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Statutory Declaration

I declare that I have authored the master thesis “The role of ecosystems and their services in policy-making in rural communities in Eastern Austria” independently and that I have not used other than the declared sources. I have explicitly marked all material which has been quoted either literally or by content from the used sources.

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List of abbreviations

CBD	Convention on Biological Diversity
CC	climate change
CHES	“managing Climate cHange impacts on land use and EcoSystem Services”, ongoing ACRP-project lead by the Environment Agency Austria (Umweltbundesamt GmbH)
ES	Ecosystem Service(s)
EU	European Union
FFF	Fridays For Future
FPÖ	Freiheitliche Partei Österreichs (Freedom Party of Austria)
GDP	Gross Domestic Product
GRP	Gross Regional Product
GHG	greenhouse gas(es)
GI	green infrastructure
LBL	Bündnis Liste Burgenland (voter group, not assigned to any party)
LUC	Land use change
NGO	non-governmental organization
ÖPUL	Österreichisches Programm für umweltgerechte Landwirtschaft, Austrian agri-environmental scheme under pillar II of the Common Agricultural Policy, i.e. nationwide program to support environmentally friendly farming
ÖVP	Österreichische Volkspartei (Austrian People’s Party)
PA	protected area
PCI	problem-centered interview
SPÖ	Sozialdemokratische Partei Österreichs (Social Democratic Party of Austria)
UN	United Nations
UNEP	United Nations Environment Programme
US(A)	United States (of America)

Abstract

The overall condition of ecosystems is deteriorating worldwide due to human activities and related climate and land use change. Consequently, services provided by ecosystems to humans are also under threat. Lately, science has largely promoted integrating these ecosystem services into decision-making to achieve conservation goals. However, the successful implementation of this approach has not been investigated much until now. For this reason, this study examines how politically active people in a diverse rural region of Eastern Austria perceive their surrounding ecosystems and linked services, and how they assess their integration into local policy-making. For this, eleven qualitative interviews with persons of various political backgrounds and influence were conducted.

All study participants were aware that society depends on natural basics and therefore has the responsibility to preserve them. Negative climate change impacts on the provision of agricultural and forestry products and drinking water were noticed or expected. The interviewees commonly acknowledged the need to initiate countermeasures and emphasized the importance of local political action. However, regulating, supporting, and cultural ecosystem services were much less considered. Furthermore, none of the study participants was aware of the conceptual approach of ecosystem services.

Party affiliation, age, and the urban-rural gradient seemingly correlated with the understanding of ecosystems and their functionality, and with individualistic problem-solving approaches. There was systematic criticism of the harmful influences of modern society and economy on ecosystems. The results suggest three main implications: provide spatially precise data on the provision of ecosystem services, integrate them into lower scale decision-making at all stages, and establish functional institutional infrastructure to enable information exchange.

Zusammenfassung

Weltweit verschlechtert sich der Zustand der Ökosysteme aufgrund menschlicher Aktivitäten und damit zusammenhängender Klima- und Landnutzungsänderungen. Dementsprechend sind auch die Leistungen, die die Ökosysteme für den Menschen erbringen, bedroht. Die Wissenschaft hat zuletzt häufig gefordert, diese Ökosystemleistungen in Entscheidungsfindungen einzubeziehen, um auch Naturschutzziele zu erreichen. Der Erfolg dieses Ansatzes wurde jedoch bisher nicht ausreichend erforscht. In dieser Studie wurde nun untersucht, wie politisch aktive Menschen in einer vielfältigen ländlichen Region Ostösterreichs die sie umgebenden Ökosysteme mitsamt Leistungen wahrnehmen und wie sie deren Integration in die Lokalpolitik beurteilen. Dazu wurden qualitative Interviews mit elf Personen unterschiedlichen politischen Hintergrunds und Einflusses durchgeführt und anschließend hinsichtlich entsprechenden Verbesserungspotentials analysiert.

Allen Studienteilnehmer*innen war bewusst, dass die Gesellschaft von natürlichen Grundlagen abhängt und daher die Verantwortung trägt, diese zu erhalten. Negative Auswirkungen des Klimawandels auf die Versorgung mit land- und forstwirtschaftlichen Produkten und Trinkwasser wurden erkannt oder erwartet. Die Befragten stellten übereinstimmend die Notwendigkeit fest, Gegenmaßnahmen zu ergreifen, und betonten die Bedeutung lokalpolitischen Handelns. Regulierende, unterstützende und kulturelle Ökosystemleistungen wurden jedoch weniger berücksichtigt. Außerdem kannte keine*r der Studienteilnehmer*innen den konzeptionellen Ökosystemleistungsansatz.

Hinsichtlich umweltpolitischer Einstellungen schienen höheres Alter, Parteizugehörigkeit und ländlicher Wohnsitz mit einem besseren Verständnis für natürliche Zusammenhänge und individualistischen Problemlösungsansätzen zusammenzuhängen. Erkennbar war auch eine systematische Kritik an den schädlichen Einflüssen der modernen Gesellschaft und Wirtschaft auf die Ökosysteme. Aus den Ergebnissen lassen sich drei wesentliche Forderungen ableiten: es sollten räumlich präzise Daten zur Verfügbarkeit von Ökosystemleistungen erhoben, deren Integration in alle Schritte der Entscheidungsfindung auf lokaler Ebene gefördert und eine funktionierende institutionelle Infrastruktur zum diesbezüglichen Informationsaustausch geschaffen werden.

I Introduction

I.1 About the structure of this study

This study is divided into four main chapters. In the first chapter 'Introduction' the reader becomes familiar with the scientific context of the study. Here developments in ecology and environmental politics in, or with an impact on, the study region are addressed. The chapter furthermore comprises information on the Ecosystem Services (ES) concept, its advantages and criticism, and its application. These basics help to classify the study participants' statements in later parts of the work.

The second chapter 'Methods' explains the purpose of this study and how it was to be achieved. It thus contains details on all methods applied during the study process from preparation through conduction to analysis.

The third chapter consists of the study 'Results'. Topic by topic the statements of the study participants are presented in their own words or paraphrased. Both popular as well as less common views are emphasized to provide an overview of the whole landscape of opinions as complete and accurate as possible.

Last, in 'Discussion' the previously depicted findings are debated by interrelating the statements of the study participants with those on other topics or of other participants and with the results of other studies mentioned in the first chapter. Furthermore, the success of this work is assessed and possible applications as well as related research need is derived from its outcome.

I.2 Definitions

Throughout the entire work, several terms appear frequently and are of central importance. Hence, for the correct understanding of the respective points it is helpful to clearly define these key words in advance. It should be noted that sometimes the study participants interpret and use the same terms differently, so their meaning can vary in the context of direct or indirect quotations. However, this circumstance only makes it more necessary to contrast it with an otherwise stringent use of the terms according to their definitions as following.

Biodiversity

Following the definition made by the Convention on Biological Diversity (CBD), the term 'biological diversity' or 'biodiversity' is understood and subsequently used as *"the variability among living organisms [...] and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems"* (United Nations [UN], 1992, Article 2).

Climate change (CC)

Climate has always been in a state of constant change. However, some developments since the times of industrialization are unprecedented in Earth's history and are clearly related to the acting of mankind, as the Intergovernmental Panel on Climate Change (IPCC, 2018, 2019) worked out. Therefore 'climate change' as used in this study means the ongoing long-term change of weather patterns on all spatial scales primarily induced by human activities. It is evident, for instance, in global warming which is the rise of Earth's average surface temperature. This is caused by increased greenhouse gas (GHG)

levels in the atmosphere which are induced mainly by massive burning of fossil fuels. For more details on drivers and effects of CC as well as human reactions to it, see chapter I.3.2.1.

Ecology, ecological

‘Ecology’ is defined as *“the relationship of living things to their environment and to each other, or the scientific study of this”* (Cambridge Dictionary, 2021a). The associated adjective ‘ecological’ is used accordingly.

Ecosystem

Once again adhering to the definition of the CBD, an ‘ecosystem’ is *“a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit”* (UN, 1992, Article 2). There is no general rule for the spatial limits of an ecosystem. Classically, the term is used to describe clearly distinguishable units such as ponds or continuous forests, which also corresponds to the use in the context of this work. It should be mentioned, however, that it can sometime stand for the global biosphere as a whole, too.

Ecosystem Service

“Ecosystem services are the benefits people obtain from ecosystems” (Millenium Ecosystem Assessment [MA], 2005, p. V). This encompasses all direct and indirect ways to support human life on Earth including provisioning, supporting, regulating and cultural services. For a more detailed description of this concept see chapter I.4.1.

Environment, environmental

‘Environment’ is a rather diversely used term describing both *“the air, water, and land in or on which people, animals, and plants live”* (Cambridge Dictionary, 2021b) as well as one’s overall living conditions. Similarly, the associated adjective ‘environmental’ refers to the entire surroundings of a living being or of an object, no matter how strongly they are shaped by human activities. This is in contrast to the stricter definition of ‘nature’ (see below).

Green infrastructure (GI)

‘Green infrastructure’ is an interlinked network of multi-functional natural, semi-natural and artificial green spaces and included ecosystems (Tzoulas et al., 2007). It enhances biodiversity and ES supply.

Land use

‘Land use’ means all forms of ground usage by people. It thus comprises, for instance, agriculture, forestry, and human settlements. How land is used has major impacts on the lives of individual people, the entire society and the environment likewise.

Nature, natural

‘Nature’ and ‘natural’ are words used to characterize components and mechanisms of the environment occurring independently of human activities (Cambridge Dictionary, 2021c). Therefore, in the context of landscape structure they depict elements which are rather little influenced by mankind.

Sustainability

‘Sustainability’ is a popular term, which is nowadays widely used in all kinds of contexts such as culture, economy, science and everyday life. Most definitions share continuous human survival as its goal (Brown et al., 1987). In the following, unless otherwise noted, sustainability is understood from an ecological perspective, aiming to assure the maintenance of biodiversity and of people’s environmental living conditions.

I.3 International environmental developments

I.3.1 People's interaction with nature

I.3.1.1 Environmental politics in the course of time

Environmental politics have become increasingly important throughout the last decades, which can be seen well in some examples. While hardly any national environmental institutions existed at the time of the first UN world conference on the environment in 1972, they are nowadays an integral part of both governments' administrations and international organizations around the globe (Conca & Dabelko, 2020). Still in 2000 S. Hays from the United States (US) came to the conclusion, that in *"no sense have environmental concerns become overriding or even reached a place of importance in either personal life or public affairs equal to that of development objectives [such as] population growth, jobs, and investments"* (p. 228). Conversely, approx. 20 years later the same objectives are predominantly accepted to be intertwined with environmental issues not only locally but worldwide (Conca & Dabelko, 2020).

In Europe, the European Union (EU) – initiated in the 1950s mainly to promote common economic growth – gradually incorporated environmental policies since the 1970s and made it a central aspect of its activities (Knill & Liefferink, 2007). Today, there is a broad spectrum of regulations that intervene with national legislations of the member states. Accordingly, national governments must often adjust their laws, instruments and administration to the superior guidelines. The specifications concern such different fields as waste management, nature conservation or the development of biotechnology (Knill & Liefferink, 2007). Additionally, the various climate-related EU programs receive an increasing share of the EU budget, expanding from an estimated 6-7% during the period from 2007 until 2013 to a targeted 25% between 2021 and 2027 (D'Alfonso, 2019).

Another visible indicator for and at the same time driver of the increasing importance of environmental politics is the rise of the green parties. In the latest European Parliament, elected in 2019, the Group of the Greens/European Free Alliance holds 74 seats (9.9%), their highest value ever (European Parliament, 2019). Since green parties traditionally have a clear ecological focus, they especially contribute to bringing environmental topics more and more into the debate (Gahrton, 2015). Nowadays, ecological issues are addressed in all major parties' programs.

The evolution of global environmental politics is a reaction to increasing conflicts between humanity and environment, which are *"to some extent a function of three key factors: population, resource consumption, and waste production"* (Chasek et al., 2018, p. 2). Chasek et al. further state that constant growth of the world population and economic markets pressure the Earth's renewable resources to a critical extent. At present our demand for resources already exceeds our planet's annual regeneration capacity by more than 50%. Although it is usually possible to pinpoint the exact location where the environment is overly exploited or polluted, these activities often affect the entire biosphere at least indirectly. Changing regional environmental conditions initiate human migration, natural cycles distribute pollutants all around the globe and the emission of GHG drives worldwide CC. All this leads to i.a. large-scale land degradation, freshwater shortage, decrease of green cover and extinction of species. As a result, use of resources, pollutant emissions, CC and biodiversity loss are among the most debated topics in recent environmental politics.

I.3.1.2 Environmental awareness and behavior

Being environmentally aware means recognizing environmental problems and the impact of consumers' choices on them. It is positively correlated with pro-environmental behavioral intention (Yang et al., 2020). Likewise, societies emphasizing individualism and cognitive-cultural elements of social institutions promote environmental awareness, and so does higher social class and income. On an individual level, *"[altruistic] value influences pro-environmental behavior indirectly through attitudinal variables such as environmental concern and PSE [perceived consumer efficiency/effectiveness]"* (Lee et al., 2014, p. 2102). A person's age also plays a crucial role for their environmental awareness, which on average peaks in one's 40s till 60s. (Morrison & Beer, 2017). However, the worldwide upcoming of the Fridays For Future (FFF) protests in 2019, which received high media coverage, is representative for the important role of environmental and climate issues for considerable parts of the young generation.

The large majority (94%) of EU citizens personally finds the protection of the environment important, although the perceived urgency differs between some member states (European Commission, 2016). This is a continuation or slight increase compared to previous results. More than half see CC among the most important issues, making it the most recognized threat to environment followed by air pollution and increasing waste production. Furthermore, Europeans fear direct impacts of environmental issues on their daily lives and health. To address this matter, they hold individuals, governments and companies likewise accountable. International cooperation on environmental topics, for instance at EU level, is commonly considered necessary (European Commission, 2016). Among the young and predominantly female FFF protesters, skepticism prevails skepticism about whether current national governments and economic markets are able to act sustainably to secure their future (Wahlström et al., 2019).

I.3.2 Main impact factors on ecosystem development

I.3.2.1 Climate change

The earth has experienced an average global warming of around 1°C compared to pre-industrial levels and currently continues to heat up at a rate of additional 0.2°C every ten years (IPCC, 2018). The spatial and temporal distribution of this surface warming is not equal around the globe: Some areas like the arctic region heat up faster than others, and land areas experience a higher average warming than ocean areas. The reason for this rise lies to a large extent in human activities (IPCC, 2014). The anthropogenic emission of GHG – especially carbon dioxide (CO₂), but also methane (CH₄), nitrous oxide (N₂O), halocarbons and others – increased their concentration in the atmosphere to levels higher than at any other time in the past 800,000 years. Higher GHG levels raise radiative forcing, which thereafter leads to rising temperatures. The emission of GHG by human activities has increased almost perpetually throughout the last decades, so that more than half of the cumulative anthropogenic CO₂ was emitted only in the past 50 years. Taking into account the projected future GHG emissions, all but the most optimistic scenarios predict further temperature rises. It is thus rather likely that global warming will exceed 2°C as compared to pre-industrial times by the end of this century (IPCC, 2014).

The mean surface temperature rise has already initiated and will most likely further drive many other climatic changes such as an increase in extreme weather events (IPCC, 2014). For instance, hot

extremes occur more frequently and last longer, and so do extreme precipitation events in some areas. Precipitation regimes change differently however, resulting in overall dryer or wetter conditions depending on altitude and latitude. What follows is a reduction of glaciers, permafrost and Arctic sea ice, a rise of the sea level and temperature and a changed ocean chemistry. Many species get reduced or become extinct and thereby threaten the continued functionality of their ecosystems. In certain areas land degrades and freshwater availability diminishes. All this heavily impacts human health, food security and economic stability.

As a reaction on this threatening development, it is indispensable to understand what causes the GHG emissions. The main contributing factor with about three quarters of the total emissions is CO₂ released from fossil fuel burning and industrial processes (IPCC, 2014). In 2010, the industry sector was responsible for the biggest share of GHG emissions, followed by land use (including agriculture and forestry), buildings and transport (see *Figure 1*). The main underlying drivers are again the same as those responsible for most large-scale environmental problems: population and economic growth.

To counteract CC and its negative impact, the IPCC (2014) concludes that it is necessary to mitigate its course and adapt to the inevitable consequences. The latter can be achieved by *“vulnerability reduction, disaster risk management or proactive adaptation planning”* (p. 97). Exemplary measures are technology and infra-structure improvements and integrated natural resources management as well as adjusted institutions, education and behavior. In order to support vulnerable terrestrial and freshwater ecosystems, one should promote habitat availability and connectivity and reduce natural and anthropogenic non-climatic stressors (Wessely et al., 2017). Rural areas benefit from technological progress and economic and institutional conditions that enhance diversified farming structures and regional markets (IPCC, 2014). Urban areas, on the other hand, mostly profit from strengthened low-income groups and local governments as well as a diverse economy. Social changes e.g. in working life, lifestyles, consumer behavior, and culture are crucial for CC adaptation, but no less for its mitigation. They can contribute to the required GHG emission reduction just like improvements in technology, production and resource use. If sustainably managed, land use also offers a range of CC mitigation measures. For example, organic soils in agricultural areas should be restored and forests should be expanded if possible. To increase the effectiveness and efficiency of any measure it is of fundamental importance to act systematically and to cooperate across sectors and on all spatial levels.

I.3.2.2 Land use

Land use is of utmost importance for both society and the surrounding environment. Humans use land for food and material production as well as to build their settlements and infrastructure. Nowadays 71% of all ice-free land is used, one third of it after previous conversions (IPCC, 2019). About half of the used area consists of grazing land, followed by forests and cropland. Human infrastructure covers about 1% of the total land area.

Land use affects environment and climate on a large scale (IPCC, 2019). Land ecosystems store huge amounts of carbon and constantly exchange it with the atmosphere. About a quarter of the anthropogenic GHG emissions originates from agriculture and forestry, thus driving CC. On the return, land surface temperatures already increased by more than 1.5°C since the pre-industrial times, thereby affecting growing seasons, yields and habitat localities.

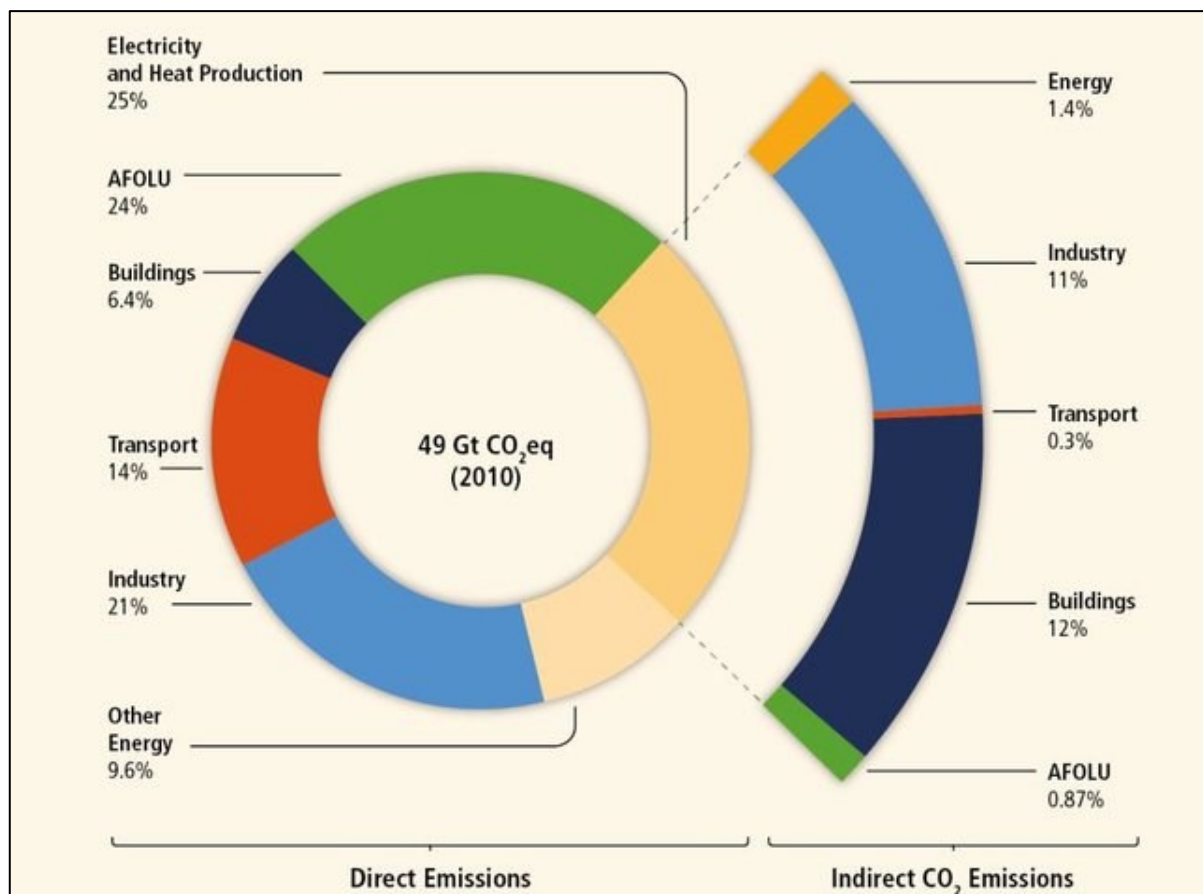


Figure 1: Total anthropogenic GHG emissions from economic sectors in 2010

Note. AFOLU = agriculture, forestry and other land use | GtCO₂-eq = gigatonne of CO₂-equivalent. From “Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change” by IPCC [Core Writing Team, R.K. Pachauri and L.A. Meyer (Eds.)], 2014, p. 47. Copyright 2014 by IPCC.

The circle shows the shares of direct GHG emissions (in % of total anthropogenic GHG emissions) from five economic sectors in 2010. The pull-out shows how shares of indirect CO₂ emissions (in % of total anthropogenic GHG emissions) from electricity and heat production are attributed to sectors of final energy use. ‘Other energy’ refers to all GHG emission sources in the energy sector [...] other than electricity and heat production. [...] The emission data on agriculture, forestry and other land use (AFOLU) includes land-based CO₂ emissions from forest fires, peat fires and peat decay [...] (IPCC, 2014, p. 47)

While the area of used land slightly declined in the Western world over the past 60 years, the global trend for pastures and cropland shows an opposite trend (IPCC, 2019). Yields developed even quicker due to agricultural intensification. Today around 10% of the total land area is managed intensively, and fertilizer use on cropland is very common. The growing food production is necessary not only because of the population growth but also to fulfill the simultaneously changing dietary needs. Dairy and meat products for instance are consumed at much higher rates today than 60 years ago.

Not all forms of land use are sustainable. Globally between 10 and 60 million km² are estimated to be degraded with negative effects on both ecosystems and food production (Gibbs & Salmon, 2015). The main drivers are unsustainable management practices, socio-economic pressures and climatic factors (IPCC, 2019). Especially wetlands, which store large amounts of carbon, are vulnerable to degradation.

The consequences of land degradation and desertification, a special form occurring in arid areas, jeopardize food security and hit poor countries harder on average (IPCC, 2019).

In the EU in 2020 most of the land surface area was used for agriculture (41%) and forestry (32,6%). 15.8% were unused or abandoned, while the rest mainly consisted of industrial and residential areas. (Eurostat, 2021). Recent trends show an overall decrease in agricultural land due to the decline in cropland, that is not outweighed by the simultaneous increase in pastures. Forests, human infrastructure and unused areas all covered slightly more land than in the early 2000s (Eurostat, 2021; Kuemmerle et al., 2016). The rate of soil sealing in the entire EU exceeded 1000km² per year (European Commission, 2012).

Land use and its changes are most strongly driven by economic and political factors, which again are largely interlinked. Political or institutional factors include for example laws, subsidies, zoning and planning (Hersperger & Bürgi, 2009). National policies are often influenced by superordinate international agreements e.g. on trade or environmental protection. Since the 1990s an increasing environmental awareness has influenced European agriculture policies and subsidies. While in many places political programs aim to reduce GHG emissions, pesticide runoff or overproduction, the major part of agricultural areas remains managed intensively anyways (Jepsen et al., 2015).

Therefore, land-use related development is economically sustainable throughout Europe, except in the metropolitan areas of a few countries (Gibas & Majorek, 2020). However, the environmental development is almost exclusively unsustainable, whereas social sustainability remains largely unchanged. One attempt to use land in a more ecologically friendly way is organic agriculture, that is, among others, the renunciation of synthetic fertilizers and pesticides (Meemken & Qaim, 2018). Organic production, market and consumption have multiplied in every respect since the beginning of the millennium, so that nowadays globally around 1.4% of all agricultural land is managed organically (Willer & Lernoud, 2019). The resulting effects on the environment and climate are positive per unit of land but not per unit of output. Organic farming thus best contributes to a more environmentally sustainable agriculture when implemented by sufficiently trained farmers and in systematic combination with higher yielding conventional methods (Meemken & Qaim, 2018). A different approach to secure the ample preservation of ecosystems is the establishment and maintenance of Protected Areas (PAs) to conserve nature. As of January 2021, 16.25% of Earth's terrestrial surface is under protection or similar conservation measures (Protected Planet, 2021). In Europe, where PAs are comparably frequent but smaller, most countries even exceed the global average percentage. Nevertheless, PAs differ in their effectiveness to conserve the entire variety of ecosystems depending on their management and location (UN Environment World Conservation Monitoring Centre et al., 2018). Many PAs are located in areas distant to human infrastructure or in rough terrain and are thereby relatively little exposed to imminent land use change (LUC), thus leaving room for management improvement (Joppa & Pfaff, 2010). In summary, correlations between land use and the environment are numerous and extensive and therefore highly relevant in decision-making.

I.3.3 Effects of Covid-19 on the environment and its perception

The ongoing Covid-19 pandemic had and still has unprecedented effects on economy, politics and society all around the globe. This also entails major consequences for the environment many of which cannot be fully predicted or assessed yet. However, initial studies found that the pandemic has both

negative and positive impacts on the environment. On the one hand it stimulated increasing medical products waste and attenuated the development of clean energies (Eroğlu, 2020). On the other hand, it reduced GHG emissions from transport, industry and other sectors, leading to an unexpected 7% drop of the global emissions after an almost continuous increase during the past 10 years. Nonetheless, the unexpected course of 2020 alone will not substantially temper CC and its consequences might be short-lived, depending on the political reaction to the crisis (Forster et al., 2020; UN Environment Programme [UNEP], 2020). Momentarily, many countries are expected to promote fossil fuel use in the next years to secure the recovery of their debilitated economies. Hence, they severely threaten the achievement of the 2°-goal of the Paris Agreement (UNEP, 2020).

Covid-19 and the subsequent government measures, including travel and activity restrictions, have initiated wide-spread changes in the perception of nature. In search of recreational activities with low infection risks, across Europe more and different visitors came to enjoy the outdoors in nearby PAs and other green spaces than in previous seasons (McGinlay et al., 2020; Derks et al., 2020). In total the visitors exerted further pressure on nature by overcrowding and more frequent problematic behavior (McGinlay et al., 2020). Simultaneously, the positive nature experience is an opportunity to increase the environmental knowledge and awareness of a broader range of people (Derks et al., 2020). For instance, it already promoted more sustainable consumption patterns and proved the impact of individual action on the environment (Rousseau & Deschacht, 2020; Severo et al., 2020). Nevertheless, it is unclear whether behavioral changes will last long beyond the crisis.

I.4 Ecosystem services

I.4.1 The Ecosystem Services concept

„Ecosystem services are the benefits people obtain from ecosystems.“ (MA, 2005, p. V) Therefore, they are the base for human existence and activities on Earth. They are divided into four categories:

- provisioning services (e.g. food, water, raw materials, genetic resources)
- supporting services (e.g. nutrient cycling, soil formation, habitat provision)
- regulating services (e.g. flood protection, air purification, pest control)
- cultural services (e.g. aesthetical value, recreational activities, education)

The ES concept is an interdisciplinary approach and enables an integration of natural capital into socioeconomic systems. Already in 1997, Costanza et al. estimated the combined annual worth of all ES at around 33 trillion dollars, which equals about 83 times Austria's 2019 Gross Domestic Product (GDP). As *“the quantity, quality and reliability of ecosystem services”* (Mace et al., 2012, p. 21) depend on functional ecosystems, the preservation of ES for economic reasons can be a powerful tool for nature conservation.

