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RECOGNITION OF SUPRANATIONAL ENVIRONMENTAL GOALS IN SUBNATIONAL LAND USE PLANNING

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Abstract

Environmental goals are often agreed upon on the international level. Local municipality land use planning can contribute to various overall environmental goals, including those necessary to reach the European Green Deal. In the current research, links between the supranational and local level activities were analysed using multi-level governance frameworks and pragmatist planning theories.

A quantitative survey in the current research, addressing Estonian and Finnish land use planners, revealed variance among how much planners reported to account for environmental goals. Consideration of some environmental goals relevant also for the implementation of the European Green Deal were reported not to be considered often. Planners working in Finland (*vs* Estonia), in urban (*vs* rural) settings, in larger (*vs* smaller) municipalities and working with comprehensive (*vs* detail) planning reported to consider environmental goals more, and to be more aware of how to account for these. The factors planners considered to increase accounting for environmental goals in planning the most were those closest to planners, such as benchmarking, sharing good practices, guidance, and more clearly set environmental goals on the municipality level. National and European level contributions ranked lower as supporting factors.

Future research should address the reasons behind significantly lower reported level of accounting for environmental goals in detail planning. Also, the seemingly conflicting objectives of the green deal (all sectors must contribute to one goal) and of land use planning (balancing various needs) could be researched, which may impede exploiting land use planning in reaching the goals set in the European Union policy.

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Abbreviations

EC	European Commission
EGD	European Green Deal
EU	European Union
LUP	Land use planning

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1. Introduction

In the current research, the consideration of environmental goals, often agreed upon in international venues, is analysed in the setting of local level land use planning.

1.1. The European Green Deal as a discussion starter

In 2019, the EGD was announced with the aim of steering the transition to a 'greener' economy in the EU. Prepared by the EC, the deal *'[…] shows how to transform our way of living and working, of producing and consuming so that we live healthier and make our businesses innovative.',* as phrased by EC President Ursula von der Leyen (European Commission 2019). In its essence, the document is a communication by the EC, presenting and grounding a roadmap of policies to be drafted or updated to reach various environmental goals, most noteworthy of these being the EU climate law. The proposal highlights certain sectors that play a key role in the transition, re-states the importance of prior agreements, like the Paris Agreement, and stresses the importance of stepping up the pace in reaching the goals agreed upon previously between EU member states (see also following illustration).

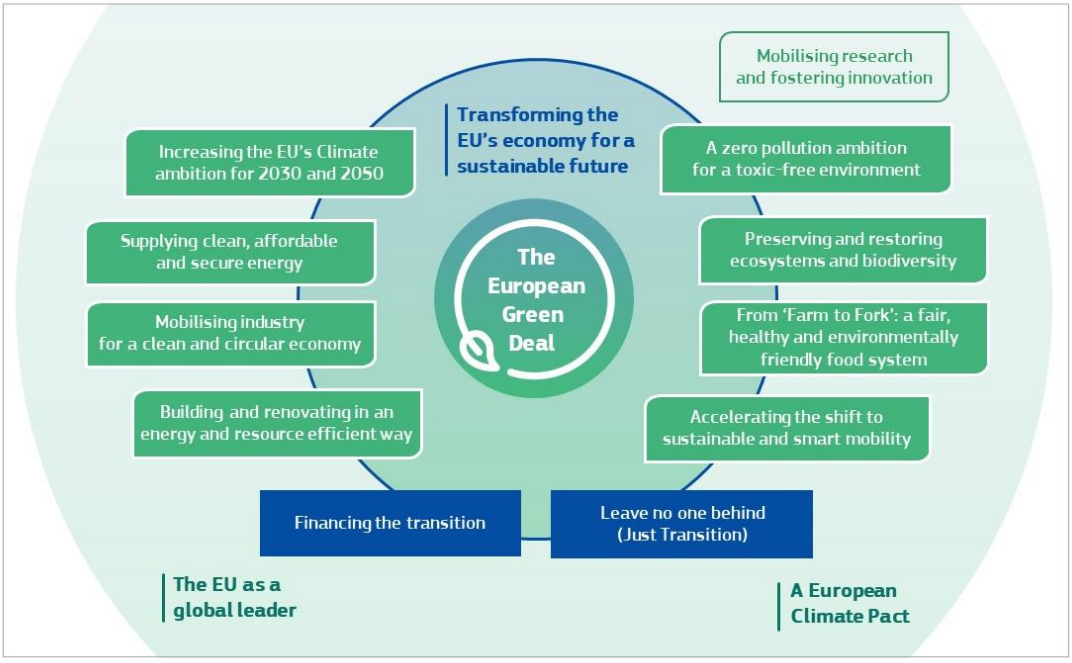

Figure 1. The European Green Deal. In: Communication… (2019)

Although considered *'the most important European energy and climate law initiative at the moment'* (Fleming and Mauger 2021, 164), the EGD did not emerge from nowhere and leans on policy processes to follow to be fulfilled. Less than a year after its publication, updates to the EGD were proposed by the EC with more progressive greenhouse gases targets (*ibid.*). The most notable legislative proposal by the EC so far is the first European climate law to state in legislative form the goal set in the deal – for Europe's economy and society to become climate-neutral by 2050 (European Commission 2021). More legislative proposals are to follow, as listed in the annex of the EGD.

In scholarly analyses of the EGD already available, it is noted that the document does not necessarily contain new issues compared to previous messages, and it is not clear whether the document could succeed in having more impact than existing policies. Summarising results of their linguistic analysis, Eckert and Kovalevska find that *'/.../ the EC has constructed a sustainability discourse and employed particular keywords, set phrases, and grammatical patterns to endorse its traditional agenda and prioritize familiar topics. The Green Deal does not depart from them in any major direction.'* (Eckert and Kovalevska 2020, 13). Ossewaarde and Ossewaarde-Lowtoo (2020) have concluded the EGD to be yet another version of the green growth model, as it aims at preserving the lifestyles and industrial layout of the society.

EGD, while not necessarily raising new environmental challenges or ways to address the existing ones, does hasten reaching environmental targets, and serves as the guiding framework for future actions in the European arena. The policy document may act as a trigger to research and actions on the ground – as was the case with the current research – even if these activities may have to consider environmental goals in a wider sense than precisely stipulated in the policy document to have meaningful implications. During the writing of this current thesis, the regulations to fully implement the EGD are pending. This means that two years after presentation, the impacts of the policy are still too early to be assessed. Nevertheless, as the overall goals stated in the document have also been known previously, it is topical to analyse accounting for the goals also listed in the EGD.

1.2. European Green Deal in a multi-level setting

One of the central messages of the EGD could be phrased in short as 'all hands on deck' – all contributions are necessary to implement the environmental goals. In the document, this is stipulated from two angles. Firstly, the idea is to leave no one behind (see also Figure 1 above). Secondly, transition is needed in all sectors, as all sectors have to contribute and play their part (section 1 in Communication… 2019). Both of these – looking into all the sectors and leaving no one behind – have

also been noted in public addresses by the President of the EC in the 2020 State of the Union speech (European Commission 2020) and by the Vice President on the EGD (Timmermans 2020).

The document itself can be considered a good example to showcase the neo-functionalist way of addressing European integration (see chapter 3.1. in current thesis for a somewhat more elaborated overview): a policy proposal developed by a supranational agency, the EC, followed by legislative proposals, often initiated by the EC. As profoundly shown by Elinor Ostrom (2010), though, environmental problems are both a cumulative result of actions by multiple actors (private actors as well as local, regional and national governments), and need addressing in a collective manner, including by sub-national governments (Ostrom 2010). The supranational nature of environmental problems and goals related to the importance of sub-national level governance is a key focus of the current research.

The importance of multiple institutions contributing has been highlighted by the EC representatives, for instance in an address by Timmermans (2020): *'The central issue is one of governance'*, emphasising that all institutions must be ready to contribute to the 'epic' transformation. Also, a browsing of the EGD itself shows that the importance of the local level has been mentioned in relation to renovation of buildings, or air quality, in addition the local level being an overall significant contributor to reaching the deal and the one to implement EU policies on the local level (Communication… 2019).

1.3. Focus and composition of research

In the current research, to analyse the relationship between supranational goals and local level contributions, LUP is used as an essentially local level governance activity (OECD 2017), and one that is connected to a number of environmental goals (see chapter 2.3 for an overview). As phrased by Juhola (2016, 344): '*On the whole, the field of land use planning is inherently an area of multi-level governance because it includes several levels of public administration. Also, land use defines the physical framework of society, thus relating to all other sectors of the society and administration.'*.

The current research adds a further analytical and empirical layer to existing research (see chapter 4). Previous research has primarily focused on the spatial implications of certain environmental goals: for instance, transport, the energy transition, or climate issues. In existing research, scanning planning documents has been noted to be a common approach, also interviewing planners or other related agents. In contrast, the current research combines various environmental goals in one empirical instrument, addresses possible European influences, and focuses on the practice and dispositions of

land use planners. Estonia and Finland are used as the empirical setting of the research due to the countries' similar land use planning systems, but slightly varying societal and historical settings.

The aim of the current research is to analyse whether environmental goals, including those articulated in the EGD, are accounted for by local level land use planners and the factors supporting or hindering this. Research questions:

1. How aware do local level land use planners consider themselves to be of environmental goals?
2. How much do planners believe LUP can contribute to reaching environmental goals and which potential changes could impact this?
3. Which environmental goals do planners consider themselves to account for in local municipality LUP?
4. Which factors explain differences in opinions of land use planners?

The current research combines several areas of research (LUP, multi-level governance, environmental goals) and the composition of the thesis builds upon the necessity to address a wide array of aspects in one thesis. In chapter 2, the concept of LUP is coupled with environmental goals, noting the international (EU) setting. In chapter 3, multi-level governance is introduced as the main theoretical standpoint of the research, and pragmatism, describing the practice of LUP. Chapter 4 contains an overview of relevant previous research and chapter 5 describes of the empirical composition of the research. In chapter 6, key results are presented and connected to previous research.

2. Land use planning and environmental goals

2.1. The term ‘Land use planning'

Many of the academic writings dealing with LUP, spatial planning or urban planning include a definition of what exactly is addressed (see, for instance, Dallhammer et al 2018, Biesbroek et al 2009, 234, Hurlimann and March 2012, Atkinson and Zimmermann 2018, Alden 2006). While no common definition of LUP exists, various sources (e.g., Metternicht 2018, McClure and Baker, 2018) seem to highlight aspects like ‘public process’, ‘permitted land use’, ‘regulation-based’ and ‘authority-led’. Building upon previous approaches and national settings of Estonia and Finland (see chapter 5.2.), in the current thesis, LUP is to be understood as a regulation-based participatory process to decide on permitted land uses, led by the local authority.

It has been recognised that the term LUP is ambiguous and often overlapping in content with adjacent concepts like spatial planning, urban/rural planning, regulatory planning. Biesbroek et al (2009, 234), in relation to the term ‘spatial planning’, have linked this multiplicity of definitions to cultural differences, traditions, attitudes and changing political discourses in and between countries.

Academic approaches in some instances use the terms ‘spatial planning’, ‘urban planning’, LUP, ‘urban and regional planning’ and ‘physical planning’ overlappingly, or deliberately decide not to distinguish the terms (see Hurlimann and March 2012, 485, Rega 2020). Even if more specific terms are used to narrow the scope of a specific contribution, it seems the terms are matching in content. As an example, Hurlimann et al (2021, 2) define urban planning as a *‘discipline which seeks to control the use and development of land for managing the activities and spatial form of cities’* – which in other instances could just as suitably be labelled LUP taking place in an urban environment.

LUP is in some instances also addressed as ‘regulatory spatial planning’ (see, for instance Asprogerakas and Zachari 2020, in the Greek spatial planning framework). Strong juridical grounding is a universal feature of national planning systems, especially in LUP (see exhaustive overviews like OECD 2017 or the ESPON 2018 COMPASS project (Nadin et al 2018)). As phrased by Hurlimann and March (2012, 479-480): *‘/.../ planning systems rely on some form of statutory ‘force’, typically derived from legislation, that provide them with decision-making powers. Indeed the appropriate statutory force has been found to be important in related fields such as the achievement of sustainability principles.’* For the current research, it is therefore important to account for the legal grounding when addressing the environmental goals related to the environmental goals in the empirical side of the study.

In relation to the 'spatial planning' concept, the prevailing view seems to be to describe the development of national planning systems *from* a narrower LUP *towards* more strategic spatial planning, meaning a broader spatial development management, including also policy instruments such as funding schemes (see Asprogerakas and Zachari 2020, 590, address in Giannakourou 2012, 117, Alden 2006, 27-28). Presenting this as a one-way development from LUP go spatial planning may be somewhat misleading, as also in a broader spatial planning context, LUP continues to fulfil specific roles, such as designating permitted land use. A conclusive distinction between spatial planning and LUP is most likely not achievable, as the terms remain synonymous in some instances, and overlapping.

For the sake of this current research, a more precise classification is nevertheless necessary. The empirical side of the current research focuses on LUP as a legally defined activity practiced in the countries analysed (see chapter 5.2.). Relating the research to previous contributions, a wider spectrum of resources also dealing with spatial planning or urban planning is used, as the tendencies highlighted in these may also be applicable to LUP, and because in some instances, the various terms are seen as interchangeable.

2.2. Europeanization – or not – of land use planning

Many authors have noted that the EU does not have general competence in spatial planning, or LUP (Dallhammer et al 2018, Atkinson and Zimmermann 2018, Faludi 2014, 2018). Nevertheless, various previous contributions have described how such a concept could have formed, and how during this non-emergence, EU policy has still influenced spatial planning. For the current research, briefly going through these aspects helps to explain the settings where subnational LUP takes place and how issues related to LUP are connected to the *acquis communautaire* of the union. While this chapter in many instances deals with spatial, rather than land use planning *per se*, these developments are relevant for LUP, as well, as LUP is an inevitable part of the wider 'spatial planning' term (see also Faludi 2018, 515, for a short reflection).

Two of the authors who have looked into the (non-)emergence of 'European spatial planning' are Atkinson and Zimmermann (2018). Other significant contributions include Faludi (2014, 2018) and Zachari and Asprogerakas (2020).

Atkinson and Zimmermann (2018), based on Faludi and other authors, have traced the beginning of the 'European spatial planning' concept to the early post-war years of the European cooperation, already then encompassing spatial development as a general concept. In 1970, CEMAT, the

conference of ministers responsible for spatial planning, was founded at the Council of Europe, still operational today. In 1983, CEMAT agreed upon the European Regional/Spatial Planning Charter (the 'Torremolinos charter', see European Conference… 1983), laying down key principles of spatial planning as a multi-disciplinary and participatory process. Atkinson and Zimmermann (2018, 157) consider the impact of the document to be limited.

While this remark on the impact of the Torremolinos charter can be argued to be true from the emergence of a wider European spatial planning discourse, the document has shown to be influential in some of the current EU member states who re-built their LUP systems in the early 1990s, after the collapse of soviet systems. Munteanu and Servillo (2014, 2253) have described the period in Romania: *'The new planning system /.../ capitalized on the sustainable development discourses emanating from the 1983 Torremolinos Charter by CEMAT /.../'*. In the Estonian context, the re-establishment of democratic and market-economy based LUP with the adoption of the 1995 Planning and Building Act in its principles strongly relied on the Torremolinos charter (see, for instance Aidnik 2019, Ruoppila 2007). The variation in how relevant the charter is considered may be seen an example of how the parallel and partly overlapping disciplines of LUP and spatial planning have emerged differently in various societies. (See also chapter 2.1.)

