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From Participation to Involvement in Urban Open Space Management and Maintenance

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Abstract: Urban open spaces (UOS) provide an everyday environment for residents to experience nature. However, the management of UOS—from zoning to construction and maintenance—tends to follow efficient and straight-forward processes lacking use of residents' experiences. This study first collected the views of management professionals on how participation can best benefit management of UOS. Second, a survey used biodiversity as a case to clarify how the ongoing changes in urban biotopes challenge conventional management of UOS. The results showed that especially in the maintenance phase of current UOS management there is potential to further involve residents in a continuous dialogue and activities to account for local perceptions, including residents' sensing and emotions raised by UOS. Such involvement may facilitate positive human-nature relations but may require new modes of interaction. We thus propose such adaptive management to foster residents' contribution to sustainability transition.

Keywords: strategic management; green spaces; residents' perceptions; governance; sustainability transition

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1. Introduction

Human beings' relationship with nature needs to change to mitigate and adapt to current and forthcoming global environmental changes such as climate change and the loss of biodiversity. Contemporary ways of using land and building on it, as well as the exploitation of the environment, struggle to meet the criteria, methods, and measurements [1,2] for sustainability. A sustainability transition requires that people understand the necessity of nature for humans. Even though the aforementioned environmental changes are global, people's perceptions of the environment tend to be formulated locally. Place-related experiences in cities may engage residents and become influential in transitions, and local user knowledge can be applied on larger scales [3,4].

Cities are thus platforms for studying spatial and temporal changes [5]. Elmqvist and others [6] considered cities as a field to explore the barriers and drivers of such sustainability transitions. In practice, urban environments—between the continual construction of new dwellings and the preservation of open land for the remnants of habitats and new parks—have been under increasing pressure. The pressure to find a balance between dwellings and urban nature constitutes a challenge in the relationship between humanity and nature.

Urban nature is a constantly evolving socio-ecological system in which the social dimension builds on planning priorities, management, maintenance, and use, and the ecological dimension consists of the entity of urban green, including naturally developed, man-made, and building-integrated habitats. Spatially, urban nature includes all biophysical elements that are green and growing, as well as the cycles of water, nutrients, and carbon that enable this growth. Urban nature as a socio-ecological system is thus subject

to constant, unpredictable change, which is governed not only by changing use but also according to predetermined maintenance practices. Aronson and others [7] claimed that the management of urban green spaces is one of the most important factors for conserving urban biodiversity. Therefore, the management of urban nature constitutes a practical case to study socio-ecological interaction, in which continual adaptation of policies and practices must be balanced between the continual changes in biophysical elements and urban life.

Urban open spaces (UOS) as urban nature comprise vegetated green areas, known as urban green, and additionally hard surfaces, water elements, and brown areas for spontaneous vegetation and use [8]. As publicly accessible sites, they are sources of recreation due to the nature experiences they provide, the different services they offer, and the social environment they constitute; furthermore, their impact on psychological and physical health has increasingly been acknowledged [9–11]. UOS also yield indirect benefits such as improved air quality and noise reduction [12], and at best, carbon sinks. The UOS and the component of urban green can thus be seen as the biophysical platform that may provide multiple ecosystem services if functioning well enough [13]. However, anthropogenic approaches that cite the benefits of UOS may override the needs for urban biodiversity. Therefore, the promotion of biodiversity needs to be fostered to enhance the wellbeing of both urban ecosystems and humans which requires adaptiveness and can be shaped by human beings [14]; this fact should challenge the management of UOS to be open to learn and benefit from various reflections and measurements [15] to ultimately make changes.

Adaptiveness also concerns participatory processes or methods which enable residents' involvement to impact sustainability transitions. Public involvement tends to follow different patterns of organised and non-organised activities [16], which generates interactive dialogues or actions and convey local and place-based perceptions to management. Perceptions imply self-reported quality of life as far as it relates to benefits of UOS [17]. Residents' perceptions of the management of UOS can be combined with other types of information [16]; however, individuals' sensory perceptions are essential to recognising intangible and tangible values and local characteristics [18]. The management of UOS is led by authorities, is based on long-term planning, and addresses changes over the course of time. Nevertheless, how such goals can benefit from the management's involvement (i.e., how management can utilise local perceptions and resources) has not been explored in efforts to foster sustainability transitions in cities. Therefore, professionals' attitudes and views need to be understood when framing how residents' involvement could be integrated into the overall management of UOS.

This paper aims to clarify how the management of UOS could benefit from residents' involvement in current and accelerating changes in UOS. The pursuit of efficiency has resulted in several management theories to streamline processes, some of which have been adopted in the field of UOS management. Simultaneously, understanding management and maintenance related to the practices of UOS can play a key role in facilitating residents' involvement. However, participation can take different forms and consist of objectives in different phases of UOS management. This serves as a basis for our research questions (RQ): (RQ1) How are residents' perceptions currently accounted for in UOS management? (RQ2) What are potential ways to improve UOS management to better consider residents' perceptions, and how can these ways best be implemented?

2. Theoretical Framework

2.1. Management of Urban Open Spaces

The management of UOS, as a part of green infrastructure, has roots in regional and local policies and strategies in the European Union. The phases of managing UOS that we now describe are bound partly to land use planning and partly to the strategies of multiscale approaches to achieve environmental and economic benefits [4]. Spatial planning of UOS includes initial urban planning zoning, which integrates large-scale strategies to foster decisions in the subsequent process. The scoping phase precedes the objective-

setting phase, before leading into the phase of general planning. When the construction and adjoining design phase are not required, site development and maintenance may start immediately after general planning (Figure 1). In this process, public participation is regulated by the government during the planning phase but may also take place in municipality-specific forms, allowing for the contribution of different kinds of information. In order to formulate a strategy of UOS, the analytical part is managed by databased information and the action part makes use of local monitoring systems [19], which can be applied to the management of UOS. Nauman and others [20] determined the enabling factors of a successful UOS management process, emphasising the relevance of each phase, which also requires the management of biodiversity at multiple scales [4]. Consequently, this process for the management of UOS shows the official steps but does not indicate the participatory methods within the process.