The ES concept is not without criticism. In their summary of critiques and counterarguments, Schröter et al. (2014) point to its anthropogenic focus, which is feared to promote an exploitative attitude towards nature and neglect its intrinsic values. They mention that the concept often comprises economic valuation and leads to the assumption that money could buy ES provision endlessly. It would lack a precise definition, be too optimistic and possibly even threaten important biodiversity conservation measures by inadequately diverting resources and attention. Nevertheless, the authors

also support the concept with counterarguments. For instance, they argue that aside valid anthropocentric points, particularly cultural ES integrate intrinsic nature values and support a sustainable human-nature relationship, too. The writers even defend the vagueness and optimism of the concept, because this makes it more adaptable, stimulates further discussion and proves good intentions. For Suarez (2017) the three main values of the concept are:

- (a) "Recognizing" value, thereby legitimating or strengthening rationales for protecting nature*
- (b) "Demonstrating" value, to provide specific estimates for supporting rational decision-making frameworks such as cost-benefit analysis*
- (c) "Capturing" value, by operationalizing new policy instruments, institutional arrangements, and mechanisms for managing ecosystem services such as PES programs (Suarez, 2017, p.9)*

I.4.2 International trends in Ecosystem Services

With the rise of the ES model in science since the 2000s came the realization that the future provision of many services is severely threatened worldwide due to human activities. The maintenance and restoration of such ecosystems that provide essential services even became one of the Aichi biodiversity targets of the CBD, initiated by the UNEP in 2010 (UNEP, 2018). Although a majority of essential ES momentarily produces increasing benefits, resulting in an overall rise of human well-being, the underlying natural capital continues to deteriorate (Shepherd et al., 2016).

The supply of many ES, especially provisioning and regulating ones, is strongly linked to biodiversity (Hooper et al., 2005; Cardinale et al., 2012). On a global scale, the most influential direct impact factor on both biodiversity and ES is land and sea use change, followed by exploitation of organisms, CC, pollution and invasive alien species (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services [IPBES], 2019). These direct drivers in turn are induced by underlying indirect drivers such as demographic, technological, economic and political developments. There is no ES whose overall global status or trend can be assessed positively (IPBES, 2019). While provisioning services differ in their variation over time and space, most regulating (e.g. freshwater quantity and quality) and cultural services (e.g. physical and mental stimulations) altogether deteriorate. Among the worst rated are habitat creation and maintenance, pollination and seed dispersal, pest regulation and education (IPBES, 2019). Without a transformational change in overall population, production and consumption trends, the status of worldwide biodiversity and ES is very likely to further deteriorate during the next decades (IPBES, 2019; Otero et al., 2019; Termeer et al., 2016). The economic costs for lost ES due to land degradation amount to approx. 10% of the world's 2010 GDP. (Sutton et al., 2016)

The situation in Western Europe resembles the global one (IPBES, 2018). Despite many conservation and restoration efforts, some of them quite successful, the overall biodiversity keeps declining. Nearly all ecosystems exhibit negative trends, with temperate peatlands being the only stable exception. This means a decrease for most of the regulating and non-material ES. Throughout all of Europe, especially habitat maintenance, pollination, freshwater quantity and quality, soil formation and protection, and adoption of local knowledge have diminished in the last 60 years. LUC, especially through agricultural intensification and urbanization, is once again the strongest driver of this development. Moist ecosystems or those under heavy human influence are particularly affected. CC on the other hand drives biodiversity loss almost equally bad throughout all habitats and is expected to have an even bigger negative impact in the next decades. A positive effect on biodiversity, however, is induced by

institutional regulations, and the educational and economic baseline of Western European countries is promising to support a future trend reversal.

I.4.3 Ecosystem Services research and consideration in decision-making

To secure the future delivery of ES, decision-makers are responsible to respect nature's needs and integrate them into their arrangements. Daily et al. (2009) illustrated one way how ES and decision-making are linked and thus influence each other (see *Figure 2*). While any decision inevitably affects ecosystems and their services, the degrees of their modelling, information sharing and consideration in decision-making depend on the actual social and political framework.

De Groot et al. (2009) agree to the ES concept being a potentially powerful tool, yet they still list numerous open questions that need to be resolved to improve its actual application. They arrange these questions in five fields of activity:

- a. *Understanding and quantifying how ecosystems provide services*
- b. *Valuing ecosystem services*
- c. *Use of ecosystem services in trade-off analysis and decision-making*
- d. *Use of ecosystem services in Planning and Management*
- e. *Financing sustainable use of ecosystem services* (de Groot et al., 2009, p. 261)

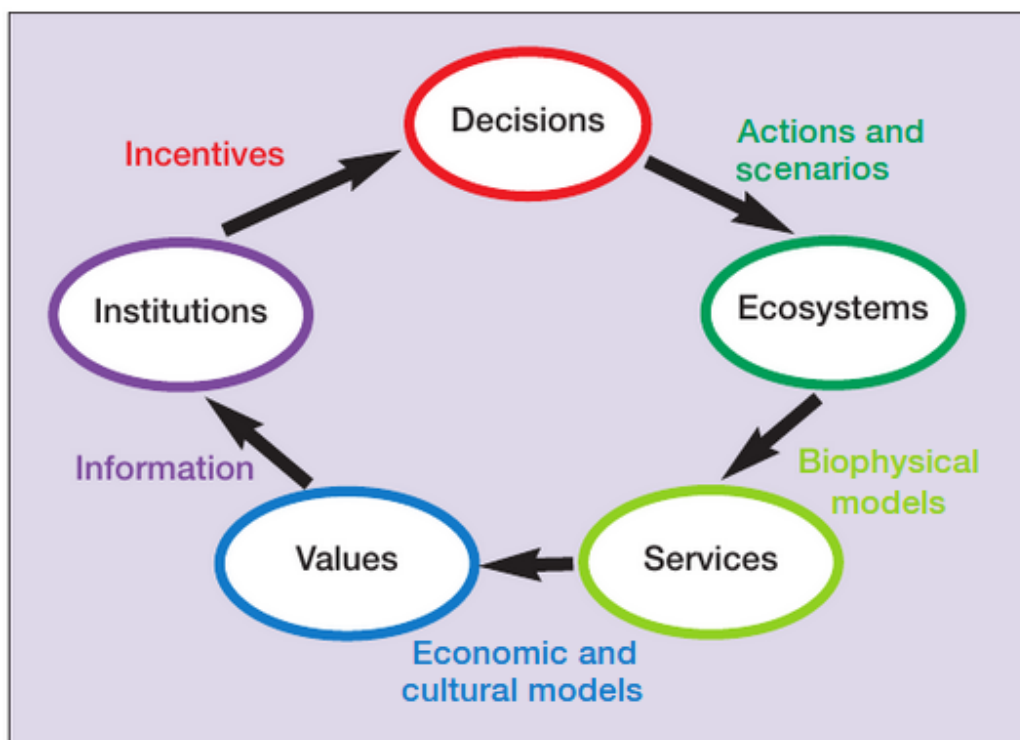


Figure 2: Exemplary framework how ES can be integrated into decision-making

Note. From “Ecosystem services in decision making: time to deliver” by Daily, G.C., Polasky, S., Goldstein, J., Kareiva, P.M., Mooney, H.A., Pejchar, L., Ricketts, T.H., Salzman, J., & Shallenberger, R., 2009, *Frontiers in Ecology and the Environment*, 7(1), p. 23 (<https://doi.org/10.1890/080025>). Copyright 2009 by Ecological Society of America.

While the first two fields mentioned (a, b) are mainly a matter of scientific research, the latter three (c, d, e) require common effort from different pillars of the society such as science, economy and politics. The scientific output regarding ES has almost constantly grown since the 1990s, with the EU and the USA together contributing to it by more than two thirds of all publications (McDonough et al., 2017). Since 2011, the EU also relies on the ES concept as a key element of its biodiversity strategies (European Commission, 2011, 2020). However, EU or state level programs often only indirectly include ES or insufficiently consider the natural complexity on local scales (Hauck et al., 2013). Subsequently, good quality data is still unavailable for many places or at the required spatial levels whereby a constructive utilization of the concept is prevented. A study conducted in New Zealand by Greenhalgh & Hart (2015) identified other obstacles to its application, for instance, slow contextual adaptation and deferred legalization in communal politics.

Despite such impediments, several studies conclude that there is progress towards a broader knowledge and consideration of ES in lower level politics. For example, Mascarenhas et al. (2014) found out that among Portuguese regional spatial planners the concept is not only generally known, but also considered important and applied by sufficiently trained personal. A study from the USA further revealed that the majority of voters, too, understands the relevance of ES, particularly regulating and provisioning ones (Metz & Weigel, 2010). This acceptance promotes the enhanced application of the model in the near future. A meta-study of Saarikoski et al. (2018) found that, for instance, transparency, participatory approaches and clear synergies of ES and human well-being enhance the application of ES knowledge, which is simultaneously impeded by factors such as established procedures, scientific uncertainties and opposed economic interests. The authors came to the conclusion that *“the concept of ecosystem services as such cannot erase the tensions between economic and ecological goals”* (p. 589). At the same time, another study from Dick et al. (2018) revealed that stakeholders mostly appreciated applying the ES model for its enhancement of stakeholder communication, cooperation and knowledge distribution. There is a range of studies analyzing how the application of the ES concept in local decision-making can be enhanced. Their recommendations include i.e. the development and use of simplified support tools specifically designed for all kinds of ES, and promoting communication channels for science-policy exchange where different valuation schemes are used and uncertainties are clearly reported (Ruckelshaus et al., 2015; Grêt-Regamey et al., 2017).

Even if ES are included in decision-making processes, they rarely produce simple and clear recommended courses of action. On the contrary, various stakeholders at different spatial levels often benefit from different services, resulting in target conflicts between different ES categories (Saarikoski et al., 2018). A frequent decision to be made is between the management of land to extract natural materials for economic benefits and development on the one hand, and the conservation of rather undisturbed ecosystems to maintain or improve regulating services on the other hand (Hein et al., 2006; Schindler et al., 2014). In such situations, a well-structured analysis of the decision's dependencies and impacts on all affected ES is needed to take legitimate targeted action without major delays (Greenalgh & Hart, 2015). To successfully integrate ES into decision-making processes from the beginning, Maynard et al. (2011) suggest creating general frameworks in collaboration with representatives of all groups of stakeholders. Their early participation enables transparent and application-oriented modelling and makes the outcoming scheme more likely to be actively used later on. Additionally, scenarios for future developments are helpful tools to navigate towards a sustainable use of ES (Ranganathan et al., 2008).

I.4.4 Links between Ecosystem Services and land use

Human land use is dependent on and interrelated with ES and biodiversity. For instance, agricultural land largely generates provisioning services (i.e. food production), while rather natural ecosystems often supply more regulating, supporting and cultural services (see *Table 1*). The intensification of agriculture drives biodiversity loss and thus reduces supply of ES (Emmerson et al., 2016). Likewise, increasing average farm size is related to decreasing habitat richness and diversity and biodiversity loss (Frei et al., 2018; Herzog et al., 2017). Organic fields usually achieve higher economic values per unit of land in almost all service categories compared to conventional ones and potentially even further improve rather than deteriorate them (Sandhu et al., 2010). However, these positive effects often disappear if measured per unit of output. (Meemken & Qaim, 2018). As in agriculture, intensification in forestry leads to reduced habitat complexity and thus negatively impacts biodiversity and linked ES, too (IPBES, 2018). Sustainable land use is crucial for human society, because after all “*more than half of the world’s total GDP is moderately or highly dependent on nature and its services*” (World Economic Forum, 2020, p. 8).

Table 1: Estimated monetary values of ES per biome

	Inland wetlands	Fresh water (rivers/lakes)	Temperate forest	Woodlands	Grasslands	Agricultural land	
						Conventional	Organic
Provisioning services	1659	1914	671	253	1305	3258	4012
Regulating services	17,364	187	491	51	159	54	107
Supporting/ Habitat services	2455	0	862	1277	1214	540	1388
Cultural services	4203	2166	990	7	193	21	21
Total	25,682	4267	3013	1588	2871	3873	5528
<i>Source</i>	<i>de Groot et al., 2012</i>					<i>Sandhu et al., 2010</i>	

Note. Values in \$/ha/year

Therefore, the perspective of farmers and other land managers on ES is crucial for their sustainable use. A study from Australia suggested that farmers highly value all ES (Smith & Sullivan, 2014). They felt moderately vulnerable to their deterioration and equally capable of managing them. Furthermore, Lamarque et al. (2014) found that farmers are generally willing to adapt their management schemes to a more ES friendly manner, if they benefit directly from the change, assess their knowledge to be sufficient and are not influenced otherwise by individual or social factors.

In Europe, however, projected land-use changes are expected to decrease ES between 10% and 15% from 2010 levels by 2050 (Maes et al., 2014). The land use form that is most harmful to nature is soil sealing. Covering the land surface with impermeable materials irrevocably depletes soil biodiversity and linked ES such as carbon sequestration (Lorenz & Lal, 2017). To compensate the predicted increase

in artificial land and ES loss, more than twice the area needs to be newly assigned to GI (Maes et al., 2014).

I.4.5 Selected exemplary services

Three ES from different categories, which play a major role both globally and in the study region, are examined in more detail in this study. The first one, the supporting ES ‘Habitats and species’, is a key indicator for the state of biodiversity and crucial underlying factor for the provision of many other services (Sonderegger et al., 2019). The abundance of habitats and species that are rare or worth protecting is related to, among others, the pool of genetic resources, an ecosystem’s resilience to changing environmental conditions and the enjoyment of nature by people (IPBES, 2018, 2019). The IPBES noted that on global and European scales, habitat maintenance clearly decreased during the past decades.

‘Insect Pollination’ is a regulating ES of fundamental importance for human food production and therefore of great economic value. Most of our main cultivated crops at least partially depend on insect pollination by both wild insects and honeybees (Umweltbundesamt, 2018). Hence, this ES is worth almost 300 million € annually in Austria alone (Zulka & Götzl, 2015). However, the trend is decreasing both around the world and in Western Europe (IPBES, 2018, 2019). Senapathi et al. (2015) found that only a small number of species such as the European honeybee contribute most of the economically relevant insect pollination. They and others further concluded that pollinator species richness is highly relevant, especially to ensure pollination under changing environmental conditions (Brosi & Briggs, 2013; Senapathi et al., 2015; Winfree et al., 2018). Diverse wild bee populations can even increase agricultural yields (MachInnis & Forrest, 2019). Insect pollinators benefit from frequent and diverse near-natural habitats (Holland et al., 2015).

The provisioning ES ‘Drinking water’ is assessed according to the quantity and quality of available ground and spring water and thus is directly affected by other regulating services such as water purification (Sonderegger et al., 2019). Once again, changing climatic and land use patterns require a sustainable use of this valuable resource to secure sufficient future supplies for the population without disturbing the ecological equilibrium. Just like the other two selected ES, the regulation of freshwater quality and quantity shows decreasing trends throughout Western Europe and the world, which is a circumstance largely related to CC (IPBES, 2018, 2019).

I.5 Situation in the study region

I.5.1 Description of the study region

The study was conducted with decision-makers from the four eastern Austrian districts Oberpullendorf (Burgenland), Neunkirchen, Wiener Neustadt city, and Wiener Neustadt countryside (all Lower Austria) (see *Figure 3*). Except for the city of Wiener Neustadt, the region has a rural character with mostly rather low population densities (see *Table 2*). While the population increased in the Lower Austrian districts and especially in and around the city Wiener Neustadt during the last ten years, it slightly

decreased in the Eastern district Oberpullendorf. The Gross Regional Product (GRP) is below the national average and Oberpullendorf has the second lowest value of all Austrian regions.

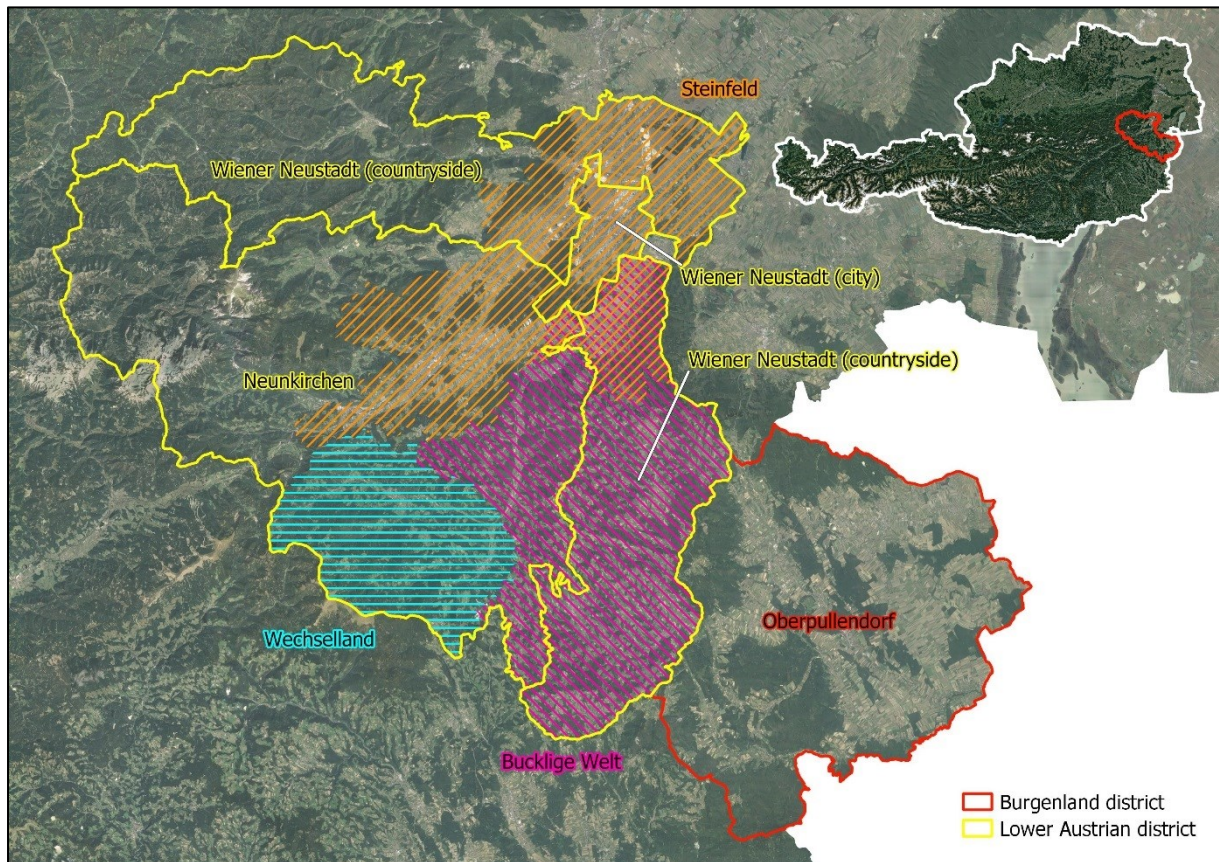


Figure 3: Map of the study region including district borders and relevant subregions

Note. Map data by Google (n.d.)

The area is situated on the western border of the Pannonian and on the eastern border of the Alpine biogeographical region. Its continental influences comprise hot summers and low precipitation, whereas winters are usually not very harsh. The three selected districts embrace an altitudinal gradient from 162m to 2076m above sea level and therefore contain landscapes ranging from lowland to alpine. More than half and in the district Neunkirchen even two thirds of the area are covered with forests (see *Table 3*). Agricultural areas make up for another 30,9% of the area and are particularly widespread in the district Oberpullendorf. Gardens have single-digit percentages throughout the total study area but play a greater role in the city of Wiener Neustadt.

In the whole of Austria, land that is both currently or generally not used for agriculture, forestry, or infrastructure altogether makes up about 15% of the total land area (Bundesministerium für Landwirtschaft, Regionen und Tourismus [BMLRT], 2021a), which is approx. four to six times more than in the states of Burgenland and Lower Austria, respectively. LUC in Austria is most frequent towards forest or human infrastructure (Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft, 2015). Soil sealing is overall moderate compared to other European countries with an average annual increase of 0.37% (European Environment Agency, 2020). Meanwhile, the overall

soil consumption rate including use of sealed and unsealed land is among the highest in Europe (EU-Umweltbüro, 2017). The study region's particular shares of built areas, agricultural lands, gardens, and vineyards correlate more or less with those of the entire country, while forests are relatively more abundant and high alpine areas relatively less (WKÖ Statistik, 2020).

Table 2: Statistical description of the districts in the study region

	Entire study area	Oberpullendorf	Neunkirchen	Wiener Neustadt (countryside)	Wiener Neustadt (city)
Area (ha)	287,918	70,152 ¹	114,692 ²	96,984 ²	6,090 ³
Population in 2019/2020 (Diff. to 2011)	252,196 (+3.4%)	37,384 (-0.5%) ¹	86,343 (+1.0%) ²	78,307 (+4.3%) ²	50,162 (+9.7%) ³
Pop. density (nr. of people/km ²)	71.46	53.47	75.02	80.21	823.68
Biggest municipality (nr. of inhabitants)		Oberpullendorf (3,204) ¹	Neunkirchen (12,721) ⁴	Sollenau (5,172) ⁴	Wiener Neustadt (50,162) ³
Highest peak		883m ⁵	2 086m ⁵	1 760m ⁵	332m ⁵
GRP per capita		26 400€ ⁶	30 800€ (NUTS-3 Region 122) ⁶		

Note. Diff. = Difference. Sources: (1) Statistik Burgenland (2020), (2) Amt der Niederösterreichischen (NÖ) Landesregierung (2021a), (3) Magistrat der Stadt Wiener Neustadt (2020), (4) Amt der NÖ Landesregierung (2021b), (5) Alpenverein Schwanenstadt (2021), (6) Statistik Austria (2020).

Table 3: Land use in the study region per district and in total

	Entire study area	Oberpullendorf	Neunkirchen	Wiener Neustadt (countryside)	Wiener Neustadt (city)
Built area	0.9%	1.0%	0.8%	0.8%	3.9%
Agricultural use area	30.9%	40.7%	22.8%	32.6%	41.5%
Gardens	2.9%	2.8%	2.6%	2.7%	11.1%
Vineyards	0.8%	3.0%	0.0%	0.1%	0.3%
Alps	0.4%	-	0.8%	0.2%	-
Forest	58.4%	46.9%	66.8%	58.8%	23.7%
Open water	0.7%	1.1%	0.5%	0.7%	1.3%
Other	5.2%	4.5%	5.8%	4.2%	18.0%
Source		Statistik Burgenland (2020)	Amt der NÖ Landesregierung (2021c)		

1.5.2 Environmental politics and decision-making in the study area

The human use of natural resources is regulated by numerous laws, plans and concepts on different scales ranging from international to local level. Since society emerged from and is based on the given natural conditions, there is no field of politics that is not at least indirectly linked with some ES. For instance, social policy influences demographic changes such as urbanization, and economic policy effects the development of certain economic sectors. Thereafter, both drive ES use and future availability.

On a broader spatial scale, the EU and the Republic of Austria regularly release laws, guidelines and concepts concerning ES development in one way or another. One relevant example is the “Österreichisches Programm für umweltgerechte Landwirtschaft” (ÖPUL), the Austrian Agri-Environmental Scheme under the Common Agricultural Policy, to support environmentally friendly farming. It is cofounded by the EU, Austria and its federal states (BMLRT, 2021b). For the latest programming period it contained a budget of almost 440 Mio. € annually, approx. one quarter of it for organic farming. The overall Austrian-wide budget for climate related measures across all sectors has fundamentally increased over the years and summed up to more than one billion in 2021 (Parlament, 2020).

Due to the federal structure, the translation of common rules into concrete land use decisions generally takes place at lower administrative levels (VfSlg 2674/1954). In Austria, the nine federal states are responsible for regional planning, whereas the local planning lies in the hands of the municipalities (Gruber et al, 2018). Additionally, most states added regions and/or districts as additional administrative levels for regional planning.

The four districts of the study area are situated in two different federal states (Lower Austria and Burgenland) and thus work under slightly different planning premises. There are two relevant documents in Burgenland: a development strategy (Regionalmanagement Burgenland, 2011) and a development program (Burgenländische Landesregierung, 2012). The latter one specifically defines central locations, areas of industrial and tourism priority as well as important nature zones. The Lower Austrian state government is not as spatially precise (Niederösterreichische Landesregierung, 2004). Their development concept comprises general intentions and strategies and thereby hands over more executive responsibility to the districts and municipalities. To realize their goals, they suggest several political instruments embracing legal action, informal communication measures, participative methods, monetary tools, infrastructural development and project assessments. This variety of instruments can involve numerous stakeholders of different backgrounds and positions such as local authorities, associations, political and research institutions, interest groups, non-governmental organizations (NGOs) and more. Both the Burgenland development strategy and program as well as the Lower Austrian development concept incorporate separate sections on the conservation and sustainable use of natural resources (Burgenländische Landesregierung, 2012; Regionalmanagement Burgenland, 2011; Niederösterreichische Landesregierung, 2004). They promote a wholistic approach and demand that the expected impacts of decisions on nature, landscape and climate are considered on all levels. This is critical i.a. for the creation of concrete land utilization plans. Both states further emphasize the importance of PAs. ES are not mentioned directly, but particular services are itemized. One example for the implementation of these political goals on local scale are several laws and programs by the city of Wiener Neustadt to support green spaces and restrict building development (Magistrat der Stadt Wiener Neustadt, 2020).

The current political landscape of the study region is diverse. On state level Lower Austria has been governed by the conservative “Österreichische Volkspartei” (ÖVP) since 1945 (Amt der NÖ Landesregierung, 2021d), whereas in Burgenland the social democrats of the “Sozialdemokratische Partei Österreichs” (SPÖ) gathered most votes and appointed the chairman ever since the 1960s (Amt der Burgenländischen Landesregierung, 2021). Other parties like the right-wing “Freiheitliche Partei Österreichs” (FPÖ), the green “Die Grünen” or the liberal “Das Neue Österreich und Liberales Forum” (NEOS) are currently represented in the regional governments but gained considerably fewer seats. The results of the 2020 elections for the municipal councils of the study region altogether resemble these trends despite great differences between certain localities (Amt der Burgenländischen Landesregierung, 2021; Amt der NÖ Landesregierung, 2021d). It is noticeable that “Die Grünen” gain much lower percentages in the study region than on national level, where they currently make up the government together with the leading ÖVP. Following the all-Austrian trend, women are significantly underrepresented in local politics (Bundeskanzleramt, 2020). In Burgenland and Lower Austrian municipal councils, only about 24% of the posts are occupied by women.

I.5.3 Climate change in the study region

Since the late 19th century Austria experienced a temperature increase that is about twice as high as the global average (Kromp-Kolb et al., 2014). Half of this gain (about 1°C) happened only between 1980 and 2000 and is mostly attributed to anthropogenic GHG. Furthermore, it is very likely that temperatures will keep rising throughout the 21st century. The extent of this rise, especially during the second half of the century, largely depends on current and ongoing GHG emissions. Without targeted adjustments it could reach values of 3 to 5°C above those of the early 1900s.

Other climatic changes can be seen in conjunction with the temperature increase, too (Kromp-Kolb et al., 2014). For instance, the mean annual sunshine duration expanded by 20% compared to the 1880s. Air humidity remained at rather constant levels in the mountains but substantially decreased at lower altitudes and particularly in Austria’s North and East. Contrary to the Western Alps, which exhibit an overall increase of precipitation, snow and rainfall in the South Eastern Alpine region went back by 10 to 15%. While long-term climatic changes are evident, short-term weather changes did not become more frequent. Temperature courses even stabilized since 1880. An increased frequency or magnitude of storms and other weather extremes has therefore not become evident until now.

CC has and is expected to further have spatially varying consequences for people in the study region. Schönhart et al. (2016) forecast an increasing crop productivity for a Lower Austrian cropland dominated area until 2040, whereas Kirchner et al. (2016) predict agricultural intensification and rising yields rather in mountainous regions with concomitant extensification in marginal areas. Both studies, however, expect overall negative impacts on environmental conditions. Other anticipated consequences comprise i.a. shifts in tourism and flood risks particularly in the mountainous areas (Fleischhacker, 2018; Formayer & Kromp-Kolb, 2009).

I.5.4 Ecosystem services in the study region

In a recent study Sonderegger et al. (2019) assessed and mapped the most important ES in Austria. Their results show that the provision of many services depends directly or indirectly on the topography of an area and the climate that is linked with it. One of the main consequences is the varying suitability for different forms of economic land use. While there is a lot of intensive grain and crop farming in the Eastern Austrian plains, higher altitudes support the cultivation of grassland and forests better. This affects i.a. the level of biodiversity, which further supports the provision of many ES. According to the study results, the ecological condition of Austrian watercourses, farmland and forests is often better in the Alps and Alpine foothills. This is applicable to the study region, too, where higher-value areas are predominantly located in the western mountainous parts. In terms of habitat fragmentation and share of deadwood in forests, no such clear directional transition following the altitudinal gradient is visible in the study region. Furthermore, the four districts of the study region all exhibit similarly moderate erosion protection and flood retention, moderate to high use of plant resources for renewable energies and rather high economic use of wildlife. The availability of fertile soil for forestry and the potential for recreational use are noticeably higher in mountainous areas, while fertile soil for agriculture is more available at lower altitudes.

