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RESEARCH ARTICLE

Ecosocial compensation of nature-based social values in Turku, South-West Finland

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Abstract
Complementary building is one of the key objectives in current urban planning as cities attempt to mitigate climate change. However, this development often reduces the urban green space. This incremental encroachment can negatively affect both the well-being of residents and biodiversity. Compensation is a way to safeguard the urban green space under the pressure of complementary construction. In the spirit of creative democracy, in this study, we examined the preconditions for ecosocial compensation and the mitigation of the harmful effects of incremental encroachment, as well as the mitigation hierarchy, in the context of land-use planning. We organised three workshops for planners and civil society associations at which we examined the preconditions for ecosocial compensation and other mitigation options using co-creation methods. We also carried out a PPGIS survey for the residents of Turku and were able to insert one question into the voting advice application of the municipal election in 2021. Our results show that there is a need for a new kind of information regarding nature-based social values when considering mitigation options and compensation. A comprehensive planning approach instead of incremental planning practices is important for considering compensation. Residents' initiative is essential in the ecosocial approach, and the compensation process may become a way for residents to step up and introduce concerns and new opportunities to the public discussion and actual decisions about urban green space.

Keywords Land-use planning · Ecosocial compensation · Green spaces · Creative democracy

1 Introduction

Complementary building and densification in urban environments is a key objective of urban planning in Finland (Ristimäki et al. 2017, p. 165; Säynäjoki et al. 2014, p. 106) and elsewhere (Andrić et al. 2019, pp. 83–102; Grafakos et al. 2020, pp. 4–7). This often means building on the surviving urban green spaces that remain in city centres. As a result, this incremental encroachment may reduce and weaken the quality of the urban green space (Arnberger 2012, pp. 703–720; Grêt-Regamey et al. 2020; Lin et al. 2015, pp. 954–956). Moreover, urban sprawl, the rapid expansion of the geographical area of cities, decreases or "gnaws off" urban green spaces (Dupras et al. 2016, pp. 64–69; Zhou and Wang 2011, pp. 271–276). For example, in Finland's largest cities, most of the urban expansion is directed at green spaces that are also suitable for recreation (Tiitu 2018, p. 7). The decline of green spaces not only negatively affects urban ecosystems, habitats, and biodiversity (Pauleit and Golding 2005, pp. 143–166); it also directly and indirectly affects humans. It makes previously public areas private and triggers negative impacts on human well-being and health (Haaland and van den Bosch 2015, pp. 764−765).

The importance of urban nature has become a popular area of ecological research (Dearborn and Kark 2010; Forman 2014, pp. 9−11; Vuorisalo et al. 2001). Green spaces provide habitats for animals and plants (Forman 2014, pp. 205−207, 242; Ives et al. 2016, pp. 122−123) and control stormwater (Forman 2014, pp. 170−174; Paul and Meyer 2001, pp. 333–365). Additionally, green spaces can be carbon sinks (Strohbach et al. 2012, pp. 225−226; Zhang

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et al. 2022, p. 5), reduce temperatures in the city (Elmes et al. 2017, pp. 346–348), and contribute to urban human and nonhuman health and well-being (Birch et al. 2020, pp. 8–9; Chiesura 2004, p. 136; Ojala et al. 2019, pp. 66–67; Roslund et al. 2021, pp. 7–10; van den Bosch and Ode Sang 2017; Wood et al. 2017, pp. 67–69). Biodiversity-rich urban areas are also valuable for recreation (Carrus et al. 2015, pp. 226–227). Complementary construction threatens these everyday urban ecosystem services and properties. Cities and their inhabitants are therefore becoming increasingly concerned about the future of green spaces and their associated ecosystem services.

The ongoing policy reform in the European Union highlights the importance of urban planning in safeguarding natural values. The Biodiversity Strategy (European Commission 2020), Green infrastructure Strategy (European Commission 2013), Climate Strategy (European Commission 2018), and especially the proposal for a Nature Restoration Law (European Commission 2022b) provide a renewed and strengthened institutional setting for biodiversity protection and urban land-use planning. The proposal is the first continent-wide comprehensive law of its kind. Building on the EU Biodiversity Strategy, it calls for binding targets to restore degraded urban, rural, and marine ecosystems, especially those with the greatest potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The programmatic shift highlights the importance of the restoration of nature and nature-based solutions in urban greening plans (European Commission 2020) for closer everyday contact with nature, as the New European Bauhaus exemplifies (European Commission 2022a).

Mitigation hierarchy and associated ecological compensation (also biodiversity offsetting) are becoming a key strategic vehicle of European nature conservation and urban greening. According to the mitigation hierarchy, if the avoidance and minimisation of the anticipated damage to nature are not fully workable, nature ought to be restored where possible (BBOP 2018, p. 30; McKenney and Kiesecker 2010, p. 165), while the ecological compensation of the lost nature values is the last resort; it only comes into question when the preceding steps do not guarantee no net loss of nature values (but see Moilanen and Kotiaho 2018, p. 113). Avoidance takes place by positioning the project spatially or temporally so that it does not cause harm. Instead, noise barriers or plants, for example, can be minimisation measures carried out on the development site where the harm occurs. Restoration actions are implemented after the project, as well as on the development site if possible. Compensation usually takes place further away, on the compensation site.

The general idea in ecological compensation is to compensate the natural values that are permanently lost with created green values of the same quality (Moilanen and Kotiaho 2018, pp. 113–114; Suvantola et al. 2018, pp. 18–21). This follows the principle of no net loss (Bull et al. 2016). Many countries have introduced a formal compensation system in recent decades (Bull and Strange 2018). Finland has just incorporated ecological compensation into the new Nature Conservation Act (9/2023) that came into force on 1 June 2023. However, ecological compensation remains voluntary. After political bargaining, the lawmakers decided that although the Act and associated decree would provide a detailed procedure for compensation and a basis for habitat banking (register), municipalities and developers should engage in it voluntarily. Compulsory offsetting will remain for Natura 2000 areas.

