Communicating the Value of Nature: Ecosystem Services in Uppsala's Environmental Planning

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Abstract

Ecosystem Services refer to the values humans derive from nature, including climate regulation, clean air, biodiversity, and many other contributions to human health and wellbeing. Over the last few decades, there have been increasing numbers of studies related to ecosystem services (ES) in Environmental Planning and Sustainability Governance. While ES are often mentioned in policy documents, much less focus has been placed on the communication and interpretation of ES in planning discourse.

This research aims to investigate how ecosystem services were presented in environmental and planning policy documents for Uppsala Municipality and Region Uppsala. It identifies the most common framing of ecosystem services and what environmental problems, solutions, or actors are included in those framings. This study examines which values and perspectives of ecosystem services (e.g., social, cultural, emotional, relational) are featured and underrepresented.

The results of the study are based on a qualitative frame analysis of six municipal and regional policies. A frame analysis approach was employed using framing theory to provide insight into how Ecosystem Services were communicated through descriptions of environmental problems, suggested sustainability actions, and assigned responsibility. Coding was done with relevant text, groupings were formed based on categories, and common frames were identified.

Four Ecosystem Service Frames were identified as being the most common among all policy documents analyzed. These included Technocratic/Managerial, Economic/Growth-Oriented, Ecological Protection, and Social/Participatory. The Technocratic/Managerial Frame was the most prominent, communicating Ecosystem Services as environmental functions that can be planned or managed. The Economic/growth-oriented frame positioned ecosystem services as a new opportunity for innovation, competitiveness, and regional growth. The Ecological Protection Framework dealt with biodiversity conservation, climate change, and ecological sustainability. The Social/Participatory Frame was present but significantly less developed than the other three frames.

It was also observed that Ecosystem Services were communicated almost exclusively through Technical/Ecological/Economic perspectives; Cultural, Emotional, Relational, and Place-Based values of Nature received very little attention. Similarly, issues of Environmental Justice/Citizen Agency/Local Ecological Knowledge received very little mention in the Policy Discourse.

These results show that Ecosystem Services are not portrayed neutrally. Instead, the policy documents create specific conceptions of nature/sustainability/environmental governance by focusing on specific values/perspectives while ignoring others. This study contributes to research about Ecosystem Services and Environmental Planning by demonstrating how policy language affects how nature is valued and included in Sustainable Governance practices.

Keywords: Ecosystem Services, Environmental Communication, Framing Theory, Sustainability Governance, Environmental Planning, Policy Discourse.

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1. Introduction

1.1 Background of the study:

The three main themes of environmental policy and research are climate change, decline in biodiversity, and rapid urbanization. The urbanization process is replacing the natural environment with an urbanized environment that has caused habitat fragmentation and a loss of biodiversity. Urbanization has changed land use for natural resources such as forest land, wetlands, and agricultural land into buildings and roads. This is causing concern regarding how sustainable development can be promoted while maintaining intact or preserving ecosystems. Due to this conundrum, there is an increasing number of professionals in both urban planning/development and environmental management fields who are examining 'Ecosystem Services' as a potential solution.

Ecosystem Services refer to the advantages people get out of ecosystems (Millennium Ecosystem Assessment 2005). They can consist of four types: provisioning services (for example, food and water); regulating services (such as Climate regulation and flood prevention); cultural services (connected to recreational activities and sense of identity/place); and supporting ecological functions. Westman (1977) stated that Ecosystem Services refer to the advantages we gain from ecosystems, and he also emphasized their significance in linking individuals and their surroundings. After that time, a number of conceptual frameworks based on Ecosystem Services have been increasingly implemented throughout different levels of government policy and planning (i.e., land-use governance).

According to Daily, G. C. (1997), Ecosystem Services were formulated partly to make ecological values more visible in decision-making. Although Ecosystem Services demonstrate that many urban green spaces (such as parks, wetlands, forests, and urban parks) constitute an integral part of developing sustainable urban environments by demonstrating that many urban green spaces function to produce clean air, prevent flooding, conserve biodiversity, etc. (as well as maintain aesthetics/wildlife corridors, etc.)(Millennium Ecosystem Assessment, 2005).

For some years back, Ecosystem Services have been progressively included in Swedish environmental planning/governance practices. For instance, Nordin et al. (2017) demonstrated that the frequency of mentions of Ecosystem Services increased considerably in several Swedish governmental regional governing documents. It was found that there was a higher mention rate of Ecosystem

Services when officials had long-term environmental conservation plans/projects at hand compared to shorter-term projects/meetings. Moreover, Schubert et al. (2018) reported recently that municipal schemes for nature management are increasingly influenced by Ecosystem Services. Also, Sang et al. (2021) noticed that strategic papers on reducing strategies against Climate change, as well as city park system strategies, regularly comprise references to Ecosystem Services.

The increasing presence of references to Ecosystem Services in policy documents has also changed the way environmental issues are communicated (Gómez-Baggethun, E., & Ruiz-Pérez, M., 2011). Costanza et. al. (2017) stated that in an era where environmentalism has been viewed distinctly from economic development, it is now critical to integrate ecosystems with economic viability/public health, etc. Thus, there is a direct link between environmentalism and economic viability/public health, etc. Consequently, green roofs, wetlands, etc. are being viewed as multifunctional environments that provide numerous functions/advantages (Hansen, R. & Pauleit, S., 2014). Therefore, it is becoming even more imperative for rapidly expanding municipalities like Uppsala to find a balance between the continuation of both economic/demographic growth and ecological sustainability.

Despite an increasing amount of scientific articles discussing the increased reference to Ecosystem Services in policy documents, there is still a need for research into how nature is constructed through policy discourses (Schubert et al., 2018; Khoshkar et al., 2020). Researchers of environmental communications claim that policy languages do not provide a neutral image of reality. Cox (2013) argued that environmental communication influences how environmental issues are understood, what solutions are deemed legitimate, and who should be held responsible for addressing environmental issues. Cox (2013) also mentioned that Policy documents not only describe environmental conditions; they construct interpretations of sustainability/governance/etc.

Therefore, the presentation formats for Ecosystem Services in policy documents have great significance. Chan et al. (2012) added that where ecosystems primarily serve to generate value/utility/productivity/economic benefit, etc., other types/forms/human/nature relationships become obscured. Homar & Cvelbar (2021) argue that common policy presentations marginalize minoritarian views towards nature since they emphasize certain values while ignoring others. It follows logically that assessing how Ecosystem Services are described within planning discourse provides insights into how sustainability governance is practiced in reality.

1.2 Research Problem

Over the past twenty years, the role of Ecosystem Services has continued to expand as an essential part of developing sustainable policy/planning. Sang et al. (2021) further argued that Ecosystem Services have become an invaluable resource by providing a means for integration of environmental protection and human welfare/Climate Adaptation/Biodiversity Conservation/Sustainability Development.

Schubert et al. (2018) reported additionally that ecosystem service approaches have been integrated into planning processes related to Climate governance, green infrastructure, biodiversity protection, and land use planning in Sweden.

Currently, Uppsala is experiencing an exponential increase in urbanization, which results in numerous challenges for the Uppsala Municipality to find a balance between continued economic/demographic growth and ecological sustainability. Berg et al. (2024) pointed out that the forests/wetlands/agricultural lands/urban parks in Uppsala provide a wide array of Ecosystem Services that contribute positively to improving air quality,/conserve biodiversity,/promote recreation,/maintain public health, etc. Nevertheless, continuous urban expansions exert increasing pressure on these natural systems.

Although references to Ecosystem Services occur with increasing regularity within planning discourse, critical scholars observe that the concept risks limiting our comprehension of what represents "nature" by promoting quantifiable utility-based values. Chan et al. (2012) noted that socially/culturally/emotionally/and relationally connected aspects of nature are constantly excluded from discussions on Ecosystem Services.

Furthermore, Schubert et al. (2018) reported that although references to Ecosystem Services have become increasingly common in Swedish planning documents, the term has been employed with overwhelming frequency in an extremely simple/technocratic manner.

For this reason, it appears necessary to shift attention from focusing solely on whether or not references to Ecosystem Services occur in planning documents toward analyzing how they are conceptualized/communicated.

Definitions of environmental problems are shaped by the ways in which they are framed, which defines what objectives representing sustainable development will have precedence over one another, which party will be responsible for ensuring accountability, and whose views will be marginalized.

1.3 Research Aim and Questions of this study:

Previous studies showed a trend towards including Ecosystem Services into environmental governance/planning in Sweden. Nordin et al. (2017), for instance, identified an important example of how Ecosystem Services have been incorporated into Swedish planning documentation with a focus on urban sustainability and land use planning. Additionally, Schubert et al. (2018) found Ecosystem Services to be cited in Swedish municipal policy documents; however, it was noted by these authors that their interpretation/use varied as much as the specific context in which they were utilized.

Moreover, Schubert et al. (2018) observed that whereas an increasing number of planners utilize Ecosystem Services in their planning processes, prior research has mostly examined whether Ecosystem Services were included in the planning process or not, and if not, why not. Very little attention has been paid, however, to how they were defined and communicated within policy discourses. Khoshkar et al. (2020) contended furthermore that additional research is required to assess how Ecosystem Services are generated through policy language and how these generations impact sustainable development governance.

In addition to the shortcomings listed above, very few studies exist regarding how environmental problems/prospective solutions, as well as who will bear responsibility for addressing prospective environmental problems, are generated within an ecological service framework at the municipal level in Sweden.

Further research is required, therefore, to study which aspects of Ecosystem Services have received the least attention within official planning discourse, particularly social/cultural/emotional/relational perceptions of nature.

Henceforth, this research aims to identify and analyze the primary framing styles describing Ecosystem Services in environmental planning documents from Uppsala Municipality and Uppsala Region; further examining how environmental problem solution identification assignments are established within each framing style; finally exploring underrepresented perspectives describing Ecosystem Services - specifically social, cultural, emotional, and relational descriptions of nature.

Main Research Question:

1. How are ecosystem services framed in environmental and planning documents in Uppsala?

Sub-questions (Analytical questions):

How are Environmental problems, solutions, and actors constructed within these framings?

Which ecosystem service values and perspectives are underrepresented?

2. Literature Review

2.1 Ecosystem Services

An ecosystem's value and rate can be established regardless of cultural, economic, and social values, as they exist independently of human evaluation.

Ranganathan et al. (2008) described ecosystem services as the benefits that are provided by ecosystems. This contribution makes human life both possible and worth living. The human population derives a variety of tangible and intangible benefits from ecosystem functions either directly or indirectly.

Kremen (2005) stated that "ecosystem services" have been defined as providing two types of benefits: direct or indirect benefits; in other words, tangible or intangible goods. The former is exemplified by the food, timber, medicine, and ritual materials that are found within specific plant and animal species, while the latter includes decomposing organic matter, cycling nutrients through microbial processes in soils, and retaining soil moisture and particulate matter using the root networks of vegetation. Ecosystem Services may be used to support public and private sector development planning and to improve environmental performance.

Brown et al. (2007) further explained how ecosystem services have emerged as a unifying framework for ecology and economics. Landowners and forest managers find value in the idea of ecosystem services because it gives them the ability to develop their own criteria for decision-making regarding land use. Our concern with these services is evident because they provide marketable goods and services. They provide forest products, fish, wildlife, and recreation, and also play a vital role by providing habitat for wild species, maintaining a vast genetic library, providing scenic beauty, and contributing in many ways to human health and quality of life.

Costanza et al. (1997) estimated that ecosystem services supply at least as much to the global economy as do marketplace processes, and probably much more to describe various aspects of ecosystem services and their value. And it is dependent on the specific cultural, geographical, and historical context in which different human societies develop, and is determined by cultural socio-economic processes as well as by the provision of ecosystem services.

However, according to Stokstad (2005), the vast majority of human well-being relies, more or less directly, on the sustained delivery of fundamental ecosystem services, such as the provision of food, fuel, and shelter; the regulation of the quality and quantity of the water supply; the control of natural hazards, etc.

2.2 Ecosystem Services in Swedish Planning Contexts

A number of studies have investigated the extent to which Ecosystem Services have been incorporated into Swedish planning systems. These studies have shown that over time, Sweden's municipalities have been integrating Ecosystem Services into their Municipal Planning Documents, Policy Frameworks, Strategic Plans, etc., especially as it relates to Sustainability and Spatial Planning (Nordin et al. 2017 and Schubert et al. 2018).

In addition, Khoshkar et al. (2020) indicate that Ecosystem Services have begun to be integrated into Governance Structures and Technical/Institutional Frameworks. However, at the same time, Hysing & Lidskog (2018) indicate that Ecosystem Services remain a political issue as there is great debate among various stakeholders as to what types of governance policies should take priority regarding sustainability.

Overall, these studies collectively demonstrate that although Ecosystem Services may have become a standard part of Planning in Sweden, they are still being interpreted differently by different Stakeholders and Government Agencies.

2.3 Environmental Communication and Sustainability Governance

Environmental Communication Research focuses on how environmental issues are communicated by the media and understood by the general population. According to Cox (2013), environmental communication is one of many forms through which the public interprets their role in protecting the environment, practicing environmentally responsible behaviors, and establishing a relationship with nature. Cox (2013) also mentioned that how an individual communicates to others can lead to increased awareness of environmental concerns and influence governmental decision-making based on environmental policies.

According to Hansen & Cox (2015), the way individuals communicate information concerning the environment can directly relate to the manner in which environmental challenges are perceived by policymakers during the development of new environmental policies. The institutional dialogue surrounding planning for sustainability has a significant impact on whether or not those plans are put into practice.

Westin & Joosse (2022) found that when discussing planning for sustainability, there tends to be a preference towards institutional/technological knowledge

versus other types of knowledge, such as non-institutionalized knowledge regarding environmental knowledge.

2.4 Framing Environmental Issues in Policy Discourse

Framing theory gives researchers the opportunity to study how conversations highlight specific ways of interpreting reality over other ways. Frames, therefore, shape how individuals interpret and respond to an issue. Shmueli (2008) states that in the context of the environmental debate in New Zealand, mediated debates can lead to selective attention to certain pieces of information and elide others. Selective representation, as such, is highly influential in the general public's interpretation of an issue, since it highlights which aspects of environmental problems to focus on while leaving other parts unattended.