A central EU policy document in the field of spatial planning is the European Spatial Development Perspective (ESDP) of 1999. The policy document has been described as leaning towards the issues of centre-periphery relationships, socio-economic disparities and polycentric development (Atkinson and Zimmermann 2018, 159), and not focusing on issues of land use management, or urban zoning (Faludi 2000, 243). According to Atkinson and Zimmermann (2018, 158), Faludi (2000) has described how '*the 'makers' of the ESDP all had a background in spatial planning and they went through a learning process, as they had to accept that something different from national types of land use regulation had to be invented.'* As Atkinson and Zimmermann (2018, 159) put it, the making of the ESDP '*made it clear that the European approach differed from an approach based on land use regulation',* that the member states had been accustomed to – again describing how the national and subnational LUP has not been directly on the EU agenda.

Even for the wider term of spatial planning, Faludi has in the various contributions (e.g., 2010, 2015) come to a conclusion similar to the one in Faludi (2014): a harmonious concept of 'European or European' spatial planning has failed to form and materialise.

From a different perspective, not endeavouring on finding a union-wide spatial planning setting, authors like Evers and Tennekes (2016), Dallhammer et al (2018) have shown how the EU has impacted spatial or land use planning as practised in the member states by presenting the linkages

between EU (sectoral) policies and LUP. The more specific links between LUP and sectoral policies are presented in chapter 2.3. In the following paragraphs, the overall process of what is sometimes called 'Europeanization' of national spatial, or land use planning, is described.

As phrased by Vink, Europeanization can be described as *'when something in the domestic political system is affected by something European'* (Vink 2002).

Asprogerakas and Zachari, analysing how the EU dimension has impacted spatial planning in Greece, have concluded that there are significant links between national spatial planning and EU policies, and spatial planning *'obtains an essential role in providing a proper framework for the implementation of the EU policies'* (2020, 598-599). The authors conclude that '*Although spatial planning is a national responsibility of the member-states the interest of the EU is apparent in a series of related documents and as expressed through current policies. Although, the related documents do not give any clear guidelines concerning the national spatial planning systems, the EU sectoral policies have broad implications in spatial terms'*. (*ibid.*)

In a recent profound contribution arguing for bringing ecological rationality (back) to land use decisions, Rega (2020) has also addressed the 'European dimension' of land use decisions. Based on previous authors, Rega has distinguished four dimensions of EU policy influence on local spatial planning (2020, 143): 1) Substantive legislative requirements (e.g., area-based designations like Natura 2000 sites); 2) Procedural legislative requirements (e.g., strategic environmental assessment requirement in preparing strategic documents); 3) Funding (EU budget contributions to reaching certain goals or protecting certain values); 4) Strategic documents and policy guidelines. Of these categories, these may be seen as impacting the practice of LUP the most: substantive legislative requirements of the EU and strategic EU sectoral documents and policies linked to land use.

The mechanisms of how the EU impacts national LUP can vary significantly. Jauhiainen (2014, 72) has highlighted the presence of both harder (coercive and binding) and softer (persuasive and voluntary) elements in the Europeanization processes. As noted by Giannakourou (2012, 119), in line with emergence of new modes of governance, more authors have started to examine the domestic impact of 'Europe' in policy areas where the dominant pattern of governance is not based on coercion or regulatory competition.

A set of 'special cases' that diversifies the relations between LUP and EU policies are the instances where an implication of an EU policy obstructs the local level from fulfilling its goals. Fleurke and Willemse have used the Habitat directive (Natura 2000 directive) as an example: the implementation of this directive, requiring certain areas to be preserved in natural use, can lead to the necessity to alter LUP documents already in force and therefore inhibit or even prohibit the local administration as a

subnational actor in fulfilling its own development goals. As the authors have specified, what first may seem a regulatory requirement of the national government, may reveal to be the EU blocking the subnational initiative (Fleurke and Willemse 2006, 91-92).

As Giannakourou has pointed out, Europeanisation of national planning may also result from 'judicial policy making' by the EU. If in a 'normal' legislative procedure, EU policies are enacted through national legislative procedures, in some cases EU regulations may turn out to impact LUP through rulings by the European Court of Justice or national courts. Giannakourou specifies this as a special kind of Europeanization of LUP, presenting examples from Germany and France where plans or planning procedures had to be altered due to rulings by the European Court of Justice. (Giannakourou 2012, 123-4). A similar example may be presented from a recent LUP case in Estonia, one of the study cases of the current research. In 2020, the Supreme Court of Estonia partly annulled the county land use plan defining the alignment of the proposed Rail Baltica railroad, based on the European Court of Justice's previous rulings on how to implement the Natura 2000 areas directive. (Riigikohus… 2020) For the sake of the argument, the Rail Baltica county land use plan itself was necessary to set the alignment for the potential railroad, which fulfils also the goals of the EU Trans-European Transport Network (TEN-T) policy.

An important analysis on how EU regulations have impacted LUP in a member state has been conducted by Evers and Tennekes (2016), using the Netherlands as an example. In the authors' words, the analysis comes as a response to the critique that empirical evidence is lacking on Europeanization of spatial planning. Scanning through EU policy areas, the authors defined the ones with mappable spatial impacts 'on the ground' and through their analysis concluded that fragmented EU policies present *'a clear challenge for coherent spatial strategy'* (Evers and Tennekes 2016, 1761). As the authors acknowledge, the issues to be dealt with in spatial planning due to EU regulations are not unknown to planning, as sectoral tensions have existed also previously, and local issues usually coincide with EU issues. What has changed, though, with the European dimension, is that EU sectoral policies are increasingly given priority over domestic spatial objectives and spatial planning seems to be heading from seeking compromise between competing land uses to compliance. Also, as a result, planning has become more sectoral, more international and more regulation based. (*ibid.*, 1761).

The overview in the current chapter has shown the mixed relationships between subnational LUP and the supranational EU level of governance and policies.

2.3. Land use planning and environmental goals

The following chapter looks more specifically into how LUP is related to sectoral policies and environmental goals.

As a general starting point, LUP brings the spatial dimension into sectoral policy making and supports the spatial implementation of sectoral development goals. The absence of the territorial dimension in EU policies has been highlighted by Asprogerakas and Zachari 2020 (599), who have stressed engaging spatial planning as a tool of governance as a future possibility. The decline of the territorial/spatial aspect of EU policies has also been noted by Faludi (2018). A similar tendency has been highlighted in the Chinese setting by Schmidt-Traub et al (2020), their review showing that none of China's 195 climate strategies include an actionable map, and only 15% of biodiversity strategies do. The authors describe how this problem of lacking spatial approaches has been taken up in China by drawing up national zoning documents. Although the Chinese overall societal setting varies greatly from European settings (e.g., role of central *vs* local government), the approaches show how applying spatial approaches is as a key tool for achieving environmental or sectoral goals in various societies.

Addressing the links between spatial planning and energy transition, Wiehe and Walter (2020, 2) have brought in another specific dimension of the practice. Spatial planning makes sure 'everything fits', in the authors' case enabling the positioning of the energy system's restructuring that is necessary to reach Germany's commitments to reducing greenhouse gas emissions, amid the strong competition for land use in both urban and rural areas. A similar characteristic is phrased in the recent Estonian green paper on spatial planning: *'[s]patial planning is the only administrative proceeding that considers the spatial needs of sectors at a certain location in interaction with each other'* (Ministry of Finance 2020, 4). This is also one of the key messages of the Torremolinos charter, shown to have had impact on some post-soviet LUP systems (see chapter 2.2.): balancing various development needs of the society (economic, social, cultural and ecological, see European Conference… 1983).

The connection between sectors and LUP is surely a mixed picture of how much LUP is considered the solution for problems, and how much the cause of problems. For example, Hurlimann and March have combined from previous contributions, the following challenges related to climate change and resulting from planning: suburban sprawl, building codes oblivious to energy efficiency, automobile obsession, reliance on fossil fuels and failure to consider urban environmental externalities; and the UK government labelling planning as the problem in relation to implementing wind farms (Hurlimann and March 2012, 477). Wiehe and Walter (2020, 2) have also mentioned in relation to wind energy siting that as the technologies are available, it is spatial planning assumed as not having delivered enough spatial support for wind energy expansion.

In the Romanian context, Munteanu and Servillo (2014, 2252) have presented another example of how spatial planning has been perceived as 'failing' to sustain values cherished by the general public, as planning had previously been used in the country as a highly political instrument considered responsible for the destruction of a large part of the built heritage in towns and villages.

The debated role of LUP has been explained by the complex nature of the practice of LUP. Whereas sectoral policies such as climate change, focus a certain goal as the primary challenge for a society, LUP has the function of balancing various needs of a society, that may lead to neglecting some goals that are of primary importance from a sectoral point of view (Biesbroek et al 2009, 231; McClure and Baker, 2018). Also, unlike the neighbouring quantifying-oriented field of research of land use change LUP is seen as an essentially integrative discipline, that considers space as a social construct, with inherent uncertainty (Hersperger et al 2018, 32; Fürst 2021, 326).

Various contributions have described how LUP cannot by any means be the sole instrument to address environmental goals (Juhola 2016, Hurlimann and March 2012, 477, Biesbroek et al 2009, 234). Juhola places LUP among instruments such as permits, sanctions, legislation, plus informal policies, economic instruments, and co-regulatory instruments (such as voluntary agreements) (2016, 343, outtake). LUP also has a role in instances where other policy instruments are used to implement and internalise environmental goals. An example can be presented from of a methodological framework Cities4Zero, aimed at helping cities decarbonise. The step-by-step framework states it is essential to modify or update existing LUP instruments (e.g., city masterplan) in order to ensure strategic activities to be undertaken to fulfil sectoral goals are backed by sufficient land provision and legal viability (Urrutia-Azcona et al 2020, 11-13). This again highlights the unique position of LUP in relation to sectoral initiatives in ensuring development is sustainable: having its clear role, but not having full capabilities to solve the problems completely.

In the European setting (Rega 2020), but also as an example in India (Kumar and Geneletti 2015, 211), the scope of spatial planning has been seen to have widened – in India, to include environmental protection, public participation, and sustainable development domains in addition to the basic issues like location of industry or developing sewerage, for instance (*ibid.*).

In a 2018 overview commissioned by the European Committee of Regions, experts from two research institutes gathered information on how spatial planning relates to, or is impacted by, EU regulations. From the EU legislation defined as relevant for LUP in the research, the following spheres are of most relevance for the current research: environmental impact assessment directives, the habitats and birds directives, water framework directive, environmental noise directives, renewable energy and energy efficiency directives, trans-European energy infrastructure directive (Dallhammer et al 2018, outtake).

It has to be borne in mind that not all environmental goals are of relevance in LUP. For instance, spatial implications of the 'right to repair' idea, which is part of the EGD, or waste shipments do exist, but are too remote to be considered of primary importance for LUP and for the current research. The relevant sectors for the current study are listed in the following table together with examples of possible links.

Table 1. Examples of links between land use planning and environmental goals

Agriculture	Combining common agricultural policy as supporting the realization of interventions in rural areas and planning as providing a comprehensive and coordinated approach and regulating development (Rega 2020, 174)
Climate change adaptation and mitigation	Spatial planning as helping mitigate CO_2 emissions through allocation of land (Wang et al 2018, 23) City form, location of activities and active measures to adapt to climate change set by plans (Biesbroek et al 2009, Hurlimann and March 2012) Development restrictions to contain urban growth, affordable housing mandates (to reduce the spatial disjoint between home and work), mixed use zoning to support self-contained communities, urban regeneration and infill, development rights to support transit-oriented corridors, code revisions/design guidelines to achieve pedestrian zones and car-free districts and/or traffic calming (based on from Seto et al 2015, 959).
Soil cover	Use of soil for infrastructure, leisure projects or urban agglomerations, that should legally be constituted as soil pollution (Krämer 2020, 297)
Energy production and efficiency	Dealing with spatial requirements related to decentralised energy generation, siting of facilities (Asarpota and Nadin 2020, 3) Changes in the built environment to lessen energy demand (e.g., in transport, or city layout or positioning of buildings) (*ibid.*, 6)
Transport	Promoting walking, cycling and public transport, applying land use patterns that reduce the need for transport (e.g., mixed land use, densification, walkable communities) (Solá, Vilhelmson and Larsson 2018)
Biodiversity	Degradation of biodiversity through urban sprawl, infrastructure, and leisure projects development (Krämer 2020, 294)
Circular economy, circular development	Need to find space in cities for colocation of industries for industrial symbiosis; the storage of construction recyclables for future projects; urban farming enabling closure of the food waste loop and ecological regeneration, as examples (Williams 2020, 916). Need for planning to provide space, long-term, for low-value, circular activities (*ibid.*, 918). Inclusion of sustainable development as a core principle of planning, acknowledgement of multi-level networks in planning, local planning as the main locus for sustainable development and circular economy (Turcu and Gillie 2020, 66).

3. Relevant theoretical frameworks

3.1. Multi-level governance

When analysing the relations between subnational and supranational policies, the theoretical framework of multi-level governance has been used in European settings (e.g., Juhola 2016, Tatar 2011). The theory stresses how in the EU's policy making processes, member states, although situated in the focal point of political deciding, are *'being melded into a multi-level polity by their leaders and the actions of numerous subnational and supranational actors'* (Hooghe and Marks 2014, 274-275).

As generalised by Lelieveldt and Princen (2015, 39), multi-level governance emerged in the 1990s as a response to existing prevailing theories explaining EU integration, neo-functionalism and intergovernmentalism. The framework known as neo-functionalism was developed by Enrst B. Haas, analysing early years of post-war European integration processes. Neo-functionalism highlights the importance of (elitist) supra-national actors in the integration processes, which will lead to *'/.../ a new political community, superimposed on the pre-existing ones'* (Haas 1958/2004, 18 in Lelieveldt and Princen 2015, 29). These trends include ever more tasks being delegated to the supranational level as integration deepens, also known as spillover (Lelieveldt and Princen 2015, 29-30). The other most influential branch of EU integration theories is intergovernmentalism, strongly related to works by Stanley Hoffmann. The primary characteristic of the theoretical framework is the notion that it is not the supranational actors but the member states that are fully in charge of the integration process (*ibid.*, 33).

As a reaction to these theoretical frameworks concentrating mostly on the role of the EU's member states, multi-level governance, strongly related to the scholars Liesbet Hooghe and Gary Marks, stresses the importance of considering all levels of governance in the EU's policy making, including the subnational level (*ibid.*, 39). As generalised by Allain-Dupré in a commentary on how the OECD has been tackling multi-level governance to support countries in their development processes, Hooghe and Marks' theory focuses on the notion that public authorities are confronted with externalities that differ in territorial reach: *'Complex challenges, linked to climate change, globalisation or demographic pressures require effective partnerships among levels of government and jurisdictions, as externalities are too strong for any one jurisdiction – be it a country or a local government – to manage the challenges on their own'* (Allain-Dupré 2020, 801).

The emergence of multi-level governance is closely related to the idea of 'regionalisation of Europe'. As Antunes and Loughlin have described, even though the importance of the state has not declined, the regions have become *'/.../ political actors in their own right, alongside the state and the (then)*

increasingly powerful European institutions.', promoting subnational authorities to seek some kind of institutional representation within the EU (Antunes and Loughlin 2020, 122). It is both the macro-regions of Europe and subnational regional networks that are often in the focus of multi-level governance frameworks and research, while the theory has also been used to describe the activation of the local level.

One of the possibilities foreseen by Hooghe and Marks (2001) was the 'hollowing out' of the member state, as the regional (subnational) and EU level gain importance. As subsequent authors (e.g., Evers and Tennekes 2016, Antunes and Loughlin 2020, 123) have noted, empirical evidence has not shown this taking place and member states still are the primary actors also on the EU level. While subnational and supranational actors are part of the current EU policy making, it has been questioned whether these actors actually do have substantial impact on EU policy making (see Nadalutti 2015, 21 for an overview).