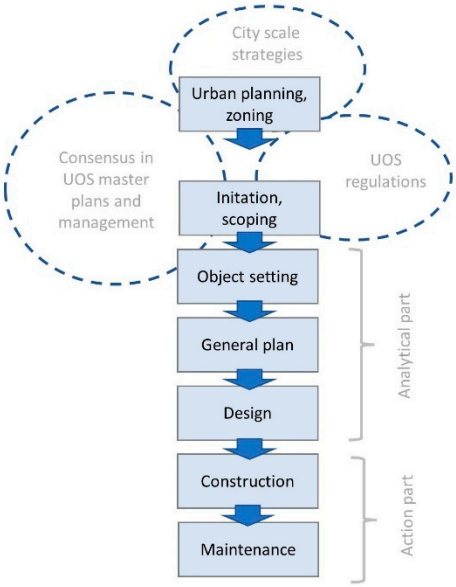

Figure 1. Management of urban open spaces (UOS) modified from Costa and others [19]; Nauman and others [20]; Pantaloni and others [4] include the phases from initiation to maintenance.

2.2. Management Concepts

Management is generally used as a concept in both the public and private sectors [21,22], but management theory tends to describe several more detailed approaches on how to manage effective productions and efficient operations [23,24]. Management theory stresses the choice of appropriate tools for varying situations and organisational conditions and contains ideas about the efficiency of production, business, and innovation activities in the fields of economics and engineering. The ideas of management theory have been applied to all professional fields and organisation types.

Public management has had a different development trajectory than management in the private sector and has been influenced by societal changes. At the macro level, external changes relate to international and national issues, as well as organisations of public institutions, while the micro level is comprised of the development of tools and practices [25,26]. In the late twentieth century, the privatisation and outsourcing of private markets led public management to pursue efficiency by learning from the private sector. Then, the prevailing international state of management, public value management [27] was renewed and led to the use of the concept of governance [26] to describe, in addition to government actions, more flexible methods of governing with different stakeholders. This change blurred the boundaries between different sectors, especially those between the larger public, private, and voluntary sectors.

Dynamic management aims to respond to situations predictively and may fit well with the needs of maintenance of UOS in a way that preserves and sustains urban nature.

However, the maintenance of UOS is based on estimations of use that combines different elements into an understanding of overall performance [28]. Such estimation of use follows instructions and standards, which also form the basis for assessments. Thus, maintenance is not a stationary stage but can be improved to bring about acceptable conditions and preserve the value of UOS.

UOS differ from private management due to the complexity of the goals for such spaces [25,29]—they not only concern physical places, but also social environments. The local context seems to be the premise for understanding such systems. Dempsey and Burton [29] defined UOS as a product which requires long-term place-keeping, thereby transforming it through place-making by users. The relationship between place and ongoing local processes also enables adaptiveness and recognition of different local coalitions, grassroot-level actors, and niches' potential to react to changes in natural systems [15]. The benefits of complexity in an adaptive approach have been acknowledged in environmental and ecosystem management since 1970 [30]; this approach was later adopted by the field of forestry as a process of policies and practices which continually develop through learning outcomes [31]. Adaptive management has not yet been applied in UOS because promoting biodiversity has not been the central focus of UOS management, and due to outsourcing, contracts often determine the allocation of resources.

Participatory democracy is related to public administrations (i.e., government utilises policy-oriented initiatives in governing UOS), whereas governance implements democracy and participation through practical cases in UOS. The governance of UOS involves collaboration with "government or non-government actors" based on negotiated rules [8] and can be independently driven or done through organisations. Governance acknowledges the significant diversity of participatory approaches [32] and can be established customs with third-sector and self-guided fourth-sector stakeholders [33], who serve as not only a resource but also long-term collaborators in terms of vision, decision-making, and power use [8].

Governance as participatory actions has not been defined in UOS management. We determined three prevailing approaches of management (labelled A, B, and C) to explore participation (Figure 2). The management of obligatory participation (Approach A) covers participation democracy in land use planning based on legislation in many countries [34,35] that have implemented bottom-up planning. The strategic management of UOS (Approach B) combines all phases from urban planning zoning to maintenance on the strategic, tactical, and operational levels [36,37]. The third approach defines the management of maintenance (Approach C) an ongoing maintenance which also considers the meaning of place-making and place-keeping [29].

The organisations which are responsible for the management of UOS have to develop expertise in terms of what the goals are for contemporary UOS. Recently, sustainability has become a key objective in UOS management [38] aiming to provide a balanced approach to ecological, economic, and social dimensions. Bennett and others [39] highlighted the twofold nature of sustainability, as it contributes to both ecosystems and citizens' wellbeing. The nature of municipal authorities may include the expertise of the ecological and economic dimensions, but the basis for social sustainability requires knowledge about residents and their needs, expectations, and values. As a concept, urban nature is not precise enough to be used in the management of UOS because it is important to understand land ownership and maintenance responsibilities in different parts of urban areas. In addition, management concerns not only vegetated areas but also hard surfaces, such as paving and decking, and infrastructural outdoor systems related to, for example, drainage and electricity. The management of UOS includes maintenance works involving "grey" urban structures, such as stormwater management and cleaning, and works of "green" urban structures, such as cutting, fertilising, and irrigation, many of them organised and targeted differently than a decade ago.

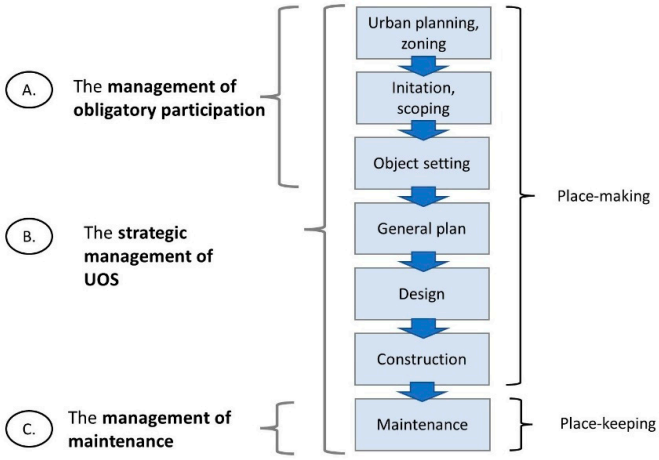

Figure 2. Three approaches to manage urban open spaces (UOS). (**A**) the management of obligatory participation, (**B**) the strategic management of UOS [36,37], and (**C**) the management of maintenance and its reflection for place-making and place-keeping [29].