Frames organize how we see things (Entman 1993) by defining problems, identifying who is responsible for them, and telling us what is right/wrong. Since frames define the causes/solutions of environmental issues differently, they can give these issues additional meanings/interpretations. Thus, frames can affect not only our understanding of environmental issues but also public opinion and potential responses.

Park & Kleinschmit (2016), authors of the foreword to Framing the Debate, believe that one will have a clearer picture of environmental issues if he/she examines how they are portrayed in media discussions and policy documents. How environmental subjects are framed can shape public opinion. Additionally, frames can determine whether someone feels obligated/responsible enough to act on an environmental issue. Furthermore, frames allow for creativity/ imagination regarding future visions of environmental subjects.

Harring and Shehata (2025) frame it as a process by which we make sense of environmental information and therefore understand environmental sustainability. Frames affect our understanding of the problem; what possible solution options exist and will be viewed as acceptable; and who has responsibility for acting on it. Therefore, framing is an important method through which individuals, organizations/institutions, and policymakers describe, present, or otherwise communicate environmental issues and define their relationship with sustainability and environmental action.

According to Westin and Joosse (2022), planning documents have been shown to be written primarily from a technical/specialist viewpoint. While public input into planning decisions might appear to be inclusive, there exists evidence that the process of making decisions often favors some voices over others. The primary function of planning documents does not consist of raising awareness of

environmental issues; however, they do frame how the general public perceives governing/natural resource management practices.

Hultman and Säwe (2020) further support this notion, stating that assessments of ecosystem services rely heavily on either economic or environmental measures. These types of measurements are utilized extensively due to their ability to aid decision-makers. However, it has been observed that emotional connections to nature, such as those related to forests, rivers, etc., are rarely taken into consideration during assessments. As a result, cultural/personal relations between humans and nature are frequently omitted.

Fisher and Brown (2015) propose that parks/wetlands/green spaces located within urban environments may contribute significantly to climate resilience. When viewed through the lens of ecosystem service models alone, the potential social/emotional significance of these areas may be diminished.

Chan et al. (2012) suggest that demonstrating the emotional association between individuals and nature/the emotional significance of cultural landscapes/human relationships with nature will likely prove difficult utilizing maps/charts/quantitative measures. As such, important aspects of how individuals experience/enjoy nature may remain invisible during discussions surrounding planning/policy.

2.5 Critiques of Ecosystem Services

The Ecosystem Services Framework, although a well-liked approach to sustainability governance, has been criticized extensively. A key criticism is the emphasis placed on human utility and the economic valuation of nature at the expense of other ecological and relational interpretations.

According to Peng et al. (2011), many ecosystem services frameworks have focused almost entirely on the benefits that ecosystems provide to humans, yet these same ecosystems comprise numerous complex, interdependent ecological processes that enable their functioning. Furthermore, as noted by Maes et al. (2013), ecosystem services are highly interactive and therefore cannot be categorized separately because they overlap in ecological processes and relationships.

A second critical perspective regarding the Ecosystem Services Framework involves the monetization of nature. As argued by Victor (2020), some ecosystem services frameworks simplify human-nature relations by reducing ecological value to an economic calculation and/or by using market-based logic. Similarly, Gomez-Baggethun & Ruiz-Perez (2011) argue that when we view nature

primarily based upon its monetary or financial value, there is a tendency to place more emphasis on the quantifiable, monetarily valued components of an ecosystem rather than non-quantifiable elements such as cultural, moral, and religious connections to nature.

Similarly, other researchers point out that ecosystem services models may overlook the intangible and emotional bonds individuals have with a landscape. For example, Chan et al. (2012) indicate that many times cultural associations, memories, identities, and emotional ties to nature are left out of discussions about ecosystem services because these cannot be measured; In this sense, Hølleland et al. (2012) state that people demonstrate environmental values beyond those which can be expressed economically for instance through oral history/ stories of their family's past experiences/traditions/social norms.

Lastly, Stålhammar (2020) also points out that emphasizing nature in terms of exchange value may limit understanding of alternative ways of relating to nature, such as spiritual or affective relationships. When nature is valued primarily according to its benefits to humans, the needs and perspectives of many people may be overlooked. These critiques indicate that the term 'ecosystem services' is not a neutral concept, and that understanding and governance of nature are shaped by its use.

3. Conceptual Framework

3.1 Framing Theory

This paper uses the frame theory, a theoretical framework used to evaluate representations and communications of environmental concerns through the use of policy documentation. Frame theory is grounded in the belief that communication is more than just presenting information without bias. Rather, it focuses on some elements of reality over others. As a result, frames will determine how an individual interprets a concern.

Entman (1993) defines frames as the selection of specific realities and the emphasis of those selected realities in communication. The purpose of frames is to identify problems, cause problems, provide solutions, and identify responsibility for those problems. As such, different frames can lead to different perceptions of the same problem.

Frame theory has been extensively utilized in environmental studies due to the fact that environmental concerns have many competing interpretations and priorities. For example, climate change, biodiversity conservation, urban growth, and sustainability can each be defined by competing values and assumptions based upon what the differing stakeholders value. Thus, frames not only create how we perceive our environmental issues, but they also justify the response to those issues.

As stated earlier, the application of frame theory to evaluate ecosystem services is highly applicable. Although ecosystem services are typically described scientifically, their definition is not fixed. Different policy documents could prioritize different values related to ecosystem services and employ varying methods of prioritizing those values. Some examples include focusing on the economic benefits of using ecosystem services, while other examples may focus on protecting ecosystems, developing plans, and creating public well-being. Frame theory offers a means to analyze and identify those differences.

3.2 Conceptual Framework for the Study

The conceptual framework combines ecosystem services and framing theory to explore how people make sense of nature and sustainable development when they engage with the language used within the context of environmental planning.

By using the concept of ecosystem services as the subject matter of their research, researchers have been able to identify and discuss the many ways in which the

natural world contributes to the well-being of society. Ecosystems produce an array of ecological, economic, social, cultural, and recreational benefits for society; however, not all of these values have received the same level of consideration in the development and implementation of policies related to land-use planning.

In addition to providing the substantive focus for research into how ecosystem services are perceived in relation to environmental planning, framing theory provides the theoretical perspective or "lens" through which researchers can interpret and compare the way in which ecosystems are defined and evaluated. Researchers assume that the way in which ecosystems are framed (or defined) influences both their evaluation and the governance of human–nature relationships.

The conceptual framework is grounded upon two fundamental assumptions: First, researchers believe that ecosystem services are not communicated in a neutral manner but rather highlight specific aspects of ecosystem services and/or perspectives while ignoring other values. Second, the communication of ecosystem services via environmental planning discourse results in some conceptions of nature being viewed as dominant while others are marginalized.

Therefore, the primary objective of the conceptual framework is to develop methods for identifying dominant ecosystem service frames and to analyze how those dominant frames result in similar perceptions regarding what constitutes sustainability, environmental governance, and human-nature relationships.

4. Methodology

4.1 Research Design

This study used qualitative research methods to look at how Ecosystem Services have been expressed (represented) in environmental and planning policy documents produced by both Uppsala Municipality and Region Uppsala. Unlike assessing whether these types of policies work, this study is concerned with how ecosystem services, sustainability, and environmental governance are communicated via policy discourse.

Qualitative research methods were viewed as an effective means for conducting this type of research since it is concerned with understanding the meanings, interpretations, and patterns that exist in policy documents. Therefore, the study will evaluate how environmental issues are framed/expressed; what specific views of nature and sustainability are communicated within planning discourse.

Both dominant frames that describe ecosystem service and which views of nature/sustainability were prioritized in the policy documents were identified during the analysis. In addition, special consideration was placed upon representations of environmental problems; proposed remedies and responsible parties; Ecosystem Service values/perspectives that were under-represented in the policy documents.

To guide the analysis, this study addresses the following analytical questions:

1. How are Environmental problems, solutions, and actors constructed within these framings?

2. Which ecosystem service values and perspectives are underrepresented?

4.2 Data Collection and Document Selection

This study draws on six official planning and environmental policy documents for Uppsala and the Region Uppsala. These have been retrieved from the respective municipal and regional government websites. They are used as empirical material for this study, as they lay out the framework for sustainability planning, climate change governance, environmental management, and urban development for Uppsala and the Uppsala region.

These institutional texts were read as documents expressing specific views on sustainability and ecosystem services. They were not merely administrative

documents to be studied for their content and form; they were environmental communications through which nature was given shape within planning processes.

The study of documents for this report focused on certain areas of sustainable development, climate change, biodiversity/ecological protection, ecosystem services, planning, participation, and economic development/innovation, with several recurring themes: planning and monitoring, sustainable growth, climate change governance, participation and collaboration, competitiveness and environmental sustainability. These themes are interlinked with the notion of ecosystem services and are part of the institutional governance framework as well as economic, ecological, and social aspects.

The selected documents are:

Environmental and Climate Program – Uppsala Municipality
Climate City Contract 2030 – Uppsala Municipality
Climate and Energy Strategy 2025-2030
Comprehensive Plan 2016 – Uppsala Municipality (short version)
Policy for Sustainable Development – Uppsala Municipality
Regional Development Strategy and Agenda 2030 Strategy for Uppsala County

Cardno C. (2021) demonstrated that close examination of policy documents reveals the processes by which decisions are formulated. Official reports indicate which stakeholders' objectives are prioritized.

In another way, Singleton B. (2022) noted that whoever is making the documents plays a vital role in the planning that flows from them; their wording matters deeply. How nature's concerns move through systems often hides within formal text, which means it lives inside phrases chosen by those in charge.

For this study, a purposive sampling approach was used when selecting the policy documents to be analyzed, and the purpose was not to obtain a statistically representative sample. Instead, it enables the study to identify policy documents that are most likely to influence planning for environmental sustainability, governance of sustainability at the urban scale, and development in Uppsala.

There were three criteria that determined which of the policy documents were included in the study. First, each of these policy documents had to represent a

formally approved policy, plan, or strategy developed by either Uppsala Municipality or Region Uppsala. Second, each of these policy documents needed to discuss environmental sustainability, climate change, biodiversity, green infrastructure, urban development, or other issues relevant to environmental planning. Finally, the focus of each of the policy documents needed to be on providing guidance for long-term planning and decision-making at the local government level, and could not emphasize short-term operational decisions.

Although none of the selected documents explicitly referred to “ecosystem services,” This is relevant to this research study, because they included many elements that could be used as proxy measures for some aspects of ecosystem services, such as biodiversity, ecological functions, climate regulation, green infrastructure, human health, sustainable development, nature protection/conservation, and environmental governance.

Since these documents provide policy direction to both municipalities and regions on land-use planning and environmental management decisions, including climate-adaptation strategies, biodiversity conservation, sustainable development practices, and natural resource management, the selection criteria for these documents provided the rationale for their selection.

The documents from this study were written in both Swedish and English. Documents in Swedish were translated by use of Google Translate for the purpose of supporting the coding and analysis with an English language version.

Given that this study had a focus on identifying more general themes and frames, as opposed to analyzing each document's linguistics in detail, it was believed that Google Translate would be sufficient. Key quotes and interpretations were cross-checked against the original Swedish versions for accuracy.

4.3 Identifying Ecosystem Service Frames

The study did not limit its analysis to only the explicit reference of the term "ecosystem services." Rather, an evaluation of how nature and environmental benefits were framed throughout the policy documents would be considered indicative of "ecosystem service" thinking.

In order to identify whether a reference would represent "ecosystem service" thinking within this analysis, it was necessary for each reference to meet at least one of the criteria listed in the ecosystem services literature. The criteria used in this study included: describing benefits that can be derived from ecosystems; describing ecological processes that provide benefits; conserving biodiversity; regulating climate; providing green infrastructure; improving human well-being;

providing opportunities for recreation; supporting sustainable development; protecting the environment; or linking people with nature.

In addition to identifying instances where the concept of ecosystem service was mentioned within the policy documents, recurring patterns in how environmental issues and nature were portrayed in communication were also evaluated during the coding process. The intent was to evaluate whether there were common themes within how environmental issues and nature were being communicated, versus simply evaluating the number of times that references to ecosystem services appear. By taking this type of analytical approach, a broad evaluation of the overall policy discourse surrounding ecosystem services and sustainability governance could occur.

Ecosystem service frames were determined by identifying recurring patterns in multiple policy documents. Frames were identified based upon their ability to provide consistent definitions for environmental problems, propose solutions to address those problems, and assign responsibility for addressing them. In keeping with Entman's (1993) framework, a frame was said to exist when a set of passages presented a consistent interpretation of nature, sustainability, governance, or environmental responsibility.

4.4 Analytical Procedure

4.4.1 Selection of Raw Data and Initial Coding

Text from policy documents was used to identify the initial "raw" data for this analytical process. Only selected sections from the total of six policy documents were included within this analysis. These selected sections were those that mentioned aspects such as nature, environmental benefits, sustainability, biodiversity, climate adaptation, environmental governance, well-being of humans, participation, and/or economic benefits related to the environment.

Selection of the texts was based on how the researcher understands the concepts of ecosystem services. Ecosystem services are defined as the benefits provided by the various functions of natural systems to society. It could therefore be inferred that although a specific reference to an "ecosystem service" may not have occurred in a specific section of the document, the section would still relate to ecosystem services when it contained references to ecological function/benefits (i.e.: conserving biodiversity, making use of "green" in construction/infrastructure; mitigating/adapting to climate change through regulation of climate; recreational uses; designing sustainable urban areas).

Once all relevant text sections had been identified, these were removed from the policy documents and then treated as raw data. The documents were then read multiple times so that familiarity with the language used throughout each document could be developed alongside repeated themes and dominant narratives. Notes were also made regarding how environmental problems were described and what solutions were proposed using which actors.

In the second stage of analysis, open coding was conducted. Open coding is a methodology whereby short descriptive labels are assigned to text segments to capture their main meaning. This methodology was utilized so that remain close to the original text without imposing predetermined categories too early in the research process. See Appendix 1 for details.