However, the Finnish Nature Conservation Act will not prescribe how to address the lost nature values important for people and their well-being, i.e. nature-based social values in urban areas. In ecological compensation, where the focus is on measured and verified natural values, the human side gets considerably less attention (Griffiths et al. 2019, p. 79; Tupala et al. 2022, p. 7). Ecological compensation therefore lacks some important values that people connect with biodiversity in their neighbourhoods (Ives and Bekessy 2015, p. 572), such as everyday recreation sites and other location-based values. Sometimes ecosystem services (Sonter et al. 2018), especially recreational values (Cole et al. 2022; Nordström and Hammarlund 2021), are examined in compensation processes. For example, in rural road construction, landowners may receive financial compensation for lost land underneath the road, while the broader set of nature-based social values is not compensated (Wallin et al. 2018). Such compensation can strengthen existing ecological values and provide new green spaces for humans in places where green space has not previously been accessible (for the creation of new green spaces, see Wolfram 2018). These processes are our focus in this article.

Our case city is Turku, where the impairment of urban natural values is not an unknown phenomenon. Turku is located in Southwest Finland and is also the capital of this region (Fig. 1). Turku was founded at the mouth of the Aura River earlier than the thirteenth century and is a major seaport on the shores of the Baltic Sea (Fig. 2). The city has a population of 195,000, and the population of the Turku subregion is 338,000 (Statistics Finland 2022). Turku, the sixth largest municipality in Finland and the third largest urban area, is one of Finland's urban centres where the city is growing by increasing population density within its present built-up area (Ristimäki et al. 2017, pp. 76–77) at the cost of urban green space and wildlife habitat. The development does not concern urban ecology alone. The loss of green spaces has increased public resistance to urban densification by residents and their voluntary associations. Public debate has criticised some aspects of complementary building and the shrinking of the urban green space. While ecological

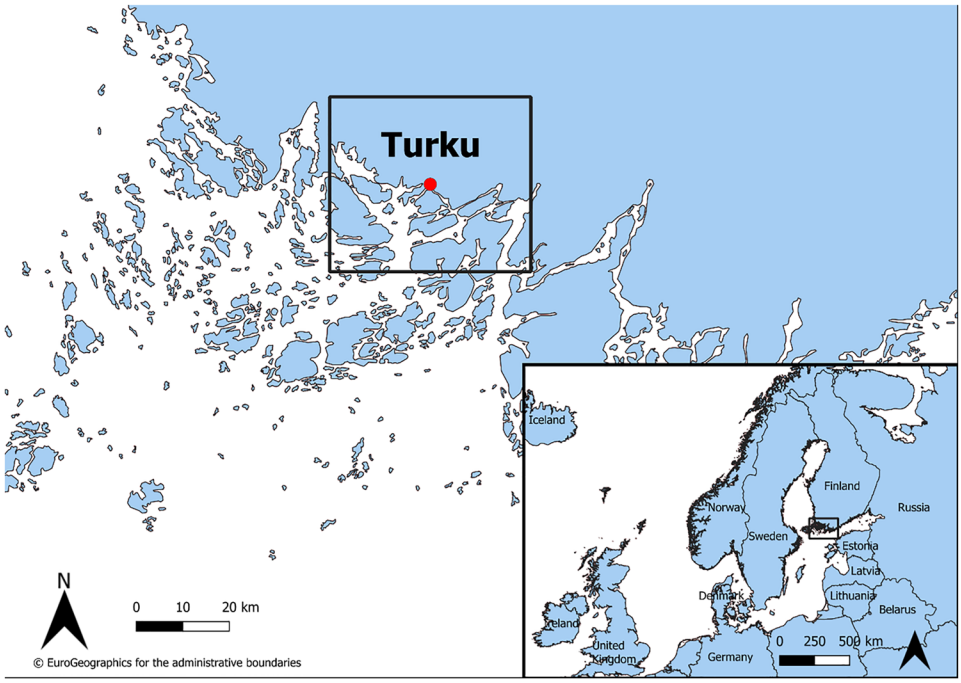

Fig. 1 City of Turku

Fig. 2 Aura River and the city centre of Turku (Image credit: City of Turku. Aerial photograph of Finland)

compensation is now mainstream, the consideration of the compensation of nature-based social values is not.

We took it upon ourselves to identify the conditions in which it would be possible to compensate for the loss of urban natural values for humans. To investigate the topic, we interacted with local land-use planners, residents, civil society associations, and decision-makers. Our working hypothesis guided our research process, i.e. compensation is not only a matter of measuring urban biodiversity and green values but also of strengthening of democracy and the everyday sense of well-being—deliberating on why urban

space mattered, and how the losses due to complementary building could be covered.

2 Co-creative methodology

2.1 Theoretical perspective

Cities and municipalities are the homes of land-use democracy in Finland. The planning monopoly is given to municipalities and their elected decision-makers, while the municipal authorities are responsible for preparing land-use plans for decision-making and their implementation. In changing natural, social, and institutional conditions, decision-making for fair land use and a sustainable healthy urban environment and representative decision-making and administrative practice must be continuously developed and improved (Hersperger et al. 2018, pp. 36–39).

The challenges in urban environmental management show that improvements in urban planning and decision-making are still needed. Our research therefore targets deliberative and direct democratic innovations supporting representative decision-making (Smith 2009). Democracy is not just a periodic act of voting. It is a creative entanglement of the representative and participatory aspects of democratic processes. Following John Dewey (2021, pp. 62–64), we understand democracy as a way of life rather than an institutional arrangement. Indeed, democracy as a way of life aims to break those societal arrangements and routines that do not produce the intended effects or enable better actions to rectify problematic situations (Dewey 2021, pp. 19–23). This calls for the goal-oriented change in structural and functional features of the everyday environment of citizens, policymakers and decision-makers (Dewey 1988, pp. 43–53). Meliorism, an inherent feature of democracy, also makes it *an ethical* way of life, a continuous search for practical improvement (Liszka 2021, pp. 139–163). According to Koopman (2009, p. 167), in Dewey's experimental and experiential approach, "improvement is not measured against the perfection of an unrealisable ideal but against the development and growth of those already extant capacities we hold to be valuable." Rorty (1999, p. xiii) continues: "My candidate for most distinctive and praiseworthy human capacity is our ability to trust and to cooperate with other people, and in particular to work together so as to improve the future."