Management guidelines and maintenance standards have often been adjusted to implement objectives and allocate resources in UOS. Therefore, these also convey the role of residents and how the role has been determined for management and maintenance in the twentieth century. Sustainable strategies have resulted in specific guidelines concerning UOS acknowledging residents' participation in management and involvement in maintenance [40–42]. However, maintenance standards [43,44] may determine the role of residents as service benefiter. In the UK, the Commission for Architecture and the Built Environment provided guidelines and programmes for site-specific management and maintenance planning. One such programme, the Green Flag Award scheme [45], recognises community participation as a part of the management planning process, which fundamentally relies on the involvement of individual residents in maintenance.

Consequently, the maintenance phase has the potential to enlarge residents' participation to respond to current changes of urban ecosystems. Guidelines and strategies may change over time according to prevailing policies, such as preferring outsourcing or stressing biodiversity. Thus, the aim of supporting a well-functioning socio-ecological system presents challenges in the role of residents in various areas—from strategies to maintenance. Since maintenance standards do not just include strategic actions, additional management of maintenance fosters residents' participation in appropriate long-term operational maintenance.

2.3. From Participation to Involvement

Public participation is regulated by law to ensure democratic practices, and its development has led to different modes of actions [46] in different fields. Since 1990, the Pillars for Effective Public Participation have been defined by International Association for Public Participation [47] with regard to development and implementation processes to advocate participation [47,48]. The concept is partly based on Sherry Arnstein's article "A Ladder of Citizens Participation" [49], which described the influence of participation through ladders and their rungs in the three main categories of non-participation, tokenism, and citizen power. These categories are comprised of eight subthemes which suggest that real participation is citizen control, whereas manipulation is the form on the other end of the spectrum [46,49]. This thinking was based on the notions that an organisation leads the process of participation and that the impact of participation increases linearly. The concept was also applied in additional studies [32,46,50] which also defined the form of participation and the role of the organisation as being a leader or an enabler.

The outcomes of participation depend on the methods used, and often, information gained from residents replaces deep participation in the cost-efficient management of

UOS. Inquiries, surveys, and data-based feedback (i.e., parallel channels) enable user knowledge but do not ensure understandings of perceptions, which refer to place-related knowledge, including emotions and senses [51]. Thus, involvement realised in interaction as activities or as a direct voice in dialogues allows for the understanding of perceptions and the formulation of responses to residents' aspirations [32,52,53]. Involvement also refers to ongoing processes which aim to achieve outcomes not only restricted to public decision-making but also based on long-term collaboration [54].

The choice of participation methods not only defines the type of information a municipality receives but also frames the perceptions of residents. The continual, dynamic transformation of the urban environment is a driver [55] that may transform residents from one-time participants into ongoing participants. Therefore, involving residents has the potential to incorporate them into regular governance; only permanent practices may be lacking. The triangle of the physical place, the users, and the organization [36,37] is the basis for the involvement in UOS; however, collaboration requires strategies and measures [52].

Recently, the importance of participation has increased. Urban densification has challenged planning processes, causing some to combine more functions in even smaller spaces. Simultaneously, the importance of UOS for residents and residents' interest in participation has increased. In addition, urban environments are constantly changing, and participation applies not only to the design phase but also to phases of use. Residents' roles have also shifted during the past 60 years from being voters to becoming co-creators [56], a phenomenon which is seen as important to cope with accelerating changes. Public participation represents an element of democracy, and in some cases, it is required by legislation, but in any case, participation transforms residents into stakeholders in UOS management and involvement in a continuous dialogue, and activities strengthen the potential benefits.

2.4. Management of Urban Biodiversity

Urban biodiversity is often more diverse than initially assumed [7,57]. The diversity of genes, taxonomies, and habitats, as well as different steps of succession, can be seen in the various and abundant habitats of the urban environment. In urban contexts, all habitats are affected by humans as they use, develop, and maintain the areas. Nilon [58] described urban biodiversity as an equal and continuously changing output of the ecosystem and the social system. The governance and management of urban biodiversity involves several professional fields; to improve their dialogue, a compact definition of biodiversity has been introduced for use by multi-professional working groups such as Werner and Zahner [59], who defined biodiversity as "the animals and plants living within the settled areas of a city". Urban ecology, conservation biology, urban planning, and engineering see urban biodiversity from different perspectives. Their discussions can thus focus on an ecological network for population dynamics that works on keeping the size and shape of the areas as natural as possible, on the connections built from UOS, on the residents' equal opportunity to achieve multi-species green environments, on the technical feasibility of green roof structures, or on the construction of suitable habitat for meadow vegetation.

Urban habitats are formed and modified during the implementation process of UOS. First, urban planning defines how a development might be located on landscape structure, which areas of pre-construction biotopes are to be preserved, and where to build new ones. Zoning stipulates how and where urban green penetrates other land uses and what the role of vegetation is in different land uses. Then, design and construction determine soil preparations, properties of growing media, and vegetation selection for new biotopes that may (or may not) provide habitats for fauna. In the last phase of the UOS management (i.e., the maintenance stage), both naturally developed and constructed biotopes are managed according to people's needs, general guidelines, and established techniques. The maintenance phase is the longest-lasting phase of the implementation process and has been seen as the essential one that affects urban biodiversity [58]. The practices in the maintenance phase have inevitably a strong, either positive or negative, effect on biodiversity.

According to Nilon [58], two different approaches to the management of urban biodiversity have been developed based on different origins: biodiversity management and biodiversity conservation. Conservation originates from the applied field of conservation biology, concentrating on rare species. Management, in turn, is based on the field of natural resource management and focuses on single species with ecological, social, or economic value. The difference between these two perspectives is essential for urban planning and the minimum areas in, for example, ecological corridors. Which mammals should ecological corridors be sized for? Are moose desired in city centres? Although the design phase defines the areas of green spaces, the maintenance phase also plays a key role in determining their qualities. In addition, biodiversity benefits both the stable and the transient diversity in urban areas. The transient land-uses provide a place for seminatural habitats, secondary succession, ruderal, pioneer environments, and open areas [60,61]. Urban biodiversity is therefore based on the spectrum of different kind of areas, not only to well-kept central parks. In addition, the management of urban biodiversity also requires recognition of the differences between species that are urban avoiders, urban utilisers, and urban dwellers, as Sandoval [62] stated.