4.4.2 Developing Categories

Following the first phase of coding, the codes were evaluated and examined for commonalities and patterns within the coded texts. The goal of this second stage was to go from individual text quotes and form larger, analytic groupings that show how people describe environmental problems, sustainable living, and nature.

Similar ideas or communicating related information were categorized. Instead of looking at single terms (words), the analysis focused on thematic patterns that each code expressed. This made it possible to identify patterns in how Ecosystem Services and Environmental Governance were described throughout the documents.

As an example, planning, monitoring, indicators, coordination, evaluation, and implementation represent a theme around administrative management and governance. Thus, these were placed in the category - Governance & Management. In another example, growth, innovation, competitiveness, regional attraction, and business development indicated an economic benefit associated with sustainability and nature. They were placed into the category of Economic Development.

Climate change, biodiversity loss, ecological resilience, environmental protection, and sustainable living are examples of codes that fall under the Ecological Sustainability category. These main categories center around protecting and preserving the ecological system.

The Social Participation category includes participation, collaboration, citizen involvement, stakeholder dialogue, and community engagement. It demonstrated

social interaction and involvement in environmental governance. See details in Appendix 2.

4.4.3 Frame Identification

Frames represent more generalized understandings than categories do. Categories are based on the grouping of like codes, whereas frames provide generalizations that help us make sense of ecosystem services, environmental problems, and sustainability governance.

Frames were identified with reference to Entman's (1993) Framing Theory. A frame is defined according to Entman, "when a particular interpretation of reality consistently defines problems, prescribes solutions, and assigns causality." Thus, a category was determined to be a Frame if it was repeated throughout multiple documents and showed a consistent pattern of problem-framing, solution-framing, and actor-framing.

Comparisons of categories were made among all 6 policy documents to assess how environmental issues, ecosystem services, and sustainability were conveyed. Of particular interest were the common narratives, priorities, and suppositions concerning the role of nature within society. As interpretations were similarly articulated through various policy contexts, they were evaluated as frames.

As examples, the category Governance & Management included coding for planning, monitoring, indicators, implementation, coordination, etc. These coding items were commonly associated with framing environmental challenges as management/administrative problems. As this framing was common among many documents and emphasized the importance of institutional solutions and the responsibility of experts, the category Governance & Management was evaluated as a Technocratic/Managerial Frame.

In addition, the category Economic Development included coding for growth, innovation, competitive advantages, regional attractiveness, etc. Coding items under this category continually equated environmental sustainability/ecosystem services to economic development/growth goals. As a result of this persistent association, this category was evaluated as an Economic/Growth-orientated Frame.

The category Ecological Sustainability included biodiversity conservation/climate change/ecological resiliency/environmental protection. Consistent with these coding items portraying ecosystems as vulnerable/in need of protection, this category was evaluated as an Ecological Protection Frame.

Lastly, the category Social Participation included coding for collaborative processes/stakeholder processes/citizen participation/community engagement. Coding items under this category focused on the social dimension(s) of sustainability, and thus this category was evaluated as a Social/Participatory Frame. See Appendix 3 for more details.

4.4.4 Analytical Interpretation

Following the identification of the four frames for ecosystem services, an analytical transition took place from categorizing to interpreting. The goal of this phase was to analyze the manner in which each frame developed distinct representations of ecosystem services throughout the policy documents.

A focus was placed upon understanding how environmental problems were framed, what responses were identified as appropriate to address environmental issues, and who was responsible for addressing environmental challenges. Through examining these three dimensions, it became possible to develop a comprehensive view that not only illustrated how ecosystem services were portrayed in the policy discourse but also how specific sustainable development approaches are legitimated through the use of policy language.

In addition to focusing on how each frame constructs knowledge about environmental challenges, the analysis focused on the implicit value judgments that underlie each frame. This included analyzing how ecosystems and their respective services were evaluated, which viewpoints were highlighted in the framing of policy, and which viewpoints either had very little representation in the framing or were omitted completely. Therefore, the analysis provided insight into how various framings construct relationships between society and nature, while also influencing the manner in which ecosystem services are linked with planning and governance.

Additionally, the interpretative process used to evaluate each frame analyzed the larger-scale implications of each frame. That is, rather than merely documenting what was contained within the policy document, the analysis evaluated how repeatedly occurring narratives contribute to forming dominant understandings of sustainability. Therefore, it was possible to assess what types of ecosystem service values have been elevated throughout the documents and what other types of understandings of nature have been overlooked.

Ultimately, this interpretation allowed for a broader assessment, from identifying repeated themes to understanding how policy discourse influences the interpretation of ecosystem services in Uppsala. See Appendix 4 for more details.

4.4.5 Application of Framing Dimensions

The last stage in the study entailed an examination of each identified ecosystem service frame through Entman's (1993) framing parameters: Problem Framing, Solution Framing, and Actor Framing. Each of the four frames was analyzed systematically against Entman's framing parameters to determine how the construction of environmental problems occurred; what types of responses would be considered acceptable; and who would be positioned as accountable for sustainability governance. The analytical framework is presented in Chapter 3.

Each frame was evaluated based on how it framed environmental challenges, offered potential solutions, and allocated responsibilities amongst various stakeholders such as public bodies, policymakers, business, experts, and/or citizens. Utilizing Entman's framing parameters allowed for a systematic comparison of the four frames, revealing how various understandings of ecosystem services are being portrayed through the Uppsala municipality and Region Uppsala policy documents.

Additionally, this stage allowed for identification of the relative importance of ecosystem service value(s) within each frame as well as the relatively less emphasized perspectives. Through comparative analyses of problem-framing, solution-framing, and actor-framing across all of the documents, the study found the prevailing methods of evaluating nature as well as the unrepresented perspectives related to cultural, relational, and participative forms of understanding ecosystem services.

4.5 Ethical Considerations

This research used solely public policy documents from Uppsala municipality and the Region Uppsala as its source of information. Since this project did not involve any living humans, there was no personally identifiable information or personal data captured; thus, no ethics review was needed. Ethical concerns, however, continued to be a concern during all stages of the research. The researchers attempted to present the contents of the policy documents (in terms of their subject matter) with an appropriate level of transparency; they also provided quotes to support each of their interpretations and described their method for conducting these analyses in detail so as to mitigate against researcher bias. Each of the original sources was properly cited, and the results were presented as fairly representative of the subject matter contained within those documents.

5. Results and Analysis

This chapter outlines the results from a qualitative frame analysis of six environmental and planning documents. In the study, these documents have been analyzed using framing theory (Entman, 1993) to outline how ecosystem services and sustainability are presented within the planning discourse in Uppsala and how they are handled by official planning.

The analysis focused on three analytical dimensions, which are how environmental problems were framed, how solutions were proposed, and how responsibility was assigned. After repeated close reading of the documents, inductive coding yielded four dominant frames across the selected documents. Those are

1. Technocratic / Managerial Frame
2. Economic / Growth-oriented Frame
3. Ecological Protection Frame
4. Social / Participatory Frame

The analysis of the documents shows that ecosystem services were mainly framed in technocratic and economic terms. Nature can be managed through governance and other systems and, in this sense, used as a resource or service to support and promote the growth of a sustainable economy and regional development.

5.1 Technocratic / Managerial Frame

5.1.1 Overview of the Technocratic / Managerial Frame

Beginning with the technocratic or managerial frame, which is the most prominent frame in all six policy documents, within this frame, the environmental problems have been viewed mainly from the perspective of being able to be resolved by means of planning systems, governance structures, monitoring mechanisms, and institutional coordination. Instead of presenting ecosystem services as culturally-based, emotionally based, or relationship-based values, each document has presented these services as environmental functions that can be managed, measured, and administratively useful for decision-making purposes.

Using the lens of ecosystem services, this representation presents ecosystem services as elements that can be evaluated through administrative processes and planning tools. Therefore, nature is represented as a controllable component of

policymaking, as opposed to representing a socially contested value or experience of living.

The overall plan supports these views by stressing coordinated planning for a city's growth and a focus on sustainable growth (i.e., "green" growth) that focuses on creating a strategic vision for the area's future. Although there are references to "ecosystem services," it is clear from the way they are used within the document that their primary function is in relation to land-use planning, environmental management, and long-range planning.

5.1.2 Problem Framing

In addition to identifying environmental issues as technical shortcomings in planning, policy, coordination, and implementation, the technocratic view does not represent sustainability challenges as conflicts among various stakeholders with competing values and/or interests; instead, it views sustainability challenges as a result of failure to integrate environmental factors into existing decision-making systems.

The technocratic viewpoint has been expressed by the Environmental and Climate program. The program states:

> “Monitoring and follow-up are necessary to achieve sustainability goals” (Environmental and Climate Program, p. 12).

This statement was classified as "follow-up" because it reflects a process of continuous evaluation and appraisal to ensure successful long-term sustainability governance. The technocrat perspective is exemplified by the statement which portrays environmental problems as managerial failures caused by poor organizational systems, which may have been corrected with better management techniques and institutional knowledge.

Similar reasoning can also be identified in the Policy for Sustainable Development, when it states:

> “Decision-making documentation shall highlight, and be analyzed on the basis of, sustainability aspects” (Policy for Sustainable Development, p. 3).

The quote above represents the integration of considerations related to sustainability into formal decision-making processes. It was classified as a sustainability assessment because it relates to evaluation and policy integration in a systematic manner. As such, the quote above is representative of the technocratic frame, since environmental concerns are treated as assessable factors

and, as such, can be systematically assessed and integrated into governance systems.

From an ecosystem services perspective, the quote also illustrates that environmental damage arises from poor institutional performance relative to the ability of organizations to include environmental consideration into their planning processes, not due to differing perceptions of what constitutes "nature."

As stated above, throughout the reviewed documentation, sustainability evaluations, indicators, monitoring tools, and governance frameworks were continuously identified as means for responding to environmental challenges. Thus, the technocratic viewpoint shifted the focus from social conflict to institutional capacity. Therefore, improved governance would ultimately result in positive environmental outcomes.

5.1.3 Solution Framing

The technocratic viewpoint focuses on developing solutions such as planning tools, monitoring methods, governance structures, and institutional implementation. From this viewpoint, environmental sustainability can be developed and implemented through the use of effective management and organizational coordination.

One of the common characteristics of this frame is that sustainability can be realized through good planning and governance. This is stated in the Policy for Sustainable Development as follows:

> “The policy shall provide guidance in planning, budgeting, follow-up and implementing municipal operations” (Policy for Sustainable Development, p. 2).

The quote above describes the role of formalized planning and administrative processes for sustainability governance. It was classified under planning and institutional management since the inclusion of environmental concerns into organizational processes was seen as separate social and political issues. The quote above falls into the technocratic frame because it presents sustainability as something that can be accomplished through structural processes of governance.

For example, from an ecosystem service's point of view, nature is described as a collection of environmental functions that can be included in planning and implementation processes. In other words, nature becomes part of administrative decision-making instead of values that are negotiated through public debate. The implication is that environmental protection depends mostly on well-managed systems of administration instead of broadening societal involvement.

Similarly, in the Regional Development Strategy and Agenda 2030 Strategy, which notes that:

> "Indicators aim to provide a picture of the county's development" (Regional Development Strategy, p. 6).

The quote above was classified as monitoring and indicators because it places emphasis on measurement and evaluation as tools for sustainability governance. As such, the quote above is representative of the technocratic frame, as it implies that environmental progress can be assessed through numerical indicators and performance measurements.

In terms of ecosystem services, the quote above represents nature as something that can be measured and monitored via institutions. Therefore, in this representation of ecosystem services, nature is understood through measurable processes rather than representing culture-experiential relationships with nature.

Thus, the quote reinforces an administrative perspective of environmental governance by emphasizing oversight and evaluation of environmental management.

For example, the Climate City Contract 2030 repeatedly emphasizes monitoring, targets, and implementation.

> "The work is followed up annually through measurable indicators."

This quote reflects a managerial model of sustainability since it assesses progress towards sustainability based on predetermined metrics. Monitoring and evaluation were identified for this quote since they emphasized the role of measurement in supporting good governance.

From the perspective of ecosystem services, this quote suggests that environmental benefits and ecological functions could be assessed with measurable metrics. Thus, ecosystem services were positioned as measurable products to monitor through institutional structures.

Similarly, the Climate City Contract 2030 also explains that:

> "Climate goals must be integrated into all municipal operations" (Climate City Contract 2030, p. 8)

This quote illustrates how environmental concerns can be included in routine administrative activities. The quote was called policy integration because sustainability is considered to be a responsibility that municipalities have to incorporate into every function they perform.

Therefore, from an ecosystem services view, this quote implies that environmental values and ecological processes will be incorporated into governance. Furthermore, ecosystem services are understood as planning considerations that can be managed through institutional structures and routines.

Together, these quotes illustrate that sustainability is framed as an administrative problem. Therefore, environmental solutions arise through administrative systems, including planning tools and governance mechanisms. Institutional capacity is also essential for developing environmental solutions. Broader societal transformations or changes in human-nature relationships are not considered.

5.1.4 Actor Framing

The technocratic viewpoint defines the main actor(s) responsible for sustainability primarily at the institutional level. Throughout the reviewed literature, municipal authorities, planners, experts, regional agencies, and political representatives have continually been described as the main actors responsible for implementing environmental policies and reaching sustainability goals. For Example:

> "Supports the 17 global development goals and Agenda 2030" (Policy for Sustainable Development, p. 2).

The quoted sentence was labeled as institutional governance and policy coordination since it relates local sustainability initiatives to formal international governance frameworks. Additionally, it is representative of the technocratic viewpoint as sustainability is directed through strategic plans, policy frameworks, and measurable objectives.

From an ecosystem services perspective, ecosystem services are considered part of broader sustainability governance systems rather than being experienced locally or by communities. Therefore, protecting the environment is framed as a matter of institutional responsibility and policy implementation.

Another statement emphasizes the connection to international governance frameworks:

> "It is the responsibility of all political representatives and officials…" (Policy for Sustainable Development, p. 3).

This quote directly designates public officials and decision-makers as those who are responsible for sustainability. It was designated as an institutional responsibility since it identifies formal government entities as being the main parties responsible for managing the environment.