Although Dewey is methodologically important to us, perhaps the most important conceptualisation comes from Hannah Arendt. While the effects of incremental encroachment are experienced in everyday life, in private, the tendency has triggered some social and public reactions as residents have stepped forward and taken action to debate and oppose problematic land-use plans (Turun Sanomat 2020a, 2020b). To understand this more thoroughly, we seek support from Hannah Arendt (2005, p. 113), who argues that politics is grounded in freedom to initiate rectifying action, i.e. "the miracle of freedom is inherent in this ability to make a beginning". Arendt (2005, p. 114) illuminates this with the Latin word *agere*—to mobilise, to release a process. Politics is thus about the capacity to open a novel public space for thinking and action and bring forth the concrete conditions of freedom and improvement. In our case, this refers to the initiated social action against the incremental encroachment into the urban green space—for example, in a suburb called Uittamo, but also in some other areas of Turku (e.g. City of Turku 2021b, 2022).

Although creativity entails spontaneity, it does not happen automatically—even spontaneity requires leadership. Arendt (2005, p. 126) uses the Greek word *archein* to connect politics with leadership. *Archein* is about how to prepare the public to initiate action, and how to ensure that these initiatives are brought to their conclusion. Dewey, with his conception of the democracy of the creative way of life, also emphasises the importance of taking experiences to their consummation, making them full and meaningful, and bringing them to their rhythmic end (Dewey 1980, pp. 35–57). This is the basis for any habit change. While Dewey explicates the processual methodology for habit change, Arendt emphasises reason and leadership to get things done. However, for both Dewey and Arendt, in democracy, the public invites decision-makers to join in the problem-solving. As Bernstein (2018, p. 97, emphasis in original) points out: "The person in power does not *rule over* the members of the group. He is empowered by them, and they can always withdraw their power from the person (or group) empowered." Democracy must then become and remain creative, or co-creative in current parlance, to initiate, sustain, and renew local communities and public spaces (Bernstein 2000, pp. 222–223).

2.2 Research process

To follow Dewey's idea of creative everyday democracy in making sense of incremental encroachment and especially in rectifying the effects of this phenomenon, we established a process of co-creative transdisciplinary research in Turku. Our work belongs to the tradition of action research (see, e.g. Whitehead and McNiff 2006), as we explored the social and institutional conditions of addressing incremental encroachment and attempted to co-initiate change in land-use planning practice in the face of identified conditions.

In the summer of 2020, we conducted 23 semi-structured interviews with decision-makers, land-use planners, stakeholders, and researchers of ecological compensation about the general conditions of the compensation of nature-based

Table 1 Workshops for planners and civil society associations

	Who	Why	Worries	Surprises	Result
October 2020	Planners	Getting to know each other and the idea	Complexity of the scheme, extra work	High interest	Green light
January 2021	Planners	Probing the idea	Land-use rules	Courageousness, innovativeness	Open questions
February 2021	Civil society associations	Civil society responsiveness to the idea	The non-compliance of mitigation hierarchy	Not In My Back Yard (NIMBY) not present	Preconditions for workability
March 2021	Planners	Approaching the actual conditions of ecosocial compensation	Mandate to act	Focus on solutions	Hope for practical testing

social values (Tuomala et al. manuscript). The interview protocol covered themes such as land use and conflicts, the meanings of green spaces, ecosocial compensation as part of the planning process, and compensation in practice. These interviews constitute the ground and justification for this work, and they are used as empirical material here.

We first organised an icebreaking meeting in October 2020 with the land-use planners about the effects of complementary construction on green spaces in Turku. The purpose was also to investigate the planners' views about the compensation of nature-based social values and their preparedness, for the process and also the preparedness of decision-makers, to engage in such a procedure (Table 1).

In January 2021, we held a workshop with 16 planners. We discussed the idea of mitigation hierarchy, ecological compensation, and the general conditions of the compensation for nature-based social values. All the workshops were recorded, and the data were thematised and analysed using content analysis.

We next explored the importance of everyday green spaces for the residents of Turku. We arranged an Internet-based public participation geographic information systems (PPGIS) survey (Maptionnaire) with the residents of Turku on the sites and routes of their everyday recreation and mobility and their development initiatives regarding these areas indicated on the map. The survey consisted of the following sections: 1) socio-economic and demographic information; 2) the accessibility of green spaces; 3) the characteristics of green spaces; 4) current recreation habits; and 5) suggestions for the development of green spaces. The routes and green spaces were not predetermined, as the respondents could freely choose places on the map. The online inquiry was open for 17 days between 12 and 28 February 2021.

After the PPGIS survey, we invited civil society associations (residents' associations and some other non-governmental organisations) to a workshop to discuss the PPGIS findings and the compensation scheme. This workshop approached the problematic situation from the perspective of organised civil society. We sent the invitation to 44 associations in the Turku region. Representatives from 10 associations attended the workshop. The purpose was to discuss together and in groups their opinions and concerns regarding green spaces and complementary building in the city, and the challenges they saw related to mitigation hierarchy and ecosocial compensation. As an outcome, the workshop formulated a memorandum for the land-use planners.

The third workshop was organised again with the planners. As in the first meeting, there were 16 participants. At this meeting, we presented the results of the PPGIS survey and introduced the workshop memorandum from civil society associations to the planners. The workshop worked in four groups, focusing on different aspects of ecosocial compensation: knowledge basis; participation; feasibility; and decision-making.

Next, we studied the preparedness of Turku's decision-makers to take action. We suggested a question in the municipal election voting advice application of the leading regional newspaper, Turun Sanomat: "The construction on a green space must be replaced with a new green space" (Turun Sanomat Election Compass 2021). In municipal elections, the residents choose decision-makers for each municipality in Finland. We could thus examine what the future decision-makers of the City of Turku thought about ecosocial compensation.

3 Results

3.1 Everyday urban green space

A total of 791 people answered the PPGIS survey. A little more than two-thirds completed the survey, and two-thirds of the respondents were women. Half the respondents were between 30 and 49 years old, and three quarters were university-educated and in work. We therefore did not reach out to the residents representatively, but only reached people who

were interested in stepping forward from their private realm by indicating activities of importance to them, including some justifications for their preferences.