Similar to other services, the supply of the three selected ES (see chapter I.4.5) largely correlates with the topography of the study region (Sonderegger et al., 2019). The Northern Limestone Alps region, for instance, hosts a large number of protected and endemic habitats and species. Consequently, in the western part of the study region higher values are assigned for the ES 'Habitats and Species' than in the eastern part. Since most of agriculture in the mountains does not rely on insect pollination, this particular service plays a much bigger role in the rather flat regions in the North, Northeast and Southeast of Austria. This includes the western and central parts of our study area, where moderate amounts of biomass are produced from insect-pollinated crops. It is to be expected, however, that CC and LUC will have significant impacts on the crops cultivated and the related demand for insect pollination in the future (Umweltbundesamt, 2018). The Austrian Alps hold the biggest shares of accessible ground and spring water in the country. This is why the largest amounts of drinking water come from there, too (Sonderegger et al., 2019). In the study area, the gradient of availability and use of ground and spring water resources follows the altitudinal gradient from high in the northwestern alpine mountains to low in the southeastern Pannonian plains.

I.6 Study aims

The ongoing deterioration of ES, which is strongly linked to CC, dangerously threatens our economic and societal future well-being. To counterbalance this trend, it is necessary to integrate profound information on ES into environmental and land use policies. Therefore, the project "managing Climate cHange impacts on land use and EcoSystem Services" (CHESS) of the Austrian Climate Research Programme in cooperation with the Environment Agency Austria is set to produce predictions for the development of land use and ES under different climatic and socio-economic premises (Umweltbundesamt, 2018). It applies a modified agent-based model to provide expected trends of nine climate and agriculture related ES until 2050 in two case study regions in central and eastern Austria. For this, the project also incorporates stakeholder involvement on local to national level.

This is the point where my study comes into play: I herewith aim to research how the ES concept is known, assessed and applied by Austrian local decision-makers, especially against the background of previously identified obstacles to its implementation (see de Groot et al., 2009). In addition to their consideration of the ES approach, I point out other existing or desired ways in which ecological behalves can be integrated into policy-making as observed by the people concerned. Hence, this study is open-ended and oriented towards the perspectives of the participants. It is conducted in the mostly rural and environmentally diverse communities of the eastern CHESS study region. To verify the general statements of the interviewees with scientifically studied examples, I further inquire information on the state and trend of selected individual ES. The results will provide conclusions on the similarities and differences in the perception of ecosystems and their services by different actors in local politics. They will also suggest possible approaches to promote ecologically sustainable policies, especially by effectively incorporating the ES concept in local decision-making for the benefit of all. In addition, the findings will be considered in the creation of the CHESS scenarios and thus support the reality and usability of the project's outcomes.

II Methods

II.1 Research process

The study was conducted mainly between September 2020 and February 2021. The topic was already determined in the beginning of 2020, when I was introduced to the CHESS project. I realized that it required further research to understand the role of ES in the study region's politics in order to assess how local decision-makers act and will act regarding ecosystems and their services. I then obtained an overview of the state of research and initially planned to conduct the first interviews in the early summer of 2020. However, the outbreak of the Covid-19 pandemic in Europe and the following restrictions of public life in Austria in March 2020 severely affected both my own and my potential interview partners' personal and working life. I therefore decided to wait until the necessary capacities to conduct the study were restored and postponed it to the second half of the year. Eventually, the majority of the interviews took place between October and December 2020, while one came a little later in early February 2021. At last, during the time from December 2020 to March 2021 I focused on the transcription, evaluation and contextualization of the interviews as well as the compilation and review of the entire study.

II.2 Preparation of the study

II.2.1 Choice of Method

This study aimed to research in depth how ES perception, consideration and related action among local politically active persons are related. Of the two principal methods of social sciences – quantitative and qualitative research – the latter one served this purpose a lot better, as it allowed for capturing information that goes beyond the frame of, for instance, a determined questionnaire. Instead, the interviewees had the opportunity to add or emphasize topics according to their individual perception (Lamnek & Krell, 2016).

Since the topic has been investigated rarely so far and never at all in Austria, the main objective of the study was to provide a sound overview of the various perceived impacts and outcomes of ES related decision-making. To accomplish this goal, I decided to conduct a series of qualitative interviews with decision-makers and other political actors of different ideological backgrounds and exertions of influence on the state of ES in the study region. Due to their active participation in local political and/or administrative processes, the selected interviewees were presumably familiar with environmental policies to a certain extent. It was therefore not necessary to provide them with preliminary information or pose possibly suggestive pre-written questions. Instead, to assess their personal *"perspectives, feelings, opinions, values, attitudes, and beliefs"* (Saldana, 2011, p. 32) on the topic as completely and purely as possible, a slightly guided interview served the study purpose best.

Among the various methods for qualitative interviews, I chose to apply the technique of the problem-centered interview (PCI) as described by Witzel (2000). It is characterized by its flexible applicability, integrating both inductive and deductive elements. Its three basic principles are:

- Problem-centered orientation: Prior to the conversation, the interviewer educates themselves as objectively as possible about the subject and the interviewee's relation with it. This enables them to properly understand and associate the respondent's statements with the context. It also enables the interviewer to react with precise ongoing questions in the research interest.
- Object orientation: The interviewer adapts to the subject and to the interviewee. This can include the addition of further research methods to the primary interview as well as the applied question techniques within it.
- Process orientation: The interviewer aims to create an atmosphere that stimulates the respondent to give honest and detailed answers. A fluent conversation is desirable, because it is more likely to reveal correlations of different subtopics. Redundancies and contradictions are no burden to the interviewer, but instead facilitate more precise interpretation or uncover areas of conflict, respectively.

II.2.2 Interview guideline

A key instrument of the semi-structured PCI is the interview guideline. After obtaining an overview of the state of research, I created a guideline oriented to the aspects of the research question (see Appendix 1). The guideline was supposed to help addressing all relevant topics during the interviews and thus to ensure the comparability of the individual responses (Witzel, 2000). It began with a short questionnaire to capture the personal, professional and political background of the interviewees. This questionnaire simultaneously served as a conversation starter and thematic introduction (Lamnek & Krell, 2016). It was followed by the main part of the interview, which comprised five major questions:

1. How do the interviewees perceive their roles within political decision-making processes?

The first question should reveal the interviewees' general understanding of the dimensions of political decision-making processes as well as their individual range of impact and courses of action. It further stimulated statements on their political ideology. The responses to this question thus later helped to assess the actual degree of influence of local politics on environmental changes, at least as perceived by the involved themselves.

2. In what relation do they see political decision-making and ES?

The second question aimed to investigate the interviewees' views on the relationship of man and ecosystem, their comprehension of ES and their opinion on whether and how they should be considered in political decision-making. If the term 'ecosystem service' was unknown to an interviewee, they were given a short description based on the definitions of the MA (2005).

3. Which role do ES play in the decision-making processes in which the interviewees are involved?

In their responses to the third question, the interviewees were supposed to state how they personally perceive and consider ES. This should provide information on the discerned values of individual services or groups of services and on the experienced and desired significance of ES within concrete decision-making processes. This question first drew attention to the local conditions.

4. How do they assess the provision of ES in their region?

The fourth question served to identify the key services of regional ecosystems as perceived by the interviewees. It should lead to a description of both current state and future development of regional ES with special regard to their interrelation with CC. The responses could be used later on to determine similarities and discrepancies with scientific findings.

5. How do they assess the situation of the services (1) Habitats and species, (2) Insect pollination, and (3) Drinking water?

Fifth came a question on the regional importance, political consideration and state and trend of three selected ES. I chose these services out of the nine in the CHES project (Umweltbundesamt, 2018), because they represented three of the four existing categories of ES (namely supporting, provisioning and regulating services) and were rather easy to understand even without a specific professional background. Similar to the previous question, this one, too, should reveal the accordance of scientific findings and individual perceptions of the interviewees.

At last the interviewees were given the opportunity to address any related topics they considered important and that were not covered by the guideline.

II.2.3 Recruitment of the interviewees

Qualitative social research is not targeted to achieve representative results. Nevertheless, it aims to represent as fully as possible the different patterns of thought and action that exist within the relevant population. Therefore, it is essential to include as many different and typical points of view as possible (Lamnek & Krell, 2016; Saldana, 2011). In the case of this study, I made sure to interview individuals of different age, gender and place of residence representing different authorities, stakeholders and political ideologies. To adequately present the multitude of different viewpoints and at the same time avoid repetitions, a number of approx. ten interviews was an appropriate goal.

Since I intended to interview persons with responsibilities in the public administration, I searched and contacted my candidates online. I approached them in writing – usually via email –, introducing them to my general research interest and asking for their willingness to participate. To avoid that the interviewees prepared themselves for the interviews by researching ES and thus distorted my results, I only mentioned that I wanted to talk about topics within the field of politics and ecology. I did not approach all possible interview partners at once but step by step. This way I could react to confirmed and refused interview requests and adapt the choice of further candidates with regard to the admired interviewee diversity.

II.3 Conducting the interviews

In my enquiry, all interviewees were provided with the same information about my academic background and general study interest. To make sure that they would speak honestly and without hesitation, I guaranteed them to remain neutral against their opinions at all times and to anonymize personal details in the further course of the study. They were not given any precise information on the topics I planned to address. I further informed them that I expected the conversations to last approx. 30-60 minutes.

Because of the changing restrictions for the prevention of the spread of Covid-19, I could only conduct the first three of my interviews face-to-face. The rest was conducted via video chat or telephone. The sequence of the conversations, however, remained the same regardless of the circumstances. At first, I introduced myself, the study aim, and the procedure of the interview. In doing so, I emphasized that I would not assess any of the interviewees' statements as right or wrong but rather accept every point of view as equally legitimate. This was meant to help creating a relaxed and open atmosphere and stimulate meaningful statements. I then obtained everybody's consent to record the interviews for later transcription and thereafter started with the short questionnaire (see chapter II.2.2).

Throughout the interviews I attached great importance to the flow of the conversations and asked my interview partners to describe their ideas in more detail or by means of an example whenever it seemed helpful for my understanding. Even if the interviewees shifted topics away from the initial question, I did not interrupt their replies and only directed them back along the guideline when I felt that they had made their point. The purpose of this procedure was to gain additional information on the perceived relative value of certain aspects as well as the personal associations that came with it. This conversation strategy apparently stimulated some interviewees more than others to add anecdotal details to their statements, so that the duration of the interviews eventually ranged approx. from 25 to 75 minutes. All conversations were conducted in German, the common mother tongue of the interviewer and all interviewees.

II.3.1 Interview partners

In sum, I conducted interviews with eleven people of various backgrounds, corresponding to a success rate of approx. 40% relative to the number of requests. While on the one hand more than half of my interview partners were active in the district of Neunkirchen – the largest district in the study area –, on the other hand the range of activity of only one person extended to the district of Wiener Neustadt (countryside). Six out of ten were representatives of political groups, and among them were members of well-established parties as well as a crossbench politician, and a member of a political youth organization. The last interview, which followed the others with some distance, was conducted with a member of the SPÖ to secure the inclusion of the positions of all four most voted parties in Austria (Bundesministerium für Inneres, 2019). The remaining interviewees were selected for their participation in regional environmental projects, land use stakeholder organizations and a youth movement. Altogether, I interviewed three women and eight men, ranging in age from 16 to 71, who had between 1 and 26 years of experience in their current positions. All interviewees were assigned an interviewee ID consisting of the letter 'I' and a number according to the order in which the interviews were conducted. For more details on the individual interviewees, see *Table 4*.

Table 4: Personal and interview details per study participant

	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11
Personal details											
Gender	m	m	m	f	m	m	f	m	f	m	m
Age [y]	31	62	64	31	39	61	51	26	16	71	42
District	Neunkirchen	Ober-pullendorf	Ober-pullendorf	Neunkirchen	Neunkirchen/ Wiener Neustadt (countryside)	Neunkirchen	Neunkirchen	Wiener Neustadt (city)	Wiener Neustadt (city)	Neunkirchen	Ober-pullendorf
Currently contributes to decision-making as...	Member of city council	Farmers' representative	Member of municipal council	Representative of env. project	Representative of env. project	Hunter's representative	Member of municipal council	Member of pol. youth organization	Member of pol. youth movement	Member of municipal council	Member of municipal council
In this function since... [y]	1	26	18	1	7	6	1	3	2	25	9
Politically active since... [y]	10	37	35	?	?	6	8	8	2	56	15
Membership in pol. organization (if applicable)	Die Grünen	ÖVP	LBL (voter group)	?	?	-	ÖVP	Junge Linke	-	FPÖ	SPÖ
Other occupation (if any)	Gardener	-	Merchant	University lecturer	Engineer for technical env. protection	Farmer	-	Student. social worker	Student	Farmer (retired)	Vocational trainer
Interview details											
Date	06 Oct 2020	15 Oct 2020	15 Oct 2020	19 Oct 2020	28 Oct 2020	17 Nov 2020	10 Dec 2020	11 Dec 2020	18 Dec 2020	21 Dec 2020	06 Feb 2021
Duration [min]	35	75	45	40	50	75	60	55	25	55	55
Note: LBL = Bündnis Liste Burgenland env. = environmental f = female m = male pol. = political ? = information not collected. All data refer to the time of their collection											

II.4 Working with the collected data

II.4.1 Transcription

Another key instrument of a PCI – besides the guideline – is the transcription of the interview based on an audio recording. It allows the interviewer to fully focus on the course and content of the conversation – including non-verbal communication – without risking to lose any information given in the spoken words for further investigation (Witzel, 2000). The subsequently transcribed text of the interviews is essential to analyze, interpret and compare the interviewees' statements, to substantiate the conclusions (Lamnek & Krell, 2016) and thus for the value of the entire study. To secure the necessary high quality of the transcript, it requires a conscientious handling of both the challenging everyday language and the non-verbal aspects such as breaks or laughter (Lamnek & Krell, 2016). However, according to the standards of simplified scientific interview transcription for mainly content-related studies, some modification of the language is acceptable and useful. To some extent, these comprise, for example, smoothing diction and omitting interactive aspects that are irrelevant for the study purpose (Fuß & Karbach, 2019). For details of the transcription rules applied in this study see Appendix 2. Additionally, in some cases I complemented the transcripts with information on the interview conditions, disturbances or perceived non-verbal communication similar to the findings of a postscript (Lamnek & Krell, 2016).

II.4.2 Analysis

After completing the transcription of several interviews, I could start analyzing the material. The main objective of my analysis was to identify and describe the elements of ES related patterns of thought and action as well as their influences and correlations. Therefore, I applied the techniques of the structured content analysis (Kuckartz, 2018; Mayring, 2015). Due to the complexity and diversity of the discussed topics and the great heterogeneity among the interviewees, other established methods of qualitative data analysis such as the evaluative content analysis or type formation were not favorable with regard to the study interest.

The structured content analysis is carried out by first breaking down the conversation into monothematic statements. Each individual section corresponds to a unit of coding, is assigned a higher-level thematic code, and is thus integrated into the overall coding framework. The available data, in this case the interview transcripts, are thereby reduced in their complexity and classified into a hierarchical system of categories. This enables subsequent analysis both within and across individual interviews. In the case of this study, I adopted a mixture of a priori creation of categories and creation of categories with the material as presented by Kuckartz (2018). Therefore, I first deductively designed a coding framework based on my study interest and the interview guideline, and then inductively refined and expanded it according to the actual interviews. The inductive creation of categories was performed mainly with the first three interview transcripts (interviewees I1-I3) and then applied to the entire material with only minor subsequent modifications. In the end, I obtained a coding framework with three levels of categories and subcategories superior to the final coding level (see chapter III.1). I assigned exactly one code to each individual unit of coding with the goal of obtaining a system that is disjunctive, plausible, exhaustive, readily presentable, and communicable (Kuckartz, 2018). I carried

out the coding using the QDA Miner Lite software and afterwards exported the categorized material to Microsoft Excel for further organization and analysis.

III Results

Most of the following section – except for its first and last chapter – comprises summaries of all substantial points of view of the study participants. The structure of this main part of the 'Results' chapter mostly follows the coding system and is occasionally supplemented by additional sub-chapters. This is due to some new thematic interlinkages, which became apparent in the course of the further analysis, and to subsequent considerations on my part for better understanding.

The result of this slight reorganization is the present structure of the following section, which can be roughly divided into two parts. The initial focus lies on how people in the study region deal with their environment, so emphasis is primarily put on environmental politics and related areas. The second part then focuses on the region's ecosystems, the services they provide, and the perceived developments of both. Since both thematic areas are largely interrelated, the transition of the two parts is fluent and they are closely intertwined.

III.1 Overview of the topics addressed

According to the topics raised by the interviewees, I identified six thematic supercategories with varying numbers of associated subcategories and codes. All codes as used during the first steps of the analysis process are shown in *Table 5* together with their respective individual and overall shares of speech. The superior categories were:

- Interviewee details (6.4% of the total words used across all interviewees): This supercategory was assigned to statements that concerned the personal, professional and political background of the interviewees. The share of thematic remarks within the individual conversations ranged from 0.7% (I5) to 13.4% (I10).
- Decision-making (13.8%): This includes all statements made on the overall political business inside or with reference to the study region. I differentiated between general explanations and comments on the course of decision-making ('Processes', 10.9% overall) and notes on the 'Personal involvement' (2.9% overall) of the study participants in the same. The highest individual value by some distance was found with I4 (45.1%), the lowest with I10 (3.7%).
- Ecosystems (33.4%): This supercategory comprises comments on the properties, state, trend and interrelation with people of ecosystems both in general and in the study region. Among the interviewees, I5 addressed this topic the most (45.5%) and I4 the least (27.3%). I9 talked about CC against this background more than three times as much as the average, each relative to the words used. All notes on the concept of ES as well as on individual services were summarized in an extra subcategory that makes up for about one fifth of the total words spoken.

Table 5: Thematic shares of speech as assigned in the coding system per interviewee and in total

	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11	Total
Words:	2,704	4,196	5,761	3,782	5,257	7,902	5,094	6,032	1,951	6,432	5,587	54,693
Interviewee details												
Personal details	6.3%	7.6%	5.0%	3.4%	0.7%	4.0%	4.8%	12.4%	4.6%	13.4%	5.8%	6.4%
Political / professional activity	0.5%	0.7%	0.6%	0.4%	0.1%	0.1%	1.6%	0.1%	0.5%	3.3%	1.7%	0.9%
Political ideology	3.7%	2.5%	0.7%	0.4%	0.3%	0.4%	0.7%	2.0%	3.9%	2.0%	0.7%	1.3%
Additional activities	0.6%	0.7%	3.0%	1.5%	-	1.7%	-	6.7%	-	4.9%	2.1%	2.3%
	1.5%	3.7%	0.7%	1.1%	0.3%	1.8%	2.5%	3.6%	0.2%	3.2%	1.3%	1.9%
Decision-making												
Processes	18.8%	6.9%	16.6%	45.1%	21.3%	9.3%	8.0%	12.5%	14.9%	3.7%	9.3%	13.8%
Personal involvement	18.5%	4.8%	15.4%	36.6%	18.7%	7.4%	4.8%	7.4%	11.9%	2.5%	5.9%	10.9%
	0.3%	2.1%	1.2%	8.5%	2.6%	1.9%	3.2%	5.1%	3.0%	1.2%	3.4%	2.9%
Ecosystems												
Characteristics	35.0%	33.8%	29.3%	27.3%	45.5%	29.8%	32.4%	32.5%	33.5%	33.2%	36.2%	33.4%
State and trend	-	-	0.8%	-	1.3%	-	0.6%	-	-	-	0.3%	0.3%
Man-ecosystem relationship	-	-	1.4%	-	3.6%	0.7%	0.3%	-	1.9%	4.9%	0.9%	1.4%
Climate change	2.8%	2.5%	0.7%	1.5%	8.3%	2.2%	10.9%	11.1%	3.0%	2.1%	3.5%	4.6%
Regional features	6.8%	4.5%	4.0%	1.7%	8.8%	4.1%	1.0%	1.3%	15.1%	4.6%	4.7%	4.4%
	4.6%	2.8%	0.8%	2.5%	0.7%	2.9%	7.8%	1.5%	1.6%	0.4%	3.5%	2.5%
Ecosystem Services												
Concept	20.8%	24.0%	21.6%	21.6%	22.8%	19.9%	11.8%	18.6%	11.9%	21.2%	23.3%	20.2%
Consideration in politics	0.4%	1.9%	1.0%	0.7%	0.5%	0.4%	1.5%	-	0.1%	0.1%	0.3%	0.6%
Habitats and species	1.3%	3.4%	0.5%	-	4.2%	-	1.9%	0.5%	3.5%	-	1.6%	1.3%
Insect pollination	5.1%	4.1%	6.6%	7.5%	4.1%	4.4%	2.2%	2.4%	0.3%	8.6%	7.1%	5.0%
Drinking water	4.7%	6.2%	5.4%	3.5%	4.5%	6.6%	3.6%	3.8%	1.4%	4.9%	3.6%	4.7%
Other services	9.2%	7.2%	8.1%	9.9%	8.9%	8.5%	2.6%	11.9%	6.6%	7.6%	8.3%	8.2%
	0.1%	1.2%	-	-	0.6%	-	-	-	-	-	2.4%	0.4%
Environmental politics												
Sustainability	39.2%	48.5%	44.7%	23.1%	25.7%	42.4%	50.4%	33.7%	34.2%	45.8%	43.1%	40.1%
Land use	23.5%	15.1%	11.9%	3.5%	1.5%	1.0%	16.2%	17.3%	12.0%	6.8%	16.4%	10.4%
Buildings	10.0%	0.3%	0.3%	-	1.2%	1.0%	3.5%	4.5%	5.3%	1.8%	3.3%	2.4%
Mobility	3.3%	-	0.9%	-	-	-	-	5.3%	-	2.1%	4.5%	1.5%
Green infrastructure	8.7%	1.1%	1.0%	2.3%	-	-	-	6.2%	-	1.2%	1.9%	1.8%
Energy	1.5%	10.3%	4.3%	1.0%	-	-	12.7%	0.8%	6.7%	1.7%	6.4%	3.7%
	-	3.4%	5.4%	0.2%	0.3%	-	-	0.5%	-	-	0.3%	1.0%

	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11	Total
Use of natural resources	0.9%	29.4%	9.3%	4.2%	14.5%	37.3%	25.2%	1.0%	1.3%	22.9%	14.7%	17.2%
Agriculture	0.9%	23.2%	6.6%	-	8.8%	11.5%	18.6%	-	-	13.2%	3.5%	8.7%
Forestry	-	6.2%	1.1%	-	4.4%	0.3%	6.6%	1.0%	-	6.7%	5.7%	3.2%
Hunting	-	-	1.6%	-	0.3%	19.9%	-	-	-	-	1.0%	3.2%
Nature tourism	-	-	-	4.2%	1.0%	5.6%	-	-	1.3%	3.0%	4.5%	2.1%
Perspectives	3.1%	1.3%	6.6%	4.7%	2.3%	3.4%	-	9.8%	5.9%	10.3%	6.1%	5.1%
Political action	5.6%	1.0%	3.4%	3.3%	0.2%	0.5%	5.5%	3.6%	2.3%	2.0%	5.0%	2.8%
Superordinate legislation	4.4%	1.7%	5.1%	4.2%	1.6%	0.2%	-	-	-	2.3%	0.1%	1.6%
Education and communication	1.7%	-	8.4%	3.2%	5.6%	-	3.5%	2.0%	12.7%	1.5%	0.8%	3.0%
Society	-	0.2%	4.0%	-	5.5%	14.1%	4.1%	8.2%	10.4%	2.9%	4.6%	5.5%
Functioning of society	-	-	-	-	2.4%	9.3%	4.1%	2.4%	10.4%	2.1%	4.6%	3.3%
Economic system	-	0.2%	4.0%	-	3.1%	4.8%	-	5.8%	-	0.8%	-	2.2%
Conversational matters	0.7%	2.9%	0.3%	1.3%	1.1%	0.4%	0.3%	0.5%	2.4%	1.0%	1.2%	0.9%
Statements without relevant content	0.7%	2.9%	0.3%	1.3%	1.1%	0.4%	0.3%	0.5%	2.4%	1.0%	1.2%	0.9%

Note. Shares of speech are indicated per individual interviewee as well as in total. Categories and codes correlate to the coding system applied during the interview analysis. The percentages of **categories** and **subcategories** resemble the summed shares of codes assigned to them and have a slightly darker background in the table. Some values are recognizable by differently marked backgrounds. They highlight the **highest**, **lowest** and **shared lowest** values within each code or category.

- Environmental Politics (40.1%): This is the supercategory with the largest share of speech of all. It was assigned to all statements made on the 'Use of natural resources' (17.2% overall), further areas of political influence regarding 'Sustainability' (10.4% overall), and the corresponding framework of political principles and instruments. It is remarkable that I6 had the lowest individual share of 'Sustainability' related statements but the highest on the 'Use of natural resources', especially on 'Hunting' (19.9%). Other individual thematic shares of speech that were well above average were found i.e. with I1 (10.0% on 'Land use' compared to an average of 2.4%), I3 (23.2% to an average of 8.7% on 'Agriculture'), and I9 (12.7% to an average of 3.0% on 'Education and communication').
- Socio-economics (5.5%): Comments on social and economic circumstances were sorted into this supercategory. While two of the interviewees (I1 and I4) made no such remarks at all, the topic accounted for more than 10% of the speech of two others (I6 and I10).
- Conversational matters (0.9%): Queries for the interviewer or other statements that did not convey relevant messages in terms of content were assigned here.

In the following chapters the interviewees' opinions on all these topics are presented in more detail, albeit slightly restructured as mentioned earlier.

III.2 Local politics

III.2.1 Personal and political backgrounds of the interviewees

Besides the information contained in *Table 4*, all interviewees provided further information on their personal and political backgrounds. For instance, some of them indicated that their families occupy central places in their lives (I7, 13-16; I10, 60-61). Two out of these three further stated that the concern about their children's and grandchildren's future strongly drives their political commitment (I3, 75; I10, 55-57). In addition, I10 felt motivated by the positive effect of his nature-oriented lifestyle on his physical health (I10, 63-72).

Some of the interviewees had similar professional backgrounds according to their own descriptions. For example, there were two farmers – one conventional (I6, 163-164) and one retired organic farmer (I10, 7-9; I10, 31-32) – as well as one full-time working agricultural stakeholder (I2, 11-12). The two farmers were very committed to their professions. They both had a family history in the agricultural sector (I3, 222-223; I10, 125). One additionally hosted tourists on his farm (I3, 37-38), while the other still performed many tasks on the farm despite his retirement (I10, 63-64). Furthermore, two of the other participants emphasized their backgrounds in social sciences, one as a sociologist and regional planner teaching at a university (I3, 13), and one as a both studying and practicing social worker (I8, 33-38). The jobs of the remaining interviewees were rather diverse (see *Table 4*).

Five of the participants stated that they hold honorary positions in a diverse range of organizations such as a farmers' self-aid organization (I2, 33-34), a district heating project (I3, 20), a traditional music society (I6, 26-29), an alumni association (I8, 51), a nature park association (I11, 12) and others. One of them further indicated that his political work, too, is completely voluntary and unpaid (I8, 71-72).

The activities of the interviewees, which potentially influenced decision-making processes, varied widely and ranged i.a. from positions in city administrations (I1, 102-104) and district's advisory

councils (I6, 76-79) through responsible partaking in statewide environmental programs (I7, 490-493) to extra-parliamentary networking (I8, 53-55) and organization of demonstrations (I9, 6-10). Besides, some of the participants were previously or at the time of the interviews active in political functions other than their present primary ones at both municipality and state level (I1, 21-22; I2, 20-21; I2, 45-46; I7, 7-9; I8, 12-15; I10, 136-137). In addition, I8 and I9 underlined that they had further points of contact with environmental behalves in their private lives (I8, 45-51; I9, 18).

In terms of their political profiles, several participants agreed to be ecologically aware and willing to contribute to a more sustainable society (I3, 8-9; I4, 233; I8, 90-94; I10, 110-111). However, opinions widely differed on whether this goal can be achieved under the present political circumstances. While at least five of the interviewees were members of one of the four biggest Austrian parties, others heavily criticized precisely these parties' policies. Alternatively, they preferred making politics outside and across party borders (I3, 26-37), establishing new parties (I8, 24-29), or refraining from party politics altogether (I6, 215-219). Some respondents emphasized their general ideological attitude regarding the environment (I4, 142-146; I8, 533-540; I10, 101-111) or their private commitment to its preservation (I11, 244-245). Three persons promoted the exchange of ideas between individuals regardless of their backgrounds (I6, 695-696; I10, 146-149; I11, 72-78). I11 generally regarded positive incentives as a more effective policy tool than prohibitive measures (I11, 284-286; I11, 299). The participants furthermore had differing views on the use of public demonstrations to effect changes in environmental politics. While three of them favored the FFF movement (I5, 207-208; I8, 310; I9, 6-7), one thought that this form of protest is the worst of all (I6, 693-695).