Multi-level governance has been criticised as being not a theoretical framework but rather a description of the EU, overstating the autonomy of subnational actors and mistaking subnational mobilization for actual influence on the EU level (Jordan 2001, Tatar 2011, 399). Antunes and Loughlin (2020, 123) have concluded that '*although the approach has shed new light on the dynamics of network governance in multilevel polities, it has been unable to advance either the theoretical conceptualization or our practical understanding of subnational engagement in the EU'*. Instead of using multi-level approaches *per se*, the authors distinguish the following factors that have been highlighted as impacting subnational mobilisation (*ibid.* 126-128):

- The quality of intergovernmental actions (the embeddedness of subnational actors in domestic networks),
- The legal-constitutional powers of sub-national actors,
- How fragmented subnational structures are,
- The perceived democratic, political and cultural 'legitimacy' of sub-national actors,
- The strength of the sub-national agency (vetoing capabilities, political capacities),
- The impact of historical legacies in policy-making practices,
- Political norms and values
- Perception of Europe.

These are accounted for, as much as possible, in designing the empirical instrument for the current thesis (see chapter 5.1.).

In their framework address on sub-national autonomy in relation to the EU, Fleurke and Willemse 2006 (85-87) have distinguished between three types of relations between the EU and sub-national

authorities. First is the network approach, that according to the authors covers most of the multi-level governance literature (including most influential works by Hooghe and Marks). In this perspective, the ways of decision-making spreading across governance levels and involving the private sector is highlighted. This is seen to bring about a positive effect – sub-national authorities' increased capabilities of raising funding and realising their goals. A second perspective is that of local response and activities to fulfil these possibilities: setting up agencies to handle EU funds, lobbying at the EU level, etc. Findings in this sphere indicate that the local authorities' capabilities in reacting upon the 'EU possibilities' vary significantly. The third set of relations described by Fleurke and Willemse is what the authors call the formal approach. This set of analysis looks at how EU regulations impact local decision-making. This impact may be both beneficial (promoting the local goals, as well), as well as restricting local-level autonomy[1] (see also chapter 2.2.). The authors assess it as premature based on existing research, to conclude whether this impact is actually measured on just hypothesised. The authors point to the fact that when analysing issues related to EU impact upon sub-national actors, analysis should focus on the activities conducted on the local level, and link it to EU policy, not vice versa. Fleurke and Willemse also highlight that this impact from the EU to the local level might be indirect or channelled by state regulations. It is this third set of relations refined by Fleurke and Willemse that is the most relevant for the current thesis.

On the edge of the multi-level governance theories lies the concept of mandated participatory planning. Newig and Koontz have described it as follows: *'As a novel phenomenon in public policy, [mandated participatory planning] shares features of policy implementation, multi-level governance and participatory governance'* (Newig and Koontz 2014, 253). In a nutshell, the approach mandates the creation and application of (sectoral) strategic documents (like plans or programmes) to be drafted on subnational, national or cross-national level to implement certain EU policies. This has been applied, for instance, in the water and air directives. A similar mechanism has been implemented in maritime spatial planning, the corresponding EU directive requiring member states to draft maritime spatial plans (see Directive 2014/89/EU).

[1] Fleurke and Willemse (2016, 91) do stress that researchers should avoid giving judgements whether an impact is negative or positiive.

3.2. Pragmatism portraying the work of land use planners

As emphasised by Metspalu, theoretical frameworks are often sought for the practice of planning, although it should be considered a *'highly practical, 'action-oriented' discipline'* (Metspalu 2019, 21). This aspiration has been previously noted by a key scholar in planning theory, Patsy Healey (2009, 277-278): *'The complexity of the relations to be grasped and the ethical dilemmas to be addressed in undertaking 'planning work' are substantial. It is therefore not surprising that many have sought to define some kind of a priori set of principles to narrow down the considerations and actions that are appropriate.'* For the current research, a theoretical approach framing the work of planners helps to set planning into an analytical setting, even if the setting may turn out to be a messy one.

Numerous authors have addressed pragmatism as the key framework describing spatial planners' work. Patsy Healey (2009) has contributed with a comprehensive overview. Sager (1999) has noted that critical pragmatism is the number one theoretical framework to analyse planners' work. In a chapter introduction, Charles Hoch (2018, 118) has stated that the pragmatist approach *'/.../ offers an especially attractive theoretical framework for urban planning because it focuses explicitly on human judgment as purposeful, anticipatory and future oriented'.*

Describing the developments of the concept, Sager (1999) has given an overview how the planners' discipline emerged from a positivist, science-oriented activity, to a communicative action. Earlier than these mid-20th century thoughts, Healey (2009) links the modern notion of pragmatism to late 19th and early 20th century philosophical pragmatic thinking in the USA. According to Healey, early pragmatism emerged as a response to previous lines of thought believing that some metaphysical higher principles or natural laws could be used to create good cities. Instead, the pragmatists believed that what was true and good, *'was continually asserted and discovered in the flow of thinking and acting in the messy world and practical enterprise of living.'* (Healey 2009, 278). In the light of the current research, another relevant aspect to be noted in early pragmatist thinking is that purpose, judgements and consequences are not linked in a linear way: there are no single-dimension relations to be applied in practice, things might be connected in multiple ways (James 1907/1991 in Healey 2009, 279). As generalised by Healey, early pragmatists *'emphasized a relational view of the world, without losing a deep understanding of its material solidity. They stressed the significance of experience in forming and validating knowledge claims. /.../. They were emphatically antidualistic, emphasizing how fact and value, theory and practice, ends and means are intertwined.'* (Healey 2009, 281).

The pragmatic thought in planning has been gaining ground since the second half of the 20th century, carrying on the ideas of early pragmatist thinking. One of the major contributors to current pragmatist thinking, and planning theory in general, has been John Forester, who has among other key messages

highlighted the (desired) role of the planner as a mediator in conflicting settings, mindful of prevailing power relations and restraining from following conventional routines (Healey 2009, Forester 2013). Another central contributor, Charles Hoch, has emphasised how practical judgement is about bringing together all the senses and knowledges to create a holistic judgement (Healey 2009).

Hoch, describing the essence of pragmatism in planning, has stated: *'In the spatial planning world pragmatists avoid prescriptions tied to methodological rigor and certainty; making plans that fulfill rational expectations. The pragmatist scholars focus instead on the relevance of social knowledge for the situation at hand attending to the meaning and impact of future consequences. They study what people making plans and planning institutions do to cope with messy, complex social and political problems that accompany modern urban development.'* (Hoch 2018, 119-120).

According to Healey (2009, 287), one of the major contributions of pragmatism has been its orientation on action – focusing on the challenge of 'acting in the world'. Nevertheless, as Healey has seen it, the current practice of planning may be turning towards a 'practical pragmatism', going for 'what works' in planning decisions (Healey 2009, 278). This may not be accounting for the core ideas of pragmatism, aimed at looking beyond the established power relations and conventional ways of thinking. In the Estonian setting, Metspalu has found traces of similar tendencies: '*In post-socialist Estonian planning, down-to-earth pragmatism tends to prevail. "Getting things done" has been the main societal expectation towards planning.'* (Metspalu 2019, 42). The downsides that could be linked to 'practical pragmatism' like circumventing the rules and principles, and the lack of strategic alternatives analysed during planning are familiar in Estonian planning practice (*ibid.*, 46).

Within the pragmatic planning theories, another specific aspect of planning has been presented, that is highly relevant when addressing the links between LUP and environmental goals. As explained by Blanco (1994, in Hoch 2018), in pragmatic logic, plan making does not start from goals, but with the problem at hand in the specific situation: '*Plans do not implement goals, but articulate goals in relation to specific contextual conditions offering practical alternatives for action and choice.'* (Hoch 2018, 122, based on Blanco 1994). From a slightly different angle, describing the mixed relation of process and outcome, a similar feature has been presented by Forester: '*/.../ critical pragmatism informs not a unilateral but a co-constructed, co-generative or negotiated planning practice, it attends both to processes and outcomes. A critical pragmatist would treat very skeptically, if not reject outright, anyone's claims that attention to process alone, or outcomes alone, could be justified pragmatically in a planning or public policy context'* (Forester 2013, 6).

As described by Zack (2006), the mayor contesting line of theorising on spatial planning is the critical approach, analysing *'/.../ the role of planning in creating, maintaining, or reproducing social control,*

oppression, inequalities and injustices' (Yiftachel 1999, 268) – although, as Zack notes, the frameworks are not necessarily dissociable. According to the author, both of the straits have been considered limited in their capability support making ethical choices in actual planning situations, and pragmatism *'does not provide a fixed moral anchor, but calls for each situation to be judged individually, and it expects uncertainty and multiplicity in values.'* (Zack 2006, 92). Also, according to Zach, pragmatism tends to underestimate existing power relations and structural impediments to planned actions.

In the context of the current research, pragmatism as a fundamental framework describing the operational settings of planners, may help to explain the complex nature of LUP and its relations to environmental goals.

4. Related previous research: land use planning, environmental goals, and multi-level governance

In the current section, relevant examples of previous contributions are presented that have been of significance in the preparations for the empirical part of the current research. In addition, previous research has helped in relating the empirical findings of the current research to the accumulated body of knowledge related to the issues of LUP and wider environmental goals.

Asarpota and Nadin's (2020) empirical analysis has looked at four cities' (Hong Kong, Oakland, Oslo, Vancouver) energy strategies for links with spatial planning. Constructing a list of potential connections to be found and based on document analysis, the authors concluded that gaps exist especially in the attention given to the urban design and built environment that could assist in meeting energy strategy goals. Asarpota and Nadin suggested linking the energy transition strategies and urban and spatial planning departments on municipality level to systematically look at the measures that planning can imply and changes that can be made in urban design.

A study focusing on transport and the role of local level urban planning in achieving these has been conducted by Solá, Vilhelmson and Larsson et al (2018). The analysis addressed planners, rather than planning documents, to investigate their understanding of sustainable mobility. By workshops conducted with local municipality planners from three municipalities with varying size, the authors highlighted themes of consensus and themes of tension (that challenge sustainable mobility planning). The findings most relevant from the side of LUP are that densification of settlement structure was seen as a key means to promote sustainable transport and mobility. On the other hand, tensions exist between conflicting goals – e.g., densification of city structure *versus* preserving parks and other public amenities near dwellings (also limiting the need for transport). This inherent balancing nature of LUP has also been noted in other instances (see chapter 2.3.).

Hurlimann et al 2021 have analysed a number of planning documents, including LUP documents of Melbourne and classified links to climate change adaptation, also looking at national level commitments and documents. The authors found that among the goals set in the state level documents, potential contributions by the energy sector were strongly presented in local level documents. Nevertheless, according to the authors, links to possible interventions from the LUP side in relation to climate change adaptation were limited. This Hurlimann et al (2021, 7) have seen to be a significant gap that can hinder meeting the overall documents' goals.

In a previous address, Hurlimann and March (2012) have generalised, based on numerous studies, the factors that may explain why climate adaptation measures are not actively part of spatial planning.

These are: *politics, vested interests, expediency of decisions; institutional path dependency; mismatch of functional responsibilities e.g., through conflicts between the hierarchical levels of planning, a 'persistent undertow' that planning should seek to meet predicted demands for growth; and the lack of a conduit through which climate change concepts can be transferred from policy principles into practice.* (*ibid.,* 483). Similar factors may be hindering including other environmental goals in LUP, as well.

McClure and Baker have contributed to the understanding of relationships between LUP and climate change adaptation by bringing in the planners' perspective in the Australian setting, where acknowledging the challenge at the national level is modest, and planners have to find ways to adapt at the local level (McClure and Baker 2018, 82). Their analysis, interviewing local planners, highlighted various barriers met at the local level by planners when dealing with climate adaptation measures: lack of clear policy guidelines from the national level; difficulties making unpopular decisions on the local level without national (central) backing; lack of funding to handle the issues profoundly; measures needed are unpopular by local voters. The following countermeasures were mentioned by the planners: seeking guidance and benchmarking from other than state authorities; referring to legal and scientific authorities for guidance on how to respond to the threat of climate change where high-level policy is silent; investigating arrangements for voluntary coordination and collaboration. (*ibid.,* 85-86)

The Indian context of links between climate change and spatial plans has been addressed – based also on European experiences – by Kumar and Geneletti (2015). From previous studies, the authors summarised the following obstacles: capacity of local governments, lack of awareness, lack of information and technical expertise, low level of political support and financial resources, disagreements between stakeholders on climate change issues (*ibid.,* 210). By their empirical analysis, the authors show that in the Indian context, lack of awareness, participation, technical skill, and action response are the prime reasons for the weak performance of spatial plans in integrating climate change issues. The study also showed that some cities in India that face regular climate change issues in practice have integrated climate change more in their spatial planning documents. Also, other issues such as physical development and socioeconomic wellbeing prevail as the focus of most spatial plans. The authors have generalised that in India, the integration of climate change issues in spatial plans at the city level is still limited. (*ibid.,* 217-218)

The importance of setting clear objectives to various levels of government has been stressed by Wiehe and Walter (2020, 2) in relation to renewable energy production and LUP in Germany. With the help of a policy analysis, the authors concluded that in order to fulfil Germany's renewable energy goals, *'mandatory and interdependent targets must first be defined for the various decision-making levels'*

(Wiehe and Walter 2020, 9-10). The authors also have also acknowledged that setting national goals to the local level may be politically challenging.

As shown by Stevens et al (2014) and Stevens and Senbel (2017), in the studies addressing connections between climate change and spatial planning, plans are frequently analysed for climate related content with more than 50 studies published between 1994 and 2013. As a 2009 meta-analysis by Berke and Godschalk showed, the average plan did not contain much of the desired content related to climate issues. Stevens and Senbel (2017) conducted a web-based survey across municipality planners of British Columbia to complement a previous study of municipality plans. As a result, the authors found partly consistent with results from previous contributions that climate change related issues are more likely to be included in plans when the topics are relevant for the corresponding municipality (such as sea level rise and coastal storms); when local officials have raised concern in relation to climate change impacts; when there is adequate municipal capacity to deal with the matters; when increased revenue/spending is spent on the issues; when the elected officials, the general public and the planning staff are committed to dealing with climate change; when educational attainment of environmental problems increases.

Strongly accounting for the theoretical setting of multi-level governance, Juhola (2016) has analysed the links between climate change adaption actions and LUP in Finland (Helsinki). Building partly on previous addresses, Juhola has noted that studies on multi-level response to climate change need to account for both local level activities *and* national support to overcoming obstacles on the local level – an aspect Juhola finds some previous studies have neglected. Juhola stresses the importance of contribution from all levels of governance highlighting that while neither the regional or national level actors have the power over the local level, the higher levels of governance can create further barriers to the activities on the local level. Based on the empirics consisting of document analysis and observation of strategy preparation processes, Juhola has found that some of the factors hindering accounting for climate change issues on the local level included a mismatch between the drafters of adaptation strategies and implementers on the land use decisions side. This was found both on the national and local level. Also, other local level objectives may hinder implementing the climate change adaptation policy goals. (Juhola 206, 341, 346, 349-350)

Studies by Tatar (2011) and by Kull and Tatar (2015), analysing the EU's impact on subnational mobilization in Estonia, have presented the importance of local level capabilities and settings in participating in supranational affairs. The importance of the country's historical-cultural-constitutional layout has been stressed: *'As anticipated by the MLG theoretical framework, many intervening variables like the prevailing state structure and the Soviet history of strong centralism as well as a weak participative and cooperative culture affect the situation in Estonia and determine the rather*

weak and only formal subnational (policy) empowerment.' (Kull and Tatar 2015, 251). As the authors have highlighted based on previous contributions, the local administration's constitutional competences and attributed tasks impacts how much opportunities they have to deal with EU matters. Also, size of the municipality impacts its capabilities (*ibid.*, 242).