It became apparent that the main roads and the Aura River (Fig. 3) divided daily recreation activities into two regions that did not connect well: the forest-north and the park-south. The banks of the Aura River and seashore are very popular places for everyday recreation. Moreover, the results show that recreation is concentrated in the city's largest forest areas. Nonetheless, interestingly, some find recreation opportunities even in the smallest green patches, while slightly peripheral spectacular natural areas like Ruissalo are less important than daily recreation. The ecological and recreational quality of the area is therefore a less important reason to visit it, as are a convenient location and easy access. The results also showed that land use for building hampered the use of some areas and completely excluded some from use.

The main factors contributing to the attractiveness of green spaces (1,865 responses) were the diversity of nature and the possibility of observing it (17%), peacefulness (17%), and the beauty of places and landscapes (16%). Pleasant green spaces were described as being as natural as possible (11%) and close to water (10%). Furthermore, the main reasons for visiting green spaces (8,088 responses) in addition to outdoor activities (29%) were observation of nature (17%) and relaxation (17%). Green spaces were suitable for outdoor activities (7,342 responses) if they were compatible with the respondent's chosen recreation (21%), had an enjoyable type of green space (21%), were close to the home of the respondent (20%), or had a good landscape (18%).

Residents arrived at their daily outdoor places (673 responses) most often either on foot (50%), by bicycle (26%), or by car (17%). Just over half the respondents (55%) considered one kilometre or less a critical distance for using a green space for everyday outdoor activities (354 responses).

When asked what kind of green spaces were desirable for recreation (1,743 responses), the respondents wanted forests in their natural state (21%) and shoreline areas (16%). Nevertheless, respondents still wanted access also to well-managed forests with different routes and paths (17%) and managed parks (13%). Various human-used routes and corridors (14%) were mentioned as a desirable development, along with other potential compensation measures (298 responses). The seaside and riverbank routes were also preferred. In addition, the renovation of the areas (12%), more wildlife (10%), more outdoor recreation possibilities (8%), and opportunities for fitness training (6%), connectivity

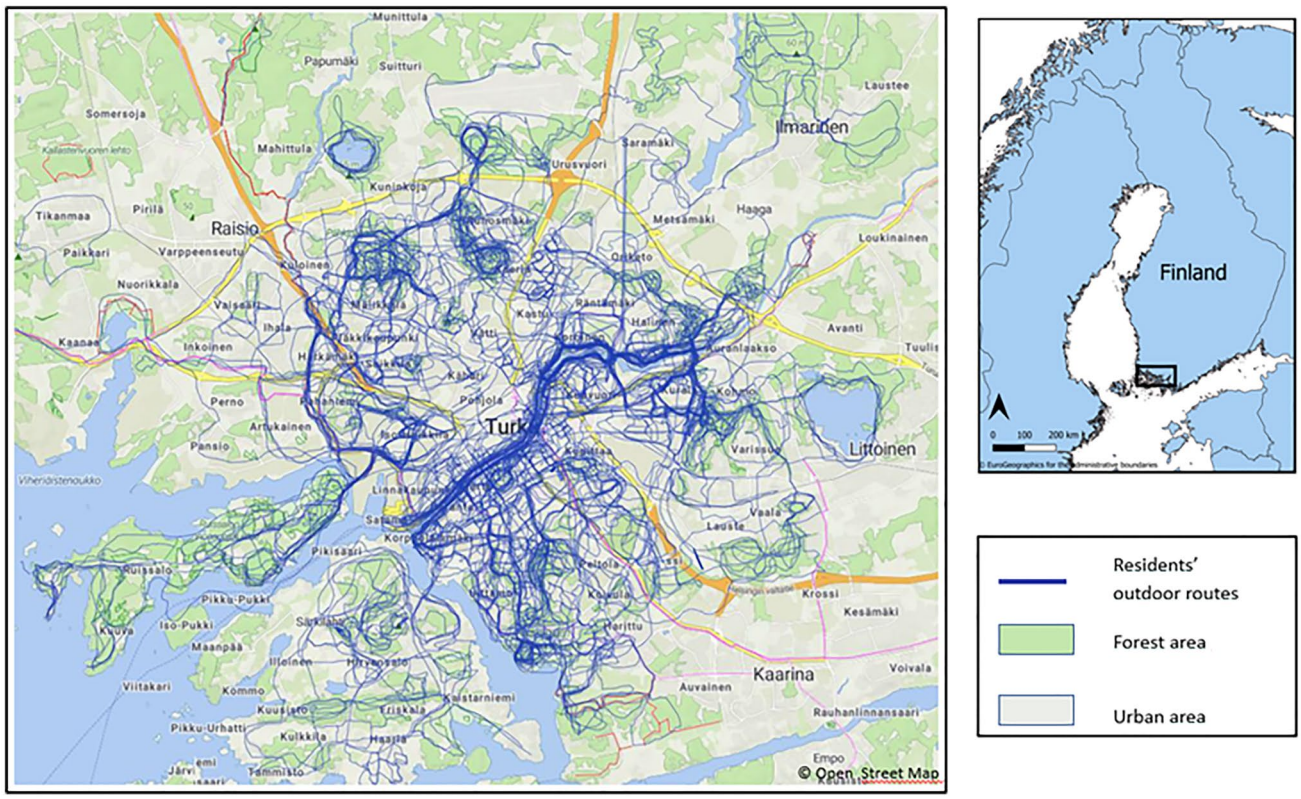

Fig. 3 Blue lines show residents' everyday outdoor routes in Turku. The routes based on PPGIS data collected in 2021

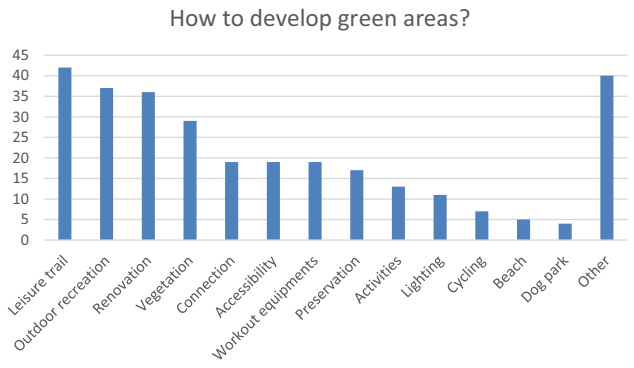

Fig. 4 How residents want to develop green spaces in the city

(6%), and improved accessibility (6%) were the most desirable features. The respondents wanted more opportunities to enjoy the scenery. They also hoped for different outdoor activity services (Fig. 4).

