

Article

Mining-Scapes of Participation in Serbian Extractive Regions: Enhancing Participatory Processes in Decision-Making

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Abstract

Extractive regions are among the most visible frontlines of the Anthropocene as they are areas where the environmental and social consequences of intensive resource exploitation are concentrated. In Serbia, mining areas such as Bor and Majdanpek represent complex socio-spatial assemblages in which everyday life, work, and governance intersect under pressures of neoliberal development and ecological degradation. This study aims to identify the challenges and opportunities for citizen participation in mining regions, providing guidance on enhancing participatory processes in decision-making. To operationalise this aim, the study pursues three objectives: (1) to assess residents' awareness, participation practices, access to information, and motivation to engage in planning; (2) to identify perceived barriers and opportunities for participation; and (3) to formulate recommendations for improving participatory and communication processes in extractive-region governance. Accordingly, the research is guided by the main question: How do residents of the Bor–Majdanpek mining region perceive opportunities and barriers to public participation in planning and decision-making processes? To address this question, a face-to-face field survey was conducted in the summer of 2024 with a random sample of residents (N = 300). In this mixed-methods exploratory study, primary survey data were analysed using descriptive and inferential statistical methods. In contrast, open-ended questions were analysed qualitatively to capture respondents' detailed perceptions and suggestions. Findings indicate limited awareness of planning procedures, low participation experience, and structural barriers related to information access, trust, and institutional responsiveness. At the same time, respondents show a strong interest in more transparent, accessible, and dialogic forms of engagement. This study demonstrates that citizen participation in extractive landscapes is not only a procedural requirement but a mechanism to strengthen democratic governance and rebuild trust. Insights from Bor–Majdanpek provide an evidence base for improving participatory practices in mining regions undergoing socio-environmental transformation.

Keywords: spatial planning; urban planning; public participation; mining regions; Serbia



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1. Introduction

Mining activities exert profound and multidimensional impacts on territories and communities, influencing housing, the economy, transport, and energy and water infras-

structure, as well as the biosphere. Technological progress in the mining sector over the past century has significantly accelerated extraction processes and increased profit margins [1]. While mining brings certain economic benefits—such as employment opportunities and local economic growth—its adverse environmental consequences are well documented, including increased greenhouse gas emissions, deforestation, loss of fertile land, degradation of aquatic ecosystems, and disruption of ecological balance [2,3].

Beyond environmental degradation, mining also produces substantial social challenges. These include forced displacement of local populations, inadequate compensation for expropriated land, the rise of boom towns and company settlements, jeopardised indigenous rights, impoverishment, human rights abuses, forced and child labour, threats to health and physical cultural resources, gender-related impacts (the nature of the work predominantly requires a male workforce), workforce migration, limited engagement of responsible institutions, restrictions on landowners' rights, and other related issues [4–12]. Such cumulative effects have fostered growing distrust and critical reflection on the actions of both mining companies and governmental institutions [13–17], particularly given that their environmental and social practices often remain questionable [5].

These tensions are further amplified within the context of neoliberal economies, where spatial planning tends to prioritise private interests and market-driven imperatives over public welfare. Such an approach often marginalises local communities and weakens transparency in the governance of large-scale mining projects [18,19].

Within the broader context of the Anthropocene—an epoch in which human activity has become a dominant geological force, reshaping planetary systems and entangling ecological and social processes—the urgency of inclusive and participatory governance becomes particularly evident. The Anthropocene's intertwined social–ecological dynamics demand more active involvement of residents and the wider public in decision-making processes, as their participation and agency have become key determinants of sustainable and socially responsible outcomes [20–23].

Given the profound and intertwined environmental and social impacts of mining, the planning of mines and the preparation of spatial plans for mining areas require a rethinking of participation frameworks. Scholars increasingly argue that the timing, methods, and intensity of public involvement in the planning of mining regions should differ from those applied in other contexts, requiring more extensive information sharing and a deeper understanding of the socio-environmental implications of planned interventions [24–26].

In Serbia, mining regions have historically been regarded as valuable resources serving the broader public and state interests. Until the 1980s, a symbiotic relationship between state-owned mining companies and local communities prevailed, reflecting the country's welfare-state orientation and the societal benefits attributed to mining. In recent decades, this balance has eroded, as environmental damage has affected an increasing number of residents, shifting scholarly and professional attention toward the negative consequences of mining activities [27]. In the post-socialist period, most mining companies in Serbia are privately owned—primarily by multinational corporations—and their engagement in local community development, in terms of corporate social responsibility, remains minimal.

In the early 2020s, Serbia experienced an unprecedented wave of public dissatisfaction related to the expansion of mining activities, most notably the proposed Jadar lithium project located in western Serbia. The project triggered one of the largest environmental protest movements in the country's recent history, with demonstrations, road blockades, and coordinated actions occurring across dozens of cities throughout 2021 and 2022 [28]. Scholars have noted that the Jadar case became emblematic of broader concerns regarding environmental risks, potential contamination of water sources, and threats to agricultural livelihoods at both the local and national scales [29,30]. Although the formal spatial

planning and permitting procedures were carried out in accordance with existing legislation [31], many citizens perceived the process as insufficiently transparent and weak in terms of meaningful public involvement, particularly given the potential long-term socio-environmental consequences [32,33].

This national mobilisation exposed a deeper structural issue: the gap between legally prescribed participation mechanisms and public expectations for substantive engagement in decisions that may profoundly shape local environments and long-term regional development. The Jadar protests demonstrated that procedural compliance alone is inadequate when public trust is low and when extractive interventions pose high environmental uncertainty [34,35].

Against this background, this study focuses on the Bor–Majdanpek mining region in Eastern Serbia, aiming to identify challenges and opportunities in citizen participation in mining regions, and providing guidance for enhancing participatory processes in decision-making. The analysis is situated at the intersection of neoliberal governance pressures, the Anthropocene condition, and ongoing efforts to democratise spatial planning. To achieve this, we investigate how residents in already established mining regions perceive opportunities and barriers to participating in planning and decision-making processes. Understanding these perceptions allows us to identify systemic weaknesses in participatory practice and to highlight ways to strengthen transparency, communication, and community engagement in extractive-region governance.

2. Theoretical Background

2.1. Anthropocene

The concept of the Anthropocene has emerged as a powerful framework for understanding the magnitude of human influence on Earth's systems. It designates a new geological epoch in which human activity has become the dominant force shaping planetary processes—from climate systems and biodiversity to hydrological and geochemical cycles [36,37]. This epochal shift challenges the long-standing dichotomy between “nature” and “society,” revealing how deeply human, technological, and economic activities are embedded within ecological processes. Scholars argue that the Anthropocene is not only a scientific concept but also a political and ethical one, prompting reconsideration of humanity's role, responsibility, and agency in shaping planetary futures [21,22,38].

From the Anthropocene perspective, environmental risks and benefits are distributed unequally across different geographies and populations, highlighting social, economic, and ecological inequalities. Industrialised economies and extractive industries have generated disproportionate environmental degradation in specific regions—often those already socially or economically marginalised [23,39]. This uneven geography of impact calls for more inclusive, just, and participatory modes of governance that recognise local knowledge, vulnerability, and resilience as critical components of sustainable development. In mining regions, such as Bor–Majdanpek, the Anthropocene is not an abstract notion but a lived experience, reflected in degraded landscapes, livelihoods disrupted by resettlement, and polluted air, soil and water.

From a governance perspective, the Anthropocene necessitates a transformation in how planning and decision-making processes are conceptualised and implemented. Traditional spatial planning models—rooted in technocratic and hierarchical approaches—often fail to account for the complex, multi-scalar interdependencies characteristic of the Anthropocene [40,41]. In contrast, planning in the Anthropocene demands adaptive, reflexive, and participatory frameworks that embrace uncertainty and acknowledge the co-production of space by human and non-human actors. This reorientation implies that public participation should not be treated as a procedural requirement but as a substantive dimension

of governance—one that shapes how communities understand, negotiate, and respond to planetary change.

Participation in the Anthropocene, therefore, becomes a democratic imperative grounded in planetary ethics, whereas spatial planning is repositioned as a critical arena where the intertwined social and ecological dimensions are made visible and contestable [22,23]. Participatory planning in mining regions, where decisions about land use and resource extraction directly influence both local and planetary systems, represents not only a governance challenge but also an opportunity to reimagine planning as a practice of shared responsibility for Earth's future.

2.2. Neoliberalism

Neoliberalism, as both an economic doctrine and a political rationality, has profoundly reshaped governance systems and spatial planning practices since the late 20th century. Rooted in the principles of market liberalisation, deregulation, and privatisation, neoliberalism promotes the idea that market mechanisms are the most efficient means of allocating resources and managing public affairs [18,19]. This ideology extends beyond economic policy to influence how institutions, policies, and even social relations are organised—prioritising efficiency, competitiveness, and investment attractiveness over equity and collective well-being. In the spatial domain, neoliberal rationalities have led to a reconfiguration of planning from a redistributive, welfare-oriented practice into an entrepreneurial, market-responsive activity [42].