Previous studies have highlighted some of the fields (climate goals and adaptation, sustainable transport), where shortcomings have been found in dealing with these in LUP. In addition, previous studies have identified the factors that can either support or hinder considering various environmental goals in LUP. Both have provided a valuable input to defining the criteria of interest in the current research.

5. Methodology

5.1. Addressing planners with a questionnaire

Analysis of links between LUP and environmental goals can be conducted using various research methods. As shown by Stevens et al (2014) and Stevens and Senbel (2017), analysing the content of plans is a frequent method used in climate related studies, while Stevens and Senbel (2017) use surveying. In addition to document analysis, interviews with planners are also used, sometimes combined with workshops or observing the meetings where plans are prepared (e.g., Solá, Vilhelmson and Larsson 2018, McClure and Baker 2018). Previous analyses have shown plans rather to be lacking content related to various environmental goals and various possible reasons for this have been identified (see chapter 4.).

Bearing in mind the key role of local municipality land use planners in preparing LUP decisions, the empirics of the current study focused on the work of planners. The choice was also furthered to better grasp the practice of planners, whose work – although having always focused on dealing with frictions between sectoral policies – is facing the situation where *'/.../ the number of high-level policies that may be relevant at the local level—hence the potential conflict between them—has increased so much over the years that the degree of complexity planners have to face is unprecedented'* (Rega 2020, 146).

The aim of the empirical analysis was to get an overview on how planners report themselves to account for various environmental goals in preparing LUP decisions, and which factors they consider supporting or hinder accounting for these. The relevant environmental goals to be included in empirical analysis were defined based on previous analyses addressing the links between land use plans and environmental goals (see chapter 2.), previous addresses (see chapter 4.) and content of the EGD (see chapters 1. and 2.). As described also in chapter 1, while the deal has certainly given a push for this research to be conducted, the policy paper is part of a continuum of environmental policies, and a wider range of environmental should be included in the research to address the links between environmental goals and LUP. Previous addresses on multi-level governance (see chapter 3.1.) and related previous research (chapter 4.) were used to identify the factors that could support or hinder accounting for environmental goals in LUP[2]. Using a questionnaire for gathering empirical data was chosen because the method allows a relatively large audience to be addressed and to explore relationships between variables (Gray 2004, 188). For the respondents to be able to open the context of

[2] For example, the importance of planners' knowledge base/expertise in relation to accounting for certain environmental goals has been highlighted by Kumar and Geneletti (2015), and Stevens and Senbel (2017). See chapter 4 for more details.

their responses in case they find it appropriate, commenting possibilities were added throughout the questionnaire.

The questionnaire consisted of three major parts. One set of questions addressed how much the planners consider themselves to account for various environmental goals when preparing land use plans (research question 3). Another set of questions tested how in the planners' view possible nudges or changes external to the actual LUP system would impact accounting for environmental goals (research question 2). Thirdly, a substantial set of questions contained statements that have been shown to impact accounting for LUP (research questions 2 and 4). Also, general background on the respondents' professional focus and municipalities was included in the questionnaire (research question 4), as well as one general question on how much in the planners' view LUP in general can contribute to reaching environmental goals (research question 2).

In questionnaire design, a commonly used Likert scale (agree-somewhat agree-not agree or similar) was avoided and numeric (interval) scales with anchor responses in both ends (e.g. Absolutely agree: 1, Not at all agree: 6) were used, instead, to allow for more statistical analysis tools to be used, sufficient amount of responses provided (see also Gray 2004, Drasgow et al 2010). In the scales used in the questionnaire, a middle value (e.g., 3 on a 1 to 5 scale) was deliberately not used. This was done to steer the respondents lacking a clear opinion on a certain question to choose the options "don't know" and "not relevant for in my municipality", instead of a middle value on the scale, as these replies could carry significant meaning when analysing the results.

The questionnaire was prepared in English and translated to Estonian and Finnish. In both countries, the questionnaire was tested prior to surveying. In addition, both the Estonian and Finnish relevant ministry officials were given the possibility to review the questionnaire and submit suggestions. The possibility was utilised by both Estonian and Finnish authorities.. Both piloting and input from the authorities provided minor, but valuable improvements to the questionnaire, somewhat improving the validity of the questionnaire to cover all relevant factors for LUP (e.g., the importance of environmental assessment, integrity of the settlement structure as an environmental goal). The English version of questionnaire may be found in Appendix 2.

The exact size of the total number of land use planners addressed with the questionnaire is not easy to define exhaustively. In Estonia and Finland, where the current research was conducted (see more on countries in chapter 5.2.), several hundred land use planners can be expected to be active in the sector, either as planning officials in urban or rural municipalities (fulfilling public tasks in planning processes), or as planning consultants in private companies. According to the Finnish Building and Planning act, all municipalities with 6000 or more inhabitants must have a planning official, although

more flexible arrangements are possible, for instance cooperating with another municipality to share competences (Maankäyttö- ja rakennuslaki[3] 1999 § 20). According to Statistics Finland, as of 2010, 154 of the 310 local municipalities had less than 6000 inhabitants (Tilastokeskus 2021a). The smaller municipalities, although not mandated to employ a planner, are still required to fulfil LUP tasks (Maankäyttö- ja rakennuslaki). On the other hand, bigger municipalities like Helsinki or Tampere have specially dedicated units in their administrational composition dealing with LUP issues. Planning consultants working in consultancies are employed to assist local municipalities in preparing plans. National legislation also sets competence requirements for land use planners (*ibid.*).

In Estonia, the Planning Act or other national legislation does not require municipalities to employ a land use planner. The 2017 local municipalities' reform in Estonia reduced the total number of local municipalities from 213 to 79 (Valner and Ministry of Finance 2018). While one of the inevitable goals of the reform was to increase the administrational capabilities of specialists working in local municipalities (see, for instance, Võigemast 2018 or Aab 2018), it has noted based on actual numbers that even after the reform, not all local governments would have enough plans produced to justify hiring a full-time planning specialist (Oidjärv 2018). Similarly to Finland, Estonia's bigger towns like Tallinn or Tartu have dedicated organisational units to deal with planning. Due to the practice developed in both countries, both planning consultants and planning officials were included in the research, the total number of whom is unknown, but can be estimated to be in hundreds.

The questionnaire was sent by e-mail both to planning officials (in Finland through the local municipalities' union mailing list) and the planning consultants whose e-mail addresses were easily available online (about 30 contacts). In addition, planning officials were asked to forward the questionnaire to the planning consultants they had previously worked with. Responses to the questionnaire were asked to be given in ten days, a reminder was sent on day seven.

Lime Survey Professional surveying platform was used to conduct the surveying. No personal information was gathered by the questionnaire and the settings in the surveying platform were chosen so that no information on the respondents would be stored that could potentially be used to identify the respondents (for instance, IP-address).

The surveying process returned 83 responses, 55 from Estonia and 28 from Finland (see Appendix 3 for overview of respondents by background indicators). Although the number of respondents allowed

[3] Translation available here: https://www.finlex.fi/fi/laki/ajantasa/1999/19990132#L7P54

for overall analysis of results, the number of replies by sub-groups was too small for more advanced statistical analysis.

During analysis, municipality size was recalculated to provide for larger sub-groups. The classification used in the questionnaire was respectful of the Finnish 6000 inhabitant threshold of having a mandatory land use planner in the municipality (see chapter 5.1.) and also allowed for defining of smaller municipalities. In the analysis phase, respondents were divided into nearly equal groups by size of municipality (20 000 inhabitants being the cutting point). To test the significance of differences between means of groups, T-tests were used (see also Gray 2004, 308). Since T-test assumes equal variance and similar sample size within groups compared, and neither were always the case in the comparisons of means conducted during empirical analysis, results from Welch's tests were used in these cases, which does not have these prerequisites (see Ruxton 2006 for explanation). IBM SPSS Statistics version 26 was used to conduct the analysis, which conveniently lists results for both equal variance assumed and not assumed.

5.2. Estonian and Finnish settings

The empirics of the current research was based on Estonia and Finland. The goal was not to compare the countries, rather, the idea was to get a more varied picture of the links between LUP and the environmental goals, given the slightly varying societal and historical settings of the countries.

Two small unitary states, Estonia (1,3 million inhabitants as of 2021 (Statistikaamet…)) and Finland (5,5 million inhabitants as of 2021 (Tilastokeskus 2021b) are located in Northern Europe, along the Baltic Sea, connected by the Gulf of Finland. Both countries are sparsely populated, with 30,4 inhabitants per square kilometre in Estonia and 18,1 in Finland; as a comparison, EU-27 (2020) countries combined: 118,6 (data as of 2019, Eurostat 2021). Both countries are members of the EU – Estonia since 2004, Finland since 1995 (European Union 2021). Both are considered counties with very high human development, with Estonia positioned 29th and Finland 11th in the 2020 United Nations human development index list of countries (United… 2020).

In 2019 and 2020, Finland was ranked number 3 among the United Nations' member states in reaching sustainable development goals, with Estonia being number 10 in both years (Sachs et al 2020). In a profound report compiled in 2019, focusing on European countries' progress towards the sustainable development goals, both Estonia and Finland were portrayed as continuing to face challenges in some natural environment related sustainable development goals, those linked to LUP

listed here in Table 2 (See Appendix 1 for a list of environmental goals related to LUP considered achieved in the countries).

Table 2. Sustainable development goals, where 'challenges remain' in Estonia and Finland, related to land use planning and the environment. Selection by author from: SDSN and IEEP 2019

Estonia	
Age-standardised death rate attributable to household air pollution and ambient air pollution	Challenges remain
Share of renewable energy in gross final energy consumption	Challenges remain
CO2 emissions from fuel combustion per electricity output	Major challenges remain
Circular material use rate	Significant challenges remain
Energy-related CO2 emissions	Major challenges remain
Red List Index of species survival	Challenges remain
Finland	
Satisfaction with public transport	Challenges remain
Circular material use rate	Significant challenges remain
Energy-related CO2 emissions	Major challenges remain
Mean area that is protected in terrestrial sites important to biodiversity	Significant challenges remain
Mean area that is protected in freshwater sites important to biodiversity	Significant challenges remain

The LUP systems in Estonia and Finland are similar. Both planning systems are tiered in nature, with higher tier plans setting the framework for more accurate plans (see Figure 2). The lover tier plans were addressed in the current research (comprehensive and detail). The Estonian LUP system was re-established in the 1990s, relying partly on the Finnish experiences. As can be seen from the explanatory note to the first Estonian post-soviet Planning and Building Act in 1995, the authors of the legislation have found it necessary to stress that the draft legislation had gotten a 'very positive' assessment from the Finnish local municipalities union. (Riigikogu 1995). Also, the same source highlights that in order to test the Estonian draft legislation, pilot planning processes had been carried out in cooperation with the Finnish Ministry of Environment.

Estonia	Finland
National spatial plan *Üleriigiline planeering*	National planning guidelines *Valtakunnalliset alueidenkäyttötavoitteet*
County spatial plan *Maakonnaplaneering*	County spatial plan *Maakuntakaava*
Municipality comprehensive plan *Üldplaneering*	Municipality comprehensive plan *Yleiskaava*
Detail plan *Detailplaneering*	Detail plan *Asemakaava*

Figure 2. Estonia's and Finland's main land use planning instruments. Sources: Maankäyttö- ja rakennuslaki, Planeerimisseadus

The functions of the municipality comprehensive plans and detail plans are analogous in the countries, with the former setting the overall structure of land use in a municipality and the latter regulating land use and building in a smaller area. In both countries, according to legislation, municipalities are in the centre of LUP activities. Still, notable differences exist.

Table 3 indicates the slight variances in how environmental priorities are addressed in the countries' LUP regulation. In overall planning principles, the balancing nature of LUP is mentioned, referring also to prioritising the environment 'where possible'. In the paragraphs addressing the content of comprehensive or detail plans, the Estonian legislation is more operational, whereas the Finnish legislation rather lists the priorities to be accounted for.

Table 3. Environmental priorities reflected in land use planning regulation in Estonia and Finland. Outtakes from legislative acts by author. Sources: Maankäyttö- ja rakennuslaki, Planeerimisseadus

	Estonia	Finland
Objectives in/principles of land use planning	Principle of expedient, reasonable and economic land use - When preparing spatial plans, the appropriate use of previously used areas or of insufficiently used areas must be promoted where possible. - When planning human settlements, the built environment and green areas must receive balanced consideration, taking into account the existing environment and local circumstances. - When preparing spatial plans, preference must be given, where possible, to solutions that are environmentally sound and ensure good energy performance.	The objective in land use planning is to promote the following through interactive planning and sufficient assessment of impact: - biological diversity and other natural values; - environmental protection and prevention of environmental hazards; - provident use of natural resources.

	Estonia	Finland
Comprehensive plan functions/ content	Functions of comprehensive plans - to specify the conditions to ensure the functioning of the green network and to determine the restrictions resulting from such network; - to designate natural objects to be protected at the local authority level and to state the conditions for their protection and use; - to designate valuable agricultural land, green areas, landscapes, individual features of landscapes and natural biotic communities and to state the conditions for their protection and use; - to designate built-up areas of cultural and environmental value and to assign the status 'valuable' to individual objects and to state the conditions for their protection and use;	Required content of the local master plan. The following must be taken into account when a local master plan is drafted: - the functionality, economy and ecological sustainability of the community structure; - utilization of the existing community structure; - opportunities to organize traffic, especially public transport and non-motorized traffic, energy, water supply and drainage, and energy and waste management in an appropriate manner which is sustainable in terms of the environment, natural resources and economy; - reduction of environmental hazards[4]; - protection of the built environment, landscape and natural values.
Detail plan functions/ content	Functions of detailed spatial plans - to determine the principles of traffic arrangements; - to determine the principles for planting vegetation and street-side maintenance; - to establish the requirements to ensure observance of standard levels of noise, vibration, pollution risk and insolation, and other environmental parameters; - to assign locally protected status to natural objects and determine the relevant protection zones; - to define built-up areas of cultural and environmental value, to assign the status 'valuable' to individual objects and to areas of arable land, and to determine the conditions for the protection and use of such areas and objects, provided such areas or objects have not been defined or assigned as valuable in the comprehensive plan;	The local detailed plan shall be drawn up so as to create the preconditions for a healthy, safe and pleasant living environment, locally available services and the organization of traffic. The built and the natural environment must be preserved and their special values must not be destroyed. There must be sufficient parks or other areas suitable for local recreation in the area covered by the plan or in its vicinity.

As explained by Hytönen and Ahlqvist (2019, 1350), all Finnish municipalities have the same planning responsibilities, but may have very varying capabilities to conduct planning, with Helsinki,

[4] Original Finnish phrasing: ympäristöhaittojen vähentaminen. Also can be translated as 'minimising environmental damage'

the largest municipality with more than 600 000 inhabitants, and the smallest ones with less than a 1000. According to Prusi (2013), Finnish municipalities have had remarkably strong planning autonomy in international comparison, in relation to the central government, and to the market. The regional planning has also been conducted under municipal steering. According to Hytönen and Ahlqvist's argumentation (2019, 1353), Finland's statutory planning system is currently moving towards a less publicly regulated and increasingly market-reactive direction, which challenges realising long-term, including sustainable development goals.