3.2 Conditions for compensating nature-based social values

Our meetings with Turku's land-use planners showed that ecological compensation and the mitigation hierarchy were already quite familiar, but the possible compensation of nature-based social values was not. The planners considered that the compensation of those values could be easier than the compensation of ecological values, although people had different views concerning what constituted a pleasant environment.

Planners felt it would be difficult in an urban setting to implement ecological compensation inside the area where damage to nature would take place. In Finland, tangible land-use measures and construction are designed in detailed plans, while masterplans establish the objectives of the land-use and guide detailed planning. Detailed plans usually cover only a small area: it is next to impossible to compensate weakening ecological values within the same area under land-use planning, or even in its vicinity. There is a contradiction that makes the compensation of nature-based social values difficult to compensate in an urban setting.

Combining the social and ecological elements was perceived as important but also challenging. As the compensation of nature-based social values is not mandatory by law, and as there are no existing instruments or practices for it, the land-use planners highlighted the importance of co-creative initiatives from other actors such as residents and construction companies, but also other departments of the municipality administration, such as the city's maintenance services. Planners were worried that ecosocial compensation might bring unspecified additional work and concerns, as planning areas would expand, with blurred boundaries and institutionally more complex situations. The larger the planning areas are, the greater number of issues must be considered by planners and decision-makers. Private creativity and voluntary work—third sector and municipality partnerships—in green environment maintenance and management work (such as meadows, park construction, forest management habits, etc.) were mentioned as a possible remedy. The planners highlighted the cases where residents had been active and suggested improvements for the city. Such suggestions had helped with the implementation and maintenance of nature-based solutions.

In the compensation of nature-based social values, it was considered essential that the compensation area is located spatially near the development site. The situation therefore differs from ecological compensation, where compensation can often happen a little further away, apart from the species requiring Continuous Ecological Functionality stated in the EU's Habitats Directive (92/43/EEC) for Annex 4 species, which requires compensatory patches to be sufficiently close. Similarly, the compensation of ecosocial values should be seen as part of a wider strategic development of the city, where the connectivity and accessibility of natural sites and residential areas with other green spaces play a key role. In the compensation of natural-based social values, residents play a very different role compared to ecological compensation, where usually only law-based natural values matter.

While significant ecological values (habitats) are already relatively well identified and secured in urban and semi-urban environments, it was considered more difficult to preserve and identify ecologically less valuable and smaller natural sites that had no legally protected species or habitat types. These sites are often located between larger nature areas and can also be an important part of green corridors, infrastructure, and buffer zones. Additionally, such places can be an important part of everyday recreation. These everyday ecological values are important from the perspective of compensating nature-based social values.

Land-use planning is already seeking to avoid construction on green spaces, especially in the central areas of the city. Keeping the construction area as small as possible or adjusting it to local nature values makes it possible to reduce the damage to that area. Yet green spaces are often the only municipality-owned land in the centre of Turku, which puts heavy construction pressure on them. High-rise building construction saves land areas, but its impact on the centre's cityscape is so significant that it is not considered an option in Turku. In general, even though reducing construction is the best solution for green spaces, the demographic pressure on city development is so great that it cannot currently be considered an alternative. During the workshop period, the participants could not imagine how the proposed EU's regulation on nature restoration would influence future construction. It would obviously effect mitigation hierarchy practice.

Moreover, the knowledge base for compensation is not yet robust. The land-use planners had a rather clear idea of where Turku's residents went outdoors during their everyday life, and why. However, they had no knowledge of the experiences, needs, and suggestions related to ecosocial compensation, or what the residents' associations thought about these issues. Nor were they aware of how different trade-offs were considered by the wider public: what counted as nature, or what nature values a particular potential compensation site could compensate for. For example, the need for car parks is an issue. However, there is a trade-off between parking lots and green space. Construction could be avoided by placing parking underground, under different decks, or in separate multi-storey car parks. However, this would also require a change in residents' mindsets—they would have to walk a little further from their homes to the car park. More than merely values, beliefs, and needs, planners need technical information about various greening measures, their ecosocial impacts in the context of urban ecologies, and the wider green infrastructure.

The primacy of the city masterplan—general—level was raised in the workshops for the planners. The larger lines of the compensation could be designed within general planning, as detailed planning occurs at the more local level. Neither the land-use planners nor the decision-makers have the mandate to practise compensation beyond the planning area in question. Within the planning area, the municipality may attempt to conclude land-use agreements, but this is not an option outside the planning area. In addition, it was suggested that land-use plans would not always need to include all the compensation measures, as some measures could be carried out voluntarily through local action.

3.3 Civil society, green spaces, and compensation

Interestingly, the association workshop did not bring up the NIMBY (not in my backyard) phenomenon, where the concern would have been directed at specific spots. Instead, the loss of urban nature and the idea of compensation were viewed more comprehensively at the city level. In the associations' opinion, complementary building on urban green spaces was a very problematic development that must be prevented. Residents were not only concerned about the vanishing green space but about the narrowing of public space in the city. In some respects, views on the diversity of green and recreational values were contradictory, because some preferred managed green sites, while others preferred wilder natural sites. Only a site-specific review would have brought more nuance to this perspective, but we did not want to undertake this because we wanted to have a general view of the phenomenon in the spirit of a deliberation free of specific interests.

The discussions emphasised the importance of the mitigation hierarchy and the primacy of damage avoidance. Civil society associations hoped for an open discussion and a better information exchange about the effects of planned land use. In addition, it was hoped that there would be a discussion of more alternatives to land-use plans and generally more comprehensive arguments and justifications for planned development projects. Preserving existing ecosocial values was considered a priority. In general, value choices in planning and decision-making were highlighted—avoidance was the most effective measure for preventing the loss of green spaces through development when there was a reasonable choice between new housing and nature conservation due to urban growth.