Recent research on the relationship between urban biodiversity and resident has followed three approaches. First, residents' general attitudes towards diversity have been investigated through acceptability studies [63]. Second, studies have examined residents' activities benefiting biodiversity not only in decision-making or planning but also in gardening or as civic activity [64,65]. Studies that have followed the third approach focus on human wellbeing and health [66–68]. These tree research approaches also clarify the set of participation methods used in UOS.

The development of urban biodiversity can also be interpreted as a system that combines residents, the biophysical environment, and growth-supporting processes such as water, carbon, and nutrient cycles. The system approach to management stresses the complexity and dynamic nature of a system and requires more interactive and adaptive management as feedback is not completely predictable [69,70]. The fostering of the system, however, requires maintenance practices that are flexible in time and place and can adapt according to the commitment of the residents. In particular, public UOS could benefit from system-based and adaptive maintenance in public areas and offer solutions that connect residents and biodiversity. Public UOS tend to cover a large part of the city surface, provide commons for residents, and are often managed by one responsible authority according to one operating model.

3. Materials and Methods

3.1. Data Collection

The qualitative data for this study were collected in 2018 and 2021 in Finland. The workshop 2018 was used to collect empirical data for recognising professionals' opinions about public participation of the management of UOS. The survey was conducted in 2021 to complement understanding of UOS management in terms of anticipated changes. In the survey we adopted an instrumental case study approach using biodiversity-friendly management as a case, where qualitative exploration was applied to understand beyond the case [71]. Further, the case was utilised in an explanatory manner, i.e., for enlightening causal relations and mechanisms rather than merely for illustration.

In 2018, a three-hour workshop was organised for management professionals as a pre-seminar of an annual conference in Finland. An invitation was sent to all members of the Finnish Association of Landscape Industries in an e-newsletter. The workshop was chosen as a research method because it offered authentic collaboration related to participants' interests and produced data about the phenomenon under investigation [72]. We structured the workshop into the following phases: (1) introduction, (2) discussion, and (3) evaluation. A paper canvas measuring 300 cm × 125 cm was the working material. The management of UOS was presented on the canvas, including strategic, tactical, and operational phases. Two of the authors facilitated a group discussion, which is a suitable

research method to generate different opinions to be discussed [73]. The final outcomes were written notes of unlimited quantity.

The task was to discuss at which phases of UOS management user knowledge could be utilised and what kind of user knowledge the participants recognised. User knowledge is used for gained knowledge about and from customers in many fields [74,75]. In this study it was used as a general term, not being directive to the concepts of participation or involvement. The 16 participants all worked as professionals in the field of UOS both in public (n = 11) and private (n = 5) sectors. They were asked to mark the sectors of UOS management which they connected to the strategic, tactical, and operational management phases. Additionally, the section regarding user knowledge was divided into two parts—actual user knowledge and potential user knowledge—to which they added their discussed opinions. Figure 3 shows the content of the workshop canvas with all notes added and translated into English. The participants were familiar with the management of UOS, having an understanding about how user knowledge is related to the different phases and how it can be utilised for strategic, tactical, and operational purposes. The method provides a comprehensive understanding about the contemporary UOS management and the related user knowledge.

	Possibility to benefit the user knowledge in management:			*Actual use of user knowledge:*	*Potential use of user knowledge:*
	Strategic	*Tactical*	*Operational*		
Urban planning, zoning				Values about environment, history, narratives	User surveys and compilation for GIS
Initation, scoping				User experience, genius loci, belonging, property value	Applications for the use of big data (Envirate, Parkcheck)
Object setting				Hearing about an objective, utilizing general feedback from other projects	On-going feedback database, GIS, stories, collaborative learning, evaluation of impact
General plan				Feedback channels, making values visible for politicians, GIS-based channels	Digital methods to map use, place-based feedback, favourite places
Design				Systemic accumulation of feedback	Participative budgeting
Construction				Informing citizens	
Maintenance				Joint debate about maintenance, qualitative and quantitative feedback, pop up use	Maintenance by citizens, work party, participation in management planning

Figure 3. The workshop data from 2018 present the content of the canvas after the workshop. The participants replied with how user knowledge is related to the different phases of UOS management. The grey areas mark how the participants related strategic, tactical, and operational phases to UOS management.

The Likert scale survey enabled to measure the differences between attitudes [76]. The extreme ends represent the opposite stands, but do not require to choose only the negative or the positive preferences. Therefore, each statement describes the strength of the attitudes, perceptions, or opinions. We used a Likert survey [77] which included four statements leaving out an alternative for the opinion "I cannot say". The themes of the survey reflected to the respondents' everyday responsibilities in the professional field. When drafting the questions, it was assumed that the respondents were able to answer the questions, and that is why the answer scale was used from 1 to 4. The four statements were (1) strongly agree, (2) somewhat agree, (3) somewhat disagree, and (4) strongly disagree.

The survey was sent via e-mail to the members of the Association of Park Managers, as they represent full-time administrators responsible for UOS in municipalities and also form an active nationwide network in Finland. The two main themes of the survey were

(1) management and (2) residents and communities as stakeholders, both related to contemporary practices to increase biodiversity in UOS. The estimation time to complete the survey was 10–15 min in order to receive a good quantity of responses.

The survey provided 44 responses from the members of the Association of the Parks Managers (n = 127). The average years of work experience in UOS management was 25.7 and varied between 5 to 41 years. Years of work experience included possible practical maintenance work at the beginning of their careers, but mainly involved years working on the management of maintenance staff or in responsibilities in city-level UOS management. The survey was an efficient method to reach the professionals widely in Finland. Due to the anonymity of the survey respondents, it is not known if part or all of the 16 workshop participants were among the 44 participants of the survey.

3.2. Data Analysis

The operationalisation of the key concepts shows the definitions and the indicators for this study (Figure 4). The first analyses focused on participation versus involvement. The workshop data were transcripted and thereafter coded using the indicators. Then, the phases of strategic management were interpreted based on the indicators and combined with the previous analyses to answer the following operationalised research questions: (1) How are involvement and perceptions currently accounted for in UOS management? (RQ1) and (2) What are potential ways to better involve residents, also at the maintenance phase? (RQ2). Then, the management of UOS was explored through the lens of biodiversity to convey changes and answer the RQ2. The indicators were cyclic processes supporting growth and abundant plant species in UOS, which were indicated in the survey.