III.2.2 General remarks on local politics and decision-making

The interviewees widely perceived decision-making processes in local politics as longsome developments which often take several years (I11, 185). Although I1 saw potential for quick and uncomplicated resolution of matters of cross-party consensus (I1, 26-28), the achievement of many objectives requires patience and consistent effort. While some study participants emphasized that persistence can eventually lead to the desired result, others had lost faith in the course of regular politics.

You must always be after it, and if a project or a thing doesn't work at the moment, then you need to bring it in again and again, and then you need a lot of persistance. (I1, 41-43)

But you always have to be after it and not give in, that's the most important thing. (I10, 236-237)

It's always announced, but in the end very, very little or nothing happens. And that irritates me. (I3, 188-189)

Besides a generous timescale, the study participants identified other key factors promoting the achievement of their political goals. These comprise support of the electorate (I5, 185-186), intensive communication among the involved parties at all levels (I4, 323-329), reduction of bureaucracy (I3, 443-446; I4, 151-155) and adequate funding, which is often difficult to obtain (I1, 38-39; I5, 172-173). I11 explained that decision-making usually requires one or two leading political officials to moderate the cooperation of different communal committees and mediate emerging conflicts (I11, 34-43; I11, 129-130).

Yes, many things go very, very slowly and take time and money and very many meetings and very much in communication and, I say, mediation as well. (I4, 150-151)

In the eyes of several of the interviewees, government participation is crucial to realize a party's political agenda (I2, 60-62; I5, 472-473). However, I1 emphasized that even when in charge political actors still need to accept compromises as long as they are part of a coalition (I1, 39-43). Some study participants also saw potential to influence decision-making from the position of an opposition party (I8, 283-286; I10, 201-202) or extra-parliamentary movement (I9, 23-25). At least five of the interviewees agreed that the implementation of political programs depends to a greater extent on the activities of individual political office holders (I2, 76-77; I4, 34-37; I5, 90-94), and they mostly highlighted the potential disadvantages to a truly sustainable policy (I3, 421-427; I8, 229-233).

One has to say that many political representatives in my region often don't have a professional, thematic background in this area. [...] They are, I would say, appointed relatively spontaneously for this department and then they don't have the technical backgrounds to supervise large-scale projects [...] (I4, 347-352)

One of the interviewees even went so far as to generally scrutinize the expedient occupation of political positions. He suggested that the appointment of functionaries usually serves rather the distribution of money and power to respected party members than the purposeful work towards the improvement of the common good (I3, 455-461). At the same time, he emphasized the fruitful cooperation with extra-political forces such as local companies (I3, 42-54). According to I11 it is the task of the leading politicians to seek extra-parliamentary advice.

Sometimes there are different interest groups, associations or other experts that we involve in the decision-making process. [...] So we just always try to involve all stakeholders, and the coordinating function is my responsibility [...] (I11, 44-49)

Other study participants, too, favored intensive collaboration of the authorities with various local stakeholders such as landowners (I10, 207-209), hunters (I6, 18-19), and citizens (I4, 73-76; I8, 310-314) to drive sustainable policies. Particular importance was given to representatives of land users and regional projects with an environmental focus. They provide "advice, representation of interests, and education" (I2, 7) as well as public statements (I2, 28-29) or assist with establishing regular exchange of information and applications for special financing (I4, 92-95; I5, 76-79). Nevertheless, proactive approaches of extra-political groups were registered rather rarely (I11, 53-54).

III.2.3 Perceived personal involvement and influence in local politics

The perceived involvement in local decision-making processes varied greatly between the individual study participants. On the one hand, those holding public positions often recognized a certain degree of personal influence and subsequent political success (I2, 20-22; I3, 42; I7, 55; I10, 189; I11, 39). As a result, I11 self-confidently represented negotiating power (I11, 188-192). On the other hand, the impact of representatives of stakeholder groups or extra-parliamentary organizations was described as rather little to almost non-existent (I2, 88; I8, 29).

No, this is an altogether political process now, but of course [it is supported] because I am the leader there, if I may say so. (I7, 100-101)

The reach is not very big. I am a small cog in political decisions. (I2, 55)

So I make the decision-making process. [...] we are responsible that it comes to a decision-making process in the most diverse matters and we simply prepare the decision-making. (I11, 32-34)

According to their own experiences, the influence of the study participants was often linked to the political parties and actors that were currently in charge, and to their relations with them (I2, 66; I7, 64; I10, 187-188; I11, 54-57). Aligned interests with the leading politicians were advantageous, because *“if the political leader wants something, then in many cases it can be implemented”* (I11, 68). Nevertheless, even those who had no direct connections to the leading local politicians could exert influence by drawing public attention to selected topics and encouraging debates (I8, 18-23; I9, 32; I10, 175-178). This did not equally apply to matters of national or international relevance though. (I3, 189-190).

The effort for their various political activities differed between the interviewees regardless of their perceived impact. It ranged from voluntary work (I6, 25-26; I8, 71; I9, 6-10) through part-time and secondary employment (I1, 12-15; I4, 359; I7, 15-16) to full-time jobs (I2, 11-14; I5, 9). Similarly diverse was the functional experience and professional knowledge of the study participants (I4, 371; I6, 258-259). What united them, despite their different backgrounds, was the desire to participate in shaping their environment.

[...] I am rather one who seeks the result and also finds it. (I6, 129)

Thereby communication was regarded crucial to succeed. This included contact between different stakeholders (I6, 7-9), administrations (I4, 54-56; I6, 21-22), politicians (I5, 71), political movements (I8, 310-314) and the public. One interviewee described his role as *“mediator between the population or the municipality, respectively, and the state. It is very important for me to also maintain, to have contacts, where one gains access and isn’t a supplicant, but where one can also discuss things openly”* (I3, 39-42). Others, too, emphasized their functional relevance as coordinators and mediators (I4, 54-55; I5, 36-39), *“even if in practice it may not always be so conflict-free”* (I4, 146-147).

The study participants furthermore named various specific applied methods and measures to achieve their goals, especially in the context of environmental politics. These included i.a. holiday games, workshops and individual conversations (I4, 87-88), festivals and mobility projects (I4, 376-377), land consolidation procedures and participation in state level environmental programs (I7, 20-23), press activity (I8, 18-22), attendance at networking events and protests (I8, 310-314), and signing petitions (I9, 18-19).

Finally, several of the respondents reported that they actively participated in the final phase of political processes, i.e. in the execution of the rules and projects previously determined (I2, 92-94; I6, 114-116).

I invite, I work out the measures, I process the measures, we work them out. Yes, I am responsible for the whole project implementation. (I5, 37-38)

III.3 Elements of environmental politics in the study area

III.3.1 The role of environmental politics

Directing the focus explicitly to environmental politics, the interviewed representatives of regional thematic projects described how they contributed to the networking of involved parties across spatial and institutional borders (I5, 24-34). The projects could be seen as a result of the cooperation of international, national and regional institutions, especially in financial terms (I4, 21-29). Therefore, the representatives considered their projects examples for the functional integration of environmental issues into local politics despite initial doubts (I5, 51-63).

Well, I would say that this plays a very big role. The mayors, as regards my case, have their big say in what goes on. And then there's a lot that comes out of that, and then a lot can also be implemented at that level. We get the funding and the guidelines from above, that's top-down. But the ideas and the rest is bottom-up based. (I5, 101-105)

Several interviewees mentioned regional planning in the context of local environmental politics. On the one hand they stressed the importance of this instrument for municipal authorities (I1, 278-279; I5, 259-260). On the other hand, they saw it embedded in a system of superior planning interests (I4, 194-195) and demanded legislative and advisory support from higher political levels (I1, 279-285; I3, 247; I11, 46-47). When speaking about the overall success of the integration of environmental concerns into local decision-making, the study participants showed varying opinions. Some argued that the topic was not considered important enough and often only handled with non-binding announcements (I3, 242-245). Others could already see "good examples" (I2, 91) for targeted action. Still others concluded that the integration currently depended on and thus changed with the individual commitment of the persons or authorities responsible (I4, 166-169). However, there were no opposing opinions to the increasing relevance of environmental topics for both politics and the general public (I7, 70; I9, 97-101).

[...] this entire environmental issue, that's not something I can do overnight, but it has to settle in, I believe. (I7, 502-504)

Hey, these environmental topics aren't of interest of some bobos, some greens, so, but that's actually also relevant in the reality of life of quite normal people [...]. (I8; 286-288)

III.3.2 Perspectives on local environmental politics

Most respondents said that there is general agreement across all political camps on the need for environmentally friendly politics at the local level (I4, 159-162; I5, 284; I6, 271-272; I10, 100-101). They nonetheless struggled to precisely define the relationship of politics and ecology (I2, 98).

Everybody wants to bring in as much ecology as possible. That's with every saying or what the politicians say: Economic, ecological, and biodiversity and organic. For me and my generation, I say, all this just happened. Previously, people didn't even talk about that. (I6, 156-159)

According to the interviewees, the perceived relative importance of environmental issues still varied remarkably among different relevant groups. For instance, the green party was mentioned twice (I8,

185-186; I10, 89-90) and the FPÖ once (I10, 83-89) regarding their above average commitment for the environment. Furthermore, the attached importance of environmental politics was reported to alter between municipalities and to be frequently interlinked with individual attitudes of decision-makers (I5, 89-92; I10, 51-54).

Whereupon I notice that with many things concerning the environment, climate, and mobility, there actually is very often a consensus at the municipal level that this is important. (I1, 30-32)

Some communities are more committed, some less. (I5, 83-84)

Now I mainly deal with the level of local politics, like with mayors. I believe that this is enormously important now in the course of the climate and environmental debate. There can be very many impulses, I would say, coming from this level. (I4, 99-102)

Although the interviewees generally acknowledged the need to address environmental issues, they recognized that this issue was not yet sufficiently integrated into day-to-day political business (I3, 276; I9, 55). Once again, funding appeared to be a key factor and issue of conflict between different political positions (I1, 35-36). There was also further demand for thematic dispute across all political areas and stages of decision-making processes (I4, 162-164; I4, 174-176). One study participant claimed that this dispute then deserves more attention and must produce more serious results to be implemented consequently (I8, 186-203). Another one, however, felt positive about the development of the recent past.

It is constantly getting better, I believe. There was a time when it was very little. (I10, 265)

When speaking about the limits of environmental politics, the interviewed persons mentioned several aspects. One of them is the present legislation, which is said to be insufficient or ineffective for sustainable management of the environment (I2, 195-196; I6, 696-697). Another feature was the craving for wealth and recognition of the persons in office which often prevailed over the dedication for unpopular measures in the interests of nature (I3, 67-68; I10, 143-144). In the context of the homogenization of agricultural landscapes, one interviewee simply regarded politics as helpless against the market forces.

This is (...) a snowball effect somewhere and then politics can't really do anything about it, yes. (I2, 276-277)

Besides the criticism of the current situation, there were also some suggestions on how it could be improved. Two of the study participants advocated for promoting regional value creation to support ecologically friendly agricultural production and yield distribution. These statements were made against the background of food production and exports of Eastern European countries subsidized by the EU despite lower quality and environmental standards according to the perception of the interviewees (I6, 182-186).

This needs to be rethought and that would be my way or my goal, where I say: Hello, I produce valuable food. Then I also want to get my money for it. (I3, 154-155)

Another supporting factor for a more ecologically sustainable policy identified by the study participants was honest communication and proper education. The latter concerned both the members of authorities and administrations (I1, 115-117) and the affected public (I3, 220-222; I10, 433). This

argument matched the controversial opinion that not mainly politics but rather every individual citizen is fundamentally responsible for the development of the environmental conditions. (I11, 263-264)

You can improve the world, but everybody must start with themselves and not always say: He should do this and he should do that. We must also align ourselves to make the world more livable for everyone. (I6, 690-692)

From my point of view, this is also related to awareness. The individual is simply far too little aware [...] that he or everyone can contribute something (...) to climate change. (I11, 415-417)

Especially city dwellers were perceived as often ignorant towards the real premises under which land is managed and used for human benefits (I6, 689-702; I10, 194-197). In turn the two inhabitants of the city of Wiener Neustadt among the interviewees argued that individual action was indeed relevant, but that the “moral forefinger” (I8, 272) aiming at each and every citizen should only complement and not replace political action.

[...] it certainly contributes a lot if everyone individually did something in private life, for instance, used less plastics. So it's just not okay that, for example, a quarter of the people does that and politics then simply don't listen to them anyway, and all the factories and so on still emit so much CO₂ and clear so much rainforest et cetera, that it then can't be controlled by the private sector and then it's simply up to politics and what goals and rules they introduce. (I9, 47-53)

In contrast to local decision-making, higher level policies were repeatedly criticized for their insufficient activities. In this context, the study participants pointed out that leading politicians sometimes lacked individual interest (I3, 472) and succumbed to pressure from above (I10, 159-160). However, the achievement of environmental and climate targets depended on commitment at all political levels.

But I believe it's important not to lose sight of the bigger context then, that it's just not enough to somehow have a climate-friendly community in your own little village or town and- Because the climate just is a global issue, so, and we can't just give a damn, and we can't somehow be happy that we as, I don't know, community XY are climate-friendly and the rest of the world sort of doesn't give a shit. (I8, 110-115)

Motivation to improve the handling of environmental issues often derived from the thought of future generations. The interviewees felt somehow responsible to provide them with a livable environment.

If we effectuate something positive, that's the most important thing. We must think about the grandchildren and the future. And if our parents hadn't thought, we would have nothing either, so they have made an effort for us, I have to say. (I10, 517-519)

III.3.3 Political action

In the eyes of several study participants the opportunities of local scale environmental policies mainly lay in specific targeted action (I2, 102; I8, 194-196). While some pointed out that there were already many efforts made (I1, 84-85), others demanded more commitment to realize projects.

The topic of the environment, environmental protection or climate protection is rather mostly dealt with on a practical level [...] (I1, 73-74)

Perhaps we would also need much stronger implementation projects in different areas. (I4, 322-323)

The degree of engagement depended, according to the interviewees' points of view, once again on leading politicians and the course of their municipality administrations (I4, 171-173; I10, 271-273). For instance, I3 expected mayors to continuously stimulate political action as they *"repeat over and over again: Hello, we need this, this is important"* (I3, 488-489). He further claimed that the potential for activities was fulfilled neither in most of the municipalities of his region (I3, 482-485) nor on superior political levels (I3, 278-288). I6 contradicted the last point, claiming that there were constant political efforts to produce ecologically friendly in order to achieve a good position on the EU market (I6, 180-182).

By going a bit more into detail, together the interviewees presented a set of instruments to achieve their environmental aims. For example, I1 and I3 desired further integration of environmental aspects into all steps of planning. This included the recruitment of specially trained employees (I1, 109-113; I3, 98), *"[...] so that it is actually always already being considered in the planning or in the administration, or that it is always already a point to be taken into account"* (I1, 92-94). I2 described the use of regional legislative authority using the example of the Burgenland state which banned certain noxious insecticides (I2, 390-393). I11 opposed the prohibitive approach as he believed that bans are not effective on the long run (I11, 284-286).

That we just specifically promote things that we want to implement, and do so more intensively and in a much more concentrated manner. That, I believe, creates the best incentives. (I11, 409-411)

Furthermore, some interviewees mentioned the membership in environmental networks or the participation in thematic programs, namely the climate alliance (I1, 120; I4, 76; I8, 48), the e5 certification programme (I4, 105) and the LEADER project (I4, 27). I7 explained how ecological aims can correlate with others and be achieved together as was the case in forest fire prevention (I7, 241-261). Last but not least, I3 added cooperation with land use stakeholders as another political instrument (I3, 65-67).

Whilst assessing the activities in their own region, the interviewees drew very different conclusions. On the one hand, some underlined their good efforts and subsequent developments (I3, 48-49; I5, 449-450; I10, 204-207). On the other hand, I8 criticized that applied measures usually had little positive or even negative effects. Both different points of view could be supported by the examples of two construction projects. For one thing, a politically promoted hotel had been erected on a former park site in Wiener Neustadt (I8, 365-369). Then again, the construction of a new supermarket could be prevented (I11, 166-174).

I think that we are pioneers in the district. Not only in the district, but also statewide. [...] In ecological regards. (I3, 9-12)

[...] I wouldn't see on any level that it currently works out well. I also believe that on a local scale, it's actually relatively difficult to do anything sustainably in the long term somehow environmentally friendly. (I8, 99-102)

I7 concluded that finally only time would tell how successful any measure had been.

But these are all things that you can't do overnight, and that also don't have any effect overnight. [...] Because I find this environmental issue and this ecology and all this, it's all so sustainable. And it'll only be possible to say in two years' time: Well, it paid off what we've done there. (I7, 485-490)

Besides or additional to political action, some study participants stated that civic participation played a great role in shaping local environmental politics. As means of interference they listed conferences (I8, 218), petitions (I10, 197) and protests (I8, 241).

You always get the most attention with pressure, of course, with things that just happen outside, so that are seen by everyone, like a demonstration, for example. (I9, 136-138)

III.3.4 Superordinate environmental legislation

Six of the interviewees described how local environmental policies were embedded in and to a certain extent determined by a framework of superordinate regulations including state, national and EU legislation. Individual participants even demanded strict guidelines, for instance, in the contexts of international food production (I3, 255-260) or regional planning (I1, 279-280, I5, 262).

And I would wish that there was also some support from higher political levels, so from state level, for example, or for municipalities or so (...) legal regulations, too [...] (I1, 272-275)

Some currently existing framework conditions were already considered functional and valuable. The interviewees specifically mentioned the state level thematic input from the Energy and Environment Agency of Lower Austria (I1, 75-77), administrative assistance from Burgenland (I11, 46-47) and financial support in the form of subsidies for ecologically friendly land use (I10, 422-426). On the contrary, I4 urged superior political levels to further obligatorily integrate local issues into their decision making (I4, 329-335) and to support local scale environmental action (I4, 352-354).

So that not so much somehow depends on the patience, on the energy and on the commitment of individual political subjects, I would say, but that the municipalities are somehow approached much more actively, I would say, and that there is also much more support, much more resources to support various politicians in their decision-making processes. (I4, 343-347)

I5 assessed recent developments in this regard positively and linked this with the national government participation of the Green party, which further affects processes on subordinate political levels (I5, 477).

So, what I notice in any case is that through the government – from a purely political, pragmatic point of view – through the participation of the Greens there is much more budget for us. So for all these measures that come through the climate fund for [our environmental projects]. It is heard more again. We have more money and we can work much more and better. (I5, 467-471)

Simultaneously, I3 criticized superordinate policies – and especially EU regulations on land use – for their sometimes ineffective and sometimes entirely unwanted legislation (I3, 155-157; I3, 185-186; I3, 288-295).

That is a trade agreement that exists unfortunately. There as well I must make a cut. There is now the discussion with all the states anyway. So I would not allow this. (I3, 166-168)

We have such a bloated apparatus, and really nothing happened, when you get right down to it. There is always circumvention, and that can't be. (I3, 171-173)

Other participants, too, claimed that certain superordinate regulations ran against their interests (I2, 62-63; I6, 697-698). I10 specifically deprecated that EU laws did not effectively conserve nature.

I don't have anything against the EU, but regarding nature they don't have too much, so that one has to admit. [...] The measures are not necessarily aimed at very near-natural things. There is mainly the profit, and bigger and bigger, and that's just the way it is. (I10, 161-165)

III.3.5 Environmental education and communication

The great majority of the interviewees identified education as key instrument to achieve more environmental awareness and corresponding behavior across both authorities and the public. Therefore, several participants considered citizen education a central aspect of political activities (I3, 147; I5, 261-262; I9, 227-229).

There we have a giant task to form the consciousness. It is often: Through ignorance things happen, or we have always done it this way, let's keep doing it this way, yes. (I5, 169-172)

So in any case, what always helps with any issue is education, education, education. (I9, 103)

I3 and I11 justified this position by referencing the potential consumer's impact on ecologically relevant processes like agricultural production (I3, 191-193).

It would already be the simplest thing in shopping, the shopping consciousness. That I simply think about what goods I buy. How are they produced, how are they packaged, how sustainably can I reuse or dispose of them? (I11, 255-258)

I8 and I9 stressed the interrelation of education and political activity such as participation in protest movements, aiming to draw further attention to the handling of environmental issues in decision-making processes (I8, 268-269; I9, 29-30; I9, 106-108). As factors contributing to the success of environmental education, the interviewees mentioned sufficient funding (I5, 190) and availability of objective as well as fact-based information (I9, 117-122). According to I3, the responsibility to provide such quality input lay with both local decision-makers like himself (I3, 480-481) and superior authorities like the EU (I3, 214-215). Nevertheless, one of the study participants also emphasized that creating awareness alone might not solve the existing environmental problems.

I don't know, the projects I have are rather in the direction of creating awareness, where I sometimes ask myself whether that's really the only thing we can do. (I4, 320-322)

Four participants additionally emphasized the importance of environmental education addressed specifically to politically active people such as decision-makers, administrative staff or organized citizens (I1, 113-114; I3, 509; I4, 71-73; I8, 330-332). Their list of educational measures comprised newsletters (I4, 71), public events (I3, 493), training courses (I1, 121-122) and employing staff with a specific work focus (I1, 114-115). Most of the study participants showed interest to receive the results of this very study, either for their own education or to pass it on (I4, 386-388). Moreover, I4 saw room for improvement in the sharing of information between different institutions.

And that's why, from an organizational point of view, we perhaps need a one-stop shop, so to say some institution that is responsible for bringing the perspectives together and somehow promoting an exchange. Because what sometimes happens is that when the responsibilities are so fragmented that a certain competition, a competitive thinking, breaks out between the institutions, then information isn't passed on. (I4, 359-364)

In contrast to the other interviewees, I8 held a particular view on the relevance of staff education. He stated that lacking information was in fact not what prevented the implementation of more ecologically friendly policies (I8, 244).

But it's often pretended that it practically only fails because the politicians or the political parties have too little information and need to be informed that it would actually be much smarter to do this and that or to promote this and that. But (...) the politicians who practically sit at the levers of power, they are already aware of this, they simply have other interests, so. (I8, 220-225)

Three communication channels received particular attention from the study participants: media, school education and first-hand nature experience. Regarding the first one, I3 and I7 indicated that environment related articles were frequently published in their community newspapers (I3, 310; I7, 451-453). Simultaneously, I3 and I5 were aware of the power of mainstream media (I3, 77-79), “regardless of whether social media or print, TV media.” (I5, 198) They were disappointed of the currently unfavorable thematic media coverage and misguided intention of reporting (I3, 494-507), and of the fact that their institutions lacked money to change this circumstance (I5, 196-200). Where the established communication channels failed, some citizens tried to take public education into their own hands. Referring to the recent FFF movement, I5 and I11 recognized an appreciated overall increase in environmental awareness (I5, 477-479; I11, 249-252).

[...] but climate change is simply inside the minds already. Thanks to Greta [Thunberg], although this person is very polarizing, but she really helped the whole thing a lot. (I5, 206-208)

We work a lot with Fridays For Future in Austria in general, but we also briefly thought about how we could best do it in such a way that we could connect it with regional things. Because people are much more interested if we don't say, I don't know, on the other side of the world there's this and that, but here with us it's happening just now. (I9, 212-216)

We have lost our awareness of ecology and (...) and I think we have already considered this again and again through the media and through the different dynamics now, (...) I think, to include this more again in our decision-making. (I11, 85-88)

Secondly, three study participants highlighted the education of children in kindergartens and schools. By this means they saw potential to influence not only the adolescents themselves (I3, 327; I9, 112-113) but also their family members (I3, 333-339). I9 therefore desired further political support for environmental school projects (I9, 237-238) to improve the still sometimes insufficient thematic input (I9, 104-105). According to the experience of I7, children quickly and happily take on positive nature experiences (I7, 490-497). Against this background, I10 highlighted the importance of patient communication.

With ‘must’ nothing works, so you have to explain it to them nicely and you just need to have the time and take your time, so something like that. (I10, 116-117)

Education of the young generation could also take place at near-natural locations “*where children can then go with schools, learn from the whole situation*” (I3, 321-323). Such first-hand nature experiences were considered appropriate to educate not only children but the whole public (I4, 124-126; I7, 471). Special on-site information offers could further facilitate educational success.

So there we’ve already thought up a bit of something that’s now, so to speak, put there in the form of a board. And, yes, so that the whole thing is then also read and has a benefit in further consequence. (I7, 481-483)

III.3.6 The influence of Covid-19 on local environmental policies

Several interviewees perceived the upcoming of the Covid-19 pandemic in Europe as obstacle to the proper handling of environmental issues in local politics. Most of them reported major uncertainties, delays or cancellations of projects (I7, 113-114; I9, 216-217).

“Well, I have to say that this whole Covid crisis was a great challenge for my work, because there were of course other issues that were more urgent than this climate and environmental protection issue. (I4, 82-84)

At the moment, also because of Covid, many projects were again somehow cancelled and less, too. (I8, 60-61)

I2, however, saw the pandemic only as one excuse of many to avoid approaching environmental issues seriously (I2, 302). On the contrary, I5 hoped that the Covid-19 crisis initiated a fundamental change of the economic system towards a more sustainable one (I5, 452-455). At the same time, he thought it was just as likely that the pandemic would have long-lasting negative consequences.

The question now again, with the savings from the Covid pandemic and so on, is how that will continue in the future. That I don’t know. (I5, 471-472).

I11 drew a comparison between Covid-19 pandemic and climate crisis and concluded that on the long run bans were not an effective instrument to achieve a desired behavior (I11, 286-290).

Simultaneously, some interviewees saw positive effects of the pandemic as well. I5 gladly realized that, although the current crisis with all its consequences dominated the people’s consciousness, CC was still a relevant issue (I5, 202-207). Others were hopeful to return to a more environment-centered policy once society recovers from the pandemic, as it was already noticeable during the relatively relaxed situation in the summer of 2020 (I4, 89-90).

And yes, and the new ideas or the (...) sustainable ideas from me and our councilor for the environment and so on, what you just hear from the public and want to implement, that we can then only do in the near future, right? (I7, 133-136)

I7 repeatedly emphasized how the Covid-19 crisis positively affected people’s awareness for regional agricultural production. The fear of another economic crisis and an increased appreciation of the outdoors drove both regional added value and private gardening (I7, 325-327; I7, 380-391).

Such and other changed behavioral patterns also influenced the state of ecosystems. I6 and I10 noticed changing visitor patterns in nature, because tourists could not rely on the established infrastructure anymore (I10, 251-253).

And even if I close them all now, yes then maybe in the epidemic or partly in the Covid time now that there are fewer [visitors] then. But then again everyone now wants nature [...] (I6, 498-500)

This even led I11 to the conclusion, that *“nothing has benefited our earth like the pandemic”* (I11, 419-420). To him, the subsequently reduced mobility and industrial production revealed the power of every individual to make a change (I11, 424-425).

III.4 Applied environmental politics in the study region

III.4.1 Construction, mobility and energy sectors

Three economic sectors received relatively much attention by the interviewees, even though they were not included in the interview guideline and hence not specifically addressed by the interviewer: the construction, mobility and energy sector. They were repeatedly associated with each other and with CC.

For instance, several interviewees supported the renovation or replacement of old buildings (I1, 210; I3, 53-54), mainly to increase their energy efficiency.

So old houses are already partly being renovated anyway, which isn't bad. And isolated and just improved in any case. (I10, 327-328)

While in this context some rather thought of the enhancement of public buildings (I1, 305-307; I3, 53-54), others further suggested supporting the construction of dense residential buildings instead of more energy-intensive and space-consuming single-family houses (I8, 265-268; I11, 123-127). Such reflections were necessary, in the eyes of I11, in the context of the ongoing *“construction boom”* (I11, 154). The choice of construction materials had a certain relevance, too. For example, I1 promoted avoiding large glass surfaces to reduce heat radiation (I1, 182-183) and I3 proposed the use of biodegradable insulation materials (I3, 119-122). Other measures mentioned were, for example, the installation of air filters at industrial sites, which according to I10 improved the overall air quality in his region (I10, 218-222; I10, 231-232), or the replacement of air-source heat pumps with more sustainable heating systems if financeable (I11, 376-383; I11, 389-402).

Despite the various possible approaches listed above, I8 still drew an overall negative conclusion on the construction policy of his residence Wiener Neustadt. He claimed that by not constructing *“somehow affordable community housing that is more climate-friendly than single-family homes somewhere on the outskirts of any municipalities”* (I8, 507-509) the city government missed an opportunity to achieve both their social and environmental goals (I8, 274-279). On the contrary, according to him the present allocation of real estate and construction subsidizing rather outweighed other positive measures (I8, 204-207).