The quote further supports the hierarchical structure of the technocratic viewpoint. Ecosystem services are managed through expertise, planning systems, and institutional authority. The citizenry and community groups appear only sporadically in the reviewed literature, and they are rarely identified as active participants in making decisions regarding ecosystems.

In general, the technocratic viewpoint frames ecosystem services as governable environmental functions that may be integrated into planning systems, monitored through indicators, and administered through institutional coordination. The dominant position of this viewpoint indicates that sustainability in Uppsala's environmental planning is mainly seen as an administrative task requiring expertise, good governance, and organizational capacity. Although this approach improves coordination of policies and programs, it provides limited room for cultural values, local knowledge, or participation-oriented forms of governing ecosystem services.

5.1.5 Analytical Interpretation

In summary, both quotes and patterns found in this frame show that there are primarily two views on what an ecosystem service means – they are mainly viewed as controllable environmental attributes. People value nature for its contribution to goals for sustainable development, government policies, and planning objectives. The use of terms such as indicator, assessment, system, mechanism, etc., continually frames ecosystem services as something that can be used and integrated into governmental administration.

In addition, the fact that the dominant frame in the policy discourse of Uppsala focuses on managing ecosystem services by using a managerial view, one focused on coordination, measurement, and efficiency in governance, indicates that alternative forms of seeing nature are marginalized. Therefore, cultural values associated with ecosystems, individuals' emotional connections to them, indigenous/local ecological knowledge of ecosystems, individuals' experiential relationships with ecosystems, and many other forms of knowing/valuing ecosystems are largely absent from discussions about ecosystem services. Ecosystem services are generally represented as environmental attributes that can be controlled/manipulated/managed and that can be quantified and integrated into planning systems.

Therefore, the technocratic frame has played a critical role in defining how Uppsala city's planners conceptualize ecosystem services. A technocratic approach emphasizes governance, coordination, and institutional responsibility towards creating a vision of sustainability where environmental challenges are

addressed through management based on administrative processes rather than through broader social/political transformations.

5.2 Economic / Growth-oriented Frame:

5.2.1 Overview of the Economic / Growth-Oriented Frame

The economic, or growth-oriented frame, was the next most common of the frames used in policy documents analyzed. In this frame, ecosystem services are viewed first and foremost as contributing to economic development, competitiveness, innovation, and a region's attractiveness for business.

It can be assumed in many cases that environmental sustainability and economic development support each other; they do not need to work against one another. In all of the policy documentation, there is a repeated reference to how environmental quality will help create innovative and modern economies and regions through business development and by increasing the competitive advantage of those regions. Therefore, ecosystems are considered to be viewed not just based on how they are ecologically functional; rather, they have become places that can create attractive, resilient, and economically viable locations for people who live there, work there, invest there, and/or visit them.

In this context, most of these sustainable activities are generally framed as necessities for future economic success and thus as key components of longer-term development strategies. The protection of the environment is framed as necessary to ensure that current actions do not limit future opportunities.

5.2.2 Problem framing

Environmental problems are defined primarily as threats to economic development, competitiveness, innovation, and long-term development within the context of the economic frame. Problems of environmental degradation are viewed as problematic from an economic standpoint due to their potential to diminish the conditions needed for successful economic development.

Examples of how this type of risk/problem framing occurs in the analyzed documents include:

> “We will develop and maintain a competitive business sector” (Regional Development Strategy, p. 3).

The statement quoted above was coded as "competitiveness" and then categorized as part of "Economic Development". It is clear that although the statement itself does not specifically reference ecosystem services, it can be assumed that

environmental quality has some bearing on supporting a competitive economy. Ecosystem services like climate regulation, resource availability, aesthetically pleasing landscape views, and overall healthful living environments create conditions conducive to successful economic development. Thus, damage to ecosystems creates concerns regarding reducing a region's ability to compete economically.

Similarly, another statement explains:

> “Knowledge-driven sustainable growth, development and innovation” (Regional Development Strategy, p. 5).

The quoted statement was identified in this study as a form of growth and innovation. The combination of sustainability and economic growth illustrates that economic development and sustainable environmental practice are not mutually exclusive but rather complement each other. Rather than presenting sustainable environmental practices and economic development as alternative solutions, the source indicates that these two goals can be pursued together.

The Comprehensive Plan 2016 also states:

> “Sustainable urban development strengthens competitiveness” (Comprehensive Plan 2016, p. 18).

The previous quote established a link between sustainability and economic performance. The statement was coded as "competitiveness" & "sustainable growth" since it describes environmental sustainability as a method to make municipalities more competitive and economically successful. Ecosystem services, including green space creation for recreation activities, climate adaptation functions, etc., are viewed as having value due to their contributions to making municipalities more competitive and contributing to successful economic development.

The Comprehensive Plan 2016 states:

> “It is both about taking advantage of what already exists and about creating the conditions for desirable development” (Comprehensive Plan 2016, p. 4).

Initially, this quote was coded as "development," "growth," and "long-term planning" prior to being categorized as part of the larger group of "Economic Development". This quote represents development as a positive goal while at the same time indicating that development should occur by building off current environmental and social resources. Instead of framing sustainability as an

obstacle to future growth and development, the quote indicates that there are potential futures based on using those resources responsibly.

5.2.3 Solution Framing

A solution is framed as either a problem to be solved using innovation, entrepreneurship, technology, modernization, sustainable development, and the cooperation of public and private actors. An example of how the Environmental and Climate Program frames the relationship between environmental and sustainable development is demonstrated below:

> "Environmental and climate work shall contribute to sustainable growth" (Environmental and Climate Program, p. 11).

This quotation is specifically linking environmental actions to economic development. This quotation was first coded as "sustainable growth" and later categorized under "Economic Development". This quotation falls within the economic frame of thinking since it presents environmental policy as a means of contributing to continued economic development rather than limiting it.

In terms of ecosystem service value, ecosystem functions are valuable as they provide contributions towards developing economic resilience and long-term wealth. For example, climate regulation, green infrastructure, etc., are seen as being beneficial to sustainable forms of development and economic activities as they support sustainable forms of development and economic activity. Similarly, the Regional Development Strategy explains:

> "Innovation and entrepreneurship strengthen regional attractiveness" (Regional Development Strategy, p. 5).

Innovation/Entrepreneurship and Regional Attractiveness are the coding categories of this quote. The quote identifies innovation as a key driver in both sustainability and economic competition. Therefore, the quote fits into an Economic Frame of Thought because the quote describes innovation and progress as the main solution to sustainability problems.

Additionally, the quote suggests that ecosystem services can lead to increased economic attractiveness indirectly due to the health, resilience, and desirability of the environment provided for locals, businesses, and investors. Therefore, nature is appraised based upon its contribution to economic attractiveness rather than solely on its inherent ecological value.

Across all the documents analyzed, there were repeated references to innovation/modernization/ entrepreneurship /technological advancement as paths

to sustainability. As such, environmental sustainability is framed as something that can be achieved via advancements in technology and improvements in efficiency in development processes. In contrast to this, large-scale changes in consumer behavior or the structure of economic systems were rarely discussed across all the documents.

Therefore, in the context of this economic frame of thinking, ecosystem services have been evaluated for their utility in enabling economic systems to function. Additionally, nature is constantly linked to new investments/products/services/ productivity/attractiveness/comparative advantages, with respect to culture/emotions/social connections remaining absent from consideration.

5.2.4 Actor Framing

Responsibility for sustainability is assigned mainly to those responsible for promoting economic interests, i.e., to institutions providing access to capital/institutions providing employment, etc./the business community/regional actors/public-private partnerships.

> "The business community… has contributed to shaping a development strategy" (Regional Development Strategy, p. 3).

This quotation was coded as business involvement/stakeholders/partnerships/economic governance. This quotation illustrates that business actors play a proactive role in defining priorities for regional development and illustrates that the actors in question view business actors as having an essential role in the promotion of sustainable development.

This quotation belongs to the economic frame of reference because it views businesses as leading actors in the pursuit of sustainability objectives. Unlike the technocratic frame, which limits accountability for sustainability to governmental institutions, this viewpoint assigns an essential role to business actors in fostering growth/innovation/competitiveness. Another statement explains:

> "Sustainability requires cooperation between public actors and businesses" (Environmental and Climate Program, p. 14).

This quotation was coded as public-private partnership/cooperation/shared responsibilities. This quotation further establishes that collaborations between governmental institutions and business actors are necessary when facing sustainability problems.

From an ecosystem services point of view, this type of actor framing implies that ecosystem services are relevant to both public and private sectors. Ecosystem

services are relevant to business productivity/climate resilience/desirable living environments/long-term development; thus, managing them should represent a common responsibility.

These quotations collectively suggest that sustainability governance is heavily linked to business/industrial/market-oriented actors. Business does not simply experience impacts due to environmental regulations; rather, business is represented as a partner in developing sustainable development strategies. Therefore, many times, ecosystem services are assessed from a perspective of what they contribute to economic prosperity/innovation/regional competitiveness.

5.2.5 Analytical Interpretation

Overall, the economic framework defines ecosystem services from the viewpoint of sustainable development, competitiveness, innovation, and local attractiveness. Here, natural resources are economically valuable to the extent they contribute to long-term economic prosperity and sustainable development. As such, these services are placed within larger frameworks for green growth and sustainable development.

Our data suggests that there has been a tendency for environmental considerations to be added to current economic and developmental frameworks rather than create new frameworks or fundamentally alter current growth-oriented frameworks. The ability to sustainably develop economically is seen as compatible; environmental considerations were framed as drivers of innovation, competitiveness, and future wealth creation rather than constraints on growth.

In terms of how ecosystems have been defined through the lens of ecosystem services, our findings reflect an instrumental view of nature. For example, ecosystems were viewed mainly as systems that could provide products to support economic activity, enhance urban attractiveness, and increase regional resilience. Therefore, the ecological processes that can support economic objectives received significant attention, while the social, cultural, and relational value associated with nature was given relatively little attention.

Thus, the economic framework supports a discourse where ecosystem services are generally considered to be primarily supporting sustainable economic growth and development at the regional level by viewing nature as integral to growth-oriented sustainability governance.

5.3 Ecological Protection Frame

5.3.1 Overview of the Ecological Protection Frame

The Ecological Protection Frame is the Third Main Frame of Analysis. The Technocracy/Economic Frames are based on Governance Systems and Economic Development, while the Ecological Protection Frame is concerned with Nature's Ecological Function and Maintaining Environmental Integrity. Therefore, within an Ecological Protection Frame perspective, ecosystem services are viewed as key components of ecosystems that provide for Biodiversity, Environmental Resilience, and Long-Term Sustainability.

The fundamental premise of this frame is that people's ability to live in communities depends upon a functional environment. Thus, the major environmental issues of our time, including global warming, species extinction, and the degradation of natural systems, are viewed as serious threats that need to be protected and managed over an extended period of time. Therefore, the services provided by ecosystems are not only considered as products or "services" of nature but rather as necessary ecological processes for ensuring sustainable living conditions into the future.

5.3.2 Problem framing

Within the ecological protection frame, most environmental problems are framed as threats to both ecological systems and their ability to provide for the continued health of humans. Examples of these include climate change, biodiversity loss, environmental degradation, and declining resiliency of the world's ecosystems. This is in contrast to the technocratic frame (governance/coordination) and the economic frame (competitiveness/development), which view environmental issues as either a problem with how we govern ourselves or how our economy competes. For example, the Regional Development Strategy states:

> "The world today faces enormous challenges… climate change… loss of biodiversity" (Regional Development Strategy, p. 14).

Climate change and biodiversity loss are identified here as global environmental challenges that require immediate response. The quote has been assigned to the categories of climate change, biodiversity loss, and ecological vulnerability since they refer to threats to ecosystems rather than deficiencies in administration and/or risk to the economy. The quote belongs to the ecological protection frame for this reason; environmental degradation is seen as a problem in its own right, rather than as an obstacle to growth or governance.

Similarly, the Environmental and Climate Program states:

> "Biodiversity and ecosystem functions must be protected" (Environmental and Climate Program, p. 18).

This quote establishes a clear relationship in the context of environmental management between the conservation of biodiversity. Because this quote recognizes that healthy systems are required to provide us with the benefits provided by nature (from the viewpoint of ecosystem services), it has been coded as ecosystem protection and ecological sustainability. Biodiversity is important from an ecosystem service point of view for two reasons: not only is it of value in terms of being conserved on its own merits, but also because it supports many types of ecosystem functions, including climate regulation, water filtration, pollination, and habitat creation. Therefore, the quote identifies environmental problems as threats to the basic ecological structure that supports these ecosystem services.

A similar understanding appears in the Climate and Energy Strategy 2025–2030:

> "Climate goals guide local sustainability work" (Climate and Energy Strategy 2025–2030, p. 6).

Environmental Governance in relation to Sustainability Climate Change represents an important example of what is referred to as "ecological" concerns of sustainability. Therefore, environmental governance should have as its primary objective the pursuit of ecological objectives.

The two quotes show in what ways the environmental issues may create ecological crises, which could possibly affect the ability of ecosystems to continue to perform their functions in the long term. Throughout the coding activity, there were numerous repeated references to climate risk; biodiversity conservation; ecological resiliency; and ecosystem protection within all of the documents. It appears, therefore, that ecosystem services depend on the health of ecological systems. If, however, ecosystems decline through biodiversity loss or degradation of ecosystems, then the ability of ecosystems to provide necessary services will diminish.

The Comprehensive Plan 2016 provides one of the clearest references to ecosystem services within the analyzed documents:

> "Ecosystem services are things we get for free from nature, and which we often take for granted. But the fact is that we depend on these services for our survival." (Comprehensive Plan 2016, p. 8).

This quotation was first categorized into the categories of Ecosystem Service Benefits, Human Dependence on Nature, and Ecological Functions. In contrast to a number of the other policy statements that reference "sustainability" generally, this statement has provided an explicit definition of ecosystem services and has stressed human society's dependency upon ecological systems. Therefore, this quotation is within the category of Ecological Protection Frame because ecosystems are portrayed here as necessary life support systems, not just as sources of economic development or administrative subjects.