Concept	Definition	Indicator	Analysis	Research question
Participation excluding involvement	One-way communication, sharing	Digitally collected big data, feedback methods, surveys, official hearing	Participation versus involvement	RQ1
Involvement	Participation through activities or interactive dialogue	Local knowledge, narratives and interpretations that refer to localness		
Strategic management of UOS	Strategic, operational, and tactical management [36]	Strategic: analytical information for land-use scale; Tactical: information for objects; Operational: information and instructions for action	Phases of management	RQ2
Biodiversity	Diversity of flora and fauna, diversity of habitats	1. Cyclic processes supporting the growth (water, nutrient, and carbon cycles) 2. Abundant in species and communities	Different phases of management through the lens of biodiversity	RQ2

Figure 4. Operationalisation of key concepts.

The second and the third steps included two more analyses. Next, the results were combined to the phases of strategic management of UOS as they were recorded in the workshop data. The survey was collected as visual data to show the comparability in which participation was reflected to the phases of UOS management and biodiversity.

A deductive content analysis [78] was conducted to classify expressions of participation and involvement in the data. Participation includes all user knowledge, and therefore the indicators for participation excluding involvement and involvement were determined from the transcription material. First, involvement consists of regular activities or interactive dialogue and the indicators convey localness. Secondly, the methods of capturing participation excluding involvement do not enable interaction. Then, involvement was coded. The moderate involvement comprised local knowledge which refers to involve-

ment, however the interactivity cannot be confirmed (e.g., "narratives about an area"). The activity and dialogues were ensured in the category of strong involvement (e.g., "joint debate about maintenance", participating in management projects"). Both categories of involvement thus enable perceptions (Figure 5).

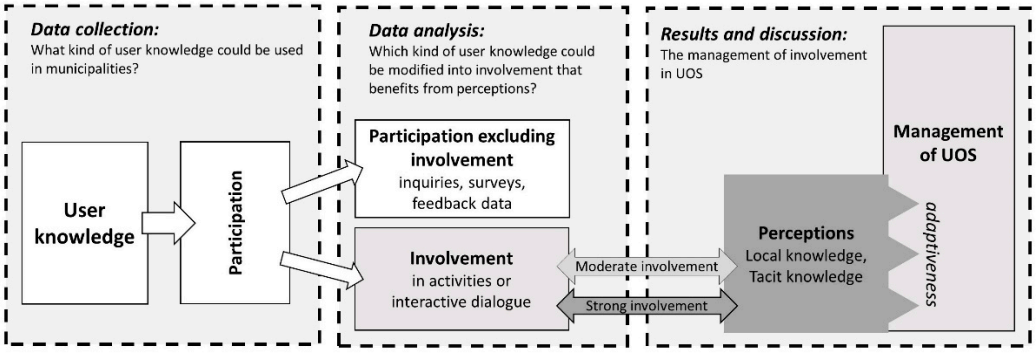

Figure 5. The user knowledge was coded as involvement by using deductive content analysis. After that, involvement was categorised into moderate and strong involvement.

4. Results

4.1. Participation and Involvement

Strong involvement was ascertained to belong to the maintenance phase with the potential to increase involvement. Moderate involvement was ascertained to belong to the strategic and tactical phases of UOS management in the following way: actual moderate involvement in urban planning and scoping corresponded to the phases of object-setting, general planning, and design related to the potential. Additionally, the construction phase did not indicate any participation (Figure 6).

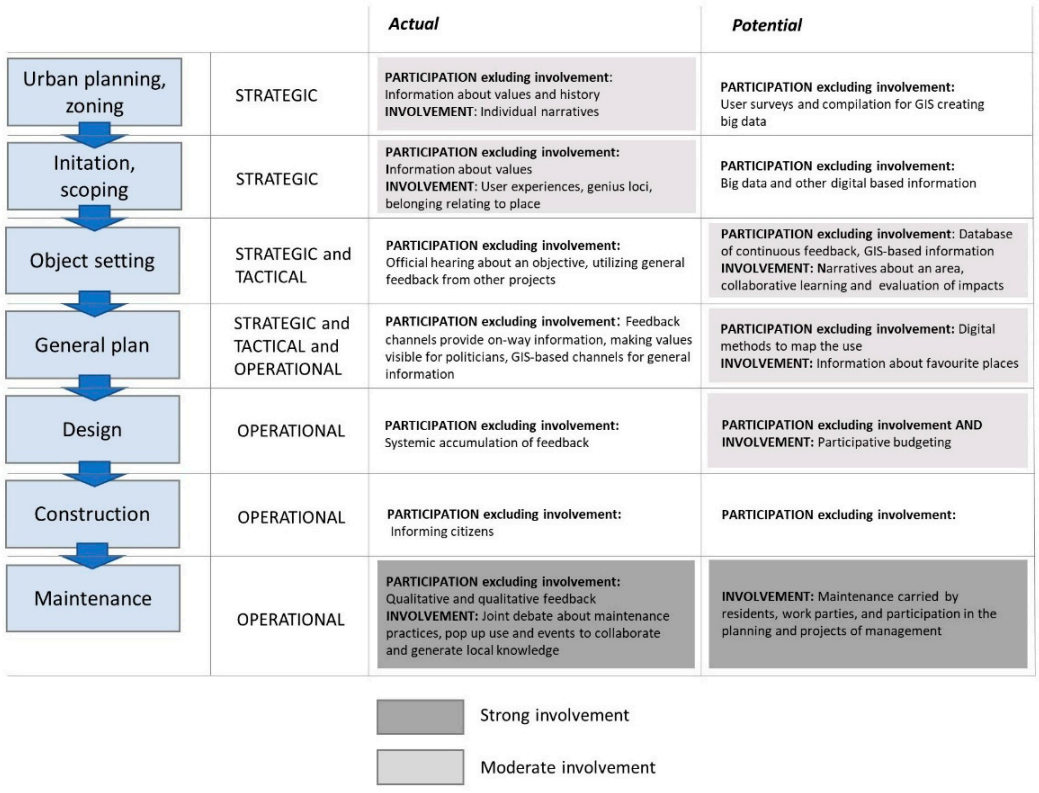

Figure 6. The results regarding present participation, moderate involvement, and strong involvement, as well as how participants related them to strategic, tactical, and operational management.