Estonia's situation has been assessed to be rather different. The early 1990s in Estonia encompassed a rapid post-Soviet privatization of land, but also an increase in living standards. Roose et al (2013) have linked these, plus decentralization of planning regulations and devolution of county-level powers, weak and decentralized planning capacities to the Estonian reality where *'residential development is more guided by detailed plans for small parcels of land initiated by private developers than comprehensive strategic land use plans and general plans of the municipalities.'* (Roose et al 2013, 81). In addition, use of consultants in planning processes is commonplace in devising plans in Estonia. The practice has been criticised as the roles that the planning authority has to fulfil have been in practice fulfilled by consultants (Ministry of Finance 2020, 10).

The varying status of the local administration in Estonia and Finland can also be described by the difference in the subnational government financial sovereignty, with the financial autonomy of Estonia's municipalities being significantly lower than that of Finnish municipalities (see Figure 3). Comparing the countries, overall lower local municipality autonomy has also been noted for Estonia, when compared to Finland (OECD 2019).

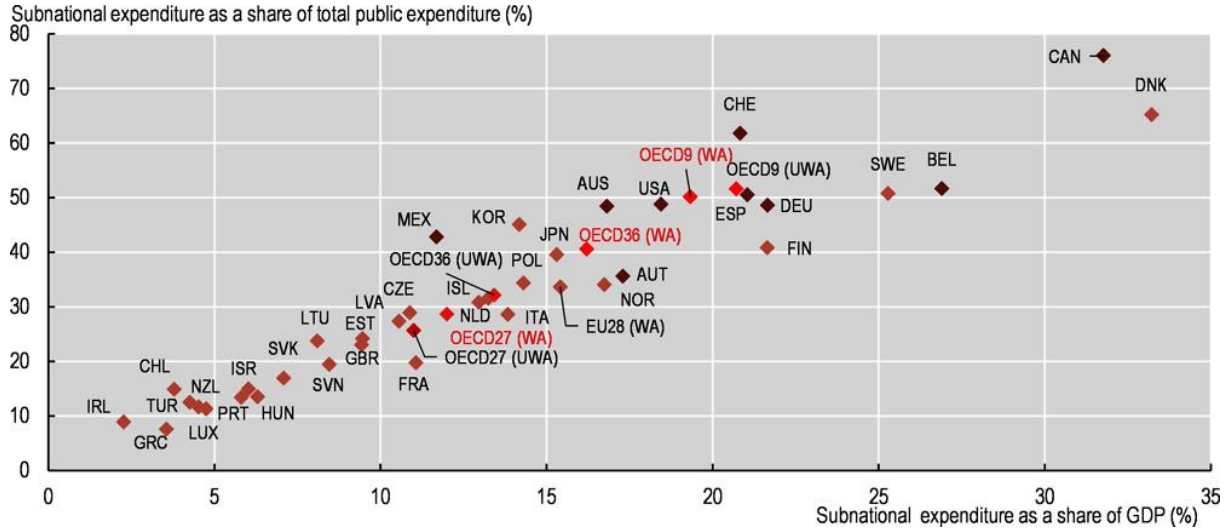

Figure 3. Subnational government expenditure as a percentage of GDP and total public expenditure (2018). Source: OECD 2020.

6. Results and discussion

6.1. Key results

Overall, the respondents consider LUP can contribute to reaching environmental goals: 57% of respondents consider LUP be able to contribute significantly to reaching overall goals, 41% somewhat. Three remarks must be added that are relevant for the interpretation of these rather optimistic overall estimations by planners. Firstly, this overall question was placed in the end of the questionnaire, by which time the respondents had gone through a list of environmental goals, and factors that could support accounting for these. This may have influenced the respondents' general reflections. Secondly, the questionnaire's introduction, explaining the goals of the survey and the topicality of the research, may have impacted some respondents in their estimation on the importance of LUP. Thirdly, in more precise questions, notable differences occurred in how environmental goals were reported to being accounted for in preparing land use plans. This is elaborated on in the following chapters and is of key interest in the current research.

6.1.1. Accounting for environmental goals

Of the 24 environmental goals listed in Table 3, a vast majority (22) received a mean score of 3,5 or less by the total sample on the scale of 1 (always considered) to 6 (never considered), meaning respondents in general lean towards reporting to account for environmental goals. The environmental goals reported to be accounted for more often by planners were fully utilising existing infrastructure, ensuring connectivity between natural areas and strengthening the integrity of settlement structure. Of the environmental goals included in the survey, the following were reported to be considered least often by planners: reducing soil cover, making agriculture more sustainable, increasing the quality and quantity of forested area, furthering circular economy (reducing use of and reusing materials before recycling), reducing energy consumption of existing buildings (see also research question 3).

Of the background indicators included in the study, statistically significant differences between means occurred more often along some indicators than among others. Compared to Estonian planners, Finnish planners reported significantly higher consideration for environmental goals in 11 of the environmental goals out of the 24 goals included in the study. Similarly, higher consideration to environmental goals was reported by the respondents working in larger (*vs* smaller) municipalities, and by those working with comprehensive (*vs* detail) level LUP.

When asking about how much certain environmental goals are accounted for in LUP decisions, in addition to ‘don’t know / hard to tell’, the possibility was included in the questionnaire for the respondent to reply that certain environmental goals were not applicable (also translatable as ‘not meaningful’ or ‘not important’ in Estonian and Finnish questionnaires) in their municipality or in the municipality where they prepare land use plans (numbers presented as N/A in Table 4). While for most of these goals reporting the goals as not applicable may be understandable (restoration of damaged ecosystems, agriculture, forestry), as they are not always considered an integral part of LUP, it is noteworthy that 12 out of 83 respondents noted that promoting low-carbon modes of transport (e.g., rail, electric) is not applicable for LUP in the corresponding municipality. Also, of the environmental goals considered more often, relatively higher number of ‘don’t know / hard to tell’ responses were given in goals like promoting brownfield instead of greenfield development, promoting multimodal transport, and adaptation to climate change.

The participants of the survey were also asked for open text explanations on why they considered some environmental goals not applicable in the corresponding municipality. The possibility to comment was utilised by 30 of 83 respondents. 14 of the open text comments grounded their choice with the environmental goal not being relevant in their municipality, for example: *‘I mostly plan in rural areas, coastal areas and villages – for instance, hard covering soil is not meaningful in practice, in these areas’; ‘Our municipality is very sparsely populated and there’s lots of forest, where it’s not easy to impact ecosystems. No greenhouse gases.’; ‘No rail transit, no brownfield areas, only transport possibilities are bus and private car.’.* The argument that environmental goals is not the task of LUP, or of the municipality, was also noted, for example as follows: *‘In smaller and medium size plans, the issues listed previously are usually too general and the size of plans too small to encompass all the of the above-mentioned. More than municipalities, the solutions to the above-mentioned issues are influenced by positions of ministries and environmental organisations.’; ‘In larger municipalities, there are various specialists, each with their own niche, therefore the table is not correct. Comprehensive plans and detail plans are compiled by separate departments. /.../’. ‘Environmental goals are handled by the environmental specialist according to law. /.../’*

Table 4. Environmental goals considered in preparing land use plans, as reported by land use planners. Differences by groups. See Appendix 3 for full results.

In your work preparing land use plans, how often do you consider the following priorities? Scale: 1 (always) to 6 (never)										
	Mean ↓	N	D/K	N/A	Statistically significant differences in accounting for environmental goals. Group shown where corresponding environmental goal reported by respondents to be accounted more often.					Total statistically significant differences of means between groups
					Country: Estonia, Finland	Municipality type: mostly urban, mostly rural	Municipality size: 0-20 000, 20 001+	Respondent type: planning official, consultant	Type of land use planning: comprehensive, detail	
Fully utilising existing infrastructure	1,90	82	1	0	FI	.	Larger	.	Comprehensive	3/5
Ensuring connectivity between natural areas	1,90	80	3	0	FI	.	.	Official	Comprehensive	3/5
Strengthening the integrity of settlement structure	1,95	79	2	2	.	.	.	.	Comprehensive	1/5
Promoting cycling and walking	2,09	81	1	1	FI	Urban	Larger	.	Comprehensive	4/5
Preserving ground and surface water	2,14	76	6	1	.	.	.	.	Comprehensive	1/5
Preserving natural processes that support the functioning of ecosystems and societies (e.g., natural infiltration of excess water infiltration vs rainwater sewage, vegetation to provide for habitat preservation, etc.)	2,26	76	6	1	.	.	.	.	.	0/5
Reducing noise levels in human settlements and natural environments	2,35	80	3	0	FI	.	.	.	.	1/5
Promoting brownfield instead of greenfield development	2,38	73	8	2	FI	.	Larger	.	.	2/5
Preserving and restoring biodiversity	2,57	76	3	4	FI	.	Larger	.	Comprehensive	3/5
Reducing the need for motorised transport (e.g., mixed land use, availability of services)	2,72	74	3	6	FI	Urban	Larger	Official	Comprehensive	5/5
Promoting multimodal transport (combining various means of transport)	2,74	70	7	6	.	.	Larger	.	Comprehensive	2/5
Adaptation to climate change	2,82	72	9	2	FI	Urban	Larger	.	Comprehensive	4/5
Preserving agricultural land	2,85	73	5	5	.	.	.	.	Comprehensive	1/5
Promoting low-carbon modes of transport (e.g., rail, electric)	2,93	67	4	12	FI	Urban	Larger	Official	Comprehensive	5/5

In your work preparing land use plans, how often do you consider the following priorities? Scale: 1 (always) to 6 (never)										
	Mean ↓	N	D/K	N/A	Statistically significant differences in accounting for environmental goals. Group shown where corresponding environmental goal reported by respondents to be accounted more often.					Total statistically significant differences of means between groups
					Country: Estonia, Finland	Municipality type: mostly urban, mostly rural	Municipality size: 0-20 000, 20 001+	Respondent type: planning official, consultant	Type of land use planning: comprehensive, detail	
Finding ways to produce renewable energy	2,94	71	8	4	.	.	.	.	.	0/5
Reducing air pollution	2,99	75	5	3	.	.	.	.	.	0/5
Reducing energy consumption of new buildings	3,12	73	9	1	.	.	.	.	.	0/5
Reducing greenhouse gas emissions	3,13	71	7	5	FI	.	Larger	.	Comprehensive	3/5
Promoting restoration of damaged ecosystems	3,29	68	8	7	.	.	.	.	.	0/5
Reducing soil cover	3,34	76	4	3	FI	Urban	Larger	.	.	3/5
Making agriculture more sustainable	3,40	63	12	8	.	.	.	.	.	0/5
Increasing the quality and quantity of forested area	3,49	63	10	10	.	.	.	.	.	0/5
Furthering circular economy (reducing use of and reusing materials before recycling)	3,56	70	7	6	.	.	.	.	.	0/5
Reducing energy consumption of existing buildings	3,60	73	8	2	ET	.	Smaller	.	Detail	3/5
				Total	FI: 11 ET: 1 12/24	Urban: 5 Rural: 0 5/24	Larger: 10 Smaller: 1 11/24	Official: 3 Consultant: 0 3/24	Comprehensive: 12 Detail: 1 13/24	

Remarks:
Only differences significant on 0,05 level between means of corresponding groups presented in the table.
.=No statistically significant differences between means of groups
D/K: Hard to tell / Don't know
N/A: Not applicable for land use planning in my municipality or in the municipalities where I draft land use plans

The overall strong belief of the respondent planners that LUP can contribute to reaching environmental goals combines well with the relatively low[5] number of those who considered certain environmental goals not to be applicable the municipality where they work as planners (see Table 4). In relation to research question 2, this means that according to the results of the survey conducted, planners do consider LUP to be able to contribute to reaching environmental goals.

Some further questions on the planners' current practice were included in the questionnaire as statements that the respondent could either agree of not agree to (1 – absolutely agree, 6 – not at all agree; see Table 5 for overview and appendix 3 for details): one on considering environmental goals a natural part of any LUP decision, which gained a notably higher mean score than the other statement on whether plans are checked for compliance with environmental goals prior to enforcement. As can be seen from more detailed results in appendix 3, statistically significant differences occurred in responses to these by countries and municipality size. Among Estonian respondents, the statement on environmental goals being a natural part of LUP decisions received the mean score of 2,12, whereas among Finnish respondents the score was 1,52. Differences of similar magnitude or higher can be observed in input from respondents working with LUP in rural *vs* urban environments, both on checking plans for environmental goals prior to enforcement, and on considering environmental goals a natural part of LUP decisions.

[5] Environmental goals 'Promoting low-carbon modes of transport (e.g., rail, electric)' and 'Increasing the quality and quantity of forested area' as most notable exceptions.

Table 5. Land use planners' agreement with statements on current land use planning. Differences by groups. See Appendix 3 for full results.

Up to what extent do you agree with the following statements, bearing in mind your work as a land use planner? Scale: 1 (Absolutely agree) to 6 (Not at all agree)									
	Mean	N	D/K	Statistically significant differences in agreeing with the statements. Group shown where level of agreement with statement is significantly higher.					Total statistically significant differences of means between groups
				Country: Estonia, Finland	Municipality type: mostly urban, mostly rural	Municipality size: 0-20 000, 20 001+	Respondent type: planning official, consultant	Type of land use planning: comprehensive, detail	
Environmental goals and targets are a natural part of any land use planning decision	1,91	79	4	FI	.	Larger	.	.	2/5
Before land use plans are enforced in my municipality or in the municipality where I prepare land use plans, they are checked for compliance with environmental goals	2,94	78	5	FI	.	Larger	.	.	2/5
			Total	FI: 2 ET: 0 2/2	Urban: 0 Rural: 0 0/2	Larger: 2 Smaller: 0 2/2	Official: 0 Consultant: 0 0/2	Comprehensive: 0 Detail: 0 0/2	

Remarks:
Only differences significant on 0,05 level between means of corresponding groups presented in the table.
.=No statistically significant differences between means of groups

Up to what extent do you agree with the following statements, bearing in mind your work as a land use planner? Scale: 1 (Absolutely agree) to 6 (Not at all agree)									
	Mean	N	D/K	Statistically significant differences in agreeing with the statements. Group shown where level of agreement with statement is significantly higher.					Total statistically significant differences of means between groups
				Country: Estonia, Finland	Municipality type: mostly urban, mostly rural	Municipality size: 0-20 000, 20 001+	Respondent type: planning official, consultant	Type of land use planning: comprehensive, detail	
D/K: Hard to tell / Don't know									

6.1.2. Supporting and hindering factors

When using quantitative questionnaires, possibilities to assess and analyse the reasons behind certain judgments are limited. To get an overview on how much certain factors found to be important in previous addresses correspond to planners' practice, possible criteria hindering or supporting consideration of environmental goals in LUP were included in the study, both from 'as-is' point of view and as explaining possible improvements. Table 6 lists the statements included in the study aimed at evaluating the planners' current practice and attitudes. Also in these statements, significant changes appeared between groups, with Finnish (*vs* Estonian), urban (*vs* rural), larger (*vs* smaller) and those engaged in comprehensive level (*vs* detail) planning reporting higher agreement levels with statements that support accounting for environmental goals in LUP.

When looking at overall mean scores in agreeing with the supporting statements, and bearing in mind that on a 1-6 scale, the centre score is 3,5, the mean score of agreeing to some supporting statements leans towards the negative side, although only slightly (3,58, 3,59). These are statements that aim to test whether planners consider having sufficient support from national legislation and strategic documents and local municipality environmental goals to back LUP decisions that prioritise environmental goals over other considerations. These statements are also closely linked to the hindering factor that received the highest mean score as being agreed to: other priorities overriding environmental goals in LUP decisions.