The production of energy received a little less attention from the interviewees than its savings measures. Yet, four persons favorably mentioned the installation of renewable energies such as wind

turbines, photovoltaic systems and district-heating projects (I3, 49-53; I4, 301-302; I8, 207-209; I11, 402).

[...] wind farm, wind energy, solar energy, photovoltaic are of course a question of the future, yes. That will surely be adopted on the roofs or also on agricultural areas. (I2, 309-311)

However, there were various criticisms to the implementation of renewable energy concepts. I2 argued that the state contractual policies were not always fair to the landowners (I2, 312-317). I5 reported occasional public resistance against the construction of wind farms (I5, 182-183). And I8 blamed politicians to use the installation of simple solar panels to conceal their otherwise environmentally harmful policies. (I8, 207-214)

Furthermore, I3 believed that his region's power supply was somehow unbalanced and still partially relied on the import of unwanted nuclear energy.

Apart from that, there is everywhere a bit of lie about nuclear power. We get nuclear power anyway, even though we say: We have so many wind turbines that we can cover 120 percent of our energy with it. This works only in part, it has to be said straight away. If we have wind, then it's economical. But there are also weeks when there is nothing and then we are still – and that is the problem – supplied with nuclear energy. (I3, 101-106)

When asked to speak about CC measures, many study participants furthermore promoted the expansion of alternatives to fossil fuel-based individual transport. For instance, I1 appreciated the installation of public charging stations for electric cars (I1, 32) and the thematic input provided from state administrations (I1, 78). Yet, I3 found the support from above flimsy because leading politicians themselves would not switch to e-mobility contrary to better knowledge (I3, 472-476).

Another means of environmentally friendly transportation was the bicycle. I1 and I4 reported on an increasing number of corresponding projects such as new cycling paths. Although there existed practically no fundamental resistance to the improvement of cycling infrastructure (I1, 33-35), there were debates about their financial dimensions (I1, 36-39). I4 had positive expectations nevertheless, since the national government had announced to increase funding by a factor of ten (I4, 90-92).

So I already notice that when some road construction projects happen, our construction office always also (..) takes into account and determines the subject of cycling. (I1, 95-97)

Other study participants rather pushed the expansion of public transport. They expected politics to improve the local transportation network and recognized that initial measures were already being implemented, even though perhaps not yet to a sufficient degree (I2, 299-302; I10, 280-284).

As long as people don't have good transportation options, they'll go back to the car, which is very harmful to the climate, anti-climate. And that's where politics has to create the framework conditions. (I8, 521-524)

Some of the interviewees saw potential for improvement in higher-level traffic concepts, too. On the one hand, their criticism concerned site-specific planning of regional cycling paths (I1, 287-293), tourist guidance systems (I4, 216-218) and traffic-relieving bypass roads (I8, 355-359). Against this background, I11 emphasized his own successful commitment for a centralized town structure that allowed errands on foot or by bike due to short intermediary distances (I11, 179-185). On the other

hand, there was also objection against superior political concepts that still fostered the climate-damaging automotive industry (I8, 203-204) and overall traffic volume.

So now I know the figures best from transport, for example, and there we are heading in a completely different direction. And we actually have a constant increase in greenhouse gas emissions. (I4, 140-142)

III.4.2 Land use and land consumption

The debate on traffic infrastructure and settlement organization already indicates that local land use was a topic which frequently occupied politically active people in the study region. Several interviewees promoted a condensed housing development for both social and ecological reasons (I1, 208-210; I8, 209-214; I11, 115-121).

That is, I'm anyway also for that there, so to say, the municipalities don't also somehow expand and somehow then concrete up natural areas or just make them to living spaces. Because I believe that one should rather build in the metropolitan areas, where there is already a relatively large infrastructure, and so on. (I8, 405-409)

A frequently mentioned argument for this position was the aspired avoidance of further extensive soil consumption or soil sealing, respectively. According to the study participants, new building projects often came at the expense of arable lands (I1, 275), meadows (I11, 155-158) or recreational areas (I9, 125-127) that were worth protecting.

But in any case, make sure that there are more green spaces, less construction, more use of recreational areas. (I9, 235-237)

Well, to reduce soil sealing and land consumption, especially with regard to environmental and climate protection. (I1, 219-220)

Some were hopeful that the awareness about the issue was slowly increasing, although they had to recognize that there were opposing opinions on the subject (I4, 250-254; I11, 119-121). I1 therefore requested once again a more comprehensive legal framework from superior political levels (I1, 275-276). He further saw potential in the implementation of concepts for space utilization and development (I1, 199-206).

Well, thank goodness, not as much is built up as in the past anyway. That is, with the spatial concept and so, that's not so bad that not so many grounds are built up anymore. (I10, 325-327)

Contrary to this view, others emphasized the strong impact of economic interests, e.g. from the construction sector, on the dedication of building areas (I1, 210-217; I8, 359-361). They claimed that given natural conditions were often insufficiently taken into account.

And that you then make a building site out of these gardens or that you have them rezoned is just somehow not so okay. (I7, 150-152)

Away from human settlements, in most areas land use comprised mainly agriculture and forestry. I6 and I7 attributed to the study region a relative continuity in terms of land use form and intensity (I6, 617-618; I7, 394-396). A general great interest in agricultural and forestry activities was reported both

among full-time land users (I2, 270) and recently also among small-scale landowners (I7, 368-376). Still, I6 expected changes in the overall agricultural structure due to the prevailing economic conditions (for further details see chapter III.4.4).

There will be some changes, because, as I said, the small farms, due to the viability or the income that comes purely from agriculture, you can't live on it in the future. Now one or another will just be leased, the structure will get larger, so the agriculture. (I6, 604-607)

On this topic, I10 further highlighted the uniqueness of near-natural locations that could not be restored once destroyed (I10, 149-152). I11 nevertheless predicted a future expansion of farmland due to decreasing soil fertility as a result of CC (I11, 448-450).

Last, surface waters were rarely mentioned, but when they were, they were considered worth protecting. I3 and I11 stressed the preservation of running waters in their natural state together with their marginal areas (I3, 85-86; I11, 147-151).

III.4.3 Green infrastructure

A special form of land use is the conscious establishment of GI. The study participants were concerned about this matter especially within settlement areas. For instance, I7 advocated the planting of available open spaces such as lane dividers within her residence town (I7, 117-119; I7, 360). Others added further small as well as larger areas like parks to the list of valuable green spaces (I9, 178-184; I10, 195-196; I11, 145-147). They reported of great interest from the local communities for this kind of measures (I7, 129-131; I10, 202-204; I11, 111-115). However, they drew different conclusions on the political success concerning the creation and maintenance of GI in their respective environments, some positive (I10, 202-204; I11, 153) and some negative (I8, 361-366).

So that was a bit of an attempt to make a compromise. Okay, we won't build on everything. One building site is eliminated, the municipality buys it, and it becomes a green space. (I11, 141-143)

Elements which the interviewees considered important components of GI comprised above all meadows and trees. The former were especially meaningful for I3, who repeatedly demanded the preservation of wildflower patches, which additionally served as habitats for bees and other animals (I3, 63-64; I3, 486-487). As I2 reported, state level politics had already established laws to force farmers to assign small percentages of their farmland to biodiversity areas. There even appear to be ongoing debates in the Burgenland state on whether to further increase this obligatory share, an idea which he other than I3 saw very critically (I2, 235-243). He repeatedly mentioned that extensive regulations already existed on the preservation of GI areas and elements (I2, 92-93; I2, 94-95; I2, 346-350). I10 had made different experiences in his region where he joined forces to protect a piece of park from a state level project (I10, 198-201).

That actually should be introduced a bit everywhere that you keep natural areas where really the bees and all these (...) have a life again, a habitat created. (I3, 266-268)

While I2 and I3 mostly thought about meadows, the focus of I1 and I7 rather lied on trees (I1, 97-99; I7, 23-26). I7 personally undertook the task to “activate the whole thing a bit again with trees and easily maintained shrubs and that you really bring a bit of green into the community again” (I7, 39-41). For this purpose, she together with I4 stood for the primary use of native plant species (I4, 265-267;

I7, 199-202). A popular approach in this context was the planting of trees individually assigned to a communities' children (I3, 79-85; I7, 78-82; I9, 184-186). In one case pest insects were a challenge for inner-town tree networks and required adjustments of the choice of species used (I7, 44-49).

Within settlements trees and green spaces in general were appreciated, if available, for their micro-climatic effects (I1, 178-179; I7, 362-365; I8, 369-372).

Because then just, if that's in the city, then it's not so hot in the city if there's multiple green spaces.
(I9, 180-181)

In the agriculture-dominated countryside, trees and hedges were also recognized as valuable habitats for birds, bees and other insects (I2, 231-233) and crucial elements of an aesthetically pleasing landscape (I2, 233-235). Once again, I2 evaluated the respective existing regulations as adequate (I2, 326-329), whereas I3 tried to encourage the creation of more GI by any means (I3, 70-73).

Ecologically, I really want to bring the farmers to the point that they finally also reestablish wind belts, that we don't constantly mow down, but even grow wildflowers and the like more there. We have a seed fund at the building yard, which we make available free of charge, if something like that is to be. (I3, 61-65)

III.4.4 Agriculture

III.4.4.1 Agricultural trends and policies

The production of food was considered one of the main tasks of the study region's ecosystems (I3, 205). Yet, large parts of the area were said to be not suitable for intensive agricultural management (I1, 148-149; I6, 252-257). Therefore, the region's produce comprised besides grassland-based milk and meat production (I5, 267-269), for instance, fruits. These often originated from old public or private fruit orchards, the maintenance and use of which currently got politically promoted again under I7's initiative (I7, 88-89; 404-424). Locally, however, there was also more intensive agriculture, for example vegetable cultivation (I6, 472-473).

There were, however, still many full-time farmers whose farming activities followed certain trends as described by the study participants. The currently noted or anticipated developments were largely reactions to CC (I2, 295). I2, who thanks to his position had a lot to say on the topic, cited changes in crop rotation such as the recent integration of rapeseed, soybeans and other legumes (I2, 155-166). He further explained that *"farmers switch to winter cereals, which already have the moisture in winter"* (I2, 284-285). I5, too, expected more adaptations in the future *"which are not only risks, but also opportunities. I have the possibility that other species grow or thrive, I can then use other animals"* (I5, 362-363). He already noticed the introduction of new fruits (I5, 368-372) and in addition wondered whether some parts of the cultural landscape would be put out of use (I5, 388-392). I10 thought that it was at least possible that an overall extensification trend would set in (I10, 479-484), and pointed to his observation of an ongoing change from the cultivation of corn to grassland (I10, 395-397). I5 supported this thesis with his argument that most farmers would readily adjust their activities to biodiversity friendly practices because they had an interest *"to simply maintain productivity"* (I5, 297-298). I3 was the only participant who strongly disagreed with this view.

I say this deliberately because many would even use the asphalt to grow anything [...] (I3, 68-69)

Politics on different levels already supported sustainable agricultural management with different projects such as the nationwide ÖPUL (I2, 92) or the Burgenland program 'Ecologically valuable areas', where *"there are meadow areas, there are also arable areas that need to be mowed. There are the orchards with it [...]"* (I2, 211-212) where farmers had to follow certain management regulations concerning the mowing scheme as well as the use of plant protection agents and fertilizers (I2, 209; I2, 214-217). I2 and I3 recognized subsidies as key instrument to bring about favorable agricultural practices, although one of them evaluated their current application rather positively (I2, 350-351) and one rather negatively (I3, 159-162). Therefore, I3 demanded more advanced competences of politics to effectively push through ecological goals (I3, 252-254). Meanwhile, I2 argued against an expansion of current specifications regarding, for instance, biodiversity areas.

[...] that is too much of a good thing, that isn't possible, yes. That would bring a collapse in agriculture in terms of production. I think it's a good thing if they leave it at five percent, which is a lot anyway. (I2, 241-243)

Despite the present incomplete enforcement of rules, I3 saw farming in his region on a good track to reducing the use of chemicals independently (I3, 140-145). I5 also emphasized the farmers' personal responsibility.

Because we still have many who want to preserve the habitat, that is, this cultural landscape. Firstly, so that they earn something themselves, and because that's simply their job. So I see that this doesn't come directly from the communities, but is rather anchored in agriculture (...) in our region, because we are very agricultural. (I5, 288-292)

Sustainable farming does not only include avoiding the use of chemicals, but also conserving a favorable state of the existing soils and water balance. Regarding soil erosion, for example, I2 mentioned actual targeted political and stakeholder moderation (I2, 83-84; I2, 152-154). I6 depicted that ground water quality was currently not threatened since agricultural intensity was generally not too high (I6, 246). However, water quantity was a bigger issue in the region. For once, even though irrigation would be beneficial for farming productivity (I2, 418-423), it was simply not an option in certain rather dry areas (I5, 360-361).

That I irrigate agricultural crops, that I irrigate corn or whatever, there is no such thing. (I2, 415-416)

Generally, working in agriculture entails dependency on weather conditions (I6, 318-321). Although farmers could insure themselves against extreme weather events (I6, 308-309), a certain economic risk under the changing environmental circumstances nonetheless remained (I3, 217-220). Therefore, it was considered crucial that agriculture takes measures of adaptation such as, for instance, *"reactivating all these trenches again"* (I7, 179-180) to mitigate the consequences of heavy rainfall.

III.4.4.2 Farm structures and working environment

Five of the interviewees addressed a noticeable change in agricultural structures over time towards a situation with less but bigger farms dominating the landscape (I5, 391-392; I7, 156-160; I10, 374-375; I11, 451-458). The recent both technical and economic developments favored the establishment of

such large-scale farm structures (I7, 160-166; I10, 373-374). This development was only limited in certain areas due to the natural conditions and the increased workload needed to manage the lands (I6, 262-265).

[...] leaseholds are now only available to large farms. They are still able to lease, and the medium-sized and small farms no longer get anything to lease. They can't keep up with the prices, yes. (I2, 272-274)

[...] the farmers are dying. They become less, but the area still remains the same. Inevitably, it gets bigger, and when it gets bigger, it's not always advantageous because then it can't be tilled with heart, so to speak. Then you drive over it and not every field tolerates the same processing. (I6, 625-629)

The environmental consequences as perceived by the study participants were mainly detrimental for soil quality (I7, 165-166) and biodiversity (I2, 320-323). Farmers now often “*manage in such a way that they are efficient, that they no longer look at the connections*” (I2, 183-184). This came at the expense of monocultures and less diverse crop rotation (I2, 197-201; I2, 325). There were varying views on the extent to which these developments could also be seen in organic farming. I10 argued that comparable changes were not even possible in their case due to the inevitably greater labor intensity (I10, 375-378). I2 on the other hand claimed that organic farms nowadays, too, paid less respect to a balanced crop sequence. He thus called for political action in this context (I2, 184-191). I11 took his predictions even one step further and forecasted that diminishing soil capacities might eventually entail an overall increasing soil consumption for farming purposes to maintain the current level of agricultural production (I11, 448-451).

I6 pointed out how farm expansions were often accompanied by high investments into new machines and associated economic risks for the farmers (I6, 278-284; I6, 618-622). As a consequence, nowadays more farmers had a second occupation (I6, 608-611) or could not continue running their farms (I10, 126-129). I10 explained that organic farming was a serious possibility to gain fairer market values for the produce (I10, 43-46; I10, 99-100) and to create a basis for a socially sustainable agriculture.

If it is managed properly, that they also get a little better price, the farmers [...] You will also get more young people who are willing to do that. That is also important that the young then above all (...) are so accepted, too, and that they are properly recognized, then it works again. (I10, 297-301)

I6 complained about the fact that most consumers had lost their understanding for the conditions of food production, a development that made necessary to actively support small-scale land users (I3, 223-228). On the contrary, I7 noted that the appreciation for regional agricultural products of high quality had already increased again in the recent past (I7, 328-332). Not least due to the Covid-19 pandemic and subsequent engagement of the people with their environment, as she claimed, there further was an increase in private small-scale vegetable cultivation (I7, 342-346).

But there are also many of us who have such small fields. And they were really overgrown. And now all of a sudden you see: Aha, they there now want to [...] also grow potatoes and vegetables and carrots and onions themselves next year. (I7, 380-385)

III.4.4.3 Organic farming

Organic agriculture has received great political attention and support throughout the last years. As examples, I2 mentioned the implementation of organic model communities, the Burgenland organic campaign and the nationwide ÖPUL program (I2, 82-84; I2, 102-105). The evaluation of this development varied between the interviewees. On the one hand, I10 reported how in the 1990s most conventional farmers were skeptical about or even opposed to organic agricultural practices (I10, 9-17). I6 still criticized several points such as *“a tremendous effort and with a reduced yield”* (I6, 171-172) or unclear certification of organic imports (I6, 172-178). And I3 believed that organic production could not solve all environmental problems and would not be applicable for the entire agricultural production (I3, 91-95).

And they are always talking about organic, always more organic and organic. That won't work. (I3, 147-148)

For me personally, I work organically, ecologically, but I do not correspond from my agriculture that I am classified as an organic farm. [...] With us we have strong weeds, and if we do not spray there- (I6, 162-165)

Contradicting the opinion of I6 (I6, 165-172), I10 claimed to gain yields comparable to those of conventional farmers with organic methods only (I10, 20-23). He highlighted the positive impact on animal welfare (I10, 95-99) as well as the management adaptation according to and thus conserving the natural premises.

You have to incorporate the soil and that, of course, the [conventional farmers] take up the space and do nothing more, right? (..) That they keep the embankment nice and such things, or make a swamp and such things, they then have no more time. That is that. That's what mostly do a few organic farmers, who are still around, they do this. (I10, 380-384)

For similar reasons, I11 concluded that farmers and politicians alike in his municipality promoted the further development of organic farming.

[...] otherwise all farmers are with us, [they] do organic farming. And there would also be the municipality, there we would be of course also ready to invest. Because that is quite simple, we are also aware that it is extremely important. But it is currently working very, very well. (I11, 476-479)

III.4.5 Forestry

Forestry was perceived as an important land use sector in the study region. For instance, it played a major role in the Oberpullendorf district (I2, 255) or in the Wechselland area of the southern Neunkirchen district (I4, 269). Nevertheless, during the interviews the topic was talked about much less compared to agriculture.

There are various ownership structures of forest areas. Among the land owners mentioned by the study participants were large enterprises and associated foundations (I11, 216-219), small owners both individually (I2, 255-256; I10, 353) and organized in communities (I2, 359-360), municipalities and their administrations (I10, 337; I10, 345-350), and churches (I10, 354). In terms of management, the forest owned by the large Esterhazy company *“is used intensively because he has the contracts”* (I2, 261). The

church-owned forest patches in the Neunkirchen district were, according to I10, maintained well, too (I10, 354-355). Meanwhile, in the areas controlled by the city of Vienna *“there could be better care of the forest”* (I10, 352-353). Where the ownership structure was more diversified, the interviewees reported of forest management approaches with varying degrees of success.

But to the small forest owners, you can't get to them. And that is a forest which is overgrown, but which is not usable, yes. Something has to be done about that in the future. (I2, 262-263)

But the care of the forest is not so bad. So, the farmers are all watching, and the BH [district office] is also behind it, isn't it? So if (...) certain people don't do anything, then someone else does it and it must just be paid. So there, there is already looked after, yes. (I10, 336-339)

Economically, forest use was attractive mainly for *“those who have more forest there”* (I10, 449-450). These included, for instance, the church (I10, 446-447) and the Esterhazy enterprise.

And there is, of course, forest utilization as an economic factor a huge topic. On the one hand, the resource wood as raw material. Then Esterhazy earns from the network of trails used: hiking trails, there are a few mountain bike trails. (I11, 219-222)

On the contrary, other landowners reduced their forestry activities. A sawmill operated by the municipality of Vienna was closed on purpose (I10, 333-336). Meanwhile, small owners sometimes did not even know the whereabouts or management needs of their forest patches (I2, 256-257). At the same time there were also political as well as private proponents of the idea to put areas out of use or to actively afforest them (I2, 364-365; I10, 449).

We don't have to cut down everything, on the contrary: we do it where it's necessary, where there's imminent danger. Otherwise, we plant about 100 trees a year and maybe ten or so are cut back because there is imminent danger or because they pose some other problem. Yes, that is our way. (I3, 87-91)

Forests were currently exposed to a range of threats. As a result of human activities such as tourism or reintroduction programs, wildlife – for instance game and beaver populations – could grow in certain areas and damage trees (I6, 530-532; I11, 346-347). A more widespread and serious threat to forestry were bark beetles. No less than five of the interviewees recognized them as a problem (I4, 218-229; I7, 212-214; I8, 390-395; I10, 228-230; I11, 458-463) and some of them further mentioned the associated great economic setbacks.

And forestry, of course, is declining, because what I notice is: There is no possibility or fewer possibilities to draw profit from the raw material wood. The price of wood is down because of the bark beetle, which has been a huge issue for us. (I11, 458-461)

I4 suggested adapting the set of tree species to mitigate future damages.

Not only to make monocultures with spruce, but take care that one is more broadly positioned. And all experts also say that, for example, a healthy mixed forest does not yield as much as a mono spruce culture after 100 years, but at least it yields. Because if the beetle was in it, the mono spruce culture yields nothing after 100 years [...] (I4, 224-228)

Forests further reportedly suffered from CC. I7 noted an increased risk of forest fires in recent years (I7, 225). Even though the specific history of her area, where there used to be an ammunition factory, enhanced the danger, more frequent droughts and heat waves supported the emergence of fires (I7,

219-222) as had happened in early 2020 (I7, 214-216). Preventive measures such as forest clearings, creation of fire ponds and procurement of special equipment for forest fire fighting were effective but very cost and labor intensive (I7, 232-233; I7, 258-271).

According to several interviewees, the drier conditions alone were already causing problems for the region's forests. Even nowadays, lacking water influenced tree regrowth (I11, 428-432). I4 and I10 agreed on the need to adapt to this acute danger by changing the composition of tree species, although they had different opinions on whether to integrate more spruce or oak trees (I4, 383-386; I10, 364-371).

Due to the drought, the forest stand that we have there (..) will be available only for a limited time.
(I11, 389-390)

And then there will also be landscape changes. Concerning the forest, other tree species will flourish.
(I4, 387-388)

III.4.6 Hunting

Hunting was only mentioned by four of eleven interviewees. Nevertheless, those who talked about it saw hunting as a topic of political and economic relevance that was interlinked with the activities of other land users. Regarding policies, for instance, I3 hoped to cooperate with hunters to reach his ecological goals *"which isn't always easy"* (I3, 67). In return, hunters approached politics to obtain changes in hunting law or the like (I6, 110-115). I11 regarded hunting an important economic sector in his region (I6, 222-223), but was concerned about the future of the local game population.

And hunting is of course a huge topic now, many landowners still earn a lot from it. But if there is nothing left to hunt, it will also (..) lose its appeal. (I11, 463-465)

Hunting activities in the neighboring Neunkirchen district were regulated by detailed shooting plans, as the hunting representative I6 explained. He further told that kills were limited for certain species, while others like wild boar could and should be shot more freely (I6, 80-95). The purpose of this was to restrict the spread of animal diseases (I6, 89-94) and to keep game damage low (I6, 63-64). I6 further described that kill rates were adapted to local conditions (I6, 536-542).

If I now have the shooting plan quite high, then at some point the game species, the game stand will only be a game stand worth preserving, then I can take out less. (I6, 556-558)

According to I6, individual hunters or hunting societies, respectively, had to pay high rents and additionally compensate for omissions if they did not manage the game population in their territory properly (I6, 565-569). They thus aimed to keep game populations at levels where they caused minimal harm to other resources used by the people such as wood, drinking water or agricultural produce (I6, 454-472). Simultaneously, they needed to secure *"that they will still exist in a few generations, i.e. the continued existence of those game species"* (I6, 65-66). For I6 personally, however, agricultural and hunting activities were not in conflict but complemented each other well (I6, 146-152).

And hunting and property have a lot in common, or rather, they should be coordinated with each other, because without hunting there is no agriculture, because we have to regulate it so that it fits. [...] And on the other hand, without the land ownership of agriculture and forestry, hunting would

not be feasible. So there has to be a certain harmony that it all fits together, that the forest-wildlife-relation or just flora, fauna and hunting fit together. And of course we try to regulate this as best as possible. (I6, 10-18)

Although I6 emphasized the attention that hunters pay to the maintenance of flora and fauna (I6, 475-477), I4 reported of frequent conflicts with aims of nature conservation (I4, 277). Other study participants mentioned conflicting interests, too. For instance, I6 talked about some hunters' aversion to tightened hunting rules in PAs (I6, 481-483) and I11 was disappointed by the law which forbade hunting beavers (I11, 350). I3 spoke about the hunters' unreasonable opposition to a wildcat reintroduction program which he supported.

The hunting community comes here and says: No, they might drive away our game. A cat doesn't drive away game, deer or wild boar. What is this nonsense? (I3, 513-515)

Last, hunting was also interlinked with tourism. On the one hand, some tourists travelled around as hobby hunters. Neither I3 nor I6 showed understanding for this type of hunting, which lacked engagement with the local nature (I3, 235-237; I6, 138-146). I6 even claimed that for him *"hunting is not a pleasure. Hunting is a task or a vocation"* (I6, 137-138). On the other hand, other tourists were critical of hunting (I6, 40-44) or disturbed the wildlife by their presence in nature (I6, 516-520). Subsequently, hunting schemes were adapted to the circumstances.

There I have to manage it differently. These are so-called retreat areas, again positive for hunting, because there the game has peace and quiet. (I6, 529-530)

III.4.7 Tourism and recreation in nature

Nature tourism is very present in parts of the study region, too. I5 singled out the Wechselland and Bucklige Welt regions in particular as tourist destinations (I5, 269-271), where hospitality and accommodation of visitors were of economic importance (I5, 111-112; I6, 495-497). As I6 told, vacation in the countryside did not even lose substantial significance in the summer months of 2020, when travelling was largely restricted due to the Covid-19 pandemic (I6, 223-225; I6, 500).

Some of the study participants described the present infrastructure in their respective residence regions which was set up to attract visitors and enable their recreation. Among the infrastructural elements that were mentioned were hiking and mountain biking trails (I6, 229-231; I11, 222), recreation centers (I10, 251-252) and benches to rest (I10, 273-274). Nature tourism was sometimes promoted by politics (I10, 274-277) or the media (I6, 486). I6 noted, however, that its distribution over the area was not equal and depended on the attractiveness of a place.

In each area there are again parts that are impassable. Only someone lost gets there. [...] If I just run around in the forest for 20 kilometers, uphill, downhill, and maybe I get lost and don't see anything, yes, then no one will go there. (I6, 524-529)

Together, the interviewees offered a range of reasons that attracted people to green spaces and nature. These comprised immediate experiences of nature's aesthetical and recreational values (I4, 198-199; I10, 286-287), more space to stroll around and fresh air for people and their pets alike (I6, 504-510), and the opportunity to practice outdoor sports (I9, 146-148).

[...] many people always pass by us, they say that it's beautiful and that it's reasonably maintained, the meadows and all that stuff, and also that they can recover in the forest nicely in the fresh air. (I10, 266-268)

The reported effects of nature tourism were manifold. On the one hand, two study participants said that landscape and ecosystems in tourist areas were usually well maintained to keep them attractive for visitors (I4, 189-195; I5, 144-146). On the other hand, *"overuse by tourism is certainly an issue"* (I4, 215). I4, I6 and I7 feared currently increasing pressures on ecosystems (I4, 215-216; I6, 484-491; I11, 223-239). I10 further stated that one had to preventively counteract misconduct of visitors such as unnecessary noise production (I10, 287-290).

Soft tourism, that's nonsense from my point of view. It doesn't work, because as soon as soft tourism becomes so interesting, so attractive, that you get into the masses, it's no longer soft tourism. Then it is mass tourism and the burden on nature is enormous. And then you won't stop it anymore. (I11, 225-228)

I4 concluded that, because of such negative impacts, it was necessary to advocate the development of concepts for sustainable tourism (I4, 218-222).

III.5 Social and economic framework conditions of environmental politics

III.5.1 Society and environment

Most of the study participants talked about the social and economic systems in which the people of Austria lived, thus referring to more or less direct links to environmental politics and nature conservation. I5 even became – according to his own words – *"a little philosophical"* (I5, 407-408) when he explained that the assessment of the state of nature as good or bad existed only due to humanmade concepts (I5, 403-405; I5, 407-409). Another participant (I10) nevertheless believed that an optimistic approach to life was favorable. This should include accepting unavoidable disadvantages and learning from mistakes (I10, 117-122; I10, 129-132). I9, too, pleaded for a more reflected way of the people to deal with their environment (I9, 222-227). Such desired behavioral changes were hard to realize against the general convenience of people even in the face of pressing environmental issues, as claimed by some other interviewees (e.g. I11, 374).