The strategic phases utilised both approaches of participation, excluding involvement and involvement. The tactical phases, along with the strategic phases, were related to the object-setting and general planning phases. Additionally, in the general planning phase, operational actions were reported to also benefit from involvement. The operational phases were considered the action phases, incorporating mostly participation excluding involvement, moderate involvement, or non-participation; however, the maintenance phase involved strong involvement and potential strong involvement.

4.2. Participation and Continual Change in Biodiversity-Friendly Management

The results of the survey indicated the influence of different actors promoting biodiversity in the implementation process of UOS (Figure 7). Local politicians may be involved the decision-making phases concerning the zoning, initiation, and object-setting phases. Three other groups—authorities, designers, or planners of maintenance, and maintenance staff—are responsible at different phases of the implementation process: authorities are responsible for UOS throughout all phases; designers of UOS or of maintenance are responsible from land use to design and additionally maintenance staff are actors in the maintenance. The fourth group—residents and communities—consists of public participants contributing to user knowledge. The question related to promoting biodiversity demonstrated that this practice represents a divergence from routine maintenance and elicited understanding about which group could influence the needed approach most. Those with the greatest potential to influence the approach to UOS management were authorities and UOS professionals. Residents and politicians had a somewhat similar level of influence; however, politicians were seen as influential in the planning part of the management process.

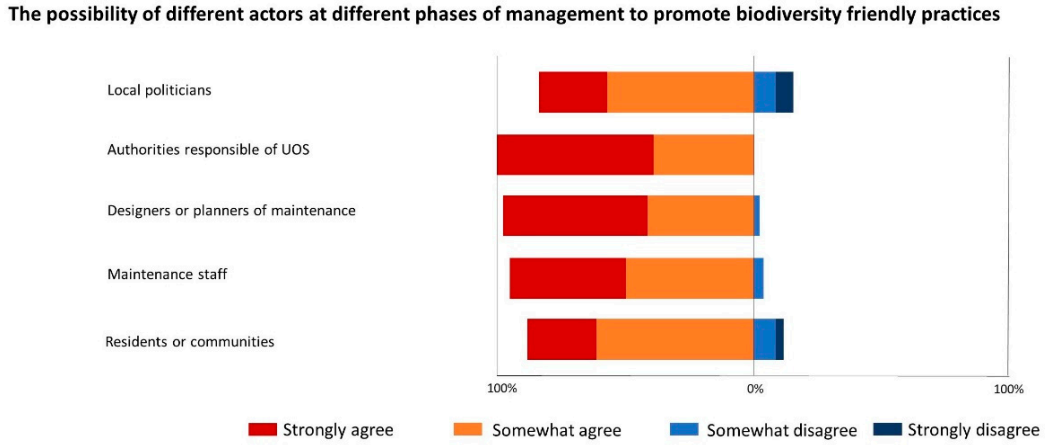

Figure 7. Actors at different phases of management have similar opportunities to promote biodiversity-friendly practices.

The results of the survey revealed the attitudes of UOS professionals. They considered the residents' willingness to accept different biodiversity-friendly solutions to vary greatly (Figure 8). At the time of the survey, stormwater management had been widely and generally discussed in Finland, and sustainable stormwater management structures had been somewhat widely implemented. Respondents thus felt that the residents most readily accepted these structures. However, decaying material or turning lawns into meadows, both of which were presented as other solutions that support biodiversity, were not perceived as generally accepted by the residents. According to the respondents, resident participation is better incorporated into the design phase than into the maintenance phase.

Respondents believed that continual change related to biodiversity is challenging to present in design documents, which are generally used to describe how construction is implemented (Figure 9). According to the respondents, designs better represent changes in individual elements than changes in the processes that support growth. However, the

presentation of ageing is seen more often as a shortcoming than as a standard solution in designs.

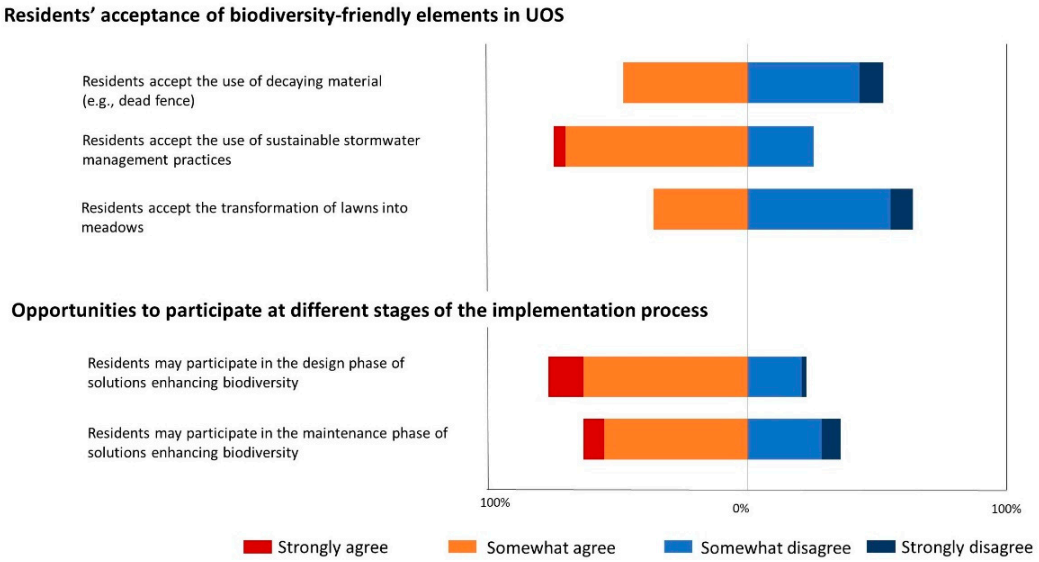

Figure 8. Residents' willingness to accept biodiversity-friendly elements varies depending on the practice-based topic.