Spatial planning under neoliberal conditions increasingly functions as a tool to attract investment, stimulate economic growth, and facilitate large-scale development projects, often at the expense of social and environmental considerations. This shift has been particularly evident in resource-dependent regions, where extractive industries are positioned as engines of regional development. Mining projects are frequently framed as opportunities for modernisation and economic revitalisation, yet they often perpetuate spatial inequalities and environmental degradation [43,44]. The alignment of planning goals with corporate interests can lead to the marginalisation of local communities, whose voices and knowledge are treated as secondary to the imperatives of global capital. Brunet & Longboat [45] present chapters exploring how mining corporations' programmes often treat local stakeholders as secondary to corporate agendas.

In this context, neoliberal planning frameworks tend to privilege technocratic and expert-driven forms of decision-making while reducing public participation to a formal or symbolic exercise [46,47]. Participatory mechanisms, when they exist, are often limited to consultation rather than co-decision-making, thereby reproducing structural asymmetries between state, market, and citizens. The resulting "post-political" condition [48] depoliticises planning by framing complex social and environmental issues as technical challenges, thus narrowing the space for genuine democratic deliberation.

Within the broader framework of neoliberal governance, mining regions such as Bor-Majdanpek are primarily assessed through economic performance indicators, profitability, and resource efficiency, while the social fabric and well-being of local communities are often marginalised. Land is increasingly perceived as a monetary and financial asset [49], reinforcing market-oriented priorities in spatial planning and decision-making. Consequently, understanding participation in the neoliberal context necessitates a critical reflection on how planning can reclaim its democratic purpose—not merely as an instrument for facilitating economic growth, but as a means of empowering communities to negotiate the future of their territories in more equitable, inclusive, and transparent ways.

2.3. Participative Democracy

The growing complexity of socio-environmental challenges in the Anthropocene and the dominance of market-oriented governance in the neoliberal era have renewed interest in participatory democracy as a means of reasserting citizens' voices in decision-making processes. Participatory democracy extends beyond representative models by emphasising direct engagement, deliberation, and collective action as integral components of governance [50,51]. In contrast to technocratic or market-driven forms of governance, participatory approaches recognise citizens not as passive recipients of policy outcomes, but as active co-creators of the spaces they inhabit. Within this framework, participation is valued not only for its instrumental benefits—such as improving policy efficiency or public acceptance—but also for its intrinsic role in fostering democratic legitimacy, trust, and social learning [52,53].

In spatial planning, participatory democracy has evolved as a response to the limitations of top-down planning traditions and the procedural inadequacies of formal consultation mechanisms. It seeks to open deliberative arenas in which diverse actors—including marginalised or less powerful groups—can articulate their interests, challenge dominant narratives, and co-produce spatial knowledge [20,54]. Such engagement is particularly vital in contexts characterised by high environmental risks and social inequalities, where planning decisions shape not only land use but also the social and ecological conditions of everyday life [55]. Meaningful participation thus becomes both a right and a necessity in ensuring that spatial decisions reflect the collective priorities of all stakeholders, rather than the interests of a few dominant ones [56].

In the context of neoliberal extractivism, however, achieving participatory democracy is particularly challenging. The concentration of decision-making power in the hands of corporations and state agencies often constrains the scope for genuine public influence [57,58]. Participation is often limited to procedural compliance—a mere checkbox exercise within environmental and social impact assessments or planning regulations—rather than a transformative process that can redistribute power [59,60]. Yet, numerous studies emphasise that when communities are actively involved in co-designing plans and negotiating project outcomes, the resulting decisions tend to be more socially robust and environmentally responsible [25,61]. As citizens are considered significant actors within this concept, questions arise regarding their level of knowledge, expertise, and motivation for responsible environmental governance. In this regard, there is a need to reaffirm the notion of “committed actors”, who are engaged with issues of public interest and demonstrate a sense of responsibility toward their community [62–64].

The specific socio-historical context of Serbia also shapes participatory democracy. The country's approach to environmental issues is influenced by its post-socialist, semi-peripheral position [26]. Economic hardships, relatively closed political structures, and the wars of the 1990s contributed to limited engagement with environmental concerns [65]. International isolation further delayed the harmonisation of national environmental regulations with global standards. Despite transformative processes after 2000, the implementation of new environmental governance frameworks remains slow and inadequate, particularly regarding citizen participation [64].

In mining regions such as Bor–Majdanpek, where the environmental, economic, and social stakes are exceptionally high, participatory democracy represents both a challenge and an opportunity. The urgency of addressing cumulative impacts on health, livelihoods, and ecosystems creates a compelling rationale for deeper public involvement, as the relatively new reality of majority foreign ownership further complicates the relationship between local communities, governance structures, and corporate actors. By exploring how citizens in this region perceive and engage in spatial planning processes, this study contributes to

broader debates about the democratisation of planning in extractive contexts—highlighting the potential for participatory frameworks to enhance transparency, accountability, and long-term sustainability.

A substantial body of literature examines environmental governance (e.g., [28,66–71]), public participation (e.g., [72,73]), and the social licence to operate (e.g., [74–78]). There is also a growing body of research on mining, community perspectives, and socio-environmental conflicts (e.g., [14]). However, these strands of scholarship tend to remain analytically separate. Studies on participation rarely focus on mining-affected populations, while studies on mining communities typically do not investigate participatory practices or citizens' roles in decision-making (e.g., [79–85]).

Although recent work has examined public perceptions related to the Jadar lithium project (e.g., [29]), it does not do so in relation to the limitations of formal participatory mechanisms or the public demand for more transparent, inclusive, and dialogic processes. As a result, there remains a clear gap in research that simultaneously examines public participation in mining regions from the perspective of local communities. Therefore, this study addresses these gaps by providing empirical evidence on how residents in established mining regions perceive opportunities and barriers to participation, identifying systemic weaknesses in current practices, and offering actionable guidance for enhancing participatory processes in decision-making under the intersecting pressures of neoliberal governance, ecological risk, and the Anthropocene condition.

3. Materials and Methods

This study aims to identify the challenges and opportunities for citizen participation in mining regions, providing guidance on enhancing participatory processes in decision-making. In line with this aim, the research adopts a mixed-methods approach and an exploratory research design. Given the limited empirical evidence on citizen experiences in Serbian mining regions, the study is based on the collection of primary data through a face-to-face survey conducted with residents of the Bor–Majdanpek mining region. The survey was designed to capture their perceptions of opportunities and barriers to participating in planning and decision-making processes. By combining these survey data with theoretical reflection in the Discussion chapter, the research seeks to provide a comprehensive understanding of participation practices and their implications for democratic governance in a neoliberal economy.

To operationalise this aim, the study pursues three research objectives:

- (1) To assess residents' levels of awareness, participation, information access, and motivation related to planning and decision-making;
- (2) To identify key barriers and opportunities that influence citizen participation within the Bor–Majdanpek mining region;
- (3) To formulate evidence-based recommendations for enhancing participatory practices and communication processes in extractive-region governance.

Building on this framework, the study is guided by the following main research question: How do residents of the Bor–Majdanpek mining region perceive opportunities and barriers to public participation in planning and decision-making processes? To address this question systematically, we developed a set of sub-questions aligned with the key dimensions of citizen involvement that also structure the survey questionnaire. These dimensions reflect essential aspects of participatory practice in planning and allow for coherent integration of empirical findings.

The main research question is further elaborated through the following sub-questions:

- Awareness: How aware are residents of local community issues and their opportunities to participate in planning processes?

- Participation: How do residents currently participate in planning, and which participatory methods do they prefer?
- Information: What sources and channels of information do residents rely on, and how effective are these in supporting participation?
- Motivation: What motivates or discourages residents from engaging in planning and decision-making?
- Proposals: What suggestions do residents have for improving participation methods and communication channels?

A survey was conducted between July and September 2024. Prior to fieldwork, pollsters received training focused on the ethical conduct of survey administration, including approaches to communication, neutrality, and respectful engagement with respondents. The questionnaire was administered exclusively to adult citizens, ensuring that all participants were legally eligible to provide informed consent.

The survey satisfied the ethical principle of respondent anonymity. Individual responses were not linked to any identifying information. All survey data were treated with the strictest confidentiality. Only authorised researchers directly involved in the project had access to the data. Participation in the survey was entirely voluntary. Respondents were not required to answer any specific question and could withdraw from the survey at any time without any consequences. The data were stored on the servers of the research institution leading the project. Only authorised researchers directly involved in the project have access to the data.

The survey conducted with the local population in Bor and Majdanpek was preceded by two earlier research phases. The first phase involved desktop analysis, which included a review of literature, projects, reports, and other documents. The second phase consisted of a professional visit to the Tara mine in Ireland. These research phases provided an important conceptual and contextual framework for designing the questionnaire. Through the analysis of secondary sources, we examined local community issues in mining areas, mapped existing formal and informal participation methods, as well as information channels related to planning documents. One of the key insights is that the main factor driving opposition to mining activities is the lack of trust within the local community [86].