No, because it's simply not in the consciousness. We have always done it this way, but now the signs have changed due to climate change. [...] There we have a huge task to raise awareness. (I5, 168-170)

In the eyes of I6, particularly city dwellers, who anonymously lived next door to one another, alienated themselves from their environment (I6, 636-657). He hoped for a more *"harmonious coexistence"* (I6, 683) of humans both with each other and with nature, and so did I7 (I7, 199). I6 further explained that for the balanced lifestyle he imagined respect for one another's land and property was crucial (I6, 44-51), just as was healthy and conscious nutrition (I6, 661-681). However, I6 was not yet convinced of the people's ability to adapt their consumer behavior.

Because the consumer certainly isn't yet mature enough to live healthy. He wants to live cheaply. Because he prefers to go somewhere on vacation or to undertake this and that, before he somewhere acquires more expensive food or takes it for eating. (I6, 192-195)

I7 contradicted this negative outlook. She recognized a development towards more sustainable production of food and goods alike (I7, 356), not least due to the general uncertainty caused by the ongoing Covid-19 crisis (I7, 385-389).

I believe that the trend is now also becoming more again. Not cheap, but if at all, then quality. (I7, 352-353)

Moving beyond private lives and towards politics, I8 criticized that power and money interests were at the heart of the activities of most top-level politicians with consequential damages to the environment (I8, 225-228). Aiming to resolve this situation, his political organization recently tried “to link the climate question to a social question” (I8, 255). Similarly, I9 would engage democratic operations (I9, 234-235) to assure that policies would not be driven by money anymore, but by the expected outcome for present and future generations (I9, 39-43). I11 doubted, however, that politics temporarily could guide the population towards a more sustainable future at all.

I think politics now has two problems. Point one: We are (...) We are no longer a role model for society. And (...) and credibility has simply been lost in many cases, that is clear anyway. And secondly, [...] It has simply become customary for politics to fix things. Responsibility is gladly shifted. But politics doesn't have the solutions and can't fix it, because we need the masses again to fix it. And we no longer reach the masses, in my view, because we have simply lost far too much credibility. (I11, 269-275)

Combining both optimistic and pessimistic positions, I5 attempted an outlook to the far future.

It will always go on. There will be giant conflicts coming our way, but it will continue, in whatever form it takes. (I5, 460-461)

III.5.2 Economy and environment

I3 described how, as a result of the consumers' demand for cheap products, economic pressure was passed on to the production and commercial trade sectors (I3, 193-200). Consequently, producers had to take high risks by investing into expensive equipment without knowing the future course of external influences like the weather (I6, 286-318).

But many must do it, because they have invested, they constantly need the circulation of money. And that's the problem that most have. (I3, 200-202)

I5 realized that money was at the heart of practically everything (I5, 117), only its distribution patterns disadvantaged ecologically friendly projects in comparison to profit-oriented companies (I5, 190-191). Likewise, I6 started to doubt the successful self-regulation of the market in practice (I6, 180-183). I3 came to a similar conclusion when he criticized that large agricultural holdings had a competitive advantage over small high-quality producers in terms of land acquisition (I3, 206-211). The influence of money was said to lead some corporations to believe that they could achieve their goals even against the will of politicians.

So the economy is always in competition with someone [...] (I2, 171-172)

The large corporations have always believed that they can get their way or that it is relatively easy for them to make decisions that go beyond local politics, but [...] It doesn't always work, yes. (I11, 197-201)

I8 illustrated that in his opinion individual action was not able to compensate for the systematic damage (I8, 102-102).

Hey, that's in fact a question of the economy and of the system, so. And that it's not done that simply, that you just somehow at once buy regional and organic products on an individual level and then everything is fine. Because that's actually just wrong, it doesn't work that way. You might soothe your own conscience there, but you won't change anything in the long term. (I8, 315-319)

Three of the interviewees identified the demand for constant and unlimited economic growth as main driver of unsustainable resource management (I8, 296-307; I10, 54-55).

Only the system as such is doomed to fail, with unlimited growth and limited resources as we have them on Earth, for me that can't be reconciled. (I5, 450-452)

Whereas one participant optimistically recognized a progress towards a more sustainable economy throughout the recent past (I10, 223-225), another one remained skeptical and tried to stimulate public discussions to promote a system change (I8, 327-330).

[...] I believe that truly sustainable, meaningful, reasonable climate policy is in fact simply not possible under capitalism and just won't happen in the social and economic situation we are currently in. (I8, 529-532)

III.6 Humans and ecosystems

III.6.1 Relationship of humans and nature

When questioned about the relationship of man to nature and to its ecosystems, many interviewees first emphasized that human existence was essentially based on the natural environment in which it was embedded. They particularly mentioned the dependence on natural cycles (I2, 114-115) and resources (I2, 172-173; I8, 122-131). I6 noted that some perceived these to be limited and exploited to spatially varying extents (I6, 633-636). That is why, according to two of the participants, mankind had to continuously adapt to the everchanging environmental conditions and to modify nature to fulfill their needs (I5, 403; I7, 184).

Well, the ecosystem is somehow the basis, and nature is somehow the basis on our planet where we live, so thus very important. (I1, 81-82)

Well, we are dependent on each other. So the ecosystem less from us, but we from the ecosystem, because we live on the earth and if it doesn't exist anymore or if it exists in a bad condition, then we will get a lot of problems. (I9, 58-60)

The interviewees generally saw the use of natural resources for economic benefits as an integral part of human existence on the planet (I8, 122-125; I11, 215-216). In the case of the study region, this

especially included agricultural and touristic forms of land use (I5, 118-119). However, I2 claimed that it was difficult but necessary *“to find a consensus between the economy and the eco-cycle, because the economy is usually, not always, against the eco-cycle”* (I2, 116-118).

Yes, in principle, I would also agree with this classic, I would say, concept of sustainability. That we should only take as much from the environment as is compatible and as much as the environment can, I would say, recover. And I think we are now miles away from that [...] (I4, 135-139)

At the same time, I10 also noted a general appreciation for a landscape that included authentic pristine elements (I10, 191-193).

A wide range of negative environmental impacts of mankind was mentioned by the study participants. For example, one of them complained about waste disposal in nature (I11, 239-244), another one criticized lacking consideration of natural conditions in road construction (I5, 217-218), and a third one described urban environments as generally rather unnatural (I1, 85-86). Although I5 and I10 recognized certain improvements within their region (I5, 432-434; I10, 213-214), they had a negative overall impression of the global development. In this context they specifically talked about rainforest deforestation in South America (I10, 214-218), mass combustion of coal in China, and huge carbon footprints of Europeans and Americans (I5, 434-449).

We are destroying our habitat, that's what it is. But nobody wants to admit that, (laughs) this whole thing. And the earth or nature, that is a system that's actually only disturbed by humans [...] (I5, 405-407)

Several of the interviewees identified public awareness of ecosystem values as key instrument to achieve more sustainable human interaction with the environment. However, there were different opinions on the state of ecological awareness. I5 and I7 complained that nature's behavies previously and partly still at present were not integrated seriously enough in regional planning (I5, 166; I7, 156). Others supported this position by arguing that a good state of nature had long been taken for granted (I7, 140-143; I11, 98-100), which led to a common decrease of awareness (I11, 248-249). Simultaneously, I11 emphasized that *“for myself nature is very important”* (I11, 208-209). Others, too, stated that intact ecosystems were considered increasingly important by the people (I3, 281-283; I5, 107). I7 and I8 gave several examples of how people in their personal environments appreciated nature and acted eco-friendly more and more again (I7, 325-328; I7, 431-447).

And begin to appreciate the little things that they have now more again. As I said, land and property and the forest. (I7, 389-391)

[...] it's true that friends and family members of mine also somehow leave leaves in the garden for hedgehogs, for example, yes, or build small insect hotels, or somehow hang up these grain bags for birds and so on. So they do a little bit. But I don't have the feeling that it's a burning, urgent issue or so, yes. (I8, 432-437)

Accordingly, I7 gladly reported of an increasing personal attachment to nature (I7, 76; I7, 342; I7, 450) which also revealed in the fact that *“that regional value creation [...] is, I believe, now (..) greater than it has ever been in recent years”* (I7, 339-340). I3 on the other hand still criticized the distance of the people to their natural surroundings, which he regarded as too great (I3, 230).

Due to the dependence of mankind on functioning ecosystems, the interviewees agreed on the need to actively maintain them in a desirable condition (I2, 119-120; I5, 409-412). They aimed to achieve a

harmonious coexistence of mankind and nature (I6, 685; I7, 199) and “*there you have to be able to deal with different aspects*” (I6, 585-586). On the one hand, some study participants recognized that they “*have it under control quite well*” (I6, 577-578) at least within the study region (I5, 443-445; I10, 305-307). There was agreement on the responsibility for “*our environment and that we have to take care of it*” (I9, 28-29) also in the long run (I6, 578-580; I8, 131-135). I7 recommended to take into account the actions of previous generations who in her view did many things right (I7, 192-197). On the other hand, other participants were afraid that a lack of attention might lead to a deterioration of nature’s resources (I8, 135-139). Both individuals and politics were held responsible to manage ecological development in the desired way (I5, 97-98; I8, 75-79).

The individual doesn’t understand that everything he does, even if it’s only the smallest area, that he can create there a positive effect in the whole ecology system. (I11, 253-255)

And in my understanding, politics should create the framework conditions so that each and every one of us can live in an environmentally friendly way and that the resources on our planet, which are the basis of life for all of us, are somehow protected. Exactly, that would be the task of politics, which it is definitely not fulfilling at the moment. (I8, 83-87)

III.6.2 The Ecosystem Services concept

The ES concept as a model to link human and ecological behavies was completely unknown to all interviewees (I1, 65; I2, 128-129; I3, 122-123; I4, 109; I5, 124; I6, 202; I7, 283-284; I8, 156; I9, 79; I10, 239; I11, 303). Upon hearing the term for the first time, some of them first associated it with political measures to support sustainable construction work or the like (I3, 117-123; I4, 99-107). Others, however, correctly assumed that it comprised forms of ecosystem “*performance for the society*” (I2, 125).

No, that doesn't mean anything to me now, but I can figure it out. That is, what profit I can generate from the ecosystem or (...), right? (I5, 124-126)

After having been introduced to the ES model briefly, a few of the study participants showed approval or at least interest in the idea (I10, 251). Nevertheless, I11 was the only one, according to the interviewer’s perception, who actively sought for information on the topic in further detail (I11, 317-319). In many cases, spontaneous reactions came only after a delay and with longer pauses. Eventually, first reflections led to the assumptions, that individual services were not in a “*competitive situation [...] with other functions*” (I2, 177) but had to be managed “*with reasonable bounds and aim. And what is important for the respective area*” (I7, 186-187). Others kept their thematic statements vague.

And about that I'm already thinking a lot, too, right? What you just mentioned there. (I6, 232-233)

Questioned about the current relevance of ES in local politics, the interviewees were divided in opinion. On the one hand, some saw no or too little consideration in present decision-making (I2, 205-206; I7, 180-182; I9, 97) and wished for more (I3, 479-480; I7, 70).

I think rather less, I must say honestly. So from this aspect, we have, I have actually seen that rather less. (I1, 71-72)

And I think it's just very important that this is included even more, because, as I said, at the moment it's just so that many people don't look at it enough. [...] And of course politics has a great value here, too. (I9, 97-101)

On the other hand, some also explained how ES were already considered individually or as a whole even without explicit knowledge of the specific scientific concept (I3, 134; I5, 141-154; I7, 71-74). I6 even included the term “*ecological use*” (I6, 461) in one of his statements without referring directly to the concept presented previously. According to I5 and I7, ecological and long-term effects of political actions already had their shares in current decision-making after positive developments in recent years (I5, 186-188; I7, 103; I7, 310-311). I7 further stated that more proactive action was required (I7, 314) and feasible within the existing political structures (I7, 507). I11 agreed that ES were already considered in his political environment, even though not always enough (I11, 403-405), because they sometimes “*reach our limits when it comes to the cost factor, when things get too expensive.*” (I11, 398-399)

I can't really think of anything now where it's not being considered. No, I have to say that it is already taken into account. Just not always primarily, but it's already anchored in the back of our minds, I would say. (I5, 152-154)

Perhaps (...) we already include something like this, without knowing the exact details, in our actions and creations, these principles of ecosystem services. (I11, 323-324)

Additionally, I2 had a different approach to further include ES in the management of large agricultural enterprises (I2, 183). He was also the only participant who admitted that in his personal and professional context some ES, mainly such in the context of agricultural production, had a higher priority than others (I2, 172; 203).

So, when it comes to soil fertility, of course, yes. Erosion control or the like. The influence on soil organisms, this indeed plays a role in my work. The recreational function plays less of a role now [...] (I2, 146-148)

III.7 The study region and its ecosystems

III.7.1 Remarks on characteristics and composition of local ecosystems

When describing their surroundings, the study participants highlighted different aspects according to their places of residence and personal perceptions of the environment. However, some of them explicitly or implicitly described the region as rather diverse in terms of, for instance, landscape structure und species inventory (I8, 349-355; I10, 284-285).

And there is a lot of structure. We just have from the lowlands, such as Neunkirchen in the direction of Wiener Neustadt, to the highest mountain in Lower Austria, the Schneeberg, a very broad spectrum. (I6, 583-585)

Water was not mentioned that frequently, but if it was, then in diverse contexts. I7 described how the availability of ground water could change drastically within short distances (I7, 119-125). I9 emphasized that “*the lakes are very important for Wiener Neustadt*” (I9, 145-146) for recreational use by the city's population. And I1 explained how the river Schwarza used to drive Neunkirchen's

industrial development (I1, 149-157). Industrial areas still existed in the Neunkirchen district, said I7 (I7, 253-254), whereas in Oberpullendorf *“industry we have none in the district”* (I2, 246). A regional particularity of I7’s residence were the remains of an ammunition factory which still noticeably increased the danger of forest fires up to date (I7, 216-231).

I5 stated that nowadays *“agriculture, forestry, tourism”* (I5, 265) were the major land use forms in the region. I11 explained that forestry was of particular importance in his municipality in the Southern Oberpullendorf district, where there existed also a large cross-border nature park (I11, 88-98). The border to Hungary furthermore implied mutual influences of the land use schemes of both countries, as was the case with, for example, agricultural chemical use (I3, 148-149). This concerned rather those large parts of the study region that were *“agriculturally influenced with small businesses”* (I2, 246). I6 described his residence district of Neunkirchen as *“relatively small in structure”* (I6, 261-262). The soil in some areas like the Steinfeld was not very fertile (I1, 147; I7, 205-208). This might explain why viticulture and intensive agriculture existed in certain places and were not viable in others (I2, 246-253; I3, 297; I6, 256; I7, 205-208). Other crops grown in the area comprised, for instance, cereals (I2, 431-432) or fruits such as apples and pears (I7, 202).

Some of the study participants explicitly expressed their happiness to live in *“a beautiful district, an interesting district in my eyes as well”* (I6, 261) and *“in a promised land”* (I3, 231-232). I11 claimed that the population of his municipality was increasing (I11, 160-164). I6 stressed the advantage of his place of residence, which was a quiet location with at the same time good connections to public transport and metropolitan areas (I6, 219-229).

So in my region there are [...] both rather more urban communities like Neunkirchen, Ternitz or Gloggnitz, as well as very small rural communities. (I4, 49-51)

Otherwise, I really appreciate that we are quite a lot in the countryside and that somehow forests and so are not far away and you can go somewhere with the bike somehow quickly. (I8, 349-351)

Some of the interviewees realized that their region was not only home to its human residents, but also contained *“vital places for (...) animals, that is, for biodiversity”* (I9, 144-145). That is why the construction of large infrastructure projects such as the Semmering base tunnel were considered an impact to *“water balance and the ecosystem. Because this is a massive intervention, I would say, in geology, in (...) yes, in the entire ecosystem of the region.”* (I4, 230-231)

Generally, some of the study participants described the circuit character and interdependencies of nature and its ecosystems (I3, 234; I3, 389-390; I7, 195). Furthermore, there was believe in a continuous evolution of nature regardless of the human influence (I5, 399-400).

And that's why I also believe that species diversity is now just as important in the fauna - and that everything is connected in a system - as species diversity is in the flora [...] (I5, 277-279)

Nature usually takes care of itself anyway, it just takes time, you just have to wait for it. (I11, 356-357)

III.7.2 State and trends of local ecosystems

In the perception of the interviewees nature in their surroundings was mostly in a good state (I4, 229; I6, 236). However, I6 and I10 emphasized that even within their residence district or state conditions varied remarkably and ecosystems were not equally well preserved (I6, 249-250; I10, 228-235). Meanwhile, on a global scale *“the relations don’t fit at all”* (I4, 438).

Forecasting trends of the near future, the interviewees were in good spirits to maintain or reach a favorable state of nature (I4, 215; I6, 244-246; I7, 317-321; I10, 253-262) in an everchanging environment (I10, 305).

[...] and therefore the soil is also not bad for the forest around it and also for the meadows. With the pasture and with that it yet remains more or less (...) the same as years back or earlier here. So there that’s not so bad, that’s my opinion, please. (I10, 259-262)

Some of the study participants emphasized that it required active human action to achieve constant favorable ecological conditions (I10, 74). In this context, I10 talked about previous activities in the region that contributed to the present good state (I10, 144-146) and stressed that *“you have to be behind the whole thing all the time”* (I10, 293). He explicitly mentioned that water as a resource would require additional attention and management in the future (I10, 144-146). I11 supported the opinion that it was necessary to give enough space to natural developments (I11, 360). And I4 summarized the situation as *“relatively intact but in need of improvement. And look that one maintains it there!”* (I4, 215)

I3 was sure that in his rural environment more ecosystem deterioration was avoidable (I3, 281). He and I10 rather believed that there was and would be progress made towards a better condition (I3, 250-252; I10, 310-311). Simultaneously, I3 was aware of the potential for damage caused by the people such as, for instance, a loss of biodiversity due to unsustainable agricultural practices (I3, 254-255). I4 was more pessimistic in this respect and stated to have lost faith in a positive development of natural conditions under human domination (I4, 414-415).

We really have a very good soil, we have a good climate. So why should I destroy that somewhere unnecessarily now? (I3, 204-205)

No matter whether they believed in trends towards a better or worse state of nature, the interviewees widely agreed on a relatively slow course of environmental changes that would take as much as *“ten to 20 generations”* (I3, 252). I11 believed that at least in the case of wildlife populations a few generations might already be enough to restore an ecological balance (I11, 353-356). Superior developments like CC would have longer-lasting negative effects, I4 and I9 feared (I9, 75-77).

[...] from the 20th century on the generations will be the generations that caused this, this climate change. I don't know if we can still stop it. [...] So we will definitely have an impact. [...] We will not pay for it yet, our children and grandchildren will pay for it. They will be very grateful to us for all this. (laughs) (I4, 419-425)

III.7.3 Climate change

III.7.3.1 Impacts on local ecosystems

All interviewees already depicted impacts of CC on the study region's ecosystems or at least forecasted them for the future. The most reported effects comprised temperature rise, changing water regime and extreme weather events. For instance, I1 expected that rising temperatures would lead to *"major problems with heating up and overheating"* (I1, 175-178) especially in big cities. The fact that *"it is getting a little warmer after all"* (I2, 287-288) went along with the finding of several study participants that recent winters were often milder (I6, 532-533) and less snowy than they used to be (I5, 372-374; I10, 495-499). The interviewees noted reduced precipitation not only in winter, however, but throughout other seasons, too (I2, 289-291; I5, 249-250; I11, 432-434). I5 even concluded that some parts of the study region had entirely *"slipped into the Pannonian climate"* (I5, 368).

But last year it was quite bad [...] There the summer was already dry and this year in the spring as well, especially there was little snow. (I10, 315-318)

While I3 and I4 said that water regimes in their environment were not yet affected to a critical extent (I3, 383; I4, 226-227), others referred to the present situation already with great worries.

Well, changes we already have, yes. We have drought all the time in spring. In April, May, when we need precipitation, it doesn't come. (I2, 281-282)

Of course, there we are extremely dependent on the (...) water or on the precipitation, which has now decreased massively in recent years. And we have a huge water problem. (I11, 364-366)

According to some of the interviewees, 2020 was rather *"an average year"* (I5, 237) in terms of temperatures and precipitation distribution (I10, 314-315). I10 suspected that the reduced mobility of the people during the pandemic attributed to this effect (I10, 503-505). Other noticeable changes concerning the region's water regime comprised, for instance, lower expenses for winter road maintenance (I5, 372-373) and sinking lake water levels in summer (I8, 344-347; I9, 154-157). With regard to the anticipated future developments, several study participants feared further and stronger changes in precipitation which require a reaction from the people (I2, 291-292; I4, 212-214; I9, 166-167; I11, 434-435).

So I have the feeling that the effects of climate change are also already noticeable and that this is definitely not developing in a good direction, so to speak. (I8, 347-349)

Despite this observed overall decrease in precipitation, the participants foresaw *"less predictable"* (I6, 324) natural phenomena and *"in any case more extreme"* (I9, 170) weather events. Whereas some were happy that their residence communities had not been hit hard by strong rainfalls and subsequent flooding events so far (I1, 185-190; I3, 298-300; I11, 435-436), I7 already experienced *"these storms, where we are also very affected in the community, as already mentioned the flood, it has hit us very hard this year in August [...]"* (I7, 144-145). Such new weather patterns required to *"work with the climate"* (I6, 329-330) proactively, what for some politicians meant to invest in flood protection and retention basins (I1, 188-89; I3, 300-308). In the case of ever stronger weather impacts in the future (I11, 444), I11 was afraid that these measures might still not be enough.

But that's of course also a huge problem, that is the change of extremes, which is also noticeable. Heavy rain, you can't protect yourself against it with a retention basin. When it falls, everything overflows and, in the worst case, you have water in your own living space. Or the canal is flooded and leads to environmental pollution from the wastewater. So that's definitely a problem, and you can see that climate change has also arrived here. (I11, 437-442)

Besides these major weather developments, some of the participants also mentioned other and more specific natural changes related to CC. For instance, I7 noted an increased risk of forest fires (I7, 225) and I6 saw shifts in insect species diversity.

Certain insects no longer exist. [...] But insects that did not exist in our latitudes before are coming back. [...] And that is also a consequence of so-called global warming. (...) So some are becoming fewer, and others are coming. Which is not always positive. (I6, 333-347)

While on the one hand, I10 was sure that on a local scale “there are certainly regions that are worse off with climate change than we are, that are more affected than we are” (I10, 320-321), I5 and I9 had a bigger picture in mind which worried them.

[...] that is when the temperature rises, so many ice poles melt away that the sea level rises and the coastal areas, for example, are flooded. For the people there, that means they have to move because there are so many climate disasters. What does that mean for us in Europe? Because we are not directly affected by the flooding, for example in Austria. That means a lot of immigration. As a result, we will not have enough supplies and so on. So that can have serious consequences. (I9, 64-71)

[...] and what the effects are, will be experienced by the next generation. I don't believe that we will kill ourselves off, that we will be wiped out, because of climate change. There will be great conflicts worldwide, then also because of the fact that simply habitat will be destroyed [...] So I have no fear at all that it will harm nature. It will harm us as humans. (I5, 496-503)

III.7.3.2 Mitigation and adaptation

To avoid the worst of impacts, some of the study participants talked about CC mitigation and adaptation measures. The former were to be achieved by political programs such as the Paris Agreement, although I4 believed that “if we just think about the climate targets, the 2-degree target by 2050, then we definitely won't make it in many areas” (I4, 139-141) and I5 rather expected that “maybe we settle somewhere between three and four degrees” (I5, 495-496). Therefore, I3 promoted the participation of communities in thematic alliances (I3, 74-77) and urged to quickly implement effective climate protection action (I3, 287-288).

According to I2 and I11, measures should target the main drivers of CC. On a regional scale, I2 made out “traffic as the main contributor” (I2, 303) to be adapted, whereas he did not see much mitigation potential in agriculture (I2, 303-306). I11 also demanded proactive action from the consumers.

That's mobility behavior, that's shopping behavior. If we start changing that, everything else will change. (I11, 417-419)

At the same time, I5 believed that regional action alone could not significantly influence the course of CC if on a global scale larger economic markets kept driving air pollution (I5, 485-493). He concluded

“that climate change is taking place and that accordingly- that it can no longer be prevented, one must also (...) take adaptation measures” (I5, 53-55). Similarly, I2 demanded *“reacting for the farmers, yes, reacting for the crops. But not reacting to prevent climate change, yes. That should be said honestly, there we are much too small or we can do nothing, yes”* (I2, 295-297). Others further highlighted thematic public education to create awareness and to promote the achievement of urgent environmental goals (I3, 308; I5, 168-170), e.g. by political activism (I9, 38). I5 was happy to see that even during the pandemic CC remained a topic of strong media presence (I5, 479-482). I7 was the only one who stated to already see an improvement in the way people interact with their environment (I7, 310-311) and who believed in a positive trend of her region’s ecosystems (I7, 323).

III.7.4 Selected ES 1 – Habitats and species

The first of the three selected ES, which were addressed specifically in all interviews, was ‘Habitats and species’. Despite some ambiguity about the service (I2, 334), almost half of the interviewees commented positively on its relevance and associated measures (I2, 342; I8, 401-402; I10, 449; I11, 487). I7 realized that *“these near-natural spaces for the animals”* (I7, 430) recently received increasing attention and I11 supported this argument stating that for targeted action *“we would also be willing to invest more from the community side”* (I11, 474). I10, too, advocated the implementation of further protection measures from various landowners (I10, 438-449), but *“whether anyone will do anything, that I don't know. I don't think so”* (I10, 447). There were some more interviewees who were not aware of any greater political attention to this particular ES (I6, 513; I9, 191). I5 even assumed that the topic was rather *“outsourced directly to the farmers”* (I5, 288), where I2, however, recognized little intrinsic motivation to take protective action (I2, 343).

To be honest, this is a topic that I haven't really dealt with yet, or rather I also don't see any great potential, I have to say honestly. (I1, 250-251)

Six out of the eleven study participants talked about PAs in their respective regions. Natura2000 areas were mentioned most often (I1, 243-245; I2, 353-355; I4, 253-255; I6, 479-481), besides other PA concepts like a nature park (I11, 472-473) and a self-installed *“Ökoland”* (I3, 48). Applied management mainly involved putting areas out of use (I2, 364-365; I3, 341-344; I11, 472-473). However, PAs sometimes required certain management measures, too, such as adapted wildlife regulation (I6, 481-482) or the exclusion of tourists (I6, 494-495).

So that's a very important factor for me, that you actually leave it in its natural state, the whole thing. And maybe every five, ten years, you have to look through it a little bit, there need to be some fixes to make sure that nothing happens. [...] We also have gravel pits where you let it grow as nature wants. We just have areas where I'm proud that we're succeeding. (I3, 324-339)

The mentioned PAs often consisted of forests (I1, 242-243; I3, 341), but also comprised sand and gravel pits (I3, 327-328), mountainous areas (I3, 480) and other habitats *“where there is a lot of groundwater, where animals can stay, where there is wild growth of trees of all kinds and types”* (I3, 320-321). Many of them were rather small (I1, 246-247; I2, 368). Inside cities there were also individual trees or small spots protected (I1, 240-242). The financial opportunities of a community defined the extent of their protective measures both in the case of the purchase of land or to fund protective action of stakeholders (I2, 355-356; I3, 341).

Besides near-natural PAs there were also protection measures implemented within the cultural landscapes of the study region, as the interviewees reported. For instance, I4 talked about the consideration of ecological matters within cities' *"nature park concepts, urban park renovations, plantings"* (I4, 264). I5 supported that one took advanced measures in road construction to enhance biodiversity and balanced water regimes (I5, 156-164). I3 and I10 appealed to support the maintenance of biodiversity areas such as wildflower meadows within agricultural landscapes (I3, 266-272; I10, 426-431), as I10 privately already did.

And we also have several wild areas, where we mow the swamp because of the butterflies and because of the flowers and because of the bees, so we already do that, over one and a half hectares. I have to mow with a chainsaw or a normal saw, but in return rare flowers are also in there. (I10, 46-49)

Such conservation action eventually influenced the landscape, too. I5 hoped to preserve the overall cultural landscape of his region (I5, 275-276), while at the same time he expected changes in species composition (I5, 382-383) and structural changes in smaller areas.