It was considered essential to examine the entire city area rather than an individual planning site for ecosocial compensation. In a small planning area, it is harder to find opportunities for compensation, as was also evident in the planning workshops. Planners suggested that compensation should be planned at a more general level, either in city masterplans or strategic city-level development plans, to examine the green spaces and connections as a whole. These citywide general assessments should be continuously updated, which would make it possible to use their database for individual local planning projects regarding the safeguarding of nature values. Moreover, the importance of open discussion and continuous dialogue between planners and residents was stressed, perhaps through PPGIS surveys and associated workshops. Associations hoped they could discuss the current planning actions with planners regularly—once a year, for example.

According to the residents, the compensation should be targeted at those residents who experience the damage and lose their local green space. The location and accessibility of green spaces were considered particularly important for children, the elderly, and people with reduced mobility. Car-free households were also identified as a group with limited access to green spaces. The associations emphasised that compensation measures should qualitatively correspond to experienced losses. An environment heavily modified by humans was thought to be easier to compensate for than a very natural area, and solutions other than nature-based solutions could be used for compensation. In addition, they thought that when green spaces were gnawed off, and/or lost areas were compensated, it would be important to secure these green spaces for the long term. This was also seen as an action that increased confidence in planning and urban development.

At the same time, the residents feared ecosocial compensation could be just a novel way to gnaw off green spaces but this time with a permit. In this case, ecosocial compensation would be a sort of greenwashing and would thus act against its original purpose, as problematic urban

development could continue as long as some kind of compensation is created. In this scenario, the developers would only clean their conscience. There is therefore also a real danger of greenwashing if the compensation measures fail or are incomplete. Of course, this is a general concern about compensation, not only related to the compensation of social values. On the other hand, according to the residents, the compensation scheme would have great potential for the creation of a better, more pleasant, and more convenient urban environment if it could stop the gnawing development, and if there were shared rules for the compensation. The residents hoped to get more involved in planning and that they could give their opinions as early as possible during the planning process. Many resident associations had good experiences of this, but they recognised that participation would require more of their own activity too.

All in all, according to the association workshop, there was a need for such comprehensive assessments of ecological and ecosocial values rather than the current practice of individual site-specific assessments. Indeed, according to the planners, new major plans that could be continuously updated could serve as background information for detailed land-use plans. The problems of including updated information on ecosocial values through all levels of land-use plans was discussed, and the need for better communication between planning processes was emphasised. Cooperation between different actors within the city administration would therefore be essential for designing and implementing strategic compensation areas as part of wider green space networks. Despite different local situations and conflicts, associations shared a common concern about the decline in green spaces, and they wanted to raise the concern in a public discussion forum.

3.4 Decision-making and green spaces

The mayor of Turku responded to the call of the residents. In accordance with her initiative, the city council decided in the autumn of 2019 to allocate 10 per cent of municipal revenue to the compensation of recreational values when construction expanded to the city's public and private green spaces (City of Turku 2020c). This unique decision was probably driven by one key planning dispute in Turku (the Uittamo plan), where complementary construction would have gnawed off the green space. However, this was clearly part of a longer continuum of the will formation in city-level environmental policy practice (City of Turku 2020b).

As part of the municipal elections in June 2021, the results of the voting advice application indicated interesting facts about Turku's new decision-makers. As many as 59 of the 67 elected members of Turku City Council responded to the voting advice application. Of these respondents, as many as 50 (85%) fully or partly agreed with the statement that construction on green space must be compensated for with a new green space. No one completely disagreed, and only five (8%) city councillors partly disagreed with the statement. What is remarkable is that there was more support in each party for the idea of compensation than opposition. Compensation for green spaces therefore seemed to be gaining support from the current Turku decision-makers—at least at the time of the municipal elections.

Although there are no common rules for compensation, the municipality has already developed its own Blue-Green Factor Tool for detailed planning (City of Turku 2021a), in which a certain amount of land and water should be secured in land-use planning. However, it was pointed out in the workshop for civil society associations that the Blue-Green Factor Tool did not take social aspects into account. The associations also made this remark to the municipality when the tool was in preparation. The city has also committed itself to the European Union Green City Accord Initiative (City of Turku 2020a). The land-use planners saw that sufficient political engagement would be an important precondition at the city level. Political guidance was therefore a move towards the better consideration of green spaces.

4 Discussion

4.1 Institutional arrangements for mitigation practice

In this study, we have investigated the use of a mitigation hierarchy as a guiding tool in land-use planning processes, paying particular attention to the preconditions for ecosocial compensation. Our findings indicate that although the avoidance or minimisation of damage to urban green spaces is already part of planners' everyday practice, the conception of the mitigation hierarchy in general and the ecosocial compensation of nature-based social values are not well known.

In our case, land-use planners and civil society associations were aware of the logic and the key principles of mitigation hierarchy, and planners noted that the avoidance of damage to nature and the minimisation of harmful impacts were already now part of normal precautionary and law-abiding planning practice. Indeed, in Finland, the Participation and Assessment Scheme (PAS), as required by the Land Use and Building Act (132/1999), already obliges planners to identify the key stakeholders and allow them to present their opinions about the objective and the likely impacts of a given land-use plan in the early phase of the planning process. It is only reasonable to avoid and minimise damage and the resulting disputes. Although the extent to which the avoidance and minimisation are practised is case-specific, depending on the knowledge base, the openness

of the planning process, and vested interests of power, the minimum procedural standards for good planning practice to avoid and minimise harm are in principle set in current land-use legislation and practice. The mitigation hierarchy can be understood as a democratic communication and precaution device in urban land-use planning.

The implementation of a mitigation hierarchy and the compensation of nature-based social values could fit well within the planning approach, which builds on public participation and reason giving (Forester 1999; Hiedanpää and Bromley 2016, pp. 229–245). Participatory structures for the expression of opinions and values and procedures for co-designing land-use measures already exist. A quite strong interplay already exists between the institutional setup, deliberative democracy, and planning practice.