A significant contextual finding we arrived at is that the specific characteristic of state-owned and mining companies in Serbia is that the perspectives of citizens and the social values related to proposed mining projects are often deliberately overlooked [29,87]. In practice, only the minimal, legally prescribed level of public participation is usually implemented, while decision-making often remains non-transparent and susceptible to manipulation. The voice of the local community is often considered less important by the business and government sectors [88,89]. The professional visit to the Tara mine in Ireland offered additional insights and perspectives from the mining industry in more developed countries regarding the motivation of local residents to participate in planning processes, their trust in institutions, and how they receive information about planning documents. Given the extremely neglected local perspective in mining areas in Serbia, we intended to design a questionnaire that would capture attitudes toward public participation, perceptions of transparency and trust in institutions, and citizens' willingness to engage in planning processes. It consisted of 20 questions, both closed- and open-ended.

The data were collected through a structured, interviewer-administered questionnaire survey conducted face-to-face in both urban and rural settlements of the City of Bor and the Municipality of Majdanpek. In urban areas, a random sample of 200 respondents was drawn using systematic household selection within each local community ("mesna zajednica"), with one randomly chosen respondent per household. In rural areas, a two-stage sampling procedure was applied: villages were first purposively selected based on (1) prox-

imity to the mining basin and (2) population size, after which respondents were randomly selected during fieldwork ($N = 100$). This combined approach was adopted due to time and resource constraints that made it unfeasible to cover all rural settlements.

The final sample included all urban and selected rural settlements in proximity to mining sites—Bor, Brestovac, Krivelj, Oštrelj, and Slatina in the City of Bor, and Majdanpek, Rudna Glava, and Vlaole in the Municipality of Majdanpek (Figure 1).

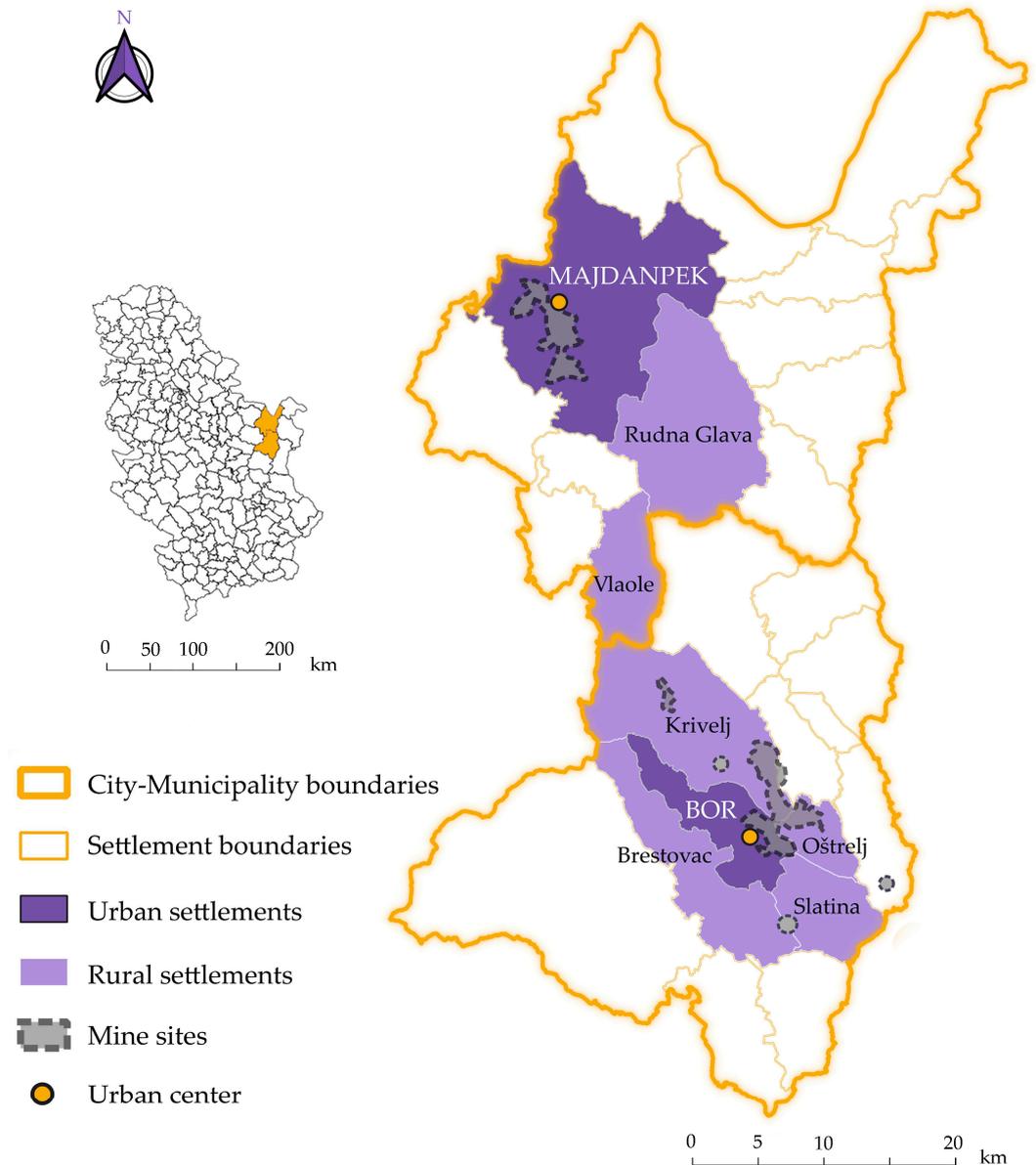


Figure 1. Bor and Majdanpek—the surveyed settlements.

Key sociodemographic characteristics—gender, age, place of residence, and educational attainment—were used to ensure the sample’s representativeness (Table 1). Although primary school students from the Bor–Majdanpek region were slightly underrepresented in the survey (15.2% in the survey vs. 19.2% in the population), the sample can still be considered broadly representative, and such minor discrepancies are, according to Groves et al. [90], Babbie [91] and Dillman et al. [92], generally acceptable in social research.

Table 1. Survey representativeness—survey region vs. survey sample.

	Bor–Majdanpek Region	Survey Sample	Respondents Number
Settlement type			
Urban	66.3%	66.8%	200
Rural	33.7%	33.3%	100
Gender			
Male	48.9%	47.3%	142
Female	51.1%	52.7%	158
Age structure			
I age group: (20–24)	5.6%	6.4%	19
II age group: (25–44)	27.2%	28.0%	84
III age group: (45–64)	34.5%	38.2%	115
IV age group: (65 and older)	27.1%	27.4%	82
Educational attainment			
No formal or incomplete primary education	9.17%	6.4%	19
Primary education	19.2%	15.2%	46
Secondary education	55.7%	57.6%	173
Higher and high education	15.6%	21.2%	64

Source: for the regional level—[93,94]; for the survey sample—authors.

This analysis focuses on key dimensions of citizen involvement in urban and spatial planning: (1) awareness, (2) participation, (3) information, (4) motivation, and (5) proposals. Each dimension provides insight into different aspects of how citizens engage with and perceive the planning process. The first dimension, awareness, refers to citizens' understanding of local community issues. Participation examines both citizens' involvement in planning processes and their preferences regarding participation methods. In addition to participation methods, we also analyse how citizens prefer to express their opinions in planning processes. The information dimension captures citizens' self-assessment of their knowledge about planning documents, as well as the channels through which they obtain information. Motivation focuses on identifying what drives citizens to engage in planning processes, including the amount of time they are willing to dedicate, as well as the reasons for a lack of interest. Finally, the proposals reflect citizens' perspectives and provide an opportunity to collect concrete suggestions for improving participation methods and information channels related to planning documents. Table 2 presents a detailed overview of the analysed dimensions and the related survey questions.

Table 2. Analytical framework for local citizen engagement in urban and spatial planning.

Key Dimensions	Survey Questions	Question Type
I AWARENESS		
Awareness of local community issues	1. Which issues concern you the most in your local community?	Closed-ended
	2a. Have you ever participated in an early public review of a planning document?	Closed-ended, single choice
	2b. Have you ever participated in a public review of a planning document?	Closed-ended, single choice
	2c. On a scale from 1 to 5, please rank how well the listed participation methods in development planning suit your needs.	Closed-ended, scale
	2d. Choose the method from the list that best suits your needs.	Closed-ended, single choice
	2e. Do you feel more comfortable expressing your opinion in the planning document creation process: Anonymously/By providing your name/It doesn't matter to me.	Closed-ended, single choice
	2f. Can you indicate the reason (if the respondent chose "Anonymous" or "By providing their name")?	Open-ended
II PARTICIPATION		
Citizen participation in the urban/spatial planning process and preferred methods		

Table 2. Cont.

Key Dimensions	Survey Questions	Question Type
III INFORMATION Reaching information and preferred information channels	3a. How would you assess your level of information regarding your city's development plans?	Closed-ended, single choice
	3b. How and where do you get information about the spatial and urban plans of your city/municipality?	Open-ended
	3c. How would you like to receive information about opportunities to participate in the spatial and urban planning of your city/region?	Closed-ended, single choice
IV MOTIVATION Motivation of citizens to participate in the development of planning documents	4a. What motivates you the most to participate in the planning document creation process?	Closed-ended, single choice
	4b. In your opinion, what is the main reason for citizens not to participate more in the planning document creation process?	Closed-ended, single choice
	4c. How much time are you willing to dedicate to participating in the planning document creation process?	Closed-ended, single choice
V PROPOSALS Citizens' proposals for improving participation methods and information channels	5a. Do you have any suggestions on how to improve citizens' awareness of participation in urban and spatial planning?	Open-ended
	5b. Do you have any suggestions on how to improve citizens' participation methods in urban and spatial planning?	Open-ended

Source: authors.