This frames nature as vulnerable to growing environmental changes. The services provided by ecosystems are framed in terms of the need for protection and long-term sustainability of those systems. Climate Change and Biodiversity loss were identified as two major forces impacting both societal stability and environmental stability.

Ecological problems are described in general terms in most cases. Global concerns regarding climate change and biodiversity loss are discussed at length, whereas concerns about specific environmental problems such as land use conflict, environmental injustice, and inequitable distribution of benefits derived from ecosystem service delivery are significantly underrepresented. Therefore, environmental problems are generally framed as ecological vulnerabilities rather than social conflicts or political contests.

5.3.3 Solution framing

Within the Ecological Protection Frame of Reference, in addition to providing a solution to the ecological protection frame of reference, all proposed solutions are based on a consistent approach that emphasizes conservation of biodiversity, adaptation to climate change, environmental protection, enhancement of ecological resilience, and transition toward long-term sustainable development. For example, the Policy for Sustainable Development states:

> “Long-term and structural changes… ecological sustainability” (Policy for Sustainable Development, p. 3).

In addition to identifying the necessity of a long-term transformational approach to achieve sustainable development and not just isolated environmental activities, this quote also identifies the need to transform environmental governance and management and has therefore been coded as both ecological sustainability and structural changes.

Similarly, the Climate and Energy Strategy 2025–2030 explains:

> “The municipality shall work actively with climate adaptation” (Climate and Energy Strategy 2025–2030, p. 9).

The statement shows a recognition that systems (society and ecosystems) need to adapt when their environment is changed. Climate Adaptation is identified in the plan as one way to provide longer-term environmental resiliency and to decrease potential vulnerabilities to climate impacts in the future.

The ecological protection perspective is also reinforced by the Comprehensive Plan 2016 with its explicit reference to ecosystem services:

> “Ecosystem services are things we get for free from nature, and which we often take for granted. But the fact is that we depend on these services for our survival” (Comprehensive Plan 2016, p. 8).

Unlike some of the other quotes provided in the study, this quote establishes a direct definition of what constitutes an ecosystem service and how dependent society is upon its natural environments. The quote was categorized under "human dependence on nature" and "ecosystem service benefits" because it views ecosystems as crucial to supporting all aspects of human life. As such, ecosystem services are defined by the study not solely as environmental amenities but as vital components necessary for continued human existence.

The same document further states:

> “We will use nature's services wisely, and at the same time create values for recreation and experiences for those of us who live here” (Comprehensive Plan 2016, p. 8).

These two quotes have a lot in common. They both emphasize the need to value and protect natural systems by acknowledging the different kinds of "services" they provide. In addition to providing food, fiber, clean water, etc (ecosystem services), they also contribute to people’s quality of life and emotional well-being (cultural services). Both quotes were therefore coded with respect to long-term conservation and stewardship. As such, they highlight an important aspect of how ecosystems are currently understood, namely that they are valued for their ecological and cultural contributions.

In sum, these quotes indicate that many environmental “solutions” are focused primarily on preserving and promoting the continued provision of ecosystem services. Therefore, maintaining ecosystem function, promoting ecological resilience, protecting biodiversity, adapting to climate change, and practicing good environmental stewardship are all framed as ways to sustain the delivery of ecosystem services. However, very few of the proposed solutions represent fundamentally new ways of doing things at the level of society. Rather than creating entirely new ways of thinking and acting around environmental issues

and problems, most solutions rely on existing institutions and approaches such as policy development, strategy, planning frameworks, and programs for sustainability.

5.3.4 Actor framing

Within an Ecological Protection Frame, the primary assignment of responsibility for Environmental Sustainability has been placed on governments, municipalities, public bodies, and International Sustainability Institutions.

For example, the Policy for Sustainable Development states:

> "Supports the 17 global development goals and Agenda 2030" (Policy for Sustainable Development, p. 2).

The quote demonstrates that Local Sustainability Efforts are linked with International Governance Frameworks. The Quote was coded under Agenda 2030 and Institutional Governance since this Quote points out the importance of Formal Policy Structures in directing/steering the Environmental Action.

Beginning with the Climate City Contract 2030,

> "Authorities are responsible for implementing sustainability goals" (Climate City Contract 2030, p. 7).

In essence, this quote directly establishes the responsibility of government agencies and supports the view that governments have a primary role in governing sustainable development.

Therefore, from an environmental protection viewpoint, governmental agencies/organizations will be the ones creating policies, coordinating their implementation, and developing environmental strategies to protect the environment.

Agenda 2030, climate goals, environmental authorities, sustainability programs, and governance systems were recurring throughout the analysis. The repeated nature of these examples suggests that most of the time, ecosystem services are managed at the level of institutions, and less frequently through local community-based initiatives.

An example of how ecosystem services can provide a framework for understanding the concept of ecosystem services is found in relation to biodiversity, where the maintenance and protection of ecosystems are primarily framed as the responsibility of governments and policymakers. In general,

citizens/local communities are presented as recipients/beneficiaries of ecosystem services rather than as active participants/governors in the environmental governance process.

Because of this, the ecological protection frame presents a predominantly top-down approach to governance of sustainability. Although the top-down approach may lead to stronger policy coordination and better planning, the top-down approach reduces the visibility of both local/community knowledge/stewardship and other forms of environmental governance. Therefore, ecosystem services are viewed as resources requiring protection through institutions and not as shared ecological relationships, which could potentially be jointly managed/governed by a variety of social actors.

5.3.5 Analytical Interpretation

While the quotes and patterns evident throughout this frame collectively suggest a primary understanding of ecosystem services as the ecological foundation supporting both social and environmental sustainability (i.e., functioning ecosystems enable the conditions for life, resilience, and long-term sustainability), there are differences with respect to the previous frames.

Ecosystems were viewed primarily through an economic lens for their contribution to sustainable development and through a technocratic lens, in terms of planning and governance systems. With regard to the ecological protection framework, the value of ecosystem services is defined by their ability to support biodiversity, regulate environmental processes, and maintain ecological balance.

Additionally, while repeated emphasis on biodiversity conservation, climate adaptation, and ecological sustainability is seen as an acknowledgment of environmental limits and ecological interconnectedness, there is recognition within the documents that ecosystems cannot solely be seen as a resource base for economic utilization; they need to be protected.

Despite this ecological emphasis, the ecological protection frame is still closely tied to institutions and government. Environmental protection is generally framed through policy objectives, strategic framework/programmes of sustainability, as opposed to through localized experiences of nature. As such, ecological issues are generally translatable into administrative objectives/governance commitments.

One additional point is that while the ecological protection frame does highlight the ecological roles of ecosystem services and the importance of protecting biodiversity/environmental resilience, it does little to challenge the larger assumptions regarding economic growth and development, prevalent in other

sections of the document. Rather, ecological protection has been portrayed as being compatible with continued growth/modernization. It appears that environmental sustainability has largely been incorporated into extant governance frameworks and development frameworks rather than positioning itself as a viable alternative.

In conclusion, the ecological protection frame provides another essential viewpoint by emphasizing the ecological functions of ecosystem services and the necessity of protecting biodiversity/resilience of environments. However, its ability to have influence continues to be limited due to the continued predominance of the technocratic/economic viewpoints shaping how Uppsala's environmental planning discourse views ecosystem services.

5.4 Social Participatory Frame

5.4.1 Overview of the Social / Participatory Frame

The participatory (or social) frame was found to be the most infrequent of the four frames used by authors throughout their analyses. Participation, collaboration, dialogue, inclusivity, and involvement of stakeholders were key concepts emphasized by the social /participatory frame concerning sustainability governance. However, compared to the technocratic frame, which is concerned with planning systems and coordination of institutions, the economic frame, which ties sustainability to an increase in economic growth/competitiveness, and the ecological frame, which focuses on cooperation among various social actors to achieve sustainability goals within society, the social/participatory frame has much lower levels of emphasis placed upon these aspects throughout the policy documents.

While there are many references to participation and collaboration, it is apparent that while authors refer to participation/collaboration, they do so as a normative principle of good governance as opposed to an operationalized method for environmental decision-making. Therefore, in general, the citizenry is not conceptualized as active participants in decisions regarding ecosystem service management.

However, the study shows that the concept of participation has been mainly referred to as a principle of good practice rather than as a clearly defined process for making environmental decisions.

5.4.2 Problem framing

The social-ecological frame has fewer definitions for social sustainability issues than either the ecological or technocratic frames. In addition to discussing coordination and governance challenges, the technocratic frame discusses climate change and biodiversity decline. On the other hand, although the social frame is frequently referenced in terms of collaboration and participation, there is less discussion about social issues related to environmental justice, unequal distribution of green space, social exclusion, and competing demands for environmental resources.

Questions regarding whether certain segments of society have been adversely affected by environmental changes, whether some segments of society benefit disproportionately from the provision of ecosystem services, or how different segments of society perceive environmental policy do not appear frequently.

From an ecosystem services perspective, this lack of reference is important because recent studies have shown that many aspects of access to ecosystem services are not equitable throughout society. Depending on the social, economic, and/or geographical characteristics of a group (or individual), the use of and/or impact of ecosystems can vary. However, it was rare to see references to these types of issues in the documents reviewed.

Thus, environmental governance is typically portrayed as a collaborative process in which all parties are working towards common sustainability objectives. Competitive interests, conflicting objectives, and differences in political power were never mentioned during the coding process. References to planning processes, economic development, climate adaptation strategies, and sustainable development strategies were frequent, but references to social inequities, power dynamics, and citizen engagement were few.

As a result, environmental challenges are predominantly defined as technical, ecological/economic, rather than as socially constructed. Thus, the social aspect of ecosystem services is also underdeveloped in the context of urban planning.

5.4.3 Solution framing

As stated, when social aspects are addressed, all suggested options for addressing social dimensions are focused on the development of collaborations, dialogues, citizen participation, and inter-institutional and inter-communal cooperation.

For example, the Policy for Sustainable Development states:

> “Sustainability work is based on collaboration… with inhabitants… associations” (Policy for Sustainable Development, p. 3).

This quote is coded as collaborative and community-based due to its explicit recognition of the role of citizens and civil society organizations in sustainable activities. This quote is also classified as part of the social-participative frame since it identifies sustainability as a common responsibility instead of solely being the responsibility of public institutions.

From the ecosystem service's viewpoint, this quote indicates that environmental benefits, including recreational opportunities, green areas, and well-functioning ecosystems, provide many advantages to various members of society. Therefore, decisions made concerning ecosystem services must include input from those people who utilize, experience, and/or rely on these benefits.

As mentioned above, the Policy for Sustainable Development goes further, stating:

> "Collaboration with citizens, businesses and civil society." (Policy for Sustainable Development; p. 3).

This quote further illustrates that sustainability requires a cooperative effort among various stakeholders in a community. This quote is classified as a multi-actor collaboration because it identifies both institutional and non-institutional actors, and it is evident when one views this quote from an ecosystem services standpoint; the protection of the environment and the achievement of ecological/environmental benefits can be obtained through collaboration with many individuals and group(s).

Furthermore, the Climate City Contract 2030 notes:

> “Participation and dialogue are important in sustainability processes” (Climate City Contract 2030, p. 12).

While participation is highlighted as positive within this quote, the document does not offer much information on how participation actually affects the decision-making process.

Similar perspectives are reflected in the Comprehensive Plan 2016:

> “Citizens and organizations should be involved in sustainability work” (Comprehensive Plan 2016, p. 22).

Although the above quote supports community involvement in sustainable initiatives, the quote indicates that an important benefit of involving them is as a

way to use their expertise and experiences to help manage local ecosystems. Similarly, the Climate City Contract 2030 refers to:

> "Broad engagement in the climate transition" (Climate City Contract 2030, p. 12).

This quote places a strong emphasis upon engaging all types of societal actors in sustainability initiatives. The quote was categorized as participation/societal engagement as it implies that all types of societal actors will need to make contributions toward achieving climate/sustainability transitions. This quote also falls into the social/participatory category because it states that environmental governance cannot simply depend upon public institutions. From an ecosystem services lens, this quote implies that cooperation amongst people is necessary for both sustaining and benefiting from ecosystem services.

These quotes above demonstrate the importance of individuals (as well as partnerships) in achieving sustainable practices. However, neither of these documents explains how citizens can have an influence on decisions concerning either ecosystem service or environmental planning. Thus, participation is described as a support to the governance of sustainability rather than as a key component of making decisions relative to sustainability.

5.4.4 Actor framing

Citizens, community associations, Civil Society Groups (CSGs), etc., are also referred to as "actors" in the Social-Participatory Model for Sustainability Governance. However, they play a much smaller role compared with municipalities, planners/policymakers, or expert professionals.

Throughout all of the documents that were reviewed, citizens have generally been portrayed as people who may provide input into planning decisions through public consultation processes, but they are rarely viewed as major players in making the actual decisions. The encouragement of both collaboration and dialogue does not alter the fact that responsibility for planning, implementing, and governing environmental issues has remained largely confined to formal institutions. For example, the Comprehensive Plan 2016 highlights the importance of dialogue with different societal actors:

> "Dialogue with residents and stakeholders" (Comprehensive Plan 2016, p. 22).

This quote was categorized under stakeholder engagement/public participation due to the emphasis placed upon communication between planning authorities and local communities. The quote falls into the social/participatory category because it identifies that there needs to be more involvement than just government

institutions when addressing environmental issues. When looking through the lens of ecosystem services, this quote suggests that decisions regarding green space, parks, etc., need to take into consideration the viewpoints of the people who utilize/are influenced by these ecosystems on a day-to-day basis.

This is particularly important from the perspective of ecosystem services since it influences which knowledge, perceptions, and values will influence environmental decision-making. For example, local people's experiences of nature, their emotional attachment to places where they live and work, and the collective understanding of ecosystem services in their local context receive relatively little attention when compared to expert knowledge used in institutional planning.

Therefore, based upon this analysis, ecosystem services appear to be primarily managed through a top-down system of institutional arrangements rather than through participative or community-initiated frameworks. Citizens can generally be seen as recipients or participants in sustainable development programs/projects that benefit from ecosystem services; however, very few people would view themselves as playing an active role in managing the environmental resource base.