So what is no longer cultivated becomes wooded and overgrown, and nature takes care of itself anyway. There will anyway only come- only persist those species that are resistant or more resilient [...] (I5, 397-399)

In addition to the conservation of habitats, certain species or species groups also received special attention of the interviewees. For instance, they valued diverse meadows as habitats for marigolds (*Calendula sp.*) (I10, 454) and bees (I10, 384-385; I11, 473). There were almost no mentions of particular plant species because *"what plants are worth protecting, I really don't know"* (I2, 338-339). On the other hand, there were more precise statements about animals of conservation interest. I4 referred to a snail and a toad species (I4, 242-253), I7 named ibex (*Capra ibex*) (I7, 427-428) and I8 European sousliks (*Spermophilus citellus*) (I8, 382-388). I6 talked about game species (I6, 443-446) and especially about *"grouse, capercaillie, black grouse"* (I6, 589) (*Tetrao urogallus*, *Lyrurus tetrix*). He further explained that grouse populations were monitored and provided suitable habitats and thus thrive in the area (I6, 587-601).

While I7 believed that in her area they *"don't really have anything like that now, which would be a rare species"* (I7, 456), I1 told that in his municipality lived a rare bird species that he had never even personally seen (I1, 245-246). Birds also played a major role in I11's surroundings *"where bird populations, that are endangered, are specially bred and sick animals are nursed back to health and then released again"* (I11, 481-483). Some study participants also bore in mind the *"diversity of species, including flora and fauna"* (I6, 475-476) in its completeness. I8 appreciated the relative diversity in the surroundings of his residence (I8, 388-390) and in I7's view worth protecting was *"what suits our climate in this region"* (I7, 404). I10 was further aware of the high value of original habitats that were not completely restorable once destroyed (I10, 152-154).

A contentious issue was the reintroduction of larger mammal species. I3 strongly advocated the establishment of a vivid population of wildcats (I3, 510-513) but reported of opposition from the hunting community (I3, 230-234). Likewise, I11 was not happy about the already implemented reintroduction of beavers and otters in his region. He had to realize that it came at the expenses of local fish populations, trees and flood protection measures (I11, 329-341; I11, 343-350).

So in sum, everywhere where we try to intervene again afterwards, it is a problem from my point of view. (I11, 351-352)

III.7.5 Selected ES 2 – Insect pollination

The ES of insect pollination was commonly considered important among the interviewees (I4, 278; I7, 299-300; I10, 391), mainly because it regulated the *“pollination for the fruit trees, for the crops, for the forest, so everywhere we need something to pollinate”* (I6, 349-350). Some believed that human supportive action was required. For instance, I7 promoted political measures (I7, 476), whereas I5 depicted existing action *“but not from the political side now”* (I5, 321). However, I6 and I10 emphasized that an unequal distribution of insects in the landscape was to a certain extent normal due to varying environmental conditions (I6, 379-384) and that some pollinator species compensated for the population decrease of others (I10, 397-399).

Yet, five of eleven study participants depicted an overall decline of insect abundance either based on own observations (I6, 390-394; I10, 401) or public debates (I1, 255-257; I5, 320-321; I6, 389-390). They expressed their worries (I8, 422-423) and commitment to initiate a turnaround (I1, 257-258). At the same time, they thought that *“it’s not that dangerous”* (I6, 357-358) yet and that there is sufficient potential for recovery (I10, 402). Drivers of the perceived pollinator decline were, according to some of the participants, the Varroa mite (*Varroa destructor*) (I2, 389-395), CC (I5, 318), and pesticide usage (I5, 318-319; I10, 395-398). Unlike the rest, I9 was not aware of any development in the matter (I9, 194-195) and I6 did not even see *“a bottleneck and with the bees I see an increase”* (I2, 397).

In the sense that people are saying, also somehow in the media and politically, that there is a rather large insect mortality and that in summer there are far fewer different insects and also bee species and so on, that there are fewer of them. And I also have the feeling [...] (I8, 413-416)

Regarding in particular the study region, the interviewees focused on very different aspects. I4 and I5 admitted that they could not realistically assess the local situation (I4, 282-285; I5, 324-326). I11 saw no need for action since *“we currently still have enough beekeepers and bees to take on this task”* (I11, 320-321). I6 emphasized that manual pollination as an alternative, if necessary, *“will not be possible in our areas or our structure of agriculture either”* (I6, 353-354). I7 and I8 reported of the creation of insect hotels and bee pastures in their whereabouts (I7, 461-464; I8, 424-428) and wished that subsequently *“there will be a lot of insect hotels in the gardens [of the people] when they see this”* (I7, 468-469).

Creating habitat for pollinating insects was a popular measure among the interviewees. I1 thought that the decline of pollinator populations also had to do with the *“question of just what the landscape is like”* (I1, 259-260). Both from the municipalities and from agriculture there were initiatives to establish insect hotels and flower meadows (I1, 264; I3, 386-388; I4, 270-275; I7, 89-95) with varying degrees of success so far.

For example, the hunters' association has started a project, and agriculture and farmers are also participating in "Wir für Bienen". There areas are cultivated with 28 to 30 components, which are supposed to bloom all year round. [...] In principle, it will not be worked on and should remain standing for the next few years. So what I have seen, just because I have it myself, it is really excellent. (I6, 355-362)

But we are not yet so far that we can say: We have already planted so many square meters or hectares of bee pasture, so we are not that far there yet. (I1, 264-266)

In the context of insect pollination, many study participants quickly focused on bees and associated support programs (I2, 129-130; I4, 270-271; I10, 391-392). Thus, beekeeping received a lot of attention, too. The interviewees noted very different developments in their respective regions. I3 and I10 recognized urgent need to promote and support beekeeping (I3, 400-411; I10, 404-416). I5 realized that a positive trend had already started (I5, 308-315). Conversely, I2 and I11 stated that in their areas *“we have extremely many bees there, we have an abundance of honey”* (I11, 104-105). Therefore, I3 demanded a statewide political action to foster beekeeping across all areas.

[...] then it [the state] should go and say: we make our own associations with beekeeping, which we support because for me this is vital. (I3, 409-411)

III.7.6 Selected ES 3 – Drinking water

The provision of drinking water was an essential ES for the study participants and thus was given a high priority in politics (I1, 157-158; I3, 134-137; I11, 363). I4 further emphasized the identity-forming character of water for the inhabitants of her region (I4, 199-204).

[...] because water for me - yes, there is no other way - is a food item. Very important, there's no other way. Without water you are finished. (I3, 367-369)

Regarding the study region, most statements highlighted the relatively good provision of drinking water (I3, 361-365). I4 very much appreciated *“that we have very good water quality in the region, very many drinking water sources”* (I4, 302-303) while at the same time she and others emphasized the necessity to manage this resource sustainably (I3, 137-140; I4, 303-304). However, I7 noted that both water quality and quantity were not equally distributed across her region.

Others, too, mentioned that various ways of water management were applied to make water accessible for all consumers and land users in the study region. They indicated that local water boards arranged that most recipients were connected to pipelines and thus to the region's springs (I2, 400-403; I2, 438-400; I4, 299-300; I6, 404-409; I10, 484-488). Cross-community cooperation and storage tanks should secure that *“the local water pipes and also individual farmsteads”* (I6, 409) were supplied with water even in emergency situations (I1, 226-235; I5, 341-346). Nevertheless, alternative forms of water supply still existed. I5 explained that the individual delivery of water to certain farms by the fire brigade was not yet fully replaced (I5, 346-354). I6 preferred using water from the well on his own property (I6, 236-237) and I10 supported that especially for agricultural use *“you may also go down to the stream and take the water, which is also correct.”* (I10, 488-489).

There were some approaches in the region to use modern technology for the distribution of water. For instance, I4 said that a new pumping station was run with solar energy (I4, 300-301). I3 reported of a mineral water spring where registered people could take water free of charge or for a small fee, an offer that he claimed was gladly accepted (I3, 347-357).

A special feature of regional water management was that drinking water for the Vienna metropolitan area originated from the mountainous region in the western Neunkirchen district (I1, 159-161; I4, 307-309). This further enhanced that *“our region is enormously important as far as the topic of water is*

concerned" (I4, 209-210). The main pipeline to Vienna was the so-called 'Hochquellwasserleitung' which also supplied the Neunkirchen municipality (I1, 158-159). I1 and I4 stated that scientists, politicians and land users cooperated to conserve ecosystem functionality in the source region and therefore maintained the city's drinking water resource in a good state (I1, 168-170; I4, 307-316). I8 was the only one who openly complained about the water being transported to Vienna.

[...] Vienna's drinking water comes to a large part from the Vienna Hochquellwasserleitung, which has its source there near the Hohe Wand and the mountains. This means that the good water that is drunk in Vienna, is actually available in the region of Wiener Neustadt and the surrounding area, but it is shipped to Vienna and in Wiener Neustadt the water is horribly contaminated with chlorine. (I8, 466-470)

Most of the study participants agreed that the regional drinking water supply was not yet at risk (I1, 172; I2, 425; I3, 361; I7, 514; I8, 479-482; I10, 479). I7 did not consider measures necessary at the moment at all (I7, 524) and for I8, too, the topic played a minor role in current local politics (I8, 476). Others anticipated changes and promoted to counteract them by extensifying agriculture (I10, 479-480), using further available springs (I10, 470-472; I10, 489-493) and building "a second deep tank for the water supply" (I1, 167). I10 already noted first signs of decreasing water quantities (I10, 317-320).

The expected future decline in drinking water availability (I9, 205-208; I10, 508) was mainly attributed to CC and its consequences for local precipitation (I2, 421; I4, 212; I4, 320; I5, 375-376). I8 reported that very hot summers in the past had already required an adaption of water management (I8, 489-499). The dependency on precipitation, however, took on different dimensions depending on the location. Some regions suffered from water scarcity very soon after a lack of rainfall occurred (I5, 235; I11, 363-365), while others could fall back on rather stable supplies "unless it doesn't rain for a few years, (laughs) then it gets bad" (I3, 382). Only I7 did not notice or expect any drinking water related changes due to CC at all (I7, 516-519).

We are noticing that precipitation is distributed differently due to climate change, so there is more heavy precipitation, more evaporation, that the groundwater level is declining. [...] And that's why it was recognized early on that there's a need for action. (I5, 334-339)

Definitely, definitely. Our mountain only gives a certain amount of water. If it rains too little during this time now, half a year later in summer there is simply too little drinking water. Because it takes half a year, three to six months, for the water to be available after the precipitation in the water pipeline. (I11, 509-512)

I5 stated that "the southern Bucklige Welt has a groundwater holding capacity of one and a half years" (I5, 240-241). Similarly, I6 noted that after two consecutive dry years springs in his region began to dry out (I6, 415-418) and forecasted that in general "the quantity should become less" (I6, 422). Other study participants, too, recognized signs of decreasing water quantities such as dwindling wells (I5, 243-245) or sinking lake water levels (I8, 485-488). Although I10 reported of a particular spring with a constant water supply for cattle (I10, 90-94), I5 forecasted that generally "agriculture, they will have to change" (I5, 359-360) their water use patterns.

However, I can't irrigate, that is irrigate agricultural crops, that doesn't work for us [...] (I2, 407-408)

Additionally, there were "technical solutions, simply when you build water pipes, when you make additional supply stands" (I5, 231-232), which could be very expensive (I6, 418-419). Furthermore, I11

appealed to the people to refrain from building private swimming pools (I11, 366-372). Water scarcity was not a pressing political issue in all parts of the study region though (I8, 488-489). On the contrary, I7 had to deal with *“groundwater, that's madness, that's going into houses just like that”* (I7, 147).

There was relative agreement on the high quality of drinking water throughout the entire study region (I1, 232; I2, 441; I6, 428; I7, 521; I9, 198; I11, 518), which was even confirmed by scientific analyses in some places (I3, 372-376; I6, 240).

This means that we have extremely high-quality drinking water. (I11, 327-328)

And (...) as far as I know, it's also clean and not somehow too hard or too soft or anything else, so you see relatively few problems, or none at all, actually. (I9, 200-202)

However, I4 and I6 reported of past contaminations in connection with the Semmering tunnel project (I4, 234-237) or of illegal landfills (I8, 453-465), which caused a stir among the locals. I8 was the only interviewee who until today was disappointed *“as far as drinking water is concerned, because in Wiener Neustadt and the surrounding area I actually find it just horrible”* (I8, 452-453), especially if compared to the water delivered to Vienna.

To secure the altogether high quality of drinking water, it was necessary *“that these resources that exist are handled very, very carefully and are also cared for”* (I3, 365-367). The protection of groundwater was ensured, for instance, by establishing water protection areas where the use of agricultural fertilizers and chemicals was restricted (I2, 426-433; I10, 474-477). In the area of origin of the Hochquellwasserleitung, furthermore, the wildlife management was adapted and *“they have to leave certain things, so that the forest is not managed, and then that it just, that the water there remains clean and everything”* (I10, 358-360). I3 claimed that there had been no incidents regarding such regulations in his municipality so far (I3, 378).

I6, who had a well on his own property, stated to be in control of the water quality himself by applying the right form of land use (I6, 430-437). Otherwise, only *“some environmental disaster”* (I6, 432) could affect it. I10 claimed to have prevented such an incident in the context of the Semmering tunnel with the help of a citizen's initiative (I10, 23-31). Concerning his municipality, I11 was only afraid of a deterioration of the precipitation input.

If the pollutants were already in the precipitation, then we'd have a problem. So then, of course, our water quality would be correspondingly worse. As it is now, it's very, very high. (I11, 521-523)

III.7.7 Remarks on other Ecosystem Services

Besides the three selected ES and the exploitation of resources in the form of agriculture, forestry and hunting, the interviewees mentioned further services on their own. Four of them talked about *“the recreational function [...] that is important for tourism.”* (I2, 148-149) They regarded the cultural landscape as a place to relax or do sports (I2, 173-177; I8, 396-398; I9, 144; I10, 251-252). Having easy access to it for them was thus *“an important aspect for the quality of life”* (I11, 210).

I6 stated that some people also left the city to go somewhere *“where they can get fresh air”* (I6, 507). Likewise, I10 and I11 emphasized that high air quality depended on functional ecosystems (I10, 144-

145; I11, 384-386). Furthermore, three of the interviewees appreciated the establishment of green spaces in urban areas to provide shade and cooling (I7, 191; I8, 369-370).

In general, the green spaces are naturally- they also cool down, they have a cooling factor. (I11, 372-373)

Two more ES were named by only one study participant each. For I2 *“soil fertility plays a big role in my work. Very much so. (...) Especially Erosion control, first and foremost”* (I2, 150-151). And I5 recognized the contribution of intact ecosystems to the protection of the people and their property against storms (I5, 142-144).

III.8 Summary of the results

III.8.1 Congruent results across all interviewees

All interviewees appreciated living in the study region, which they perceived as structurally diverse and worth preserving. They were aware that it needed sustainable and environmentally friendly action to ensure the maintenance of existing ecosystems both in the study region and on larger spatial scales. This was independent from their political backgrounds. Perceived responsibility to provide future generations with a life of equally high quality was a frequent motivational factor. However, the study participants considered different actors to be mainly responsible for future ecological developments. These included political institutions, individual consumers, and in some cases economic enterprises.

Nevertheless, environmental politics played a major role in the considerations of all respondents, if only by stimulating behavioral change on the part of individuals or companies. There was demand for a supportive legal framework from higher political levels, while at the same time the high number of possibilities for active local action were emphasized frequently. It was mainly the political functionaries who were aware that they could exert influence, for instance by adapting regional planning or by educating the public. The latter was regarded essential to effectively address non-local issues like CC. The interviewees were uncertain how the ongoing Covid-19 crisis would influence future environmental politics.

The study participants identified agriculture and forestry as main land use forms and economic pillars of their region. Concerning agriculture, they described certain ongoing changes such as overall increasing farm size with simultaneously decreasing number of farms, increasing share of organic producers and reduced crop rotation. Forestry and hunting, too, received a little less attention. However, altogether the use of natural resources was considered not only very important for the region but fundamental for human society. It was thus commonly accepted that the maintenance of ecosystems, which provided the people with food and raw material, was crucial and required a lot of public awareness. In the understanding of the interviewees, nature and environment were often equated and were characterized by functioning material cycles and a certain level of biodiversity.

The region's ecosystems were threatened in various ways, as the interviewees said, but not yet to a critical degree. Perceived negative impacts included changing farm structures, land consumption from new construction projects, and locally excessive stress from tourism. Species reintroduction programs, afforestation or habitat protection measures existed, but were only locally relevant. Without exception, all study participants also recognized CC as a major threat to biodiversity and ecosystems

that required mitigation and adaptation measures. Its main perceived or anticipated effects included temperature rise, precipitation reduction and more frequent extreme weather conditions. Adaptation happened, for example, by cultivating other species, adjusting water management, establishing extensive GI and taking preventive measures against forest fires. CC mitigation, however, was expected to happen mainly through adjustments in the mobility, construction and energy sectors. The goal was to generate energy in a more environmentally friendly way and to reduce its overall consumption in order to reduce GHG emissions. There was agreement that CC is a global phenomenon and hence must be addressed globally to really keep the damage as low as possible.

The ES concept, which is a popular attempt to enhance the consideration of ecological issues in politics and society, was unknown to all respondents. Yet, some services were unconsciously regarded by the interviewees anyways, above all the provisioning of food, water and raw material. Furthermore, there were some references to cultural services such as nature aesthetics and recreation and also a few remarks on regulating services like air purification and supporting services like soil fertility. The three ES selected for this study were dealt with differently. Most participants generally supported the protection of certain habitats and species, although they did not have a very detailed picture of their current state, let alone their benefits for the people. The latter were more recognized in the case of insect pollination, which was largely associated with beekeeping and was supported by various means in large parts of the study region's cultural landscape. Finally, drinking water was seen as something very valuable and relevant. There were almost no worries regarding water quality, but the available quantity was or would likely become an issue due to CC.

III.8.2 Comparison of perspectives by interviewee characteristics

III.8.2.1 Comparison by gender

What is initially striking about the gender of the participants is the relative male dominance throughout the group. Eight out of eleven interviewees (73%) were men. In any case, gender did not seem to be an influential factor in the context of the study region's environmental politics. The thematic priorities of the interviewees varied greatly among both genders. For instance, the highest (I7) and the lowest (I4) speaking shares of all on the category 'Environmental politics' could be found with female participants likewise. Simultaneously, five of the eight men spoke more than average on the same category and three less. This impression was repeated in other categories as well as on the code level.

By focusing on individual statements, it is easily noticeable that there were more and less progressive views on environmental politics among persons of both genders. For example, there were women who both believed (I7, 507) or had doubts (I9, 55) in the power of current political structures and representatives to implement sufficient ecological measures. Comparably, within the group of male participants the approaches went in different directions, too, and were even more far-reaching. The specific demands ranged from enhanced individual action and consumer awareness (I6, 690-696) to profound changes of the economic and political system (I8, 529-535). Therefore, it stands to reason that other social factors influenced the participants' ecological perception far more than gender.

III.8.2.2 Comparison by age

The average age of the interviewees at the time the study was conducted was approx. 45 years with a wide range from 16 to 71 years old. It appears that there was a link between age and commitment to the established political forces. While only one out of the five youngest study participants indicated to try to achieve their environmental objectives with a party-political approach, only one out of the older six was no member of a party or political organization currently represented in their respective local councils.

Unlike gender, age also seemed to have at least a little effect on the priority setting of the study participants. The four youngest had relatively low speaking shares and often no mentions at all on the use of natural resources as well as the characteristics, state and trend of ecosystems. They rather focused on the social circumstances that drove environmental changes (i.e. I8, 75-80). On the contrary, the older interviewees more frequently expressed an understanding of the circular character of nature (i.e. I3, 234), noted more specific impacts of CC on regional ecosystems (i.e. I6, 333-347) and suggested most of the non-cultural ES besides the selected ones (i.e. I7, 191; I10, 144-145).

III.8.2.3 Comparison by residence

Six out of eleven interviewed persons were active in the Neunkirchen district, another three in the Oberpullendorf district and two in the city of Wiener Neustadt. Only I5's range of activity also included parts of the countryside district of Wiener Neustadt. The given distribution of participants in the study region nevertheless allows robust conclusions to be drawn.

Firstly, it is apparent against the background of their living conditions that on average people living and working in rural communities had more to say on the use of natural resources than town and city dwellers. Among those representing the rural population, mentions on coarsening farm structures came from inhabitants of the Oberpullendorf and the Neunkirchen district likewise, which indicates a supraregional development with all its consequences. Similarly, intensive agriculture seems to be rare and not even feasible in most of the study region, as interviewees from various residences reported. Other commonalities lay in the experienced and anticipated CC impacts and in the almost exclusively positive assessment of the drinking water quality.

Concerning the water quantity, however, the statements of my interview partners revealed regional differences. People from the Neunkirchen district had a rather diffuse fear of future water shortage, not to mention I7 who even reported of excessive amounts of groundwater threatening households. In the Oberpullendorf district, the implications of water scarcity were already more noticeable and caused two of the three interviewees from there to encourage its restrained use both in agriculture and in private households. The study participants were also largely aware of their surroundings' natural key characteristics with their respective economic use. While the Oberpullendorf inhabitants emphasize the abundance of forest in their district, the Neunkirchen dwellers highlighted the importance of nature tourism especially in the Western mountainous communities of their area. Accordingly, there were also different wildlife species in focus of protection measures such as water-dwelling mammals in the Eastern and ibex in the Western part of the study region.

Despite such varying natural conditions and correspondingly differing perceptions of their environments, the differences of any rural resident to the city dwellers seem a lot larger. Especially the

two inhabitants of Wiener Neustadt, but also others who lived and worked in the region's medium-sized towns, focused less on natural resources in their interviews. Accordingly, they experienced environmental changes more in urban environments and intensive recreational use areas such as parks than in near-natural habitats. Furthermore, due to their lack of expertise on regionally specific ecological developments, they all emphasized certain other topics. For instance, I8 spoke a lot about linkages between ecological, social and economic challenges and how to politically address them altogether. I9 had a particular focus on CC, yet mostly with regard to the overall social developments rather than regional ones. I1 and I4, who were based in the study region's second largest town, promoted more than usual the consideration of sustainable ideas in the construction of infrastructure or in political processes, respectively.

III.8.2.4 Comparison by profession

Naturally, the family origin and place of residence of a person were in many cases linked to their professional background and vice versa. Hence, it is often not possible to differentiate which of the two was the stronger driver of an interviewee's approach to environmental issues. Nevertheless, it appears that the participants' working environments certainly influenced their conceptions of human interactions with ecosystems in one way or another. This is rather obvious in the case of I2 and I6 who represented land users' communities. They spoke a lot about the resources they and their fellow land users extracted from the environment, which were agricultural products or game animals, respectively. Therefore, they focused on nature's provisioning services without, however, neglecting their dependence on overall functional ecosystems. As a retired organic farmer, I10 highlighted the interrelation of land use forms and ecosystems even more and promoted to act responsibly and sustainably to secure future biodiversity. The farmers identified superior drivers of climatic and other environmental changes, too, but felt rather helpless to influence their course.

While I2, I6 and I10 primarily focused on the possibilities for action at the individual level, I4 and I5 emphasized the importance of coordinating regional or supraregional activities. This matches their professional tasks which were to implement cross-municipality environmental projects. Their main approach was to enhance the transfer of relevant information to the region's decision-makers to improve their proper consideration on a larger political and thus more influential scale. I5 and also the two students I8 and I9 went even further and demanded social and economic efforts towards sustainability. Their suggestions ranged from adapting producers' and consumers' behavior under the current conditions to changing the entire underlying economic system. According to their present life circumstances, they stressed the value of high-quality education for the achievement of their goals. They realized that they could not substantially influence the course of environmental politics themselves directly but only by informing and exerting pressure on people in charge.

Among those with responsibility were the members of city and municipality councils I1, I3, I7, I10, and I11. They were aware that they had a certain power to shape their communities. Hence, they dealt a lot with matters of municipality-wide relevance like the establishment of green and traffic infrastructure or the resource efficiency of buildings and transport. They held themselves responsible to educate the population in their areas and at the same time demanded more legal and financial support from superior politics.

In general, the perceived impact of part-time or full-time politicians increased when they participated in their governments and held respective positions. Furthermore, some parties were associated more with proactive environmentally friendly action than others, even though such assessment at least partly correlated with one's individual attitude. Under the given circumstances of this study, the interviews do not allow the conclusion that a local politician's party membership has a large impact on their ecological objectives. For instance, members of other parties were not generally less environmentally concerned than the green politician, despite the tradition of his party.

In conclusion, I can say that the living conditions of any study participant noticeably contributed to their thematic focuses and perceptions in the area of environmental politics. While on the one hand gender had no discernible influence, on the other hand age, residence and profession did. However, great differences between the environmental awareness and opinions of any two people even under relatively similar life circumstances can still occur. Whether this can be pinpointed to family, educational or entirely different backgrounds cannot be answered from the conducted interviews and must thus remain uncertain for the time being. However, even without complete understanding of the underlying influential factors, the interviews offered enough possibilities to raise and analyze the current state and trends of ecologically relevant policies in the study region, which will be the focus of the following chapter IV.1.

IV Discussion

IV.1 Discussion of main results

In the following, the participants' main points will be compared with each other and with further scientific findings. The selection of the subsequently addressed issues was based on both the statistics of speaking shares per topic (see *Table 5*) and my personal impression of the interviewees' basic attitudes. I give space to popular and extraordinary viewpoints alike. Therefore, I provide an understanding of the inclusion of ecological behavels in the study regions' decision-making as complete as possible. According to the study aims I will pay particular attention to the conscious or unconscious consideration of ES.

IV.1.1 Basics of environmental politics

The interviewees are aware of the relevance of environmental politics for all areas of modern life (see Conca & Dabelko, 2020). They further agree that local decision-makers can impact the development of regional ecosystems in various ways, e.g. by means of regional planning, participation in supraregional programs or education of the public. Thus, they largely recognize that it is essential to include environmental issues into political considerations in order to act sustainably for their regions. This appears logical, since the decisions made are of local relevance and usually affect the residents' everyday life or work more or less directly.

However, at the moment the assertion of influence depends almost exclusively on functionaries such as, for example, council members and mayors. In general, the statements of the interviewees confirm the research findings (see D'Alfonso, 2019) in the sense that they already regard environmental behavels as extensively incorporated at various political levels, while the trend is further increasing (i.e. I1, 30-32). On the contrary, the consideration of extra-parliamentary views is not that well managed. It depends mainly on individual approaches of those responsible to what extent they integrate thematic inputs from active citizens, NGOs or other stakeholders into their decision-making. In this respect, there are both positive and negative conclusions from the interviewees. Especially those who do not hold any relevant positions repeatedly wish for more democratic approaches and promote institutionalized citizen participation (i.e. I4, 73-75). Corresponding to the findings of Wahlström et al. (2019), young politically active people such as FFF protesters often doubt the environmental competences of the existing political and economic structures. At the same time, they nevertheless use the available political instruments such as demonstrations or petitions.

Two main points of criticism regard the funding of pro-environmental action and the legal framework from higher political levels. Despite the fact that both European and Austrian environment-related expenses have constantly increased in the recent past (see D'Alfonso, 2019; Parlament, 2020), funding of many projects is still uncertain and depends on the communities' political agendas (i.e. I1, 35-36). Apparently, too much money is inadequately distributed or lost in the decision-making process. Likewise, superior guidelines such as the state development programs (Burgenländische Landesregierung, 2012; Niederösterreichische Landesregierung, 2004) are either too imprecise or too little known to effectively support the implementation of environmental measures. Even higher-level regulations and support programs on the part of the EU do not satisfy local decision-makers. Too little of their increasing financial and organizational efforts effectively supports local or regional projects. As

a result, several study participants regard the number of implementation projects to be too small (i.e. I4, 322-323). Others, however, are proud of their communities' activities (i.e. I3, 48-49). Once again, the commitment of political actors or committees seems to depend largely on the engagement of individuals.

Against this context it is hardly surprising that all respondents emphasize the importance of extensive education, especially since research found positive correlations between individualism, environmental awareness and pro-environmental behavioral intention (see Yang et al., 2020). They hope to ensure compliance of the existing legislative framework and its complementation by voluntary commitment at the individual level wherever necessary (i.e. I5, 169-172). Citizen education in the study region is mainly aimed at the encouragement of sustainable consumption and mobility behavior (i.e. I11, 417-418) as well as an ecologically conscious use of private and public green spaces (i.e. I7, 451-453). Since most of the study participants are less worried about their own living conditions than about those of following generations, it makes sense that they highlight the significance of objective high-quality school education (i.e. I9, 104-105). The perception of a trend towards increasing environmental awareness corresponds to pan-European developments (see European Commission, 2016).