Ecological compensation is not yet part of planning practice, not to mention the compensation for the threatened nature-based social values. New institutional arrangements are certainly needed, but the focus should be explicitly on how existing arrangements function in practice. For example, according to EU law (Directive of the Strategic Environmental Assessment 2001/42/EC), the assessed impacts should already also identify those significant adverse effects that should be compensated (Tucker et al. 2013, p. 141). However, this has been more or less neglected in Finnish planning legislation and practice (Pappila 2017, p. 40). In addition, the voluntary ecological compensation incorporated into the Finnish Nature Conservation Act is still short of a well-functioning motivation structure and voluntary practice. Institutional arrangements are formally set for transformative habit change.

In some cases, different partnership-based strategic urban plans may enable an examination of the costs of offsetting and the relationship between construction activities and nature-based social values despite different individual plans and planning levels (Jarva and Toivonen 2020, pp. 26–31). If the co-creative partnership between the municipality, landowners, residents, and developers were linked to the practice of voluntary compensation introduced in the Nature Conservation Act, a real step would be taken towards the compensation of nature-based social values. This could help ensure the connectivity and accessibility of green spaces for different local resident groups and other species.

According to our results, the mitigation hierarchy was seen as a workable means to ensure the preservation of green spaces. It could work as a framework for examining nature-based social values of current green spaces within planning processes. This highlighted the importance of place (Byrne 2018, pp. 437−448). Other studies have found contradictory attitudes towards compensation (Cole et al. 2022, p. 12; Persson 2013, pp. 264–265). Careful attention to mitigation measures in the plan commentary phase could strengthen the acceptability and credibility of planning and compensation projects while raising awareness of the importance of green spaces and the area's different values. The mitigation hierarchy should therefore be an integral part of urban planning processes from day one. There is also growing evidence that different aspects of the mitigation hierarchy will become important components of future EU legislation on biodiversity and soil protection and will thus also affect land-use planning.

4.2 Knowledge production for ecosocial compensation

Our approach to compensating lost nature-based social values is based on the Deweyan naturalistic understanding of human–environment interactions. As human practices are embedded in social and ecological processes, they change when the structural (institutional, ecosystem, geographical, economic, etc.) features of action environments are altered by urban planning and decision-making (for Dewey's naturalism, Bernstein 2020, pp. 9–28).

From this perspective, one of the main challenges of ecosocial compensation is spatiality. Typically, many land-use plans cover small areas, whereas compensation requires broader scrutiny. Incremental city planning poses a significant barrier to achieving no net loss and carrying out acceptable compensation (Birkeland and Knight-Lenihan 2016, pp. 54–57). Detailed plans are usually too accurate and targeted at a particular area to allow both the development project and the compensation to fit inside the planning area. The detailed plans cover only small areas, while the compensation must happen at a wider planning level. As we discovered, a city masterplan could be an appropriate level for compensation, ensuring the overview of more detailed aspects and their connections. In support of an ecosocial approach, city masterplans could also be drawn up in phases (a phase masterplan), i.e. covering only specific topics. For example, a thematic phase city masterplan covering areas suitable for biodiversity and ecosocial compensation could then be a means of reserving areas for future compensation needs. More comprehensive information about the biodiversity values of the planned area is needed. In practice, this would entail more comprehensive nature surveys early in the planning phase (Kalliolevo et al. 2022, pp. 7–9).

In considering the avoidance and minimisation of damage to nature, the location, landowners, and the entire setup of rights and duties are usually known, whereas in the case of compensation, they are not because of the wider spatial coverage. However, the location of the compensation site is certainly vital for those whose everyday environment is impaired. At the broader city masterplan scale, landownership is often scattered, imposing constraints on the planning and implementation of compensation. Planning for compensation is more straightforward when a single landowner such

as a municipality owns the compensation area. However, both ecological compensation and ecosocial compensation are still institutionally unestablished in Finland and for the latter part elsewhere. They therefore currently depend on the situational use of moral imagination and ethical judgement, from both ecological (Karlsson and Edvardsson Björnberg 2021) and, perhaps more so, from the urban land-use perspectives (Hanson and Olsson 2023). This is still another level of epistemic challenge.

Epistemic interaction between various experts, municipality units, and local residents, and active knowledge exchange between them is needed for the compensation of nature-based social values (Parris et al. 2018, p. 49). PPGIS surveys have a great potential to help urban planning to achieve this goal (e.g. Rall et al. 2019). PPGIS has been used to study residents' values for green spaces (Ives et al. 2017), residents' perceptions of ecosystem services (Fagerholm et al. 2019), and cycling routes (Wolf et al. 2015). Up-to-date PPGIS data on these issues could help planners and decision-makers keep informed about the values and potential development needs. PPGIS surveys could also discover potential for ecosocial compensation in cities, as we did in Turku.

In ecosocial compensation, it is essential not to forget the ecological basis. This also brings other species to the fore. For example, land-use planners do not usually know in detail about the requirements of different animal and plant species and the habitats they prefer. Although public participation offers many benefits for compensation, it can also be a threat to biodiversity and nonhuman species. Achieving no net loss in a compensation process is not easy, and the achieved values can prove to differ from what has been lost. For such complex situations with potential trade-offs, we suggest knowledge production that understands these multispecies living environments as "Umwelten", following the seminal work of von Uexküll (1926) and building on the work by Maran (2020) and others such as Sánchez-García et al. (2017). In these Umwelt-based approaches, the aim is to study living environments from the perspective of different species to identify and understand the interconnected life-supporting meaning and significance of key structures and functions. For example, the difference to the ecosystem approach is that in the Umwelt analysis the analytical focus is more strongly on the habits and relations of organisms in their living environment. This would help in co-creating a new ecosocial compensation practice, extending beyond finding some green spaces important because they are there for observation, recreation, or relaxation. Of course, diverse environments are often considered beautiful, peaceful, and healing, which the research also supports (Simkin et al. 2020, pp. 9–10; Tyrväinen et al. 2014, pp. 7–8).

4.3 Fairness in ecosocial compensation

Ethics and politics are inseparable in urban land-use planning. Incremental encroachment into green spaces reduces their size and therefore also affects both human well-being (Akpinar et al. 2016, pp. 410–414) and other species, their well-being, relative positions, and rights (Bradshaw 2020, pp. 32–41). Our approach points to Deweyan substantive democracy. Talisse and Aikin (2008, p. 133) articulated this as follows: "Dewey held that the democratic political order is essentially a *moral* order, and further, democratic participation is an essential constituent of a 'truly human way of life' (Dewey 1991, p. 218)."