In general, it should also be noted that agreeing to the supporting statements does not seem too high, with the highest mean scores being 2,16, 2,23, 2,29, 2,63 on a scale where only scores 1 to 3 were on the positive side. This may partly be explained by respondents known to avoid extremes in scale questions.

In relation to research question 1 (see chapter 1.3.) it must be concluded that planners considered themselves to be more acquainted with environmental goals set on the local level, than on the national, or considerably so, on the supranational level. Also, with environmental goals set on the local, national and supernational levels, planners working in Finland (*vs* Estonia), in urban (*vs* rural) settings, in larger (*vs* smaller) municipalities and with comprehensive (*vs* detail) plans considered themselves to be more aware of environmental goals[6]. When considering only the groups who considered themselves to be more knowledgeable of environmental goals, the (see Table 6 for overview and appendix 3 section 3 for more detailed results) statistical mean value is relatively high (1,52, 1,62 or 1,86 on a

[6] All differences statistically significant except for national level environmental goals by municipality size

scale of 1 to 6), indicating relatively high reported acquaintance with environmental goals among those groups of planners.

Table 6. Land use planners' agreement with statements describing current supporters or hinderers for considering environmental goals in LUP. Differences by groups. See Appendix 3 for full results.

Up to what extent do you agree with the following statements, bearing in mind your work as a land use planner? Scale: 1 (Absolutely agree) to 6 (Not at all agree)									
	Mean ↓	N	D/K	Statistically significant differences in agreeing with the statements. Group shown where level of agreement with statement is significantly higher.					Total statistically significant differences of means between groups
				Country: Estonia, Finland	Municipality type: mostly urban, mostly rural	Municipality size: 0-20 000, 20 001+	Respondent type: planning official, consultant	Type of land use planning: comprehensive, detail	
I am knowledgeable of local municipality environmental goals that are relevant for land use planning	2,16	77	6	FI	Urban	Larger	.	Comprehensive	4/5
I am knowledgeable of my county's environmental goals that are relevant for land use planning	2,23	78	5	FI	Urban	.	.	Comprehensive	3/5
When preparing land use plans, I have access to the necessary data to help me take environmental goals and targets into account in land use plans	2,29	76	7	FI	.	.	.	.	1/5
I know how to contribute to reaching environmental goals and targets in my daily work as a land use planner	2,63	79	4	FI	Urban	Larger	.	Comprehensive	4/5
In land use planning decisions, other needs (e.g., planning additional residential areas, space for industry, recreation of service provision) are usually more important than environmental goals	2,89	81	2	.	.	.	.	.	0/5
I am knowledgeable of environmental goals and targets agreed internationally that are relevant for land use planning	2,91	76	7	FI	Urban	Larger	.	Comprehensive	4/5
The political deciders in my municipality or in the municipality where I prepare land use plans require environmental goals or targets to be accounted for in land use plans	3,13	77	6	FI	.	Larger	.	.	2/5
Lack of time to prepare land use plans makes it difficult to take environmental goals and targets into account in land use plans	3,22	79	4	.	.	.	Official	.	1/5
I have sufficient support from national legislation and strategic documents that is in force to back land use planning decisions that prioritise environmental goals over other considerations	3,58	76	7	FI	.	.	.	.	1/5
I have sufficient support from local municipality environmental goals to back land use planning decisions that prioritise environmental goals over other considerations	3,59	79	4	FI	.	.	.	.	1/5

Up to what extent do you agree with the following statements, bearing in mind your work as a land use planner? Scale: 1 (Absolutely agree) to 6 (Not at all agree)									
	Mean ↓	N	D/K	Statistically significant differences in agreeing with the statements. Group shown where level of agreement with statement is significantly higher.					Total statistically significant differences of means between groups
				Country: Estonia, Finland	Municipality type: mostly urban, mostly rural	Municipality size: 0-20 000, 20 001+	Respondent type: planning official, consultant	Type of land use planning: comprehensive, detail	
Reaching environmental goals and targets is a national task, not that of the municipality	4,46	78	5	.	.	.	.	.	0/5
Accounting for environmental goals is the responsibility of (strategic) environmental assessment, not the responsibility of land use planning	4,72	78	5	.	.	.	.	.	0/5
Reaching environmental goals and targets is the responsibility of the respectful sector (e.g. transport, energy, nature protection), rather than the responsibility of land use planning	4,73	80	3	.	.	.	.	.	0/5
			Total	FI: 8 ET: 0 8/13	Urban: 4 Rural: 0 4/13	Larger: 4 Smaller: 0 4/13	Official: 1 Consultant: 0 1/13	Comprehensive: 4 Detail: 0 4/12	

Remarks:
Only differences significant on 0,05 level between means of corresponding groups presented in the table.
.=No statistically significant differences between means of groups
D/K: Hard to tell / Don't know.
Light green shading: statements that support considering environmental goals in LUP. Light red shading: statements that hinder considering environmental goals in LUP.

A list of potential changes, or forward-looking factors that could support accounting for environmental goals in LUP, was included in the study (see Table 7). Although variance between means was small (note scale being from supporting (1) to hindering (2)), as a generalisation, the factors ‘closer’ to local level land use planners like benchmarking, guidance, municipality-level pronounced environmental goals ranked higher than those to do with the national level, or with the international level. In some of the supporting factors related to the national or international (EU) level, significant variance occurred between groups, with Finnish (*vs* Estonian), larger (*vs* smaller) and urban (*vs* rural) municipality planners considering national and international level pursuits more influential.

Table 7. Planners' estimations on how certain changes would impact considering environmental goals more in land use planning. Differences by groups. See Appendix 3 for full results.

How would the following factors impact you accounting for environmental goals in your work preparing land use plans? Scale: 1 (Environmental goals would be considered more in your work preparing land use plans) to 5 (Environmental goals would be considered less in your work preparing land use plans)									
	Mean ↓	N	D/K	Statistically significant differences in agreeing with the statements. Group shown where level of agreement with statement is significantly higher.					Total statistically significant differences of means between groups
				Country: Estonia, Finland	Municipality type: mostly urban, mostly rural	Municipality size: 0-20 000, 20 001+	Respondent type: planning official, consultant	Type of land use planning: comprehensive, detail	
Functioning networking, benchmarking and best practices sharing possibilities with other municipalities or land use planners.	1,54	79	4	.	.	.	.	.	0/5
More clearly set environmental goals and targets on the municipality level	1,58	79	4	.	.	.	.	.	0/5
More financial resources to find out how specific local level land use decisions are linked with environmental goals (analyses, assessments)	1,66	79	4	.	.	.	.	.	0/5
Easily available good examples of plans where environmental goals have been taken into account	1,67	81	2	.	.	.	.	.	0/5
Guidance (guidelines, written instructions) on how to account for environmental goals and targets in land use plans	1,71	80	3	.	.	.	.	.	0/5
More precisely defined national regulative requirements to account for environmental goals and targets in land use plans	1,73	80	3	.	.	.	.	.	0/5
Additional training on how to account for environmental goals and targets in land use plans	1,76	80	3	.	.	.	.	.	0/5
More clearly set environmental goals and targets on the national level	1,78	79	4	.	.	.	.	.	0/5

How would the following factors impact you accounting for environmental goals in your work preparing land use plans?
Scale: 1 (Environmental goals would be considered more in your work preparing land use plans) to 5 (Environmental goals would be considered less in your work preparing land use plans)

	Mean ↓	N	D/K	Statistically significant differences in agreeing with the statements. Group shown where level of agreement with statement is significantly higher.					Total statistically significant differences of means between groups
				Country: Estonia, Finland	Municipality type: mostly urban, mostly rural	Municipality size: 0-20 000, 20 001+	Respondent type: planning official, consultant	Type of land use planning: comprehensive, detail	
More pronounced local municipality level political commitment to environmental goals and targets	1,85	74	9	FI	Urban	Larger		Comprehensive	4/5
Precise criteria in sectoral policy documents on how environmental goals should be accounted for in land use planning	1,91	79	4	.	.	.	.	.	0/5
European Union regulations and strategies defining the role of local municipality land use planning in reaching environmental goals and targets	2,03	74	9	.	Urban	Larger	.	.	2/5
More pronounced national level political commitment to environmental goals and targets	2,05	74	9	FI	Urban	Larger	.	Comprehensive	4/5
The general public requiring environmental goals and targets to be accounted for more in land use plans	2,08	79	4	.	.	.	.	.	0/5
Land use planning related national or European court decisions requiring to account for environmental goals and targets in land use plans	2,25	75	8	.	Urban	Larger	.	.	2/5
			Total	FI: 2 ET: 0 2/14	Urban: 4 Rural: 0 4/14	Larger: 4 Smaller: 0 4/14	Official: 0 Consultant: 0 0/14	Comprehensive: 2 Detail: 0 2/14	

Remarks:
Only differences significant on 0,05 level between means of corresponding groups presented in the table.
.=No statistically significant differences between means of groups
D/K: Hard to tell / Don't know.

6.2. Environmental goals accounted for in land use planning. Supporting and hindering factors

Previous studies analysing links between LUP and environmental goals tend to focus on how environmental goals related to certain fields such as transport or climate adaptation have been accounted for in LUP. In the current study, a wider range of environmental goals was included, that are either closely or more remotely linked to achieving the objectives of the EGD. Results from surveying land use planners in Estonia and Finland showed that planners consider themselves accountable for some environmental goals more than others, and that land use planners with certain background factors reported to account for environmental goals more in LUP decisions.

Because of significant variance among groups, it is not appropriate to draw exhaustive conclusions from the current research on which environmental goals are accounted for, and which are not in LUP. Some of the goals which received lower considerations by respondents are relevant for the EGD and the 'all hands on deck' principle. These are priorities related to land cover (reducing soil cover, preserving agricultural land) and reducing the energy consumption of buildings, both of which have been shown to have clear links with LUP in previous studies (Krämer 2020, Asarpota and Nadin 2020).

The notion that environmental goals is the responsibility of the respectful sector, not of LUP, and that poor links between departments may be hindering considering environmental goals (Asarpota and Nadin 2020) was not fully reinforced by the findings of the current study, although it was mentioned in some open questions. Respondents tended to agree to the idea that other goals are usually more important than environmental ones in LUP decisions (Biesbroek et al 2009, 231; McClure and Baker, 2018).

A vast majority of instances where statistically significant variance occurred between Estonia and Finland regarding environmental goals in LUP by planners, was that Finnish planners reported considering environmental goals more. In the survey results, Finnish planners also felt having more support from national (but also local) legislation (see Hurlimann and March 2012) and strategic documents when prioritising environmental goals over other priorities. The difference goes in line with Finland's overall better performance in environmental matters and may also be linked to slight variances in the countries' planning legislations (see chapter 5.2.). Further qualitative research would help to better understand these variances between the countries.

In the current survey, planners working in larger municipalities reported to account more for environmental goals in LUP and considered themselves to be more knowledgeable of the goals. These

findings are in line with previous studies where adequate capabilities have been seen to support dealing with environmental goals, and larger municipality size to impact capabilities on dealing with supranational issues (Stevens and Senbel 2017, Kull and Tatar 2015).

In addition to Finnish (*vs* Estonian) and larger (*vs* smaller) municipalities, also urban (*vs* rural) municipality planners and planners working with comprehensive (*vs* detail) planning stated to account for various environmental goals more in LUP and considered themselves to be more aware the subject. The urban-rural difference may be explainable by the mere fact that various environmental goals are considered of less relevance in rural settings. The relatively lower commitment to environmental goals on the detail planning level would benefit from further research, as it is often on the detail planning level, where for example the exact locations of buildings (potentially reducing energy consumption) or pedestrian access (capable of impacting the modal split in transport) are decided.

As supporting factors that would increase accounting for environmental goals in LUP, the highest ranked were those that can be considered closest to the planning decision: benchmarking, good practices, guidance, and more clearly set environmental goals on the municipality level. This is in line with findings from more than one piece of previous research, where a certain issue's importance for the municipality, enhanced benchmarking opportunities, and political commitment were highlighted as supporting factors (McClure and Baker 2018, Stevens and Senbel 2017). The respondents felt not having sufficient backing from national legislation and strategic documents to prioritise environmental goals over other considerations (less so, in Finland, than Estonia), which should also be considered a hindering factor in accounting for environmental goals in LUP.

In the survey, the planners' self-reported knowledge on how to contribute to reaching environmental goals in LUP, as well as knowledge of the goals can be considered relatively high. Also, further training on this as a potential supporter did not rank high as a factor among respondents.

As noted by Juhola (2016) in relation to climate change, the contributions from all levels of governance are necessary. The framework of multi-level governance describes how, in addition to the state, supranational and subnational levels of administration engage in policy making. In the current study, multi-level governance helps to explain how environmental goals are addressed on the local level, also in LUP, an essentially local activity. As shown above, it is the local level factors that planners consider would support more accounting for environmental goals LUP. Similarly, the national and EU level contributions in general, rank lower in the list of factors that would increase accounting for environmental goals in LUP. The results show the importance of localised environmental priorities (Wiehe and Walter 2020: 'mandatory and interdependent targets') as supporters for accounting for environmental goals in LUP.

6.3. Engaging land use planning in reaching environmental goals

As the current survey results indicate, variance exists among how much various environmental goals are accounted for in LUP. Also, some that are closely related to the practice and are necessary to reach the priorities of the EGD – such as limiting soil cover or finding the space to produce renewable energy – were reported not to always be considered in LUP decisions. Similarly, Hurlimann et al (2021) have noted that LUP-s missing contribution can hinder meeting overall goals set in climate adaptation, missing the possibility of engaging LUP as a governance tool to include the territorial dimension in EU policies noted by various authors (e.g., Asprogerakas and Zachari 2020).

From the (EU) policy making and implementation side, it is therefore reasonable to ask whether ways would be accessible to promote engaging subnational LUP more, as an instrument to reach the goals set on an international level. In other words – once all the factors listed above, such as locally set goals, functioning benchmarking, etc., have been implemented, will LUP decisions account for environmental goals?

The balancing nature of LUP, as also described in the Torremolinos charter (see chapter 2.2.) and by previous authors (Biesbroek et al 2009, McClure and Baker 2018) may prove to be an underlying hindering factor: LUP decisions may neglect some goals that are of primary importance from a certain point of view. Similarly, there may be a distinct difference between the EGD's discourse of 'all hands on deck' and the prevailing pragmatist discourse in LUP. While the EC's policy document and their communication on this stresses that transition is needed in all sectors, as all sectors have to contribute, the pragmatist tradition considers it the very nature of spatial planning for everything pre-defined to be open to dispute. This clearly seems like a need for further research, analysing whether such dichotomy exists and what this means for including LUP actively in the implementation of the EGD.

In the light of reaching the EGD's ambitions through consecutive policy initiatives, a link to be further analysed could be implementing 'mandated spatial planning', as a mandated participatory planning instrument (see chapter 3.1., Newig, Koontz 2014). In practice, this could mean requiring using LUP to implement certain EU regulations, and consequent reporting. Surely, various justified questions on sovereignty, funding and similar issues should be further addressed, these were not the focus of the current research.

7. Conclusions

The current research has focused on how environmental goals, often agreed upon on the international – including EU – level, are accounted for in local administration level LUP. The topicality of the subject is highlighted by the EGD, *'the most important European energy and climate law initiative at the moment'* (Fleming and Mauger 2021, 164). Contributions from all sectors and levels of governance are necessary to reach the ambitions of the deal.

LUP, an essentially local activity (OECD 2017), has been considered being able to significantly contribute to various environmental goals, such as climate change adaptation and mitigation, reducing soil cover, renewable energy production and energy efficiency, sustainable transport, or supporting biodiversity. In addition, LUP can bring the spatial dimension into sectoral policy making and supports the spatial implementation of sectoral goals, making sure 'everything fits' (Wiehe and Walter 2020, 2). Pragmatism, often considered to frame the practice of LUP as a theoretical line of though, notes the action-oriented nature of planning, and the practice being highly context-sensitive, disregarding predefined overall (planning) goals.