IV.1.2 Political promotion of a sustainable society

It is in the common interest of local decision-makers to keep resource consumption and waste production, which are essential features of human society (Chasek et al., 2018), at a sustainable level. Sustainability for the interviewees means to ensure a good quality of life for both present and future generations (i.e. I9, 43), which is a rather altruistic point of view and thus positively correlated with pro-environmental behavior (see Lee et al., 2014). Acting sustainably also means to address environmental issues such as CC and the deterioration of ecosystems. It is therefore a good sign that the main drivers and effects of CC (see IPCC, 2014, 2018) are commonly known. Furthermore, it is reasonable to try mitigating the impact from mobility and energy sectors as most of the interviewees suggest. A general fluctuation of environmental awareness levels across different generations or political parties as found by Morrison & Beer (2017) and Gahrton (2015), respectively, does not exist among the politically active interviewees. The discussed age-related differences (see chapter III.8.2.2) might be less dependent on the participants' age than on their living conditions and related lifestyles, as the following chapters will show.

With regard to energy production, its impact (see IPCC, 2014) should be reduced by two means: On the one hand by reducing energy use, for instance by designing more energy-efficient buildings (i.e. I8, 265-268), and on the other hand by using more renewable energies (i.e. I2, 309-311). The fact that these two steps are addressed on the part of the interviewees in the context of regional ecological development, even though they have mainly indirect impact on ecosystems and their services, indicates an imbalance in environmental education. To mitigate CC and its impact on the environment, it is good and necessary that the main drivers and how to reduce them are commonly known. Simultaneously, broader knowledge of their actual impact on regional ecosystems is needed to push the immediate implementation of measures concerning both specific ecosystem management and overall CC mitigation.

The situation is similar in the traffic sector, where the use of electric cars, bicycles and public transport is politically promoted in order to reduce the consumption of fossil fuels (i.e. I1, 95-97). However,

traffic infrastructure is additionally related to land consumption and habitat fragmentation and thus affects ecology more directly than the previously mentioned economies on various spatial scales. These interrelationships are known and taken into account by at least some of the study region's politically active (i.e. I11, 179-185).

Despite its many negative consequences for society as a whole, the Covid-19 crisis is perceived as a chance to enhance pro-environmental behavior (i.e. I7, 133-136). Corresponding to first scientific results (see i.a. Rousseau & Deschacht, 2020; UNEP, 2020), the study participants emphasized that the people increasingly appreciated near-natural environments, reduced GHG emissions and recognized the positive environmental feedback of their individual behavioral adjustments. In accordance with other research findings (see i.a. Eroglu, 2020; McGinlay et al., 2020), current negative impacts of changed behavioral patterns were acknowledged as well (i.e. I6, 486-491; I8, 60-61). Ultimately, it is certain that there will be long-term effects for the environment caused by the pandemic with all its political, economic and social consequences. However, the precise scenario must remain completely uncertain (i.e. I5, 471-472).

IV.1.3 Land consumption and land use

Land consumption is a topic in itself. On the one hand, there appears to be political support for further land consumption, whereby the strong negative effects on ecosystem qualities (see Lorenz & Lal, 2017) are either unknown or not considered relevant enough. For instance, the study participants report of politically promoted construction projects on the expense of green spaces mainly within or in the outskirts of settlements (i.e. I8, 405-409). On the other hand, the interview partners claimed to personally support measures for keeping built areas as small as possible (i.e. I10, 325-327). Hence, individual ideologies and economic considerations can again tip the scales in one direction or the other, and a common trend cannot be deduced. As a result, Austrian soil sealing rates are moderate in pan-European comparison (see European Environment Agency, 2020). However, the overall very high annual soil consumption (see EU-Umweltbüro, 2017) suggests that there is still a clear need for comprehensive improvement.

A special focus in urban but also in intensive agricultural use areas is placed on the maintenance and expansion of GI. In the case of GI, people actually realize the multiple simultaneous services one individual ecosystem can provide. Extensively managed green spaces are often valued as insect habitats, which additionally demonstrates the recognition of the importance of pollinators (see chapter III.7.5). At the same time, they are appreciated for regulating the microclimate, as space for recreational and sporting activities, and for contributing to the aesthetics of the landscape. Some communities even equip much-frequented GI patches with information boards (i.e. I7, 481-384). This shows again the high ecosystem value of GI as well as its usability to mainstream the many contributions of nature to our society in general awareness. However, due to the lack of definite statements, it remains to be doubtful if the study participants are aware of the large extent of GI needed to compensate for other land consumption (see Maes et al., 2014).

While built areas make up just under one percent of the study area, human influence dominates over far bigger areas altogether, including agricultural lands and managed forests covering the majority of the region (see *Table 3*). The study participants correctly acknowledge a general interrelation of land use management forms with the state of ecology (see Frei et al., 2018). Nevertheless, there is relatively

little political commitment to regulate these areas with regard to safeguarding ecosystems. This certainly has to do with the fact that agriculture and forestry are the main pillars of the region's economy, which is not very strong anyways (see Statistik Austria, 2020). None of the interviewees goes as far as to demand stricter legal specifications, possibly to avoid further conflicting interests with land users (see I2, 79) and to secure votes in their predominantly rural constituencies (see I5, 178-179). Several interviewees, however, promote creating positive incentives, for instance by increasing subsidies to support farms which are small or apply biodiversity-friendly methods (i.e. I10, 429-439). As a result, this development lead to an overall increase in organically farmed lands throughout the region, albeit with greater local differences (see I6, 162-164; I11, 474-475). Altogether, negative consequences of intensive land use such as land degradation, which is a big global issue (see Gibbs & Salmon, 2015; IPCC, 2019) are rightly not assessed as an acute threat.

IV.1.4 Use of natural resources

As mentioned several times in the previous chapters, land use in the form of agriculture and forestry is the most widespread factor shaping the landscape in the study region, thus affecting ecosystems and biodiversity. Most of the region is suitable for producing food or raw materials, whereby applicable methods tend to increase in intensity with decreasing altitude and structural landscape diversity. The relatively high percentage of used land (see BMLRT, 2021a) is economically necessary and characteristic for the study area, as the study participants repeatedly state. Hence, there are no apparent attempts to use the various political instruments (as presented by Hersperger & Bürgi, 2009) to reduce the area of used land. On the contrary, politicians and other stakeholders pay a lot of attention to ensuring the continuity of agriculture and forestry under changing climatic conditions by adapting crop and tree species sets (i.e. I2, 284-285). Measurable changes in the area shares of cropland, pastures and forests, as they exist on EU level (see Eurostat, 2021; Kuemmerle et al, 2016), are apparently not an issue in the study region.

Simultaneously, there are attempts in the agricultural sector to maintain regional characteristics like fruit orchards (i.e. I7, 405-407) and to keep negative environmental impacts low. Decision-makers largely prefer setting positive incentives over introducing new management restrictions. They further emphasize the farmers' personal responsibility (i.e. I3, 140-145), whose income in the long term depends on sustainable land management anyway. This suggests that future pro-environmental action should essentially include land users from the start instead of acting mainly through political decisions. Simply promoting organic farming wherever possible will not be enough, as both research results (see Meemken & Qaim, 2018) and the questioned politically active persons (i.e. I6, 171-172) point out. Organic agriculture has a positive impact on biodiversity and ecosystems if managed correctly (see Sandhu et al., 2010), but the ratio of effort and revenue is not favorable enough to largely or entirely replace conventional farming. Furthermore, conventional farmers are willing to apply environmentally friendly measures, too, as long as they do not reduce their yield too much (i.e. I6, 162-165). In any case, there are also other agricultural influences on ecosystem quality than the use of chemicals. The economic and technological development of the past decades has driven structural changes in the region's agricultural areas. Increasing mechanization and a development towards fewer but larger enterprises are mutually dependent factors and together cause a decrease in biodiversity (i.e. I2, 320-323). This observation correlates with the pan-European unsustainable development of used land (see Gibas & Majorek, 2020). The Covid-19 pandemic might in fact have a positive impact on this matter.

Reduced mobility of the people enhanced hobby crop cultivation and regional added value (i.e. I7, 328-332), thus setting a small counter-trend. This could now be taken up and supported with appropriate political measures.

Similar to the situation in agriculture, the relatively abundant forests also increasingly face challenges that are caused or affected by CC. These include water stress, forest fires and bark beetle damages. Large land users or land user groups, respectively, try to adapt their management accordingly (i.e. I4, 224-228). Unlike in agriculture, small forest patches sometimes remain unused, either due to lacking management efforts of their owners or due to proactive conservation action (i.e. I3, 87-91). This may also be due to the perception that wooded land is generally more natural than agricultural land regardless of how intensively it is managed. In everyday language the study participants do not differentiate between managed and near-natural forests, even though the German language offers an easy possibility to do so. This subconscious equation is a misconception, because economic management of forests significantly reduces their ecological values (see IPBES, 2018).

Another intensively used natural resource is game (i.e. I11, 463-464). Due to the absence of large predatory wildlife, hunting certainly plays an important role in the maintenance of an ecological equilibrium (i.e. I6, 63-64). There appear to be local differences in the quality of wildlife management though. A hunter among the interviewees claimed that game populations are managed responsibly in his district (I6, 475-477), while in a different place the hunters' community seemingly obstructs a wildcat reintroduction program without good reason (I3, 230-234). There is generally little interaction of hunters and political decision-makers established in the study region, at least according to my interview partners. This seems to be a missed opportunity. Due to their direct interventions in natural processes as well as their frequent cooperation with other land users, hunters could be valuable partners for the mediation and implementation of nature conservation goals.

Last but not least, tourism and recreation are a special form of use of natural resources, too. Although it is not the focus of these activities to extract material values, they still depend on the provision of high-quality landscape elements and at the same time can contribute to their deterioration. The varying accessibility, aesthetics and suitability for outdoor sports of different places lead to an uneven distribution of tourism in the study region (i.e. I6, 524-529). The resulting economic relevance of tourism for certain places has both advantages and drawbacks for the local ecosystems, as the study participants correctly realize (see chapter III.4.7). Cultural ES such as education and recreation in nature are fundamentally based on other ES, and at the same time they are negatively related. Hence, sustainable planning is required to make near-natural sites accessible to many visitors while simultaneously minimizing the negative impacts of visitor flows on ecosystems (i.e. I4, 218-222). Overall, the respondents all emphasized the importance of outdoor experiences for locals like themselves, while urging that non-local visitors be responsibly guide or even limited with regard to ecosystem carrying capacities.

IV.1.5 Regional ecosystems in the present and future

The study region contains various ecosystems and in principle its inhabitants are aware of this. They appreciate the permanent proximity to 'nature' even from the urban centers of the area (i.e. I8, 349-353) as well as the diversity of the landscape especially in the district of Neunkirchen (i.e. I6, 583-585). They also correctly identify forests and agricultural use areas as characteristic and most common

landscape components. Somewhat surprisingly, respondents from the Oberpullendorf district emphasize local forest richness more than others (i.e. I11, 95-98), although the relative proportions of wooded areas in the other rural districts are higher.

The study participants' common appreciation of a varied and multifunctional scenery is not equivalent with a common sophisticated understanding of the properties and functioning of ecosystems. In fact, the term 'ecosystem' is often used regarding the entire non-urban ecosphere of the region (i.e. I2, 114). Some interviewees generally prefer vague terms such as "*in the countryside*" (I8, 350) to describe all non-built areas. The same applies to 'nature' (i.e. I10, 95), which as a term therefore is not restricted to characterize areas under little to no human influence and rather resembles the unspecified and just as frequently used term 'environment'. Without conceptual differentiation between near-natural and human-influenced ecosystems, little awareness of their different characteristics, management requirements and also services for the people (see *Table 1*) can be expected. Nonetheless, some of the interviewees acknowledge that humans live in a 'cultural landscape' (i.e. I5 275) or speak about areas that are put out of use to conserve natural values (i.e. I2, 355). This reveals that they indeed distinguish areas according to their human influence, even though possibly only subconsciously. Yet, PAs in the study region are noted rather incidentally during the interviews. This suggests that they are either relatively small or situated in rather remote areas according to the international trend to avoid conflicts with human land use forms (see Joppa & Paff, 2010). Instead of highlighting the differences between certain ecosystems, some interviewees rather emphasize their interlinkages. Recognition of ubiquitous natural cycles (i.e. I3, 389-390) could be a starting point for implementing more conservation measures in the sense of maintaining ES for the benefit of people.

The respondents currently rate the state of their environment as predominantly good (i.e. I4, 229), and thus they are generally happy about where they live. None of the interviewees seems to be unhappy that the regional circumstances do not support intensive agriculture in most parts of the study region. On the contrary, some of them advocate extensive land use forms such as organic farming to enhance biodiversity (i.e. I10, 380-384). However, they anticipate a deterioration of the ecological quality of cropland dominated areas and this notion corresponds well with the scientific predictions (see Kirchner et al., 2016; Schönhart et al., 2016). Only they attribute this degradation less to CC than to economically driven farm structure transition. CC plays an important role in the study participants planning anyways. Most of them already detect ongoing changes in their environment or at least expect them in the next years. There is agreement on the decrease and temporal shifts in precipitation as well as temperature rise, which, too, were confirmed by scientific findings (see Kromp-Kolb et al., 2014). Perception differs from research findings on extreme weather events though. On a global scale, such events already occur more frequently (see IPCC, 2014), whereas there is no evidence yet for a more frequent occurrence of severe storms in Austria. The study participants are sure that they are an issue or at least imminent in the study region anyways. This highlights the need for better environmental education with a regional focus. No matter the exact impacts, the region's decision-makers generally agree on the need to take active action in land use (i.e. I10, 74) to mitigate the expected changes and adapt to the inevitable. They thereby recognize the manifold proven linkages between land use and CC (see IPCC, 2019). Yet some of the interviewees speak about developments that will only become apparent after several generations (i.e. I3, 252), which might be a misjudgment with far-reaching consequences in times of rapid CC.

There are, however, a few aspects that speak in favor of taking action more quickly. For one thing, the study participants realize that human activities are currently damaging nature in various ways.

Furthermore, they are committed to raising environmental awareness in society and in some cases they already observe positive developments (i.e. I7, 389-391). This correlates with scientific findings which detect an already high and further increasing environmental awareness among European citizens (see European Commission, 2016).

IV.1.6 Ecosystem services

The study participants are generally aware that human existence is fundamentally based on and embedded in an ecological framework (i.e. I1, 81-82). They recognize that land use forms such as agriculture and forestry – in certain areas complemented by tourism – are main pillars of the local economy (i.e. I5, 265). Furthermore, they all agree without exception on the high value of locally available drinking water (i.e. I3, 367-369). Thus, regarding ES they consciously or subconsciously put the main focus on provisioning services.

With the ES model as such, none of the respondents had ever dealt with prior to the interviews. While they all knew certain individual services, viewing them as a whole and evaluating their combined and manifold significance for all our lives was a new approach. This seems to be a missed opportunity to make use of the application values (see Suarez, 2017) inherent in the concept. Although I explained it to all my interview partners, it did not trigger many spontaneous reactions. On the one hand, this could be due to the inappropriate circumstances of my explanation (see chapter IV.2.1). On the other hand, this might also indicate that the concept does not catch as quickly and easily as it should to fulfil its purpose of mainstreaming ecological behalves. What also supports the second interpretation is that several study participants saw little consideration of individual ES in current local politics (i.e. I1, 71-72). Since many services are strongly influenced by land use intensity and practices (see IPBES, 2018, 2019), which in turn are largely connected with local decision-making, this contradicts the aim of the concept and nature conservation goals in general. More than a decade after de Groot et al. (2009) published their five open questions preventing effective implementation of the model, none of their points has lost its topicality. Scientific research and inclusion in strategy papers have certainly increased at international level (see i.a. McDonough et al., 2017; European Commission, 2020), but are still inadequate for many places and especially on smaller spatial scales. Hence, it remains true that more accurate data is needed for proper understanding, quantification, and valuation of ES. More awareness among those responsible for integrating ES into decision-making and applied planning, and more funding for an overall sustainable ES use are also required. Although implementing the ES model cannot resolve all environmental issues, it certainly helps to raise ecological awareness and coordinate political and stakeholder activities in the sense of sustainable action (see Dick et al., 2018; Saarikoski et al., 2018).

Recent research found out that ES are likely to deteriorate in the near future (see Maes et al., 2014; Shepherd et al., 2016; IPBES, 2019) and that land users are generally open to shift to more sustainable forms of management (see Lamarque et al., 2014). In contrast, CC adaptation measures suggested by the interviewees rather serve to ensure the immediate economic survival of land users. For instance, they suggest switching to other crop species in agriculture (i.e. I2, 295-297) or tree species in forestry (i.e. I4, 224-228), respectively. The maintenance of underlying preconditions such as regulating and supporting services receives very little attention, which might become a problem on the long run for both economy and ecology (see Emmerson et al., 2016; IPBES, 2018; World Economic Forum, 2020).

One respondent even suggests to leaving proactive environmental action largely to land users (I2, 183). This has the advantage of drawing on the expertise of those directly affected, but it is pointless without the political and economic framework conditions that enable and promote fundamental behavioral changes (see chapter IV.1.7).

Despite the unfamiliarity with the ES model and the primary focus on provisioning services, consideration of other services is not completely non-existent. For example, some study participants indeed understand that providing near-natural habitats returns benefits for humans as well (see IPBES, 2018, 2019). They recognize its crucial role for the functioning of ecosystems as a whole (i.e. I3, 388-390) and for the preservation of insect pollinator species in particular (i.e. I2, 232-233). However, most interviewees do not address the benefits of well-preserved habitats and species to people, even upon direct thematization on my part. The fact that they still promote conservation efforts such as the implementation and maintenance of PAs (i.e. I3, 320-321) suggests that they either recognize an intrinsic value of biodiversity or follow the public opinion without understanding its background. Nevertheless, such common agreement can only be assessed positively and forms a good basis for further pro-environmental activities in the context of overall decreasing habitat maintenance (see IPBES, 2018, 2019). No matter the reason to support biodiversity, it will also foster ES anyways (see Cardinale et al., 2012; Hooper et al., 2005). Moreover, the state of biodiversity is not only related to proactive human action but also to the topography of the respective area. Due to decreased machinability of hilly and mountainous areas, research results commonly regard higher altitudes as places of lower land use intensity and subsequently increased biodiversity (see Sonderegger et al., 2019), even though most biodiversity hotspots such as wetlands and floodplains are located in the lowlands. Accordingly, rare species demand more targeted conservation in more intensively used lowlands. This correlates with the perceived higher relevance and conflict potential of species conservation measures such as reintroduction programs by respondents from lower-lying parts of the study area (i.e. I11, 329-341).

As mentioned above, in the case of insect pollinator populations the questioned decision-makers more frequently associate their good state of preservation with direct benefits for land users (i.e. I6, 349-350). This corresponds with the results of the Umweltbundesamt (2018) which prove moderate to high dependencies and financial merit in insect pollination especially at lower altitudes. They also forecast future changes in its provision which according to scientific findings (see IPBES, 2018, 2019) as well as most of the interviewees (i.e. I1, 257-258) will be rather unfavorable unless sufficient countermeasures are taken. Although proposed action comprises improving habitat structures for a wider range of insects, too, emphasis mainly lies on beekeeping (i.e. I4, 270-271). This correlates with the extraordinary importance of honeybees for crop pollination (see Senapathi et al., 2015), but somehow neglects the high significance of wild insect pollinators (see Brosi & Briggs, 2013; Winfree et al., 2018). However, it can be concluded that in general the regulating ES 'insect pollination' has more comprehensible benefits for the people and stimulated more specific feedback than the supporting ES 'habitats and species'. In addition, both services are considered to be less threatened than in international comparison (see IPBES, 2018, 2019).

The third and final of the ES that I specifically addressed in the interviews was the provision of drinking water, and it was the one that respondents talked about most. Striking was the consistently very high rating of its relevance for people's quality of life in the study region (i.e. I3, 367-369). The study participants' perceptions of drinking water availability in the present and future are consistent with scientific evidence, which detects larger ground water resources at higher elevations (see Sonderegger

et al., 2019) and predicts overall declines due to climatic changes (see IPBES, 2018, 2019). What is positive is the quality of drinking water which has a wholly positive evaluation. Measures such as the establishment of water protection areas have proven effective and give hope that other ES can be similarly conserved upon enhanced appreciation.

Besides the ES I had selected and the economically important extraction of food and raw materials, the interviewees addressed further services themselves. Their choice confirmed that supporting services receive almost no attention, possibly because they influence human life only indirectly. Regulating services like air purification or microclimate regulation were acknowledged more frequently. The former, however, is often more seriously considered on a global scale, e.g. regarding the deforestation of rainforests, than in the context of local ecosystems. It was also remarkable how often the interviewees mentioned the relevance of green spaces for recreation. By doing so, they brought a cultural ES into the conversation. Furthermore, they often correctly connected the service with the economically relevant nature tourism sector and thus implied its monetary valuation, which played a minor role in supporting and regulating services.

IV.1.7 Politics and society in general

Environmental politics are naturally embedded in a superior political and social frame. Hence, the achievement of the politically active's environmental goals is inextricably linked with general developments on this level (see IPCC, 2014). The fact that many of the study participants realize these connections (i.e. I8, 255) shows that it is more or less commonly understood that environmental issues cannot be dealt with separately. They rather have to be considered in all political and social debates no matter their spatial level or main topic. This forms a good foundation on which the further promotion of the ES concept can be built.

With regard to the structures of local decision-making, the study participants criticize, among other things, excessive bureaucracy, power-hungry politicians, insufficient funding, lack of involvement of extra-parliamentary stakeholders, and laborious communication. All these factors are frequently responsible for the delay or prevention of necessary environmental measures. This, in turn, leads some of the respondents to believe that the current political system is not suitable for implementing sufficiently sustainable policies at all.

At a society-wide level, other obstacles cited comprise lacking ecological consciousness, too much distance between citizens and nature, and unreflective consumerism. Moreover, some interviewees found the entire economic system with its immanent expectations of perpetual growth and steadily declining costs to be fundamentally harmful to nature, which is in line with the analysis of Otero et al. (2020). There are some positive remarks on the course of society, politics and economy, too. Nevertheless, the general opinion is that much more change is needed also at the international level to counteract the multitude of threatening developments (see Chasek et al., 2018). These might be different in nature, but commonly require improved environmental education (see chapter IV.1.2). Further consideration of superior issues would go beyond the scope of this study, and thus must be left aside at this point despite the undisputed relevance.

IV.2 Study assessment

IV.2.1 Reflection of method and study process

This study was my first work in the field of qualitative social research. It therefore took me some extra effort to familiarize with the principles, subtypes and applications of this type of research. However, it was certain at all times to be the best way to fulfil the study purpose, which was to display the perceptions of local decision-makers on ES related topics as completely and realistically as possible.

The decision for the PCI proved to be the right one in my opinion. According to the problem-centered orientation I gave myself a rough impression of the regional ecological features and local environmental politics prior to the interviews. Hence, I calculated that the interviewees might not be familiar with the ES concept and prepared other questions on related topics to retrieve thematic information anyways. This turned out to be very helpful during the conversations. What information I could not find during my preparatory internet research – for instance, on the private background of my interview partners – I inquired in the very beginning of the interviews in the form of the short questionnaire, so that I could later relate to it, too. However, due to the very different life histories, functions and political ideologies of the study participants, I expected them to have rather different expertise and opinions. Thus, object and process orientation were even more relevant for my study interest. I did not apply further research methods, but I frequently adjusted my question techniques to the respective interview partners. For example, I sometimes tried to stimulate anecdotes from some while I gently guiding others back to the original questions. However, these incentives were never meant to disturb the respondents' narrative flow, so that they felt comfortable at all times and were happy to share more information. On the contrary, if I realized that a certain topic somehow had a greater relevance for my interview partners, I made sure that they could talk about it in detail and that I understood their intention correctly.

Although I retrieved many meaningful statements, there are two points which I could and should improve for future qualitative interviews. For one thing, I consciously or unconsciously adapted my use of language to that of my interview partners. What is helpful on the one hand to create a pleasant conversation atmosphere comes at the expense of scientific accuracy on the other hand. By not distinguishing precisely between terms like 'nature', 'environment', 'ecosystem' and the like, I missed an opportunity to gather more information on the study participants' personal ecological concepts. Secondly, my explanations on the ES concept did not stimulate as many meaningful reactions as I had hoped. I had to realize that instead, the lengthy explanation on my part disrupted the interviewees' narrative flow, made them feel uncomfortable because of their apparent knowledge gaps, and contained too much new information for them to immediately relate to. If I were to repeat this study, I would either introduce the concept in a less confrontative and more relaxed situation, for instance, by asking for a short conversation break during which I would hand out a printed scheme of the model. Or I would ask at least some of the participants for a brief follow-up discussion right away, so that in the meantime they could learn about the concept in detail and assess whether it might be of practical use in their political environments.

I realized this disadvantageous behavior after the conduction of some interviews but regarded it too late to change it without risking the compatibility of the interviews. In general, I only adapted the interview guideline once. After making my first experiences in the interview with I1, I added a specific question on CC and an explanation of the ES concept on my part to the guideline. Both of these points

came up in that first interview already, and I considered them relevant enough to ensure that they would also be addressed in a comparable manner during all consecutive conversations. Besides this adjustment, the guideline proved to be overall operative for my study purpose. It was precise enough to provide the conversations with a necessary structure. At the same time, it was flexible enough to allow me shifting the focus of this study from mainly assessing the application of the ES concept to a more general reflection on the consideration of ecological behavies in local decision-making.

The recruitment of the interviewees and conduction of the interviews went according to plan as far as the special conditions of the Covid-19 pandemic allowed. The group of study participants is slightly unbalanced, for instance, in terms of residence district. However, this is not surprising for such a small sample and depended mainly on the willingness of the different requested persons to participate. The unequal gender distribution among the interviewees corresponds to the overall share of women in local decision-making in the study region (see Bundeskanzleramt, 2020). Thus, this imbalance does not have a negative impact on the significance of this study.

The interview transcription and analysis methods I chose – simplified scientific transcription and structured content analysis – served my purpose well. Then again, the development of the coding system presented me with some challenges. Since all addressed topics are interrelated more or less directly, it turned out to be difficult to find codes and categories that are truly disjunctive. However, using categories that were created a priori and with the material, too, helped me to establish a coding frame that was in line with both the interview guideline and the interviewees' statements. Hence, I could use it to roughly analyze the thematic shares of speech and to build my further content related analysis upon. The fact that the latter does not follow the coding system in all means shows that I would probably have designed my coding system somehow differently with more experience. Overall, however, compensated for the weaknesses of the coding system by working attentively with the individual text passages. I thus think that my results provide reliable implications for the consideration of ecological issues in local politics of the study region.

IV.2.2 Placement in the scientific context

The present work ties in with other recent research regarding the common rise of environmental awareness and policies (see European Commission, 2016), the general acknowledgement of major threats to many ecosystems and their services (see IPBES, 2019), and the deficient consideration of the latter in the former (see Hauck et al., 2013). It displays the perceptions of ecosystems and related intentions for land use management in the precise spatial and political environment of a diverse Eastern Austrian cultural landscape. The study thereby confirms that the inclusion of pro-environmental action and CC mitigation in decision-making has been at least partly successful in Austrian local politics in the recent past. It further uncovers that the transmission of the ES concept and its application from higher to lower political levels failed in the case of the study region so far. Nonetheless, many ES are subconsciously involved in local decision-making anyway, albeit with potential for further and more balanced future consideration. These findings can also support the development of realistic scenarios for the future course of ES in the study region in the framework of the CHEAD project.

Moreover, the results offer various approaches for further research. For one thing, since it is apparent that environmentally friendly politics at the local level depend primarily on the commitment of the

involved individuals, it would be helpful to examine in more detail the internal and external drivers and impediments to such behavior. Secondly, relating reported measures to actual implementation projects and subsequent measurable effects on ecosystems could reveal strengths and weaknesses of present local environmental politics. Third, after it turned out that none of the politically actors was aware of the ES model prior to this study, its potential for an implementation in decision-making processes in the study region remains an open question. This could be investigated in a follow-up study in which participants are informed about the concept in advance. Furthermore, possible refinements and adaptations of the ES concept should be studied to improve its consideration. As Ruckelshaus et al. (2015) emphasize the need for maximally simplified tools and models, one approach might be to identify key ES in a manner similar to keystone species, whose protection concurrently contributes to the conservation of many others.

These are only a few ideas for further research, but there are certainly many more interesting approaches. Previous studies (e.g. IPCC, 2014; IPBES, 2019) have more than adequately demonstrated the urgent need for targeted environmental policies and action, whether through application of the ES concept or through other means. This work now suggests that local decision-makers have good incentives in some respects, while lacking realistic assessment in others. What is certain is that comprehensive and spatially precise data is the necessary base for all further improvement, and that there is much to make up for in almost every associated field of research.

IV.2.3 Implications of the study results

There are three main implications that can be drawn from the results of this study. They regard different steps of the decision-making process. Hence, they build on each other and require simultaneous improvement to achieve an overall improved approach to pressing local environmental problems. All three of them rely upon sufficient financing on the part of politics.

1. Promote scientific research and acquisition of spatially precise data.