In summary, while the social-participatory approach stresses the need for citizens to collaborate with other stakeholders (i.e., government agencies, NGOs) in achieving effective environmental governance, this approach has developed much more slowly than its three counterparts – technocratic, economic, and ecological. Consequently, social perspectives of ecosystem services exist but remain at the periphery of Uppsala's discourse regarding environmental planning.

5.4.5 Analytical interpretation

The quotes/patterns of interest show that ecosystem services are viewed as shared social assets/added value to society & quality of life for humans;

Not like the economics frame that sees ecosystems as means to grow the economy or the technocracy frame that focuses on "management" systems, the social/participation frame acknowledges that ecosystem services have an impact on communities & daily life.

However, it is still a relatively weak frame. The repetition of words such as collaboration/dialogue/participation (see above) illustrates that the policy documents identify the potential value/importance of including citizens/stakeholders in sustainability efforts. However, very few of these references go further than expressing a general sense of support. The references

do little to describe specifics related to participation (how will participation happen? who gets priority voice? how does local knowledge get used?)

Therefore, participation has functioned more as a type of normative ideal rather than as a developed strategy of governance.

This finding is also relevant for understanding ecosystem services because there is an emphasis from some researchers studying ecosystem services on the importance of using local knowledge/place-based attachments/community values in making environmental decisions. These emphases are largely absent in the policy document analysis. Citizens are acknowledged as being impacted by ecosystem services -- they are not generally depicted as playing a role in defining/managing those same ecosystem services.

As a result, the social-participatory frame appears to occupy a marginal position in relation to other components of the larger policy discourse. While policy documents may express that sustainability requires both collaboration and public involvement, environmental governance continues to be primarily driven by institutional management/economic development goals/ecological planning.

The relative underdevelopment of this frame indicates that social/relational perspectives of ecosystem services are receiving much less attention than technical/economic/ecological perspectives in the environmental planning documents produced at Uppsala municipality and Region Uppsala. For a more detailed overview, see Appendix 5.

5.5 Underrepresented Perspectives

While the preceding parts of this study showed that four dominant frames were used to communicate about ecosystem services in Uppsala's environmental and planning documents, this study has shown that additional perspectives are either poorly represented or completely missing. Studying these exclusions is important because discussions of environmental issues are shaped not only by what is included but also by what is omitted. The exclusion of certain viewpoints influences how ecosystem values are understood, evaluated, and managed.

Perhaps the most glaring example of this relates to cultural/relational/emotional values related to nature. All of the documents studied frame ecosystem services primarily in technical/ecological/economic terms. Nature was almost always referenced in terms of its relationship to planning systems, climate adaptation, managing biodiversity, promoting innovative products/processes, and promoting sustainable development. Very little reference was made to nature as having identity/belonging/memory/personal significance.

The presence of the technocratic and economic frames illustrates this point. From within these frames, ecosystems are mostly valued in terms of what function/benefit they produce. Nature is depicted as infrastructure to promote urban systems, as a resource contributing to economic development, and/or as an environmental asset to incorporate into planning processes. Therefore, ecosystem services are essentially viewed through what ecosystems do instead of what ecosystems mean to individuals.

The emotional and cultural dimensions of ecosystem services provide a more limited understanding than other aspects of ecosystems. The various ways that humans connect with forests, rivers, parks, etc., cannot be reduced to an assessment of ecological function. Many times, people find meaning in nature because it helps them define their "place," their cultural identity, their quality of life, and their everyday experience. Relational aspects such as these are only marginally addressed within the policy documents, indicating that ecosystem services are primarily viewed from a functional/instrumental perspective.

Another underrepresented aspect is the representation of conflicts/power struggles. Overall, all of the documents reviewed depict sustainability as a common and widely held goal. Sustainability is depicted as being developed through collaborative efforts and coordinating environmental planning and problem-solving. However, creating the image of consensus masks the reality of ongoing debates/conflicts over developing cities versus protecting the environment; conflicting opinions about land uses; differing values among stakeholders regarding nature; and a lack of discussion on who benefits from decisions made regarding the environment and who suffers from the negative effects of those decisions. Avoiding discussion on conflict enables the documents to create an image that sustainability is a purely administrative issue (i.e., improving the administration of planning) rather than a politically charged issue that includes multiple competing agendas and different levels of power.

In addition to the underrepresentation of culture/relations/emotions/decision making, the study also found that citizen involvement remained relatively weak throughout the documents. Although participation and collaboration are regularly referenced, citizens are rarely involved in decision-making in environmental governance. References to inhabitants/stakeholders/etc. Imply that public participation will occur; however, there is minimal definition provided for how citizens will participate in governance decisions. As such, public participation is generally viewed by planners and citizens alike as consultative (as opposed to decision-based) regarding decision-making related to planning decisions. Citizen stakeholders can provide valuable input/views/ideas through their role in

commenting on potential decisions made by city officials/planners/expert policy makers.

This is an important finding when considering an Ecosystem Services framework since many environmental values are context-dependent (i.e., located in particular places). Citizen interactions with ecosystems happen through recreation/daily routines/practices of culture,/place based interactions. When these types of perspectives are weakly represented in planning documents, important types of values related to ecosystem services may be overlooked.

Lastly, the analysis indicates that alternative frameworks for assessing the value of nature are poorly represented. The dominant frames rely heavily upon technical/ecological/economic assessments of ecosystem services. Nature is typically assessed using quantifiable measures/indicators/ecological functions/contributions to economic/human well-being. Assessments of value that fall outside of these categories receive substantially less attention.

Examples of assessments of value that receive poor representation include ethical obligations towards nature/spiritual meanings assigned to landscapes/Indigenous perspectives/localized forms of environmental knowledge/interconnected relational views of nature, which are rarely described. The large amount of emphasis placed on quantifiable/measurable forms of assessment reflects larger trends in governing ecosystems where environmental benefits are transformed into measurement tools for decision-making purposes. While quantitative/measurable forms of evaluation can help facilitate decision-making around environmental resources, they may also marginalize evaluations that, although difficult to measure, are still important for understanding human-nature relationships.

Collectively, these findings demonstrate that ecosystem services in Uppsala's policy discourse are primarily evaluated through managerial/economic/ecological lenses. Representations of cultural meanings/emotional connections/citizen engagement/conflict/power relations/knowledge systems are weaker representations. Consequently, the policy discourses present a relatively narrow understanding of the value of nature, one that emphasizes measurable outcomes/institutional governance/and de-emphasizes the multiple ways in which people experience/interpret/value ecosystems.

Although the absence of these representations does not necessarily indicate that these representations are deemed unimportant, rather, it suggests that various interpretations of ecosystem services have become more prominent than others within environmental planning discourses. Thus, identifying these absences is necessary for understanding the positive/negative consequences of current

approaches to governance for ecosystem services in Uppsala. For a more detailed overview of Underrepresented Perspectives, see Appendix 6.

6. Discussion

In this chapter, the empirical results are discussed in relation to previous research and framing theory. This study describes what it means to have dominant frames on the ecosystem services for sustainable development in Uppsala, Sweden.

6.1 Dominance of Technocratic and Managerial Perspectives

The strongest impression from reading through the policy documents is that sustainability has been framed from a technically oriented, managerial perspective. Sustainability is frequently described in the documents as something that can be integrated into existing administrative systems and managed through planning procedures. Environmental problems are not described as political struggles or social conflicts but rather as issues of coordination, of not being fully integrated, or of not being sufficiently implemented.

According to Hajer (1995) and Dryzek (2013), this dominance of technocratic perspectives is also reflected in other studies. In their view, environmental governance is increasingly influenced by expert knowledge and has become more institutionalized and managed. As a result, environmental problems are translated into technical governance problems to be solved by better planning and more efficient coordination of existing institutions and measures within existing frameworks.

The large number of indicators, monitoring systems, and planning tools demonstrates that an ecosystem service is viewed mainly as a component of sustainability governance, which can be measured and governed. However, the administrative coordination perspective might also lead to a narrow perspective on the services provided by nature. In the documents analyzed here, sustainability has often been linked to systems of measurable indicators and to planning systems. Thus, nature is seen more as something to be organized than as an ecological relationship to be lived.

This managerial orientation risks marginalizing the cultural, emotional, and relational value of nature. Emotional experiences of nature and landscapes, contact with green areas in daily life, cultural values of nature, and human ethics in relation to nature are aspects not included in views of the services that nature provides.

On the one hand, governance structures for sustainability are necessary for planning, and the focus on sustainability indicators, etc., can be seen as necessary to frame and manage sustainability problems more effectively. On the other hand, sustainability as a technical governance problem also risks reducing complex environmental issues to categories that can be addressed through policy.

In a similar vein, it can be noted that the focus on sustainability in the studied documents is on municipal authorities, the municipality's experts, planners, and decision-makers. They are the ones who are to take responsibility for achieving sustainable development, and in the policy documents, they are the ones who are to implement the decisions.

Swyngedouw (2009) noted that such environmental governance is often characterized by post-political features, i.e., sustainability issues are treated as technical management tasks to be solved within already established institutional frameworks, rather than as issues to be debated politically and democratically in public forums. Conflicts, disagreements, and the various interests at stake in environmental issues are rarely discussed within the policy documents under investigation.

6.2 Economic Framing and Green Growth Discourse

Findings show the significant influence of economic and growth-based thinking on both the content and tone of the policy documents. Unlike many reports, which view environmental protection as opposed to economic development, the documents viewed sustainability and economic development as complementary.

Green growth discourse: Internationally, it has become increasingly prominent within sustainability governance. This green growth discourse views achieving environmental sustainability while continuing to grow economically as occurring through new forms of innovation, technological development, and modern, sustainable ways of doing business.

This finding is consistent with prior literature on ecosystem service discourse. Literature authors such as Gómez-Baggethun & Ruiz-Pérez (2011) argue that ecosystem services are typically framed instrumentally. In instrumental framing, nature's value is almost exclusively defined by the benefits it provides to humans and economic systems.

This study's findings most certainly validate this conceptualization. The research results demonstrate that Uppsala's planning discourse is deeply rooted in a "green growth" view of sustainable development; it views ecosystem services as

valuable, primarily because they contribute to innovation, competition, and regional development.

This is an example of how sustainability can utilize environmentally-based terminology while still maintaining the same economic paradigm. Many references to ecological limits on consumption, decline in growth rates, and competition between economic growth and biodiversity preservation were identified.

Both Harvey (1996) and Escobar (2011) describe how sustainable development discourse typically integrates environmental considerations into pre-existing development structures rather than fundamentally changing those same structures. Another major finding was that this focus on business also shows how, at least in this case, sustainability governance has developed a connection with regional development and public-private partnership.

It also appears possible that the high level of emphasis placed upon economic factors in valuing ecosystem services may lead to further conflict. For instance, should ecosystem services be primarily evaluated based on their ability to contribute to the economic growth and increased urban appeal of an area, there is potential that environmental protection will only occur where those actions provide some form of economic benefit.

As a result, it seems likely that natural systems can only be safeguarded for as long as they contribute to economic development. Therefore, based upon the analysis, the findings show that Green Growth is an important factor with respect to the way that ecosystem service delivery mechanisms are being framed at the local level in Uppsala.

6.3 Ecological Protection and Environmental Responsibility

Although many of the collected data represented economic and technocratic perspectives on sustainability, each dataset also reflected an overwhelming presence of ecological concern. While there was some variability in terms of whether or not individual documents referenced specific environmental issues (loss of biodiversity, long-term ecological degradation resulting from climate change, etc.), it can safely be concluded that environmental protection has become and will remain a major element of the sustainability discourse, which is used in Uppsala's planning governance. The ecological frame demonstrates that international sustainability agendas, specifically Agenda 2030, strongly influence local environmental governance.

The majority of the documented references to environmental concerns appear to focus on the institutional aspects of government and planning, i.e., policy objectives, governmental structures/institutions, sustainable development objectives/planning process.

In this way, there is a lack of clarity as to how local residents experience and interact with the environment around them. Similarly, there is a lack of evidence of what types of knowledge are developed by local residents due to their interaction with the environment.

Another contradiction within the ecological framework found in the study was that while climate change and biodiversity loss were represented as serious and imminent dangers, many of the proposed solutions to those dangers were similarly limited to traditional managerial governance systems and economic development strategies. As such, although there was a clear identification of environmental problems, the proposed solutions were generally restricted to current institutional and economic contexts.

However, because ecological framing has been shown to occur in local planning discourse, it provides a means for understanding how local communities identify and name environmental degradation.

6.4 Weak Participatory and Social Perspectives

One of the most important conclusions of the present research study is that both the participatory/social perspectives are very low on the importance scale within the policy documents. Participative approaches (including cooperation/dialogue), although mentioned numerous times throughout the documentation, remained underdeveloped compared to other elements of the documents. Although participation was encouraged repeatedly, the findings suggest that citizen involvement remains largely consultative rather than genuinely participatory.

Thus, the results of this study confirm some of the larger criticisms within environmental governance research concerning 'tokenistic' participation. Arnstein's (1969) well-known "ladder of participation" differentiates between participation in a symbolic way and real citizen control.

Additionally, an important result is the lack of environmental justice perspectives. In addition, the examined documents hardly addressed issues such as unequal access to green areas, environmental inequality, social vulnerability, or the unfair allocation of environmental risk, and conflicts over the relationship between development and conservation were almost non-existent.

Therefore, a relatively peaceful picture of sustainability governance emerged here, where political disputes and conflicting interests are obscured. However, in reality, environmental governance is characterized by many difficult choices among urban housing development, infrastructure expansion, biodiversity protection, economic development, and social equality.

That is why the limited treatment of such conflicts indicates that sustainability governance in the examined documents simplifies the process by emphasizing consent/cooperation through coordination of interest rather than through political conflict.

6.5 Implications for Sustainability Governance

Looking at all the results, it becomes clear that the way Uppsala's policy documents are framed, in terms of nature's benefits, remains quite limited. Technocratic and economic frames have significant implications for sustainability governance. They can help with efficient decision-making and coordination; however, they are likely to exclude other understandings of nature (such as cultural, relational, and just) from being considered.