To help readers interpret the table and research findings, it is important to clarify the distinction between early public review and public review. The early public review (“rani javni uvid”) is an initial stage of participation that takes place before the plan is drafted. It typically lasts 15 days and gives the public an opportunity to examine preliminary planning materials, such as maps and the proposed spatial coverage, and to submit written comments with no feedback on them. Its primary purpose is to inform residents about the objectives and scope of the forthcoming plan and to gather early feedback.

The public review (“javni uvid”), by contrast, occurs once the draft plan is prepared. This procedure lasts a minimum of 30 days and allows citizens to review the draft plan either online or in the municipal building, consult with planners, and submit formal comments. It usually includes a public hearing or discussion, often accompanied by a live PowerPoint presentation of the plan and feedback on the comments.

Before conducting the field research, the research team carried out a pilot study to test whether the questions were sufficiently clear. The pilot was conducted with respondents of different educational backgrounds, gender, age, and place of residence (urban/rural areas) in order to ensure that the questionnaire would be understandable to participants with diverse sociodemographic characteristics. All suggestions from the pilot study were incorporated into the final version of the questionnaire.

After the survey was conducted, a logical data check was performed. Additional reliability testing was also carried out for the questions that used scales. In this paper, we analysed only one closed-ended scale question. This refers to question 2c: “On a scale from 1 to 5, please rank how well the listed participation methods in development planning suit your needs”. Of the 300 collected questionnaires, 284 (94.7%) were complete and included in the analysis. The 13-item scale demonstrated excellent internal consistency, with a Cronbach's alpha of 0.905, indicating that the items reliably reflected respondents' overall evaluation of the participation methods.

Closed-ended single-choice questions are not subject to psychometric testing, as they represent standalone nominal items. However, these questions were reviewed during the pilot study to assess their clarity and comprehensibility to respondents. The set of response options was developed based on the conceptual and contextual framework established through desk research, as well as insights gained during the expert visit to the Tara mine

in Ireland. All closed-ended questions were analysed using descriptive and inferential statistical methods in IBM SPSS Statistics (IBM Corp., Armonk, NY, USA, v25).

The open-ended responses were analysed using content analysis. The content analysis combines key qualitative and quantitative methodological features. Its initial phase—coding the text through the development of categories and assignment rules—is inherently qualitative, as it preserves contextual information and enables interpretive insight. Once coded, the data were organised into a matrix and subjected to quantitative analysis. Because it integrates qualitative data generation with quantitative processing, content analysis is often regarded as a suitable tool for mixed-method designs and for methodological triangulation [95].

In our research, we applied the method of content analysis specifically to the open-ended responses to questions 3a, 5b, and 5c (Table 2). We conducted initial, or open coding, which is performed without predetermined categories. Good coding practice must include a phase of rater training. During this process, raters need to learn how to apply the coding scheme and harmonise their individual criteria and “equations” so that their evaluations become consistent. The reliability of qualitative data coding is most commonly operationalised as interrater reliability. This, in essence, reflects the level of agreement between coders [95]. Coding validity was ensured by having five coders independently code the entire dataset. After a joint brainstorming session, a high level of agreement regarding the assigned codes was achieved. Following the coding process, the categories were quantified and analysed in the same manner as the closed-ended questions were—using descriptive and inferential statistical methods in SPSS (v25).

Case Study

The Bor region is known for hosting the largest copper deposits in Serbia and among the largest in Europe. The existence and development of Bor as an urban settlement have been intrinsically linked to planning processes surrounding the exploitation of mineral resources, dating back to the opening of the copper mine in 1903 [96]. Majdanpek, on the other hand, was established much later, in 1961, primarily for the exploitation of copper and gold deposits [97].

The character of public participation in the planning of these settlements has evolved alongside broader socio-political transformations. During the monarchy period (1903–1945), planning was driven by foreign capital and expert-led decision-making, leaving little room for the involvement of local inhabitants [98]. In the socialist period (1945–2000), urban development became deeply institutionalised: planning was comprehensive, long-term, and state-coordinated, yet citizen participation remained subordinate to collective state priorities, primarily related to mining [88,99]. Although this period emphasised social welfare, residents were not spared from the environmental impacts of intensive mining activities.

In the post-socialist era (after 2000), the shift toward neoliberal governance and privatisation profoundly reshaped the planning framework. The sale of the majority stake in the former state enterprise RTB Bor to a foreign investor in 2018 introduced new decision-making hierarchies, mainly oriented toward economic efficiency and profitability. While planning instruments formally remained in place, the legitimacy and transparency of decision-making weakened, and mechanisms for meaningful public participation became fragmented [100]. Today, the challenge lies in rebuilding participatory planning practices that can address not only spatial and environmental degradation but also the erosion of trust between institutions, companies, and residents in the Bor–Majdanpek region.

In the literature, Bor and Majdanpek are frequently described as “environmental black spots” [101,102]. For several decades, the mining and smelting complex in Bor has

been the dominant source of air, water, and soil pollution in the region, primarily due to emissions of suspended particles, heavy metals, and sulfur dioxide [103–105]. Mining in Bor causes stronger pollution than in Majdanpek [97], although recent detonations of Starica Mountain—situated directly above the settlement—have raised concerns about residents’ safety and water supply, as they obstruct underground water streams characteristic of limestone formations [102]. Elevated sulfur dioxide levels from metallurgical processes in Bor have caused soil acidification, vegetation loss, and erosion, while also contributing to landslides and contamination of surface and groundwater—particularly the Bor River, whose quality often falls below national standards [103,105–107].

Beyond the direct health effects on residents, local well-being is further compromised by the reduced quality of agricultural products cultivated in the surrounding areas [108]. Long-term mining activity has led to the occupation of agricultural, forest and construction land, and the removal of the topsoil has led to severe degradation of arable areas; however, soil remediation and revitalisation have been omitted for decades [104]. It is estimated that over 25,000 hectares of land have been damaged.

4. Results

4.1. Awareness of Local Community Issues

Figure 2 presents the issues that residents perceive as the most pressing in their communities. As shown, environmental problems are identified by the largest proportion of respondents (39.1%), followed by displacement due to proximity to the mine (19%), while unemployment is considered a major concern by the smallest proportion (5.4%). The “Other” category, selected by 4% of respondents, was open-ended, allowing participants to indicate the issues that concern them most. The responses included corruption, current government performance, lack of healthcare services, insufficient cultural and recreational facilities, poor roads and infrastructure, substandard housing conditions, frequent power outages, and inadequate social support.

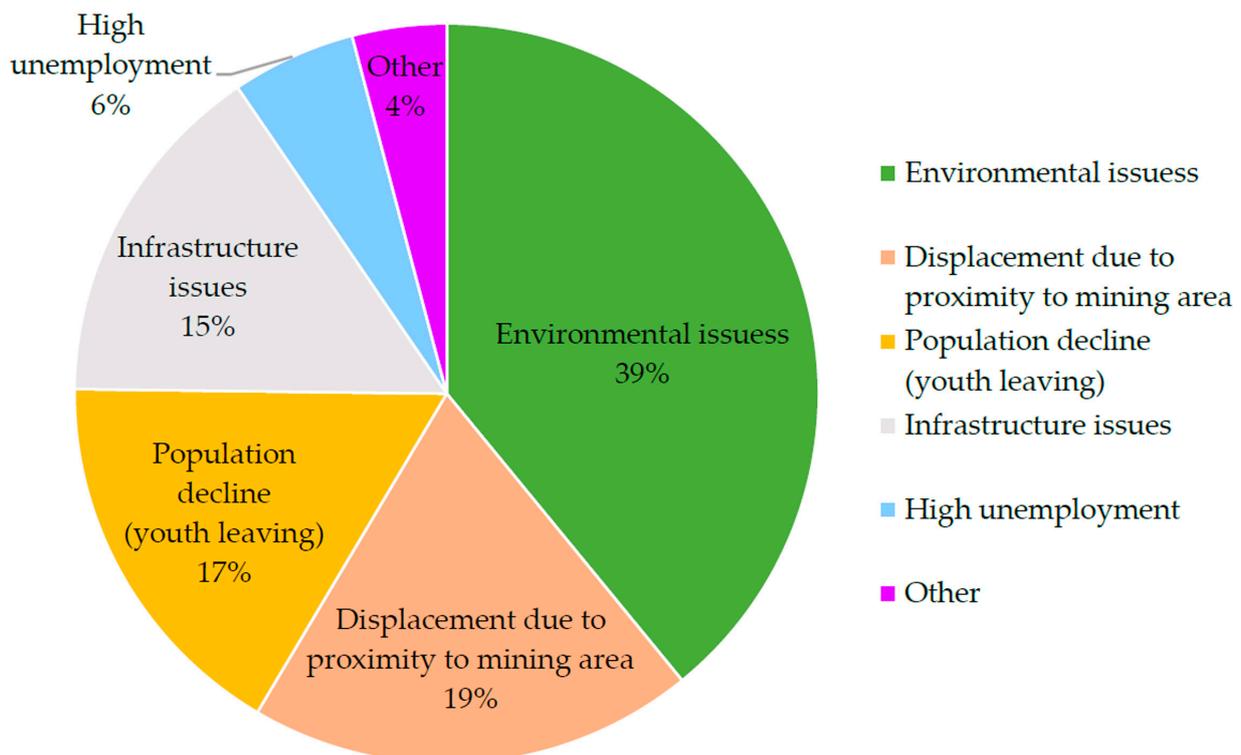


Figure 2. Key issues of concern for citizens in their local community.