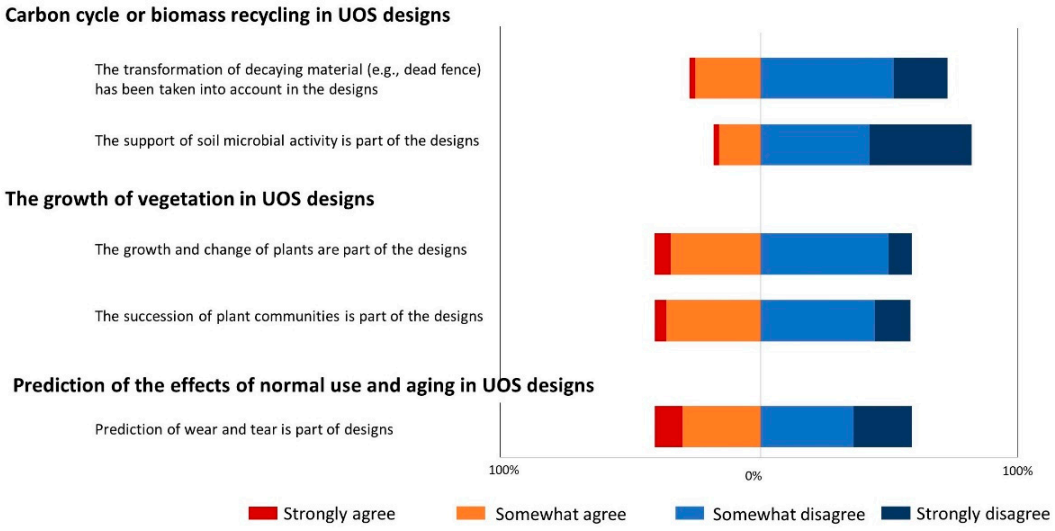

Figure 9. The current changes in UOSs and their vegetation-covered surfaces were experienced as difficult.

The respondents saw the residents' experiences as important as the starting point for planning but did not see the residents proposing direct solutions to biodiversity-friendly solutions as often (Figure 10). The residents' role is therefore to be acceptor. The results of participation are generally seen as important, as it supports residents' acceptance and increases residents' knowledge of biodiversity-friendly solutions. In addition, biodiversity and information about it were seen as increasing residents' perceptions of the importance of a place.

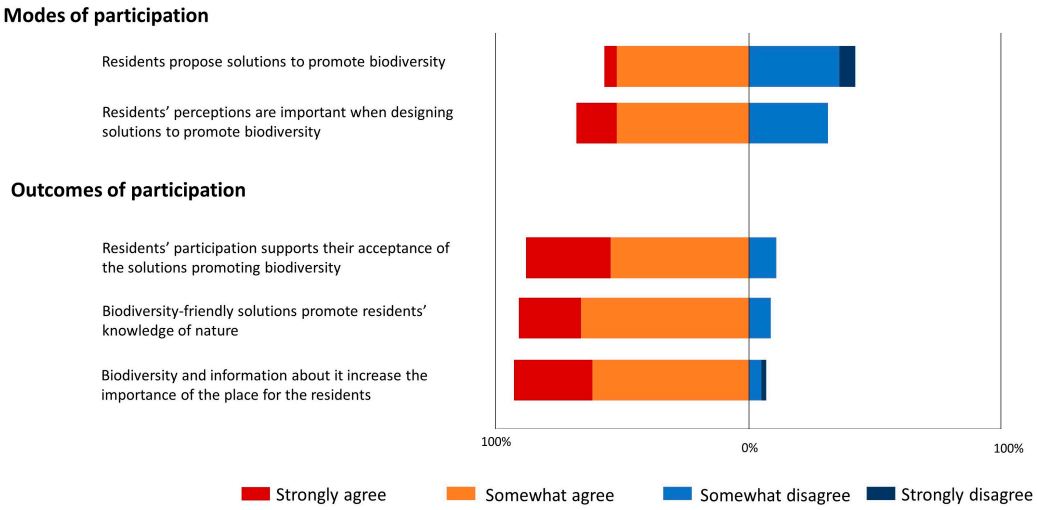

Figure 10. Respondents consider residents' perceptions important for design phase and seem to give residents credit for the outcomes of participation.

5. Discussion

This paper defined the state-of-the-art of participation in UOS management and mapped out the possibilities for more effectively incorporating residents' perceptions as an integral part of UOS management. The key findings showed both willingness and room for resident involvement in all other phases of UOS management, except in the construction phase. The appearance of strong involvement in the maintenance phase holds potential for practical local management. However, biodiversity-friendly solutions, reflecting change in UOS, showed that the professionals from all phases of UOS management have a greater influence than politicians and residents in promoting biodiversity-friendly solutions. Participation and informing residents can foster their acceptance about biodiversity solutions, knowledge about nature and place. At the same time, it was stressed that changes in UOS over time are difficult to present in designs.

5.1. Adaptive Management of Maintenance for Strong Involvement

The results expressed moderate involvement simultaneously for strategic and tactical phases (i.e., the object-setting and general planning phases). One plausible explanation for this is that UOS are different: for example, for natural areas and forests in urban environments, the general planning phase benefits from operational planning. Moreover, the general planning and design phases were recognised to contribute knowledge to tactical and operational actions, indicating that they may soon be implemented.

The results indicated that strong involvement, as represented by activities and dialogues, takes place locally. Place-related activities enable human–nature interaction in individual experiences and serve as the basis for perceptions. Therefore, the management of the maintenance phase requires long-term planning, appropriate resources, and well-formulated aims to facilitate involvement-building. In this case, maintenance cannot be limited to operational and annual standard maintenance practices.

Based on the results, we propose a model of adaptive management of maintenance (AMM) to describe the significance of place-related decision-making along a site's life cycle (Figure 11). The model stresses the continuous fluxes in socio-ecological systems and expects organisations to have resources to adapt to both changing conditions and out-comes of continual participation. The AMM is continuous and is comprised of site-specific re-planning, re-reconstruction, and re-maintenance; additionally, renovation is characterised by a profound reconsideration of the site in the context of urban green space networks. In the model, residents have a potentially active role in improving the site's conditions through, for example, developing, monitoring, and maintaining it. Furthermore, management activities may provide meaning and quality of life, as proposed by Campbell [79].