A quantitative surveying of land use planners in Estonia and Finland conduced in the current research showed that significant variance exists in how much planners report to consider various environmental goals in LUP decisions. Some environmental goals also considered relevant in the EGD, such as limiting soil cover or finding the space to produce renewable energy, were not reported to be considered often in LUP decisions. Planners working in Finland (*vs* Estonia), urban (*vs* rural) settings, larger (*vs* smaller) municipalities and working with comprehensive (*vs* detail) planning have reported to consider environmental goals more, with statistically significant variance occurring between these groups. The factors closest to the planners were considered as more important supporters to increase accounting for environmental goals in LUP: benchmarking, good practices, guidance, and more clearly set environmental goals on the municipality level. The sample size and sampling method used in the current research does not allow expanding the results to total group of planners in Estonia and Finland.

Systematically, the inherent balancing nature of LUP may be a conflicting prioritising environmental goals in LUP decisions. To support the implementation of the EGD, 'mandated spatial planning' might be considered, requiring LUP to implement certain EU policies. Both notions fall beyond the scope of the current research and would require further analysis. Also, further analysis seems necessary on the detail planning level, important to reach environmental goals, but currently contributing less to reaching environmental goals, according to current survey results.

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Appendices

Appendix 1. Sustainable development goals relevant for land use planning considered achieved in Estonia and Finland

Selection by author from SDSN and IEEP 2019

Estonia
Freshwater abstraction (% of long term average available water)
Share of green space in urban areas
Satisfaction with public transport
Exposure to air pollution: PM2.5 in urban areas
Mean area that is protected in terrestrial sites important to biodiversity
Mean area that is protected in freshwater sites important to biodiversity
Finland
Freshwater abstraction (% of long term average available water)
Share of renewable energy in gross final energy consumption
Share of green space in urban areas
Exposure to air pollution: PM2.5 in urban areas

Appendix 2. Questionnaire (English version)

Survey on links between land use planning and environmental goals

Dear local municipality planner,

My name is Tiit Oldjärv and I am currently writing my master thesis in European Studies at Gothenburg University on how environmental policy goals are considered in local municipality land use planning. Numerous academic studies have analysed the links between land use planning and environmental policy. By the current survey, I address the issue from the planners' point of view, aiming to look into the daily practice of land use planning and the factors supporting and hindering considering environmental goals in land use planning. In my study, I will survey Finnish and Estonian land use planners.

I highly appreciate your contribution. I will use the survey results to analyse the practice of land use planning in Estonia and Finland. Besides this, the results can be used in policy making to support reaching the society's ambitious environmental goals set on the local, national and international scenes.

All contributions are anonymous. I conduct the survey using the LimeSurvey platform, conditions available here: https://www.limesurvey.org/support/faq/39-data-protection-and-policy (https://www.limesurvey.org/support/faq/39-data-protection-and-policy).

The survey will take approximately 20-30 minutes to complete.

Thankfully,

Tiit Oldjärv

There are 16 questions in this survey.

General background

1. Please select type of municipality where you work as a land use planner: *

Choose one of the following answers
Please choose **only one** of the following:

- ◯ 1 Mostly urban
- ◯ 2 Mostly rural
- ◯ 3 Mixed (urban and rural)
- ◯ 4 Working as a planning official or planning consultant in various local municipalities
- ◯ Don't know

2. Please select population size of municipality where you work as a land use planner: *

Choose one of the following answers
Please choose **only one** of the following:

- ◯ 0 - 2000
- ◯ 2001 - 6000
- ◯ 6001 - 10 000
- ◯ 10 001 - 20 000
- ◯ 20 001 - 40 000
- ◯ 40 001 - 100 000
- ◯ 100 001-
- ◯ Working as a planning official or planning consultant in various local municipalities
- ◯ Don't know

3. Do you work as a... *

Choose one of the following answers
Please choose **only one** of the following:

- ◯ 1 ... land use planning official in a local municipality
- ◯ 2 ... land use planning consultant at a consultancy
- ◯ 3 Prefer not to answer
- ◯ Other [ ]

4. In your work, do you mostly work with... *

Choose one of the following answers
Please choose **only one** of the following:

- ◯ 1 ... comprehensive planning
- ◯ 2 ... detail planning
- ◯ 3 ... both comprehensive and detail planning
- ◯ Hard to tell
- ◯ Other

The pcactice of land use planning

5. In your work preparing land use plans, how often do you consider the following priorities? *

Please choose the appropriate response for each item:

	1 Always	2	3	4	5	6 Never	Hard to tell / Don't know	Not applicable for land use planning in my municipality or in the municipalities where I draft land use plans
5.1 Preserving and restoring biodiversity	○	○	○	○	○	○	○	○
5.2 Reducing the need for motorised transport (eg mixed land use, availability of services)	○	○	○	○	○	○	○	○
5.3 Promoting brownfield instead of greenfield development	○	○	○	○	○	○	○	○
5.4 Fully utilising existing infrastructure	○	○	○	○	○	○	○	○
5.5 Preserving agricultural land	○	○	○	○	○	○	○	○
5.6 Reducing soil cover	○	○	○	○	○	○	○	○
5.7 Promoting cycling and walking	○	○	○	○	○	○	○	○
5.8 Promoting low-carbon modes of transport (e.g. rail, electric)	○	○	○	○	○	○	○	○
5.9 Finding ways to produce renewable energy	○	○	○	○	○	○	○	○
5.10 Furthering circular economy (reducing use of and reusing materials before recycling)	○	○	○	○	○	○	○	○
5.11 Reducing energy consumption of existing buildings	○	○	○	○	○	○	○	○
5.12 Reducing energy consumption of new buildings	○	○	○	○	○	○	○	○
5.13 Reducing greenhouse gas emissions	○	○	○	○	○	○	○	○
5.14 Promoting multimodal transport (combining various means of trasport)	○	○	○	○	○	○	○	○
5.15 Ensuring connectivity between natural areas	○	○	○	○	○	○	○	○
5.16 Promoting restoration of damaged ecosystems	○	○	○	○	○	○	○	○
5.17 Increasing the quality and quantity of forested area	○	○	○	○	○	○	○	○
5.18 Strengthening the integrity of settlement structure	○	○	○	○	○	○	○	○
5.19 Preserving ground and surface water	○	○	○	○	○	○	○	○
5.20 Adaptation to climate change	○	○	○	○	○	○	○	○
5.21 Making agriculture more sustainable	○	○	○	○	○	○	○	○
5.22 Reducing air pollution	○	○	○	○	○	○	○	○

5.23 Preserving natural processes that support the functioning of ecosystems and societies (eg natural infiltration of excess water infiltration vs rainwater sewage, vegetation to provide for habitat preservation, etc.)	○	○	○	○	○	○	○	○
5.26 Reducing noise levels in human settlements and natural environments	○	○	○	○	○	○	○	○

6. In case you considered some environmental goals not to be relevant in your municipality in the previous question, please explain, why.

Please write your answer here:

7. In case you find some other environmental goals to be important in your work as a land use planner, please add.

Please write your answer here:

8. Comments

Please write your answer here:

9. Up to what extent do you agree with the following statements, bearing in mind your work as a land use planner? *

Please choose the appropriate response for each item:

	1 Absolutely agree	2	3	4	5	6 Not at all agree	Hard to tell / Don't know
9.1 The political deciders in my municipality or in the municipality where I prepare land use plans require environmental goals or targets to be accounted for in land use plans.	○	○	○	○	○	○	○
9.2 Reaching environmental goals and targets is a national task, not that of the municipality.	○	○	○	○	○	○	○
9.3 Before land use plans are enforced in my municipality or in the municipality where I prepare land use plans, they are checked for compliance with environmental goals.	○	○	○	○	○	○	○
9.4 When preparing land use plans, I have access to the necessary data to help me take environmental goals and targets into account in land use plans.	○	○	○	○	○	○	○
9.5 In land use planning decisions, other needs (e.g. planning additional residential areas, space for industry, recreation of service provision) are usually more important than environmental goals.	○	○	○	○	○	○	○
9.6 I have sufficient support from national legislation and strategic documents that is in force to back land use planning decisions that prioritise environmental goals over other considerations.	○	○	○	○	○	○	○
9.7 I have sufficient support from local municipality environmental goals to back land use planning decisions that prioritise environmental goals over other considerations.	○	○	○	○	○	○	○
9.8 I know how to contribute to reaching environmental goals and targets in my daily work as a land use planner.	○	○	○	○	○	○	○
9.9 I am knowledgeable of my county's environmental goals that are relevant for land use planning.	○	○	○	○	○	○	○
9.10 I am knowledgeable of local municipality environmental goals that are relevant for land use planning.	○	○	○	○	○	○	○
9.11 I am knowledgeable of environmental goals and targets agreed internationally that are relevant for land use planning.	○	○	○	○	○	○	○
9.12 Lack of time to prepare land use plans makes it difficult to take environmental goals and targets into account in land use plans.	○	○	○	○	○	○	○
9.13 Environmental goals and targets are a natural part of any land use planning decision.	○	○	○	○	○	○	○
9.14 Reaching environmental goals and targets is the responsibility of the respectful sector (e.g. transport, energy, nature protection), rather than the responsibility of land use planning.	○	○	○	○	○	○	○
9.15 Accouonting for environmental goals is the responsibility of (strategic) environmental assessment, not the responsibility of land use planning	○	○	○	○	○	○	○

10. Comments

Please write your answer here:

Changes in accounting for environmental goals

11. How would the following factors impact you accounting for environmental goals in your work preparing land use plans? *

Please choose the appropriate response for each item:

	1 Environmental goals would be considered more in your work preparing land use plans	2	3	4	5 Environmental goals would be considered less in your work preparing land use plans	Hard to tell / Don't know
11.1 More clearly set environmental goals and targets on the municipality level	○	○	○	○	○	○
11.2 More clearly set environmental goals and targets on the national level	○	○	○	○	○	○
11.3 Guidance (guidelines, written instructions) on how to account for environmental goals and targets in land use plans	○	○	○	○	○	○
11.4 Additional training on how to account for environmental goals and targets in land use plans	○	○	○	○	○	○
11.5 Functioning networking, benchmarking and best practices sharing possibilities with other municipalities or land use planners.	○	○	○	○	○	○
11.6 More financial resources to find out how specific local level land use decisions are linked with environmental goals (analyses, assessments)	○	○	○	○	○	○
11.7 More precisely defined national regulative requirements to account for environmental goals and targets in land use plans	○	○	○	○	○	○
11.8 European Union regulations and strategies defining the role of local municipality land use planning in reaching environmental goals and targets	○	○	○	○	○	○
11.9 Land use planning related national or European court decisions requiring to account for environmental goals and targets in land use plans	○	○	○	○	○	○
11.10 More pronounced national level political commitment to environmental goals and targets	○	○	○	○	○	○
11.11 More pronounced local municipality level political commitment to environmental goals and targets	○	○	○	○	○	○
11.12 The general public requiring environmental goals and targets to be accounted for more in land use plans	○	○	○	○	○	○
11.13 Precise criteria in sectoral policy documents on how environmental goals should be accounted for in land use planning	○	○	○	○	○	○
11.14 Easily available good examples of plans where environmental goals have been taken into account	○	○	○	○	○	○

12. In case you find some other factors would significantly impact how much you consider environmental goals in preparing land use plans, please add.

Please write your answer here:

13. Comments

Please write your answer here:

Conclusion

14. Overall, how much do you consider land use planning to be able to contribute to reaching the environmental goals listed in question 5? *

Choose one of the following answers

Please choose **only one** of the following:

- ◯ 1 Land use planning can significantly contribute to reaching environmental goals
- ◯ 2 Land use planning can somewhat contribute to reaching environmental goals
- ◯ 3 Land use planning can do little to contribute to reaching environmental goals
- ◯ 4 Land use planning cannot contribute to reaching environmental goals
- ◯ Impossible to tell
- ◯ Don't know

15. Comments

Please write your answer here:

16. Further comments, reflections on survey

Please write your answer here:

Thank you for your contribution.

In case you are interested in getting information on the survey results, please insert your e-mail address here to be notified: https://forms.gle/reFsznoKPMrUzGDK9 (https://forms.gle/reFsznoKPMrUzGDK9). Your e-mail address will not be linked to your answers and will be stored in Google Forms platform (conditions available here: https://policies.google.com/privacy?hl=en (https://policies.google.com/privacy?hl=en)). I will not share the e-mail addresses with further parties, I will only use the e-mail addresses to inform you about the survey results and will not store the e-mail addresses after this.

28.04.2021 – 20:33

Submit your survey.
Thank you for completing this survey.

Appendix 3. Data tables

Section 1. Overall distribution of respondents by background indicators

Overall distribution of responses by background indicators. N=83, missing responses not presented in table. Municipality size recalculated compared to questionnaire for better overview.

		Estonia		Finland		SUM
		Comprehensive planning	Detail planning	Comprehensive planning	Detail planning	
0-10,000 inhabitants	Planning official	-	12	-	4	16
	Other	-	2	-	0	2
10,001 – 20,000 inhabitants	Planning official	-	12	-	2	14
	Planning consultant	1	2	-	0	3
	Other	-	2	-	1	3
20,001 – 100,000 inhabitants	Planning official	1	1	4	2	8
	Planning consultant	-	2	-	0	2
	Other	-	2	-	0	2
100,001 – inhabitants	Planning official	0	3	6	6	15
	Planning consultant	-	3	-	1	4
	Other	-	1	-	0	1
Working in multiple municipalities	Planning consultant	1	5		2	8
	Other	-	1		0	1
SUM		3	48	10	18	79

Section 2. Considering environmental goals

Extension of Table 4 in Results: means by groups.

