategies, provided that the strengths and limitations are assessed and evaluated in the specific context of application and remembering that there exist, at a methodological level, appropriate and applicable recipes for each situation.

The present study has also shown the complexity of participatory processes, where diverse variables must run together with harmony to obtain the desired results. This complexity must be taken in consideration maintaining a high degree of analytical and methodological openness during the development of the participatory processes. In this way the constantly existing contingencies and contradictions which emerge during the process can be considered and addressed.

The wish is that this kind of research may be useful instruments in the hands of forest managers and decision-makers when choosing tools to take into consideration the evolution of society's demands, a crucial aspect during periods of rapid and important change, such the ones we are facing today. Most of all the actual challenge will be to encourage the spread of collaborative practice – like the participatory processes – to support the actual belief that forests ultimately belong to the community and are a common good to be protected and managed collectively.

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