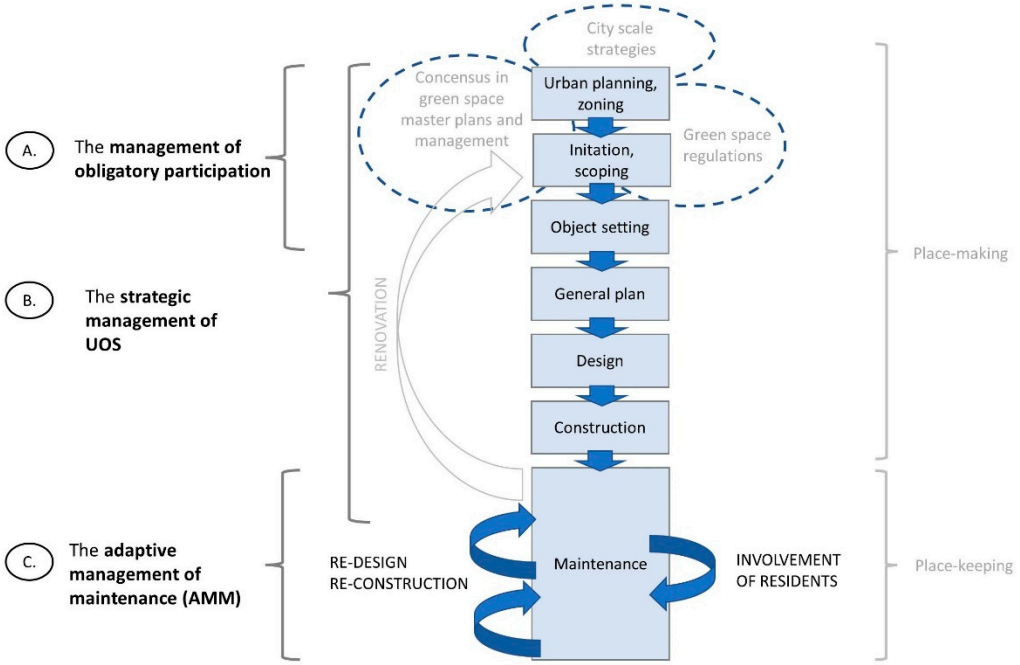

Figure 11. The three approaches (**A**–**C**) of management in relation to AMM model. The AMM model presents the management of a site in which localness enables involvement and adaptiveness to on-going changes in its socio-ecological system.

5.2. Involvement as a Vehicle for Sustainability in a Changing Environment

Studying management professionals' attitudes towards involvement in changing urban environments reveals the potential for more accurate recognition of local perceptions. Moderate and strong involvement may indicate local perceptions; however, tools or methods for capturing such perceptions were not discussed by the managers. In an effort to identify perceptions, local involvement may foster residents' knowledge about and attitudes towards sustainable behaviour [80]. This emphasises the importance of methods that provide place-related emotions and experiences in nature beyond one-way feedback methods to current UOS management. In addition, digital and geographical information system-based participation may facilitate learning outcomes and increase perceived place-based knowledge [81].

When considering the general outcomes of the workshop and survey in this study, the results of the workshop underlined the potential of involvement, but the results of the survey were not aligned. The general acceptance of involvement may describe the aim and idea of participation in theory rather than actual current practices. This prompts the question of whether participation and involvement are, after all, distinguished in UOS management practices. Biodiversity-friendly solutions were understood mainly as expert- or authority-led know-how, especially in the design and maintenance phases. This approach supports the preservation of top-down management. Nevertheless, residents' perceptions can enhance knowledge of such solutions; therefore, biodiversity-friendly solutions—once they become a more common discussion in society—can be a vehicle to promote more sustainable thinking in general.

The planning and design phases have been the conventional phases in which resident participation is incorporated, but the current demand for new ways to slow down the loss of biodiversity has opened up an avenue for action-based participation and strong involvement on a local level. The significance of involvement on a local level can become evident, specifically in urban contexts, where a single authority may manage several areas occupied by numerous residents. Up to now, this has only been a potential avenue, as authorities have primarily only considered the potential of resident participation as a primer for solutions. However, residents' participation in local biodiversity manage-

ment may lead to further involvement [82,83] than the design-phase participation has allowed for.

5.3. Reliability of the Findings

This study involved a workshop for professionals of different backgrounds in the field. Additionally, a survey was conducted to elicit information from managers of different organisations and municipalities. The study would not have been enriched significantly with a greater number of participants because the workshop data consisted of ideas from discussions, and the survey's sample covered several municipalities in Finland and included members of the Association for Park Managers. The workshop was considered an appropriate method for initially mapping attitudes and determining both the use and potential of user knowledge. The data build on the notes from the workshop discussion and include the typical limitations of workshops. Therefore, a triangulation of the analysis was conducted by two authors.

The individual responses to the survey independently supplemented the findings in the workshop three years later. The workshop data were analysed for the first time after the workshop by one researcher and then again as part of this study by two separate researchers. However, changes often occur quickly, and new studies may be required to combine understandings of contemporary practices and unpredictable changes concerning UOS and UOS management.

6. Conclusions

Conventional UOS management needs to shift towards more adaptive practices if its aim is to enhance socio-ecological interactions and solutions for sustainability transitions. Cost-efficient management may result in outsourced contracts that allow for limited timeframes for operational maintenance, which includes practices such as clipping, mowing, pruning, and cleaning; additionally, it may make residents mere objects in their everyday living environment. According to AMM, residents are instead seen as active contributors to maintenance. They partially offer labour in operational maintenance, but, simultaneously, their local knowledge is valued, collected, and used for further operations. Furthermore, acknowledging in-depth experiences and emotions requires creative methods [84,85].

The management professionals recognise the potential of participation in UOS but seem not to perceive a distinct difference between what is meant with participation and with involvement, indicating a limited insight of the value-added of local activities. In particular, the idea of strong involvement needs to be enhanced, as it is the key to building residents' perceptions in continuous participation processes. As the idea of participation already exists in municipalities, only small adjustments to practices and changes in mindsets are needed. Notably, the maintenance phase allows for an appropriate time span for involvement, requiring several rounds of organised activities and dialogues.

Novel resource thinking supports UOS managers' efforts to appropriately prioritise urban areas requiring conventional management and areas for building resident involvement. Both areas need to serve the general and cross-cutting aims of urban development. These cross-cutting objectives, including biodiversity support, also frame involvement and participation methods that are meaningful to residents.

This article provides two avenues for future research. First, involvement practices, such as maintenance activities and local interactive dialogues, could be applied to the cities where the involvement of residents shaping the public spaces is marginal. Second, managers need to have a new set of tools and participation methods, particularly for building relevant long-term involvement.

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