The transition from ecological to ecosocial compensation calls for political will, support for institutional arrangements and effective leadership. One aspect of democratic leadership, strongly called for in our workshops, is the political guidance regarding the mitigation hierarchy, compensation of nature values, and ecosocial compensation. It is not often recalled that democracy as a way of life means decision-makers participate in planning, not only in decision-making. Early engagement would make planning more effective and prevent plans changing at the brink of decision-making, hence tightly connecting plan preparation, decision-making, and implementation. Such disconnection is not unknown in Turku. An important preparatory step towards active leadership was taken in Turku when the City Mayor decided to allocate 10 per cent of municipal revenue from building on urban green spaces to compensate for recreational and well-being loss, i.e. ecosocial compensation. Strict adherence to the entire spectrum of the mitigation hierarchy creates a strong economic incentive to avoid and minimise the loss of green space, as this is often the cheapest way to achieve no net loss, both in nature and ecosocial value (criteria for ecological compensation, see Moilanen and Kotiaho 2018; 2021).

The ecosocial compensation of nature-based social values calls for scrutiny of the physical location and temporal implementation of compensation. Ecological compensation easily ignores these ethical aspects (Karlsson and Edvarsson Björnberg 2021). For example, Kalliolevo et al. (2021, p. 10) found that in many cases ecological compensation relocated nature away from residents and cities. As our PPGIS survey suggests, residents take recreation relatively close to their home, as over half the respondents felt one kilometre was the critical distance for everyday recreation. In addition, residents usually travel for recreation on foot or by bicycle, so recreational values should not be degraded close to residents' homes. These results are consistent with other findings. For example, Neuvonen et al. (2022, pp. 59–71) found that residents were outdoors more often if recreation areas were nearby, and 30 per cent of nearby recreation activities occurred no more than 300 m away from home. This

highlights the significance of local ordinary nature. Moreover, not all groups have access to more distant green spaces. During our research process, vulnerable groups such as children, the elderly, and people with reduced mobility were highlighted in discussions (see also Byrne 2018). These groups often have limited access to green spaces and lack the opportunity to move, for example, by car very far from home for their recreation, so it is paramount for everyone to find convenient green spaces close to them (Arvidsen et al. 2022, pp. 3–4; Veitch et al. 2007, pp. 876–878). Even tiny green patches in the city may be especially important for the most vulnerable.

As the urban structure is becoming more compact, and new areas become available for construction, the preservation, adequacy, and quality of green spaces should be safeguarded as part of urban development. Civil society associations are concerned about the prevailing development of building in green spaces. At the same time, previous public spaces become private, further delimiting residents' free space in the city (Zalar and Pries 2022, pp. 62–67). In addition, green roofs can be used to mitigate biodiversity loss, but roofs do not compensate for ecosocial loss. Indeed, the instrumentalisation of the public sphere in service of private ends has been recognised as a problematic phenomenon (see Apostolopoulou 2020; Weiss 2011, p. 187). We found that even the smallest local nature area could be important for local residents, and new green spaces should therefore also be located near them. Improving the environmental condition, environmental meliorism, should not only extend from people to nature, as the situation is currently in ecological compensation, but back from nature to people and back to nature again. In other words, compensatory measures should function as nature-based solutions, benefiting both people and nature in a co-evolutionary manner (Herrmann-Pillath et al. 2022).

5 Concluding remarks

The purpose of our study was to examine how it would be possible to mitigate and compensate for the harmful effects of incremental encroachment into urban green spaces—to find ways to determine the meaning and significance of green spaces for different individuals and communities, prevent the decline of the green space area, and improve the existing system from the perspective of the fairness of procedure and outcomes. We studied the institutional preconditions of what we call ecosocial compensation, i.e. how the mitigation hierarchy could be applied in urban planning and the nature-based social values compensated for residents. We were unable to draw clear steps or the content requirements for such compensation; nor was that our intention. The action research-oriented task we took upon ourselves was to reflect the role of participatory land-use planning, co-production of ecosocial knowledge, and responsive policy design and decision-making as a potential part of the future ecosocial compensation of nature-based social values in Turku in South-West Finland. In framing our task, we used John Dewey and Hannah Arendt as our conceptual guides.

Our study showed that if the mitigation hierarchy were to be a concrete part of urban planning, a new kind of information regarding nature-based social values in urban planning would also be necessary. This will become especially obvious when and if the European Union's proposal for the Law on Nature Restoration is enforced. Although the proposal's actual content remains under revision, it is obvious that the target is ecosystem restoration and biodiversity revival in urban environments as well. As this is a reasonable scenario for the near future, knowledge production for the practice of mitigation hierarchy and various compensation measures should occur in collaboration with experts and residents. According to our findings, the initiative of residents in ecosocial compensation plays a significant role in defining the values and their potential commensurability with urban nature.

Ecosocial compensation as a new instrument needs leadership support to be rooted in current planning practices. A continuous and anticipatory discussion between land-use planners, decision-makers, and residents, as well as constructors and builders, still absent in our study, will be crucial for supporting sustainable nature-based practices in green spaces. But not only discussion, ecosocial compensation requires consideration of urban green spaces as a whole, a move from incremental urban planning practices to more comprehensive approaches. Ecosocial compensation can be a way for residents raise their concerns and propose solutions to decision-makers and planners. Theoretically speaking, this is what Dewey meant by pragmatic naturalism in creative democracy. Collaborative land-use planning, decision-making embedded in planning practice, and integrated ecological and ecosocial compensation plans will most effectively ensure that the benefits of green spaces, habitats, and infrastructure are connected to residents' everyday life. While securing the availability of urban green spaces, ecosocial compensation could initiate the Arendtian action and leadership to help safeguard public space and shared life-sustaining purposes in cities.

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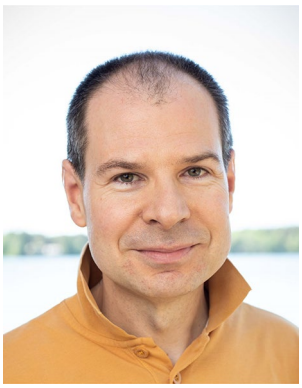

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