In your work preparing land use plans, how often do you consider the following priorities? Scale: 1 (always) to 6 (never)																													
	Total sample				Country					Type of municipality					Size of municipality					Type of respondent					Type of land use planning				
	Mean ↓	N	D/K	N/A	ET		FI		Sig	Mostly urban		Mostly rural		Sig	0-20 000		20 001+		Sig	Planning official		Planning consultant		Sig	Comprehensive planning		Detail planning		Sig
					Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N	
Fully utilising existing infrastructure	1,90	82	1	0	2,11	54	1,5	28	*	1,55	22	1,90	21		2,18	39	1,45	31	*	1,87	53	2,11	19		1,31	13	2,03	68	*
Ensuring connectivity between natural areas	1,90	80	3	0	2,13	52	1,46	28	*	1,50	22	1,86	21		2,03	37	1,68	31		1,76	51	2,32	19	*	1,46	13	2,00	66	*
Strengthening the integrity of settlement structure	1,95	79	2	2	2,10	52	1,67	27		1,57	21	2,05	21		2,05	38	1,63	30		1,92	51	2,28	18		1,50	12	2,05	66	*
Promoting cycling and walking	2,09	81	1	1	2,40	53	1,50	28	*	1,41	22	2,48	21	*	2,46	39	1,43	30	*	2,11	53	2,05	19		1,38	13	2,16	67	*
Preserving ground and surface water	2,14	76	6	1	2,35	49	1,78	27		1,84	19	2,24	21		2,26	38	2,00	27		2,20	49	2,33	18		1,36	11	2,30	64	*
Preserving natural processes that support the functioning of ecosystems and societies (e.g., natural infiltration of excess water infiltration vs rainwater sewage, vegetation to provide for habitat preservation, etc.)	2,26	76	6	1	2,35	51	2,08	25		2,06	18	2,62	21		2,38	37	2,07	27		2,35	48	2,17	18		2,30	10	2,28	65	
Reducing noise levels in human settlements and natural environments	2,35	80	3	0	2,58	52	1,93	28	*	2,33	21	2,52	21		2,50	38	2,10	30		2,47	51	2,37	19		1,92	13	2,45	66	
Promoting brownfield instead of greenfield development	2,38	73	8	2	2,61	46	2,00	27	*	2,00	17	2,38	21		2,72	36	1,96	26	*	2,31	48	2,44	16		1,92	12	2,50	60	

In your work preparing land use plans, how often do you consider the following priorities? Scale: 1 (always) to 6 (never)																													
	Total sample				Country					Type of municipality					Size of municipality					Type of respondent					Type of land use planning				
	Mean ↓	N	D/K	N/A	ET		FI		Sig	Mostly urban		Mostly rural		Sig	0-20 000		20 001+		Sig	Planning official		Planning consultant		Sig	Comprehensive planning		Detail planning		Sig
					Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N	
Preserving and restoring biodiversity	2,57	76	3	4	3,17	48	1,54	28	*	2,38	21	2,56	18		2,97	36	2,21	29	*	2,60	50	2,59	17		1,31	13	2,85	62	*
Reducing the need for motorised transport (e.g., mixed land use, availability of services)	2,72	74	3	6	3,09	46	2,11	28	*	2,00	21	3,44	16	*	3,18	34	2,03	29	*	2,49	49	3,35	17	*	1,69	13	2,97	60	*
Promoting multimodal transport (combining various means of transport)	2,74	70	7	6	2,84	44	2,58	26		2,35	20	3,31	16		3,00	31	2,29	28	*	2,77	47	2,80	15		2,00	11	2,91	58	*
Adaptation to climate change	2,82	72	9	2	3,32	44	2,04	28	*	2,05	20	3,79	19	*	3,39	33	2,11	27	*	2,83	47	2,65	17		1,77	13	3,09	58	*
Preserving agricultural land	2,85	73	5	5	3,02	49	2,50	24		3,38	16	2,67	21		2,97	37	2,68	25		2,70	46	3,11	18		1,75	12	3,10	60	*
Promoting low-carbon modes of transport (e.g., rail, electric)	2,93	67	4	12	3,39	41	2,19	26	*	1,53	19	4,13	16	*	3,81	27	1,83	29	*	2,70	43	3,63	16	*	1,75	12	3,22	54	*
Finding ways to produce renewable energy	2,94	71	8	4	2,91	47	3,00	24		3,17	18	2,89	19		3,00	33	2,88	26		3,00	45	2,88	17		2,91	11	2,98	59	
Reducing air pollution	2,99	75	5	3	3,06	48	2,85	27		2,81	21	3,56	18		3,29	34	2,76	29		3,14	49	2,83	18		2,54	13	3,11	61	
Reducing energy consumption of new buildings	3,12	73	9	1	2,86	49	3,67	24		3,30	20	3,35	20		2,97	35	3,36	28		3,31	48	3,06	16		3,88	8	3,06	64	
Reducing greenhouse gas emissions	3,13	71	7	5	3,67	43	2,29	28	*	2,57	21	3,59	17		3,63	30	2,62	29	*	3,11	46	3,29	17		2,25	12	3,34	58	*
Promoting restoration of damaged ecosystems	3,29	68	8	7	3,51	43	2,92	25		3,12	17	3,83	18		3,57	30	3,12	26		3,37	43	3,29	17		2,64	11	3,46	56	
Reducing soil cover	3,34	76	4	3	3,67	49	2,74	27	*	2,70	20	4,00	19	*	3,97	36	2,71	28	*	3,40	50	3,12	17		2,82	11	3,47	64	
Making agriculture more sustainable	3,40	63	12	8	3,27	45	3,72	18		4,08	12	2,95	20		3,21	33	3,60	20		3,23	39	4,00	16		3,13	8	3,48	54	
Increasing the quality and quantity of forested area	3,49	63	10	10	3,63	41	3,23	22		3,38	13	3,60	20		3,38	32	3,43	21		3,49	41	4,00	14		3,10	10	3,62	52	

In your work preparing land use plans, how often do you consider the following priorities? Scale: 1 (always) to 6 (never)																													
	Total sample				Country					Type of municipality					Size of municipality					Type of respondent					Type of land use planning				
	Mean ↓	N	D/K	N/A	ET		FI		Sig	Mostly urban		Mostly rural		Sig	0-20 000		20 001+		Sig	Planning official		Planning consultant		Sig	Comprehensive planning		Detail planning		Sig
					Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N	
Furthering circular economy (reducing use of and reusing materials before recycling)	3,56	70	7	6	3,80	46	3,08	24		3,61	18	3,74	19		3,73	33	3,35	26		3,71	45	3,47	15		3,22	9	3,65	60	
Reducing energy consumption of existing buildings	3,60	73	8	2	3,28	50	4,30	23	*	3,70	20	3,50	18		3,24	34	4,11	28	*	3,83	47	3,44	16		4,89	9	3,46	63	*

Remarks:
*Sig: differences significant on 0.05 level between means of corresponding groups marked with: **
D/K: Hard to tell / Don't know
N/A: Not applicable for land use planning in my municipality or in the municipalities where I draft land use plans

Section 3. Statements related to current practice

Extension of Table 5 and Table 6 in chapter 5.3.: means by groups.

Up to what extent do you agree with the following statements, bearing in mind your work as a land use planner? Scale: 1 (Absolutely agree) to 6 (Not at all agree)	Total sample			Country					Type of municipality					Size of municipality					Type of respondent					Type of land use planning				
	N	D/K	Mean ↓	ET		FI		Sig	Mostly urban		Mostly rural		Sig	0-20 000		20 000+		Sig	Planning official		Planning consultant		Sig	Comprehensive planning		Detail planning		Sig
				Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N	
Environmental goals and targets are a natural part of any land use planning decision	79	4	1,91	2,12	52	1,52	27	*	1,59	22	2,10	20		2,16	37	1,57	30	*	2,00	50	1,89	19		1,83	12	1,94	66	
I am knowledgeable of local municipality environmental goals that are relevant for land use planning	77	6	2,16	2,43	51	1,62	26	*	1,52	21	2,65	20	*	2,42	38	1,86	28	*	2,12	50	2,22	18		1,64	11	2,24	66	*
I am knowledgeable of my county's environmental goals that are relevant for land use planning	78	5	2,23	2,47	51	1,78	27	*	1,81	21	2,90	20	*	2,50	38	2,10	29		2,29	51	2,00	18		1,58	12	2,35	66	*
When preparing land use plans, I have access to the necessary data to help me take environmental goals and targets into account in land use plans	76	7	2,29	2,49	49	1,93	27	*	2,10	21	2,53	19		2,51	37	2,04	28		2,35	48	2,37	19		1,92	12	2,36	64	
I know how to contribute to reaching environmental goals and targets in my daily work as a land use planner	79	4	2,63	2,96	52	2,00	27	*	2,27	22	2,90	20	*	2,89	38	2,30	30	*	2,73	51	2,53	19		1,83	12	2,78	67	*
In land use planning decisions, other needs (e.g., planning additional residential areas, space for industry, recreation of service provision) are usually more important than environmental goals	81	2	2,89	2,87	54	2,93	27		2,59	22	2,86	21		2,87	39	3,07	30		2,75	52	3,05	19		2,92	12	2,91	68	
I am knowledgeable of environmental goals and targets	76	7	2,91	3,39	49	2,04	27	*	2,20	20	3,65	20	*	3,41	37	2,43	28	*	2,92	49	2,50	18		1,92	12	3,09	64	*

Up to what extent do you agree with the following statements, bearing in mind your work as a land use planner?
Scale: 1 (Absolutely agree) to 6 (Not at all agree)

	Total sample			Country					Type of municipality					Size of municipality					Type of respondent					Type of land use planning				
	N	D/K	Mean ↓	ET		FI		Sig	Mostly urban		Mostly rural		Sig	0-20 000		20 000+		Sig	Planning official		Planning consultant		Sig	Comprehensive planning		Detail planning		Sig
				Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N	
agreed internationally that are relevant for land use planning																												
Before land use plans are enforced in my municipality or in the municipality where I prepare land use plans, they are checked for compliance with environmental goals	78	5	2,94	3,33	52	2,15	26	*	2,19	21	3,14	21		3,36	39	2,32	28	*	3,04	50	2,74	19		2,73	11	2,97	67	
The political deciders in my municipality or in the municipality where I prepare land use plans require environmental goals or targets to be accounted for in land use plans	77	6	3,13	3,57	51	2,27	26	*	2,55	22	3,25	20		3,50	38	2,39	28	*	3,02	50	3,21	19		2,73	11	3,20	66	
Lack of time to prepare land use plans makes it difficult to take environmental goals and targets into account in land use plans	79	4	3,22	3,23	52	3,19	27		3,18	22	2,90	21		2,76	38	3,13	30		2,76	51	4,42	19	*	3,17	12	3,22	67	
I have sufficient support from national legislation and strategic documents that is in force to back land use planning decisions that prioritise environmental goals over other considerations	76	7	3,58	3,94	51	2,84	25	*	3,33	21	3,90	20		3,71	38	3,41	27		3,53	49	3,50	18		2,90	10	3,68	66	
I have sufficient support from local municipality environmental goals to back land use planning decisions that prioritise environmental goals over other considerations	79	4	3,59	3,79	53	3,19	26	*	3,36	22	3,95	21		3,74	39	3,38	29		3,65	51	3,37	19		3,45	11	3,62	68	
Reaching environmental goals and targets is a national task, not that of the municipality	78	5	4,46	4,68	53	4,00	25		4,68	22	4,42	19		4,54	37	4,41	29		4,43	49	4,53	19		4,27	11	4,47	66	
Accounting for environmental goals is the responsibility of (strategic)	78	5	4,72	4,67	51	4,81	27		4,81	21	4,38	21		4,53	38	4,57	28		4,76	50	4,95	19		5,00	12	4,65	65	

Up to what extent do you agree with the following statements, bearing in mind your work as a land use planner?
Scale: 1 (Absolutely agree) to 6 (Not at all agree)

	Total sample			Country					Type of municipality					Size of municipality					Type of respondent					Type of land use planning				
	N	D/K	Mean ↓	ET		FI		Sig	Mostly urban		Mostly rural		Sig	0-20 000		20 000+		Sig	Planning official		Planning consultant		Sig	Comprehensive planning		Detail planning		Sig
				Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N	
environmental assessment, not the responsibility of land use planning																												
Reaching environmental goals and targets is the responsibility of the respectful sector (e.g., transport, energy, nature protection), rather than the responsibility of land use planning	80	3	4,73	4,74	53	4,70	27		4,45	22	4,48	21		4,58	38	4,67	30		4,75	51	5,05	19		5,25	12	4,61	67	

Remarks:
*Sig: differences significant on 0.05 level between means of corresponding groups marked with: **
D/K: Hard to tell / Don't know

Section 4. Supporting factors

Extension of Table 7 in chapter 5.3.: means by group.

How would the following factors impact you accounting for environmental goals in your work preparing land use plans?
Scale: 1 (Environmental goals would be considered more in your work preparing land use plans) to 5 (Environmental goals would be considered less in your work preparing land use plans)

	Total sample			Country					Type of municipality					Size of municipality					Type of respondent					Type of land use planning				
	N	D/K	Mean	ET		FI		Sig	Mostly urban		Mostly rural		Sig	0-20 000		20 000+		Sig	Planning official		Planning consultant		Sig	Comprehensive planning		Detail planning		Sig
				Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N	
Functioning networking, benchmarking and best practices sharing possibilities with other municipalities or land use planners.	79	4	1,54	1,62	52	1,41	27		1,52	21	1,52	21		1,61	38	1,38	29		1,53	51	1,68	19		1,25	12	1,61	66	
More clearly set environmental goals and targets on the municipality level	79	4	1,58	1,62	52	1,52	27		1,38	21	1,71	21		1,66	38	1,53	30		1,56	52	1,63	19		1,50	12	1,60	67	
More financial resources to find out how specific local level land use decisions are linked with environmental goals (analyses, assessments)	79	4	1,66	1,71	51	1,57	28		1,67	21	1,76	21		1,76	38	1,62	29		1,73	52	1,50	18		1,62	13	1,68	65	
Easily available good examples of plans where environmental goals have been taken into account	81	2	1,67	1,78	54	1,44	27		1,57	21	1,81	21		1,85	39	1,50	30		1,67	52	1,68	19		1,25	12	1,75	68	
Guidance (guidelines, written instructions) on how to account for environmental goals and targets in land use plans	80	3	1,71	1,83	53	1,48	27		1,38	21	1,90	21		1,87	39	1,50	30		1,69	52	1,63	19		1,50	12	1,75	68	
More precisely defined national regulative requirements to account for environmental goals and targets in land use plans	80	3	1,73	1,70	53	1,78	27		1,29	21	1,70	20		1,74	38	1,60	30		1,65	51	1,89	19		1,83	12	1,72	67	
Additional training on how to account for environmental goals and targets in land use plans	80	3	1,76	1,83	53	1,63	27		1,57	21	1,75	20		1,82	38	1,67	30		1,78	51	1,74	19		1,67	12	1,79	67	

How would the following factors impact you accounting for environmental goals in your work preparing land use plans?
Scale: 1 (Environmental goals would be considered more in your work preparing land use plans) to 5 (Environmental goals would be considered less in your work preparing land use plans)

	Total sample			Country					Type of municipality					Size of municipality					Type of respondent					Type of land use planning				
	N	D/K	Mean	ET		FI		Sig	Mostly urban		Mostly rural		Sig	0-20 000		20 000+		Sig	Planning official		Planning consultant		Sig	Comprehensive planning		Detail planning		Sig
				Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N		Mean	N	Mean	N	
More clearly set environmental goals and targets on the national level	79	4	1,78	1,71	52	1,93	27		1,76	21	1,86	21		1,76	38	1,87	30		1,79	52	1,84	19		1,92	12	1,76	67	
More pronounced local municipality level political commitment to environmental goals and targets	74	9	1,85	2,06	47	1,48	27	*	1,40	20	2,60	20	*	2,22	37	1,44	27	*	1,88	49	1,88	17		1,18	11	1,98	62	*
Precise criteria in sectoral policy documents on how environmental goals should be accounted for in land use planning	79	4	1,91	1,90	52	1,93	27		1,86	21	2,14	21		2,11	38	1,73	30		1,98	52	1,63	19		1,75	12	1,94	67	
European Union regulations and strategies defining the role of local municipality land use planning in reaching environmental goals and targets	74	9	2,03	2,06	48	1,96	26		1,70	20	2,42	19	*	2,32	37	1,75	28	*	2,08	49	1,94	18		1,67	12	2,10	62	
More pronounced national level political commitment to environmental goals and targets	74	9	2,05	2,30	47	1,63	27	*	1,65	20	2,84	19	*	2,53	36	1,64	28	*	2,04	48	2,06	18		1,45	11	2,18	62	*
The general public requiring environmental goals and targets to be accounted for more in land use plans	79	4	2,08	2,12	52	2,00	27		1,76	21	2,40	20		2,39	38	1,90	30		2,18	51	1,83	18		1,67	12	2,17	66	
Land use planning related national or European court decisions requiring to account for environmental goals and targets in land use plans	75	8	2,25	2,27	48	2,22	27		2,05	20	2,71	21	*	2,58	38	1,96	28	*	2,35	51	2,06	18		2,08	12	2,29	63	

Remarks:
*Sig: differences significant on 0.05 level between means of corresponding groups marked with: **
D/K: Hard to tell / Don't know