Certain understandings of nature are given preference when writing policy documents. As such, different perspectives or types of knowledge gain influence over sustainability governance decisions, while other ideas remain at the margins. The issue extends beyond simply incorporating ecosystem services into regulatory frameworks. It involves critically examining how these concepts are constructed, as their formulation determines which actions are enabled and which remain restricted.

6.6 Framing Theory and Environmental Communication

The results of this study illustrate the usefulness of Entman's (1993) framing theory for exploring the connection between sustainability governance and environmental communication.

Using Entman's (1993) dimensions of frames, the analysis examined not only the content of the policy document but also how environmental issues were framed and communicated. Frames affect the way people think about environmental issues, the types of solutions perceived as acceptable, and who is considered accountable for taking action.

The findings show that frames do not represent an environmental issue in a neutral way. Instead, they create the way we can understand an environmental problem, as well as what solution is legitimized, and by whom to take action. Entman's (1993) claim that framing determines policy priorities and societal understanding of environmental governance is also supported.

Furthermore, this study adds to the literature examining environmental communication by showing that government policy documents act as a communication device that creates the public's perspective of nature and sustainable development. Policy documents communicate what is sustainable, who is accountable for environmental responsibility, which ecosystem services have value, and who governs.

7. Conclusions

This study looked at how ecosystem services were represented in documents for environmental and regional planning policies produced by the Uppsala municipality and Region Uppsala.

Using a theoretical model developed around framing theory and qualitative frame analysis, this study evaluated how ecosystem services have been framed as part of political rhetoric; what environmental problems and solutions are being constructed through these framings; and what type of ecological service perspective(s) would be either amplified or diminished within these framings.

From the analysis of four dominant ecosystem service-frames (Technocratic/Managerial Frame; Economic/Growth-Oriented Frame; Ecological Protection Frame; and Social/Participatory Frame), it can be concluded that the technocratic and economic frames have been more influential. The role of ecosystem services in an environmental context was typically viewed as a series of functions that could be planned for and regulated by means of governance, data collection (indicators), and coordinated decision-making processes. In addition to their protective function for the environment, ecosystem services are closely linked to ideas about economic development, innovation, competitiveness, and regional development.

The ecological conservation frame highlighted issues such as climate change, species extinction, and the need to conserve ecosystems' functioning. However, ecological considerations were often dealt with through established governance structures, rather than alternative sustainability models. On the contrary, the social and participatory frame has been much less developed. Even though collaboration and stakeholder involvement were repeatedly referred to, citizens and local communities were seldom conceived of as proactive participants in making decisions about the environment.

In addition to this, the study highlights how different perspectives frame problems of the environment, (environmental) solutions, and who is responsible for environmental sustainability. Environmental challenges can be seen as a governance issue, an ecological threat, or a barrier to the pursuit of sustainable development. The proposed solutions include the coordination of planning processes, technological innovation in order to better protect the environment through green technologies, and the promotion of institutional cooperation. The responsibility for sustainability is largely assigned to municipalities and policymakers/planners/institutional actors, while citizens are largely given a minor and consultative role.

One of the main findings of the study is that many ecosystem service perspectives are still poorly represented in the policy discourse. Compared to technical/economic/ecological perspectives, natural cultural/emotional relational values are hardly ever addressed. Similarly, power/conflict/environmental justice and/or alternative forms of knowledge about the environment are almost never addressed. Nature is mainly framed in terms of its function/benefits rather than as a source of identity/experience/meaning.

Therefore, the results support previous research in demonstrating that ecosystem services are not presented in a neutral manner. Policy documents deliberately produce certain conceptions of nature/sustainability/governance. The framing of ecosystem services affects which environmental priorities become apparent, which solutions are perceived as legitimate, and which actors are perceived as responsible for taking action toward sustainability.

However, there are some limitations. The first is that the analysis was built upon six policy documents developed by Uppsala Municipality and Region Uppsala. Therefore, the study examines how ecosystem services and sustainability are displayed in official planning discourses instead of what the implementation of those services looks like in real life. Policy documents are helpful for learning about government priority issues and methods of governance; however, they do not show the everyday work that goes into implementing plans.

Additionally, the study used qualitative frame analysis. This type of analysis has a degree of judgment from the researcher. Even though the research method had a systematic process that included coding, categorizing frames, and using quotes directly from the documents, there will always be a degree of interpretation from the researchers. Other researchers may interpret the data differently.

Some of the studied documents were created in Sweden and then translated into English while doing the research. Many quotations and interpretations were verified against the original Swedish version of the documents; however, there may be some subtle nuances and contextual meanings that were lost in translation. Thus, the findings need to be viewed as an interpretation of the substance content in the documents rather than as exact language studies.

Lastly, the study focused on one municipality and region (Uppsala). The reason Uppsala was chosen as the subject is due to its aspirations toward being sustainable and continued growth as an urban area. However, the results may not be generalized for every city/region/country. Ecosystem service framing will vary depending on each country's governance structures, environmental conditions, and prioritized policies.

Ultimately, the study is looking at how ecosystem services are communicated vs. whether environmental policies succeed in practice. Consequently, based on the information presented here, it can not be concluded that the identified framings have an effect on the outcomes of the planning process, nor do they assist in improving environmental quality.

In spite of these limits, this study contributes to our understanding of how ecosystem services are framed in both environmental planning and sustainability governance. Through an examination of the assumptions, priorities, and values contained within policy discourse, this study gives us information on how certain perceptions of nature get institutionalized through planning activities.

Future research could build on these findings and look at how ecosystem service framings affect actual planning and decision-making. Research studies that combine document review with interviews with planners/policymakers/NGOs/citizens would give us additional information regarding how people apply and interpret ecosystem service concepts in practice.

Comparative studies conducted at different Swedish municipalities or international planning cases would also allow for determining whether the framings identified in this study are representative of trends within sustainability governance, or if they represent something unique to Uppsala.

Future studies could include perspectives that were significantly less represented in the analyzed documents, such as: cultural & relational value of nature; environmental justice; citizen agency; local ecological knowledge. These types of studies would add to a more inclusive view of ecosystem services. They would aid in developing planning practices that would incorporate more diverse views of human-nature relations.

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Popular Science Summary

Communicating the Value of Nature: Ecosystem Services in Uppsala's Environmental Planning

Cities are growing rapidly, and as a result of this rapid growth, pressure is put on the environment. Nature is often destroyed by housing, road construction, and building new infrastructure over or in what was once forests, wetlands, parks, etc. However, society relies greatly on the environment to perform many of its most important functions, such as providing clean air, preventing flooding, protecting us from extreme weather conditions, supporting biodiversity, promoting recreation, and enhancing our overall quality of life.

Nature provides these benefits, which are called "ecosystem services." Ecosystem services have recently been adopted as a key principle within Swedish environmental and urban planning. While including ecosystem services in policy and planning documentation is an important first step to acknowledging the value of nature, there are still likely many of the values of nature to be accounted for.

The way in which the value of nature is framed within policy documents impacts our perception of environmental problems, the solutions that can be considered as viable options, and whose responsibility it is to ensure environmental sustainability.

This research investigated how Uppsala Municipality and Region Uppsala describe ecosystem services in six different environmental and planning policies. The objective was to analyze how officials communicate about nature and sustainability in public planning documentation and which perspectives are highlighted and which are left out.

The data collection involved qualitative content analysis of the six policy documents. As opposed to merely quantifying the number of mentions of the term "ecosystem service," the focus was on analyzing patterns in how nature and environmental concerns were expressed.

Results indicated that ecosystem services are primarily understood in four formats:

1) First format represents the idea of nature as something that can be controlled via planning, laws/regs, monitoring, and expertise. In this format, environmental issues are resolved through effective planning and coordination.

2) Second format links nature directly to economic development. In this format, ecosystem services are considered valuable for developing "attractive" cities, encouraging innovative activity, and providing for long-term economic growth. Nature is commonly seen as valuable since it creates a competitive region.

3) The third format centers on environmental protection. In this format, climate change, biodiversity loss, and ecosystem sustainability issues are linked to ecosystem services. Most importantly, nature needs to be protected so we can have a healthy environment for future generations

4) Fourth format emphasizes community engagement/participation. As a whole, the documents stressed working together among different stakeholders in society (municipalities, organizations, etc.) as well as engaging residents. However, this format represented significantly fewer instances than the previous three formats.

Perhaps the most interesting finding of this study is that multiple perspectives regarding the value of nature are ignored. The cultural/emotional/relational values associated with nature are either missing altogether from the planning documents or are referenced very infrequently. There is little discussion in the plans about people's emotional connections to their parklands/forests/waterways, nor about how nature creates identities/memories/a sense of place/belonging for individuals/citizens.

Additionally, there is relatively little reference to conflict/power relationships/environmental injustice/equitable distribution/accessibility of green spaces within the plans. Citizens are depicted in the plans as providing input participants, whereas they are not portrayed as actively participating in decision-making processes related to environmental governance.

Since the planning documents have implications for how cities are developed/planned/governed, if one views nature solely as a resource to manage or a vehicle for promoting economic development, then additional important values are likely to be ignored. By broadening our understanding of the role of ecosystem services, we can promote more inclusive/socially-sustainable planning practices.

Therefore, this study recommends that future environmental planning should pay more attention to cultural/emotional/relationship-based values of nature, while at the same time increasing citizen participation in environmental decision-making.

Appendix 1:Examples of Initial Coding

Raw Data / Direct Quote from Documents	Initial Code(s)
"The policy shall provide guidance in planning, budgeting, follow-up and implementing municipal operations." (Policy for Sustainable Development, p. 2)	Planning systems, governance, budgeting, implementation, follow-up
"Decision-making documentation shall highlight, and be analyzed on the basis of, sustainability aspects." (Policy for Sustainable Development, p. 3)	Sustainability integration, decision-making, policy analysis
"Indicators… aim to provide a picture of the county's development." (Regional Development Strategy, p. 6)	Indicators, monitoring, evaluation, measurement
"Supports the 17 global development goals and Agenda 2030." (Policy for Sustainable Development, p. 2)	Global goals, Agenda 2030, sustainability targets
"Long-term and structural changes… ecological sustainability." (Policy for Sustainable Development, p. 3)	Long-term change, ecological sustainability, structural reform
"The world today faces enormous challenges… climate change… loss of biodiversity." (Regional Development Strategy, p. 14)	Climate change, biodiversity loss, and environmental crisis
"We will develop and maintain a competitive business sector." (Regional Development Strategy, p. 3)	Competitiveness, business development, economic growth
"Knowledge-driven sustainable growth, development and innovation." (Regional Development Strategy, p. 5)	Innovation, sustainable growth, modernization
"Sustainability work is based on collaboration… with inhabitants… associations." (Policy for Sustainable Development, p. 3)	Collaboration, participation, stakeholder involvement
"Together with inhabitants…" (Policy for Sustainable Development, p. 3)	Citizens, community involvement, participation
"Provide a picture of the county's development." (Regional Development Strategy, p. 6)	Development overview, measurement, and indicators
"Planning, budgeting, follow-up…" (Policy for Sustainable Development, p. 2)	Budgeting, governance systems, planning
"Competitive business sector…" (Regional Development Strategy, p. 3)	Economic strategy, competitiveness, business support
"Development and innovation." (Regional Development Strategy, p. 5)	Innovation, technological development
"Climate change… biodiversity loss." (Regional Development Strategy, p. 14)	Ecological degradation, biodiversity, and climate risks
"Collaboration with inhabitants and associations." (Policy for Sustainable Development, p. 3)	Stakeholder dialogue, participation, inclusion
"The policy shall provide guidance…" (Policy for Sustainable Development, p. 2)	Guidance, institutional structure, governance
"Indicators aim to provide a picture…" (Regional Development Strategy, p. 6)	Statistics, indicators, evaluation tools

Raw Data / Direct Quote from Documents	Initial Code(s)
“Knowledge-driven sustainable growth…” (Regional Development Strategy, p. 5)	Knowledge economy, innovation, economic modernization
“Supports Agenda 2030 goals.” (Policy for Sustainable Development, p. 2)	International sustainability, global governance
“Sustainable growth, development and innovation.” (Regional Development Strategy, p. 5)	Growth, innovation, economic sustainability
“Need for long-term ecological sustainability.” (Policy for Sustainable Development, p. 3)	Ecological planning, sustainability transition
“The business community… has contributed to shaping a development strategy.” (Regional Development Strategy, p. 3)	Business actors, policy influence, and economic stakeholders
“The policy shall support sustainable development in all municipal activities.”	Institutional sustainability, policy integration
“Climate and environmental considerations shall be integrated into decision-making.”	Environmental integration, governance
“Ecological sustainability is a prerequisite for long-term development.”	Ecological dependency, sustainable development
“Collaboration between municipalities, authorities, and organizations is important.”	Cooperation, institutional collaboration
“Innovation and entrepreneurship strengthen regional attractiveness.”	Entrepreneurship, regional competitiveness
“Environmental and climate work shall contribute to sustainable growth.”	Green growth, climate governance
“The municipality shall work actively with climate adaptation.”	Climate adaptation, environmental planning
“Nature and green environments contribute to the quality of life.”	Green spaces, wellbeing, ecosystem benefits
“Sustainability requires cooperation between public actors and businesses.”	Public-private partnership, cooperation
“The county’s development should be socially, economically, and environmentally sustainable.”	Triple sustainability, integrated sustainability
“Environmental challenges require coordinated efforts.”	Coordination, environmental governance
“Citizens and organizations should be involved in sustainability work.”	Citizen involvement, participation
“Long-term planning is necessary for sustainable development.”	Strategic planning, long-term governance
“Climate goals guide local sustainability work.”	Climate targets, policy guidance
“Monitoring and follow-up are necessary to achieve sustainability goals.”	Monitoring, evaluation, governance systems
“Sustainable urban development strengthens competitiveness.”	Urban competitiveness, sustainable growth
“Biodiversity and ecosystem functions must be protected.”	Ecosystem protection, biodiversity conservation