Regarding all socio-demographic indicators, a statistically significant relationship was found between age groups and perceived problems in the local community ($\chi^2(15) = 35.392$, $p = 0.002$). Respondents aged 45–64 expressed greater concern compared to other age groups for environmental issues, displacement due to proximity to mining areas, and municipal problems. In contrast, the youngest age group (20–24 years) did not show pronounced concern for displacement and municipal issues. This younger cohort was primarily worried about environmental problems and the outflow of young residents. Other age groups demonstrated a more balanced concern across almost all issues, with environmental problems being dominant across generations.

A statistically significant relationship was also identified between education level and perceived community problems ($\chi^2(10) = 18.648$, $p = 0.045$). Respondents with secondary and higher education most frequently indicated environmental problems as the primary challenge in their community. Among those with tertiary education (completed university or higher), the outflow of residents—particularly younger populations—emerged as the second most frequently cited concern, following environmental issues. Conversely, respondents with no formal education or lower educational attainment more often expressed concern regarding displacement due to proximity to mining areas.

Additionally, a statistically significant relationship was found between place of residence and perceived community problems ($\chi^2(15) = 72.184$, $p = 0.001$). Urban residents of Bor were concerned about environmental problems, which is expected, given that urban areas are most exposed to industrial activity and pollution. In contrast, rural residents in Bor were more concerned about displacement, which is consistent with the fact that some sampled villages were directly affected. Rural residents in Majdanpek were primarily concerned with municipal issues, likely reflecting long-term neglect of infrastructure and limited investment in rural areas. At a descriptive level, though not statistically significant, women expressed slightly greater concern for environmental problems than men, whereas men showed slightly greater concern for municipal issues.

4.2. Citizen Participation in the Urban/Spatial Planning Process and Preferred Methods

Given that the majority of respondents identified environmental and, to a lesser extent, social impacts as the most significant consequences of mining activities, we next examined their participation in shaping planning documents and their preferred methods of engagement. Finally, we explored the ways in which citizens feel most comfortable expressing their views during the planning process.

A striking 40% of respondents stated that they were not aware that early public review exists, and even if they had known, they would not have participated. A similar percentage was observed for the public review (36.2%). This points to a general lack of awareness, but also indicates potential for future engagement, as 28.0%/27.9% of respondents said they had not heard of early public review/public review but would be willing to participate. Conversely, nearly the same proportion (27.0%/29.2%) were informed about the opportunity but chose not to engage.

Pollsters also reported that many respondents were unable to distinguish between the early public review and the public review stages of planning procedures, which likely explains the similar response rates regarding participation in both stages (Figure 3).

Only 4.3% of respondents reported having participated in the early public review of planning documents. Among them, men are notably more represented (61.5%) than women (38.5%). Most belong to the 45–64 age group (53.8%), followed by those 65 years and older (30.8%) and aged 25–44 (15.4%). Not a single respondent aged 20–24 had ever taken part in an early public review. A slightly higher, yet still low, share of respondents (6.7%) participated in the public review. Notably, participation was higher among men

(75.0%) than among women (25.0%). The youngest age group was absent from the public review, while citizens aged 45–64 and those over 64 were equally represented (40.0% each). In contrast, individuals aged 25–44 participated to a lesser extent (20.0%).



Figure 3. Participation of the local population in the planning document development.

In terms of education, in the early public review, all levels were represented, but respondents with secondary or post-secondary education formed the largest group (46.2%), followed by those with low or no formal education (30.8%) and those with higher education (23.1%). This finding is significant as it shows that participation is not limited to highly educated citizens—individuals with lower levels of education also tend to get involved in shaping planning documents. A similar trend is observed in the public review process: half of the active respondents have secondary or post-secondary education, while those with low or no formal education (30.0%) and those with higher or the highest education (20.0%) are represented in proportions similar to those in the early public review.

Regarding employment status, participants who were involved in an early public review/public review were mostly permanently employed (46.2%/40.0%) or retired (38.4%/35.0%), while those temporarily employed (7.7%/10.0%) or unemployed were least represented (7.7%/15.0% each). In terms of occupation, the respondents who were engaged in the planning procedure were dominated by retirees and individuals in technical or administrative professions. Participants were distributed across both urban and rural areas, with 38.5%/30.0% from urban Bor, 15.3%/40.0% from rural Bor, and 23.1%/15.0% each from urban and rural settlements in Majdanpek. A noticeably higher percentage of residents from the rural area of Bor participated in the public review compared to their participation in the early public review.

Responses regarding participation in the early public review/public review were grouped into two categories. The first category included respondents who selected “I have participated” and “I haven’t heard about it, but I would have gladly participated.” The second category comprised those who chose “I know there is an opportunity to participate, but I haven’t participated” and “I haven’t heard of it, and even if I had, I

wouldn't have participated." This classification allowed us to distinguish between citizens with participatory potential and those without participatory intent. The first group—citizens with participatory potential—accounts for only 32.6%/34.6% of the sample, while the second group—citizens without participatory intent—represents 67.4%/65.4%. The finding that nearly two-thirds of respondents have neither participated nor expressed an intention to participate in the process of developing planning documents (specifically, the early public review) indicates a generally low participatory potential among residents. No statistically significant relationship was found between these two groups and any of the examined sociodemographic variables.

As shown in Figure 4, no single participatory method stands out as clearly preferred over others. The diversity of responses can be partly explained by the limited education of residents regarding participation methods. Field reports from survey enumerators indicate a generally poor understanding of this topic among the local population, which further corroborates the previously noted finding on citizens' low levels of awareness. When asked to choose a single method, the largest proportion of respondents indicated a preference for live public discussions (27.3%), followed by panel discussions with participants from other cities or countries to share experiences (11.4%), and public presentation of plans at the municipal premises (text and maps) (10.4%).

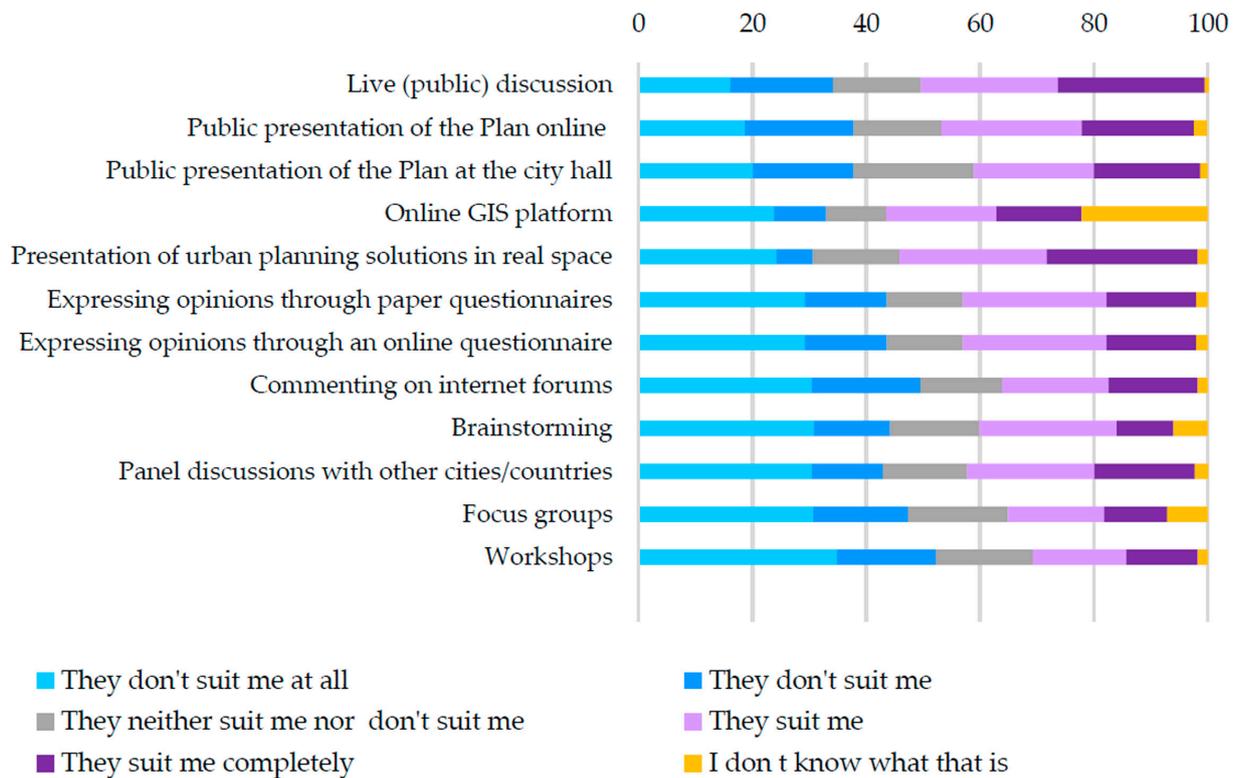


Figure 4. The method that best suits the needs of the local population.