Raw Data / Direct Quote from Documents	Initial Code(s)
“Sustainability shall be integrated into all decision-making processes.”	Sustainability mainstreaming, policy integration
“The municipality works together with regional and national actors.”	Multi-level governance, institutional cooperation
“Environmental issues are central to future development.”	Environmental priorities, future sustainability
“Innovation contributes to sustainable regional growth.”	Innovation systems, economic sustainability
“The transition toward sustainability requires structural transformation.”	Transformation, sustainability transition
“Participation and dialogue are important in sustainability processes.”	Dialogue, citizen participation
“Green environments support attractive living conditions.”	Green infrastructure, quality of life
“Environmental work shall support both sustainability and competitiveness.”	Economic-environmental integration, green economy
“Authorities are responsible for implementing sustainability goals.”	Institutional responsibility, governance actors
“Sustainability challenges require coordinated planning.”	Coordinated governance, planning systems
“Global sustainability goals influence local planning.”	Global-local governance, Agenda 2030
“The municipality shall ensure environmentally sustainable development.”	Municipal responsibility, sustainability governance

Appendix 2:Codes to Categories

Initial Code(s)	Analytical Category
planning systems	Governance and Management
Governance	Governance and Management
Budgeting	Governance and Management
Implementation	Governance and Management
follow-up	Governance and Management
sustainability integration	Governance and Management
decision-making	Governance and Management
policy analysis	Governance and Management
Indicators	Governance and Management
Monitoring	Governance and Management
Evaluation	Governance and Management
Measurement	Governance and Management
development overview	Governance and Management
governance systems	Governance and Management
institutional structure	Governance and Management
Statistics	Governance and Management
evaluation tools	Governance and Management
environmental integration	Governance and Management
institutional sustainability	Governance and Management
Coordination	Governance and Management
institutional collaboration	Governance and Management
strategic planning	Governance and Management
policy guidance	Governance and Management
sustainability mainstreaming	Governance and Management
multi-level governance	Governance and Management
coordinated governance	Governance and Management
Planning	Governance and Management
municipal responsibility	Governance and Management
institutional responsibility	Governance and Management
governance actors	Governance and Management
global goals	Ecological Sustainability
Agenda 2030	Ecological Sustainability
sustainability targets	Ecological Sustainability
long-term change	Ecological Sustainability

Initial Code(s)	Analytical Category
ecological sustainability	Ecological Sustainability
structural reform	Ecological Sustainability
climate change	Ecological Sustainability
biodiversity loss	Ecological Sustainability
environmental crisis	Ecological Sustainability
ecological degradation	Ecological Sustainability
climate risks	Ecological Sustainability
ecological planning	Ecological Sustainability
sustainable development	Ecological Sustainability
climate adaptation	Ecological Sustainability
environmental governance	Ecological Sustainability
triple sustainability	Ecological Sustainability
environmental priorities	Ecological Sustainability
future sustainability	Ecological Sustainability
sustainability transition	Ecological Sustainability
ecosystem protection	Ecological Sustainability
biodiversity conservation	Ecological Sustainability
global-local governance	Ecological Sustainability
environmental sustainability	Ecological Sustainability
Competitiveness	Economic Development
business development	Economic Development
economic growth	Economic Development
Innovation	Economic Development
sustainable growth	Economic Development
Modernization	Economic Development
economic strategy	Economic Development
technological development	Economic Development
knowledge economy	Economic Development
economic modernization	Economic Development
business actors	Economic Development
policy influence	Economic Development
economic stakeholders	Economic Development
Entrepreneurship	Economic Development
regional competitiveness	Economic Development
green growth	Economic Development
urban competitiveness	Economic Development

Initial Code(s)	Analytical Category
innovation systems	Economic Development
economic sustainability	Economic Development
green economy	Economic Development
economic-environmental integration	Economic Development
public-private partnership	Economic Development
stakeholder involvement	Social Interaction and Participation
Collaboration	Social Interaction and Participation
Participation	Social Interaction and Participation
Citizens	Social Interaction and Participation
community involvement	Social Interaction and Participation
stakeholder dialogue	Social Interaction and Participation
Inclusion	Social Interaction and Participation
Cooperation	Social Interaction and Participation
citizen involvement	Social Interaction and Participation
Dialogue	Social Interaction and Participation
green spaces	Social Interaction and Participation
Wellbeing	Social Interaction and Participation
ecosystem benefits	Social Interaction and Participation
quality of life	Social Interaction and Participation
attractive living conditions	Social Interaction and Participation
Inhabitants	Social Interaction and Participation
Associations	Social Interaction and Participation

Appendix 3:Identifying Frame

Analytical Category	Related Initial Codes	Dominant Meaning in the Documents	Frame Identified	Why This Became a Frame
Governance and Management	Planning systems, governance, monitoring, indicators, evaluation, coordination, implementation, policy guidance, sustainability integration, and strategic planning	Sustainability is mainly understood as something that can be organized, measured, monitored, coordinated, and managed through institutional systems	Technocratic / Managerial Frame	The documents repeatedly framed environmental issues as technical or administrative challenges requiring planning systems, governance tools, indicators, monitoring, and institutional coordination. Problems were presented as issues of management efficiency rather than political or social conflict.
Governance and Management	Budgeting, follow-up, institutional responsibility, governance actors, decision-making, evaluation tools	Environmental sustainability depends on formal procedures, structured governance, and administrative control	Technocratic / Managerial Frame	Sustainability was consistently connected to institutional routines, structured decision-making, and measurable governance processes. This created a managerial understanding of ecosystem services.
Governance and Management	Policy analysis, sustainability mainstreaming, coordinated governance, multi-level governance	Sustainability should be integrated across governance levels and planning systems	Technocratic / Managerial Frame	The repeated focus on integration and coordination reinforced the idea that environmental issues can be solved through institutional management and technical planning systems.
Ecological Sustainability	Climate change, biodiversity loss, environmental crisis, ecosystem protection, and climate adaptation	Nature is vulnerable, and environmental degradation threatens sustainability	Ecological Protection Frame	The documents described climate change, biodiversity loss, and ecological degradation as urgent environmental threats requiring protection and sustainability measures.
Ecological Sustainability	Long-term change, ecological sustainability, sustainability transition, ecological planning	Long-term structural environmental transformation is necessary	Ecological Protection Frame	Sustainability was framed as requiring structural ecological change and protection of natural systems over time.

Analytical Category	Related Initial Codes	Dominant Meaning in the Documents	Frame Identified	Why This Became a Frame
Ecological Sustainability	Agenda 2030, global goals, sustainability targets, global-local governance	Environmental protection is linked to international sustainability frameworks	Ecological Protection Frame	The documents repeatedly connected local sustainability work with global environmental agendas and international governance frameworks.
Ecological Sustainability	Biodiversity conservation, environmental sustainability, future sustainability	Nature must be protected to secure long-term environmental stability	Ecological Protection Frame	Environmental protection and conservation were framed as necessary responses to ecological risks and environmental instability.
Economic Development	Competitiveness, business development, economic growth, innovation, sustainable growth	Sustainability contributes to economic development and competitiveness	Economic / Growth-oriented Frame	Environmental sustainability was repeatedly linked to economic growth, innovation, business competitiveness, and modernization. Nature was valued mainly for its contribution to economic performance.
Economic Development	Entrepreneurship, regional competitiveness, innovation systems, green growth	Green development strengthens economic attractiveness and regional success	Economic / Growth-oriented Frame	The documents framed sustainability as an opportunity for innovation, investment, and economic expansion rather than as a limitation to growth.
Economic Development	Economic modernization, green economy, economic-environmental integration	Environmental and economic goals can work together	Economic / Growth-oriented Frame	Sustainability was framed as compatible with economic progress, where environmental protection supports competitiveness and modernization.
Economic Development	Business actors, economic stakeholders, and public-private partnerships	Businesses and economic institutions are key sustainability actors	Economic / Growth-oriented Frame	Businesses, universities, and development agencies were consistently positioned as central actors in achieving sustainability goals.
Social Interaction and Participation	Collaboration, participation, stakeholder involvement, dialogue, inclusion	Sustainability should involve cooperation and participation	Social / Participatory Frame (Weak)	The documents occasionally referred to collaboration and participation, suggesting that sustainability involves social interaction and dialogue.

Analytical Category	Related Initial Codes	Dominant Meaning in the Documents	Frame Identified	Why This Became a Frame
Social Interaction and Participation	Citizens, inhabitants, associations, and community involvement	Citizens and communities should be included in sustainability work	Social / Participatory Frame (Weak)	Citizens and civil society actors appeared in the documents, but usually in limited or supportive roles rather than as decision-makers.
Social Interaction and Participation	Wellbeing, quality of life, green spaces, ecosystem benefits	Nature contributes to wellbeing and everyday social life	Social / Participatory Frame (Weak)	A few references connected ecosystem services with wellbeing and quality of life, but these perspectives remained underdeveloped compared to technocratic and economic framings.
Social Interaction and Participation	Attractive living conditions, cooperation, and citizen involvement	Sustainability benefits communities and social life	Social / Participatory Frame (Weak)	Although social aspects were acknowledged, they were not central to the main sustainability discourse and lacked strong operational detail.

Appendix 4:Analytical interpretation

Frame	How Nature is Interpreted	Main Focus	What is Prioritized	What is Marginalized	Analytical Interpretation
Technocratic / Managerial Frame	Nature is viewed as something that can be managed and monitored	Planning, governance, indicators, coordination	Institutional efficiency and measurable sustainability systems	Citizen agency, emotional and cultural relationships with nature	Sustainability is framed mainly as a technical and administrative issue
Economic / Growth-oriented Frame	Nature is viewed as a resource supporting economic growth	Innovation, competitiveness, green growth	Economic development and modernization	Intrinsic ecological value and limits to growth	Ecosystem services are valued mainly for economic usefulness
Ecological Protection Frame	Nature is viewed as vulnerable and needing protection	Climate change, biodiversity, conservation	Environmental protection and long-term sustainability	Local lived experiences and social inequalities	Ecological risks are acknowledged but framed through institutional policy agendas
Social / Participatory Frame	Nature is connected to wellbeing and participation	Collaboration, dialogue, inclusion	Stakeholder participation and cooperation	Real citizen influence and environmental justice	Participation is mentioned but remains weakly developed
Overall Discourse	Nature is mainly framed through governance and development perspectives	Sustainability management and planning	Institutional coordination and sustainable growth	Cultural, relational, and ethical perspectives	Ecosystem services are constructed mainly as governance and development tools

Appendix 5:Comparative Overview of Identified Frames

Frame	Core Understanding of Nature	Strength in the Documents	Problem Framing	Solution Framing	Actor Framing
Technocratic / Managerial Frame	Nature is understood as a system that can be organized, managed, monitored, and controlled through planning and governance systems	Dominant	Environmental problems are framed as issues of weak coordination, insufficient integration of sustainability into planning, lack of monitoring systems, and ineffective governance structures	Solutions focus on planning systems, governance frameworks, indicators, monitoring tools, evaluation systems, budgeting processes, and structured implementation	Responsibility is mainly assigned to municipal authorities, planners, experts, policy-makers, and regional governance institutions
Economic / Growth-oriented Frame	Nature is understood as a resource that supports economic growth, innovation, competitiveness, and regional attractiveness	Strong	Environmental challenges are framed as risks to economic competitiveness, innovation capacity, development, and regional attractiveness	Solutions emphasize green growth, innovation, technological development, sustainable business strategies, entrepreneurship, and economic modernization	Key actors include businesses, universities, development agencies, regional actors, economic stakeholders, and public-private partnerships
Ecological Protection Frame	Nature is understood as vulnerable and in need of protection from climate change, biodiversity loss, and environmental degradation	Moderate	Problems are framed as climate change, biodiversity loss, ecological degradation, environmental crisis, and unsustainable	Solutions focus on ecological sustainability, biodiversity conservation, climate adaptation, environmental	Responsibility is mainly assigned to governments, environmental authorities, public institutions, and international

Frame	Core Understanding of Nature	Strength in the Documents	Problem Framing	Solution Framing	Actor Framing
			development patterns	protection measures, structural environmental change, and alignment with Agenda 2030 and global sustainability goals	sustainability frameworks
Social / Participatory Frame (Weak)	Nature is understood as connected to wellbeing, participation, social inclusion, and community life	Weak	Social issues such as weak participation, limited inclusion, unequal involvement, and lack of citizen influence are acknowledged but remain underdeveloped	Solutions emphasize collaboration, dialogue, stakeholder involvement, inclusion, participation processes, and cooperation between institutions and communities	Actors include citizens, local communities, associations, civil society organizations, and inhabitants, although mostly in supportive or consultative roles rather than as decision-makers

Appendix 6:Underrepresented Perspectives

Underrepresented Perspective	Observation in the Documents	What Was Missing or Weakly Represented
Cultural and Emotional Values of Nature	Nature was mainly described through planning, governance, and sustainability management language	Emotional attachment, identity, memory, and cultural meanings connected to landscapes were rarely discussed
Power Relations and Conflict	Sustainability was often presented as a shared and consensual goal	Conflicts between development and conservation, political disagreements, and competing stakeholder interests were largely absent
Citizen Agency and Public Influence	Citizens were occasionally mentioned in relation to participation and dialogue	Citizens were rarely positioned as decision-makers or active governance actors
Intrinsic Value of Nature	Nature was mainly valued for supporting sustainability and development goals	The idea that nature has value beyond human use was rarely acknowledged
Local and Everyday Experiences	The documents focused strongly on policy systems and institutional planning	Everyday experiences of parks, forests, rivers, and green spaces were rarely discussed
Environmental Justice and Inequality	Social sustainability was mentioned only briefly	Unequal access to environmental benefits and environmental burdens were rarely discussed
Alternative Knowledge Systems	The documents relied heavily on institutional and expert-driven knowledge	Indigenous perspectives, local ecological knowledge, and alternative environmental understandings were absent

Underrepresented Perspective	Observation in the Documents	What Was Missing or Weakly Represented
Participation Beyond Consultation	Participation was described mainly through collaboration and dialogue	Clear mechanisms for shared decision-making and citizen influence were missing
Ethical and Relational Perspectives	Nature was mainly framed through governance and economic systems	Ethical responsibilities and relational understandings between humans and nature were largely absent

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