We were particularly interested in understanding the reasons behind the choice of anonymous versus attributed participation, given the specific social context and diverse attitudes toward mining and its implications in Serbia. The reasons for presenting opinions under one's real name can be grouped as follows: (1) accountability and potential consequences; (2) moral and ethical considerations, integrity, absence of fear, and freedom of expression; and (3) transparency. Conversely, the reasons for preferring anonymous input were primarily related to (1) personal safety and security. Table 3 provides the detailed responses of participants corresponding to these categories.

Table 3. Reasons addressed in favour of named participation/anonymity.

Named Participation	Motivation	Anonymous Participation	Motivation
Responsibility & Accountability	Ensures input is recognised, weighs opinions, holds self/others accountable	Avoiding Negative Consequences	Prevents professional, social, or political repercussions
Morality, Integrity & Freedom of Expression	Personal ethics, integrity, and freedom to express oneself openly	Emotional Comfort/Avoiding Discomfort	Reduces stress, feels safe, avoids social judgment
Transparency	Promotes legitimacy, openness, and public trust	Safety & Security	Protects identity, privacy, and personal safety

Source: authors.

4.3. Reaching Information and Preferred Information Channels

In addition to low participatory potential, the local population is also poorly informed about urban development plans. As many as 73.8% of respondents rated their knowledge of development plans as nonexistent or very poor. Only 4.1% described themselves as very well informed, and 22.1% as well informed. Who are the well-informed respondents? Among them, women are slightly more represented. In terms of occupation, the most prevalent groups are retirees (20.8%), followed by skilled workers (16.9%) and professionals (13%). Respondents from rural areas rated their level of awareness lower than those from urban areas. Respondents aged 45–64 years are better informed than other age groups.

Given the high proportion of respondents who rated their awareness of spatial and urban planning as low or non-existent, it is important to examine how citizens currently obtain information about municipal and city plans. The survey first included an open-ended question, allowing respondents to indicate their sources of information. The majority of residents identified the internet and social media as their primary channels (25.0%). Notably, 22.7% reported that they do not actively seek information, providing answers such as “nowhere,” “I have no source,” “in no way,” “I hear something occasionally,” and “I am not interested,” among others. Within this category of open-ended responses, several explicitly highlighted issues of non-transparency: for example, “plans are not available, they are posted and quickly removed from the municipal website,” “nowhere, no one informs us, only the mayor knows,” and “nowhere, we had to inquire about everything ourselves at the urban planning office”.

Unsurprisingly, informal social networks emerged as the next most frequently cited source (19.3%), just behind the internet and social media. In contexts where official information is limited or insufficiently transparent, people rely on informal social networks to stay informed. Respondents described these networks as encompassing parents, children, acquaintances, friends, colleagues, shop assistants, cleaners, neighbours, social circles, a husband who is a journalist, a wife working for the City/Municipality, activists, other residents, people “around the village,” and those at the market. These findings are particularly relevant for stakeholders involved in citizen information and engagement, as informal networks represent a critical communication channel that should not be strategically overlooked in efforts to improve public awareness of planning processes.

In addition to open-ended questions, respondents were asked whether they would like to receive information through specific channels. Their answers are presented in Figure 5.

Among the responses, the internet and social media clearly predominate, except for personalised communication via email, which was preferred by only 35.7% of respondents. Traditional media—such as local and national newspapers, the Official Gazette, and radio stations—have largely lost their significance as sources of information. Among traditional media, flyers, posters, and television still retain some relevance, with slightly more than half of respondents indicating a preference for these channels.

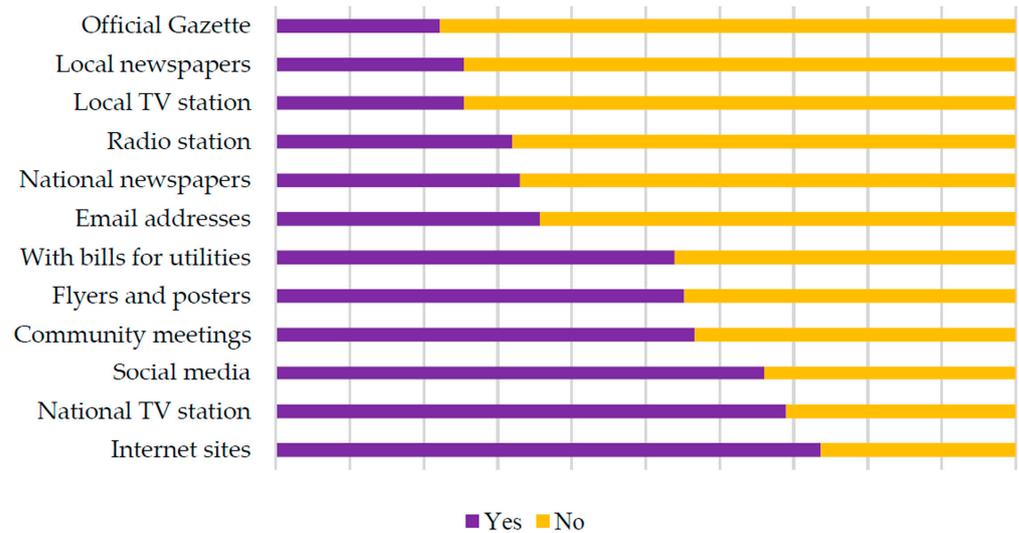


Figure 5. Citizens' preferences for information delivery channels (%).

It is important to note that respondents expressed greater trust in national than in local television stations, with 69.0% indicating a preference for receiving information via national TV and 53.4% via local TV. Another noteworthy finding is that respondents would rather receive information through utility bills than via email, suggesting that traditional media still dominate over modern technological channels in personalised communication. Additionally, the continued importance of face-to-face communication is evident, as over 50% of respondents preferred obtaining information at local community meetings.

A clear generational trend is evident: younger respondents tend to prefer digital channels, middle-aged respondents show mixed preferences, and older respondents favour in-person and traditional channels. As shown in Figure 6, social media dominates as the primary source of information for the youngest respondents (20–24 years). Those aged 25–44 rely more on websites than other age groups. Respondents aged 45–64 are receptive to both websites and in-person or traditional channels, such as community meetings and information delivered via utility bills. Among the oldest respondents, the main sources of information remain primarily in-person and traditional channels, including community meetings, local TV stations, and, to a lesser extent, national TV stations.

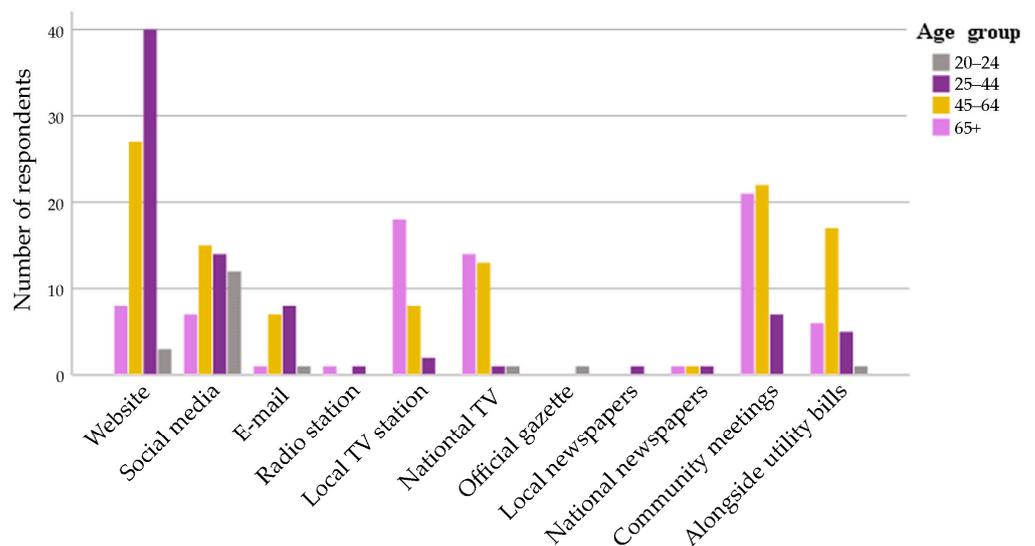


Figure 6. Preferred information sources by age group.

4.4. Motivation of Citizens to Participate in the Development of Planning Documents

Given the low levels of participation and limited awareness, it is important to examine what motivates residents to engage in the planning process. As illustrated in Figure 7, the most frequently cited motivation is the desire to improve the community (34.1%), followed by personal concern regarding a specific issue (27.2%). However, a concerning finding is that 25.1% of respondents indicated that nothing motivates them to participate at all.

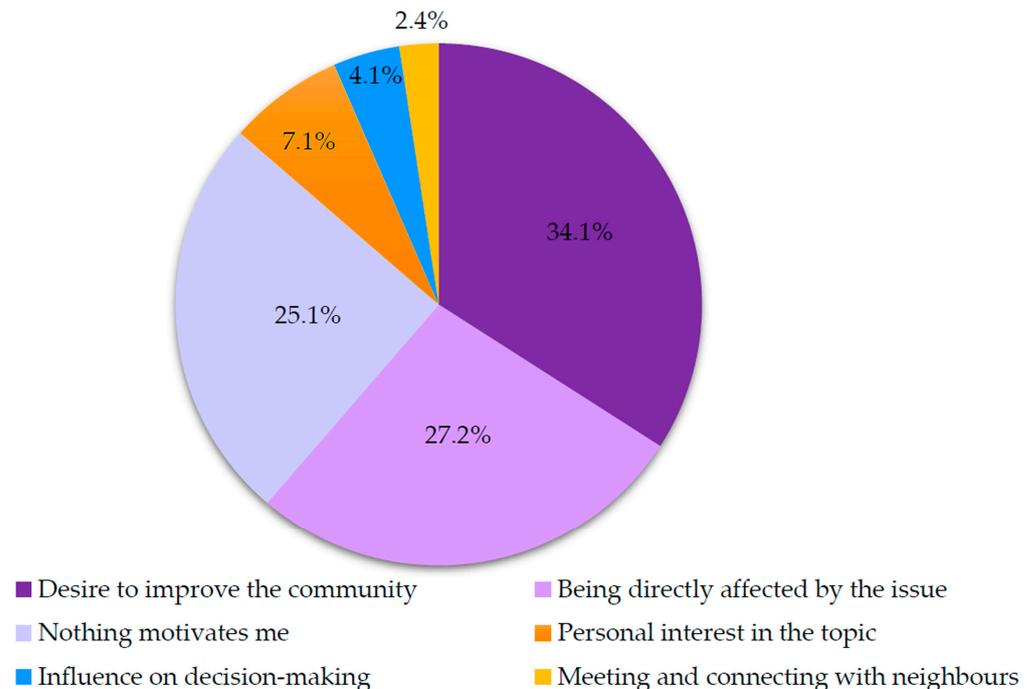


Figure 7. The main residents' motives for participating in the planning document development.

The main reasons cited by citizens for not participating more actively in the planning document creation process are a belief that they cannot make a difference (33.0%), followed by a lack of information (18.2%) and a lack of interest (17.2%). Smaller proportions of respondents identified other reasons, including lack of expertise in the relevant field (10.8%), absence of feedback or response (9.0%), and lack of time (4.7.0%). In addition to the provided options, 7.4% of respondents selected "other" and mentioned factors such as rudeness, fear (of authorities, blackmail, workplace coercion), relocation, disinterest among young people, feelings of powerlessness against profit-driven, self-interested stakeholders, distrust in authorities (both local and national), and a perceived lack of interest from local authorities in involving citizens in planning.

As Figure 8 indicates, the majority of respondents are willing to dedicate as much time as necessary to the planning document creation process, with only 14.5% indicating that they are not willing to engage at all. When participating in this process, residents prefer to express their opinions orally, in person, during a meeting or public discussion (57.6%), followed by online platforms (24.9%). The smallest proportion of respondents (17.5%) prefer to provide written input in paper form. Citizens are more inclined to express their views openly, with their names attached (29.5%), rather than anonymously (18.6%), although the largest proportion indicated no preference (51.9%).

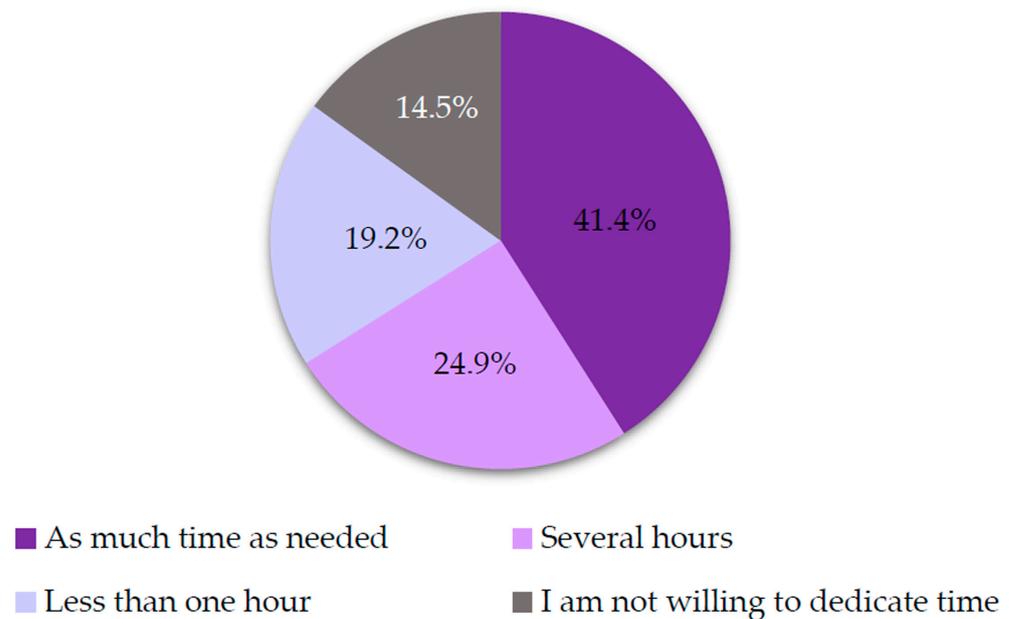


Figure 8. Willingness of citizens to dedicate time to the planning document creation process.

4.5. Citizens' Proposals for Improving Participation Methods and Information Channels

We focused on the local perspective and invited citizens to propose ways to improve public awareness regarding participation in spatial and urban planning processes. Unlike the previously mentioned questions, this one was open-ended, aiming to elicit a wide range of responses and to avoid constraining respondents in their choice of information channels. Almost one-third of participants did not provide an answer, which is discouraging: on the one hand, respondents pointed to the problem of non-transparency, yet when asked how the flow of information could be improved, a considerable proportion offered no suggestions.

The responses received were diverse. The largest share of respondents perceived the greatest potential for improving information dissemination in traditional media—particularly through the freedom and strengthening of both national and local media outlets—with an emphasis on revitalising local TV stations and newspapers (18%). Another group (12.4%) highlighted the internet and social media as key tools for improving public awareness, suggesting the regular updating of municipal websites, activation of village portals, and the use of online campaigns.

Respondents also emphasised the importance of transparency, education, and continuous communication with citizens, as well as the professionalism, commitment, and sincerity of mayors and local authorities (12.3%). Several participants mentioned the distribution of promotional materials—such as leaflets, flyers, posters, visual panels, and billboards—as potential awareness-raising instruments (8.7%). Less frequently mentioned were the improvement of local community councils, citizen associations and meetings, public debates, and neighbourhood assemblies attended by local government representatives.

A few respondents pointed to the significance of the “digitalisation of democracy,” proposing that citizens could be informed through electronic channels such as email, SMS, Viber, telephone calls, utility bills, or letters delivered to home addresses. Although less common, several responses referred to political and economic preconditions for improving the quality of public information, including statements such as: “the government should stabilise,” “people’s brains should be cleansed of politics” “citizens need increased salaries so think more about where they live rather than what to eat,” and “we should expel the Chinese company”.

Some participants also stressed the need for a more proactive approach among citizens themselves, particularly among younger generations (“Those who want to know, will know”, “People should take more interest themselves,” “Young people should take more initiative to explain things to the elderly”). Finally, a few respondents expressed a deeply pessimistic attitude toward the prospects of improving public awareness, which is reflected in statements such as “There is no hope for us” and “people are illiterate, stupid, the only way is to implant something in their heads”.

The next open-ended question asked citizens whether they had any suggestions for improving methods of public participation in spatial and urban planning. The aim was again to avoid constraining respondents with predefined options and to allow them to freely express their views on the matter. Unfortunately, nearly half of the respondents (47.0%) did not provide an answer. Many suggestions had already been mentioned in the previous question, so here we only report those that appeared for the first time or were further elaborated in this section. Given the diversity of responses and their low individual frequency, we present them briefly to provide a qualitative overview of all suggestions, emphasising that each appeared in only a negligible percentage of responses.

Among the proposed improvements to participation methods, some respondents mentioned introducing a legal obligation for direct citizen voting via e-government, as well as financial incentives. Others emphasised the importance of considering citizens’ remarks and suggestions and providing feedback. Prior to these steps, however, respondents pointed out that the way citizens are informed plays a crucial role—highlighting the need for transparency, clarity, and simplicity in reporting and during public hearings, with an honest presentation of plans, “without lies or manipulation,” as several stated.

Respondents also proposed conducting more surveys and interviews (both online and in person) with residents. As with improving information access, socio-political factors were often mentioned as prerequisites for better participation methods, including “a change of government”, “depoliticisation of local authorities”, “stopping the depopulation of the area”, “restoring trust in institutions”, and “giving everyone a voice at public meetings, not only those supporting the ruling party”. Others stressed that trust will return only when citizen proposals are truly implemented and promises made before elections are fulfilled afterwards.

According to many respondents, improving participation methods also requires raising awareness of the importance of participation and encouraging citizens to take initiative: “Warn people what will happen if they don’t participate”, “Find initiators (leaders) among interested people”, “Identify self-aware, open-minded, educated individuals willing to engage without personal interest”, “Dialogue—stop watching Pink and Happy TV channels”—commercial television stations with national coverage, characterised programmatically by entertainment formats, reality shows, and mass culture content, alongside the presence of news programming. They are often perceived as media favourable to the current government, although they formally operate as independent commercial entities. Taking initiative was frequently linked to youth engagement, with an emphasis on motivating young people from an early age and engaging them through social media and youth workshops.

This question, too, revealed a degree of pessimism among respondents, expressed in statements such as “There’s no point in doing anything” and “There’s no help for us”. The reasons for such attitudes were attributed to low trust in institutions, the perception that personal interests dominate public life, and the belief that the ageing population means that “there is no one left to participate in the planning processes”.

5. Discussion

These findings highlight the salience of environmental issues in the everyday concerns of residents in mining-affected regions, reflecting localised manifestations of Anthropocene challenges, where human activity has created direct and tangible impacts on socio-ecological systems [36,37]. The prioritisation of ecological degradation over economic concerns such as unemployment suggests that communities living near extractive industries are particularly responsive to immediate and visible environmental impacts [109,110]. Moreover, the diversity of responses under “Other” underscores the interconnection of environmental problems with governance, infrastructure, and social welfare issues, highlighting the cumulative and inseparable nature of socio-environmental pressures [22,23]. Collectively, these patterns suggest that meaningful public participation in spatial planning must account for both ecological and socio-political concerns to address the cumulative risks faced by residents effectively.

Residents’ prioritisation of environmental over economic concerns aligns with global findings from mining regions, where local communities tend to focus on visible ecological degradation [23,36,37]. Similar patterns in Chile and Peru show that issues such as water contamination outweigh employment considerations [43,44]. These parallels indicate that localised manifestations of Anthropocene pressures strongly shape residents’ perceptions and motivations for participation.

Residents’ perceptions of local issues also vary by age, education, and settlement type, indicating that participatory mechanisms cannot adopt a uniform approach. Tailored strategies are required to respond to the specific concerns and capacities of different demographic groups [22,50,111,112]. In mining regions shaped by long-term industrial activity and socio-economic transformation, inclusive and responsive participatory planning is essential to rebuild trust, address cumulative impacts, and empower communities to influence territorial development.

The low rate of public participation and limited awareness of planning mechanisms in Bor and Majdanpek reflect broader participation deficits observed in post-socialist contexts, where formal opportunities often coexist with weak institutional communication and low citizen trust [54,113]. Procedural confusion and limited outreach underscore a lack of transparency, echoing observations that in transitional societies, participation is frequently reduced to formal compliance rather than meaningful engagement [52,64,114,115]. Arnstein’s ladder of citizen participation suggests [116] that local processes rarely surpass the lowest rungs of manipulation and tokenism, with minimal engagement even at the “informing” stage. Generational differences and the near absence of youth participation reinforce the perception of planning as technical rather than democratic [20,54]. Strengthening participation, therefore, requires better information channels, civic education, and the rebuilding of trust between citizens and institutions [1].

Low levels of participation, distrust, and procedural uncertainty correspond with literature on neoliberal governance, where engagement often remains symbolic and constrained by institutional arrangements [19,42,48]. Comparable dynamics have been reported in post-industrial regions in the UK and Australia, where market-oriented planning logics and selective involvement limit meaningful participation [46,77]. This suggests that challenges observed in Bor and Majdanpek are characteristic of broader governance regimes in extractive and transitional contexts.

Regarding communication channels, residents rely heavily on digital platforms while informal social networks remain a critical supplement where official communication is limited. Traditional media, community meetings, and even utility bills continue to play a role, highlighting the value of tangible and interpersonal channels in fostering trust [52,54].

Preferences for national over local TV indicate that the legitimacy and authority of information sources shape engagement. These findings highlight the need to combine digital, traditional, and face-to-face channels to enhance transparency and accessibility and move beyond tokenistic participation [54,116].

The diversity of preferences for participation methods and channels mirrors challenges identified in other countries. In Canada, Australia, and the Netherlands, residents in mining or industrial regions often prefer in-person and deliberative formats over formal written submissions, reflecting a desire for dialogue, transparency, and accountability [50,52,61,62]. Our findings reinforce the idea that participatory democracy is contextually mediated: socio-demographic factors, trust, and familiarity with planning processes determine both willingness to participate and preferred modes of engagement.

Participation in Bor and Majdanpek remains largely symbolic, with low trust and limited influence in decision-making, which Wilson et al. [117] identify as common problems in participatory processes in general. Politicisation of planning further constrains meaningful engagement. As Grange [118] notes, planners may align with neoliberal decisionism, making non-grounded decisions driven by political agendas. Zeković, Perić, and Hadžić [119] show how, in post-socialist Serbia, planning can become a tool for financialised urban development, leaving little room for citizen input. Non-participation is further reinforced by interpersonal distrust, with some residents expressing scepticism toward their fellow citizens and perceiving collective action as futile, generating hopelessness [120–122]. Broader distrust toward state institutions and mining companies also shapes non-engagement, reflecting patterns seen even in developed countries [14,123,124]. Historical legacies of authoritarianism and low civic activism further exacerbate distrust and fear of sanctions [64,125,126]. The Serbian context, therefore, requires social dialogue and political will to enable participatory planning in a neoliberal and post-socialist setting [127].

Trust and transparency emerge as central determinants of meaningful engagement [121,128]. Citizens emphasised that procedural clarity, accessible information, and feedback mechanisms are prerequisites for active participation [129,130]. Grassroots and social networks also play a crucial role, complementing formal channels and enabling bottom-up engagement. Such initiatives often represent the highest rungs of Arnstein's ladder—partnership and citizen control—and can empower communities more effectively than tokenistic consultations [113,116,117,121,131]. Supporting grassroots activity can strengthen trust, increase civic agency, and bridge gaps left by top-down planning processes.

Education about the purpose and procedures of planning is critical, as understanding the process increases the likelihood of meaningful engagement [121,129]. Most respondents are willing to invest time in participation, indicating a latent capacity for engagement, provided mechanisms are transparent, meaningful, and perceived as effective. Preferences regarding anonymity versus attributed participation highlight the tension between accountability and personal safety, suggesting that offering both options can enhance inclusivity, reduce fear, and improve trust [117,132].

6. Conclusions

The findings of this study reveal that public participation in the spatial planning of Serbia's extractive regions remains largely limited and formalistic. Survey results indicate that citizens' involvement in planning processes is low, primarily due to insufficient access to information and a widespread perception of powerlessness—many respondents believe that their engagement cannot influence decisions, and that the authorities are generally uninterested in citizens' views. This distrust is reinforced by the politicisation of planning

and the dominance of top-down, neoliberal decision-making practices that marginalise local voices.

In the context of the Anthropocene, where extractive industries intensify socio-environmental pressures, such exclusion undermines both democratic legitimacy and the pursuit of sustainability. Strengthening participation, therefore, requires improvements in several interrelated domains. Institutionally, planning needs to become more transparent, accountable, and depoliticised, ensuring that procedures enable genuine deliberation rather than formal compliance. Socially, citizens' capacities for informed participation should be enhanced through access to clear information, professional and legal support, and civic education about the purpose of planning and available participatory methods. Culturally, participation must be reframed from a reactive act into an ongoing process of negotiating collective spatial futures.

For practice, the study recommends developing context-sensitive participatory mechanisms in mining regions—such as local deliberative forums, participatory mapping, and Geodesign workshops—that connect expert, political, and community knowledge. Such approaches could rebuild trust and foster shared responsibility for spatial outcomes.

A primary limitation of this study is that it reflects only the perspectives of the local population in the Bor–Majdanpek region, without including other relevant stakeholders or vulnerable groups. The survey design also limited the depth of insight, as only a few open-ended questions were included. Additionally, the case study approach constrains the generalisation of the findings, since context-specific conditions in this region may not reflect those in other mining areas. These limitations could be addressed in future research by incorporating multiple stakeholder groups, using mixed qualitative methods to enrich context, and conducting comparative studies across different regions.

Future research should also explore comparative post-socialist cases to understand how participation evolves within hybrid governance systems. Interdisciplinary perspectives combining political ecology, planning theory, and participatory design may offer further insights into how participation can become not only a procedural right but a transformative tool for democratising planning in the era of the Anthropocene.

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Data Availability Statement: The data presented in this study are available from the corresponding author upon reasonable request. Although the survey was conducted anonymously, data sharing is restricted to protect respondent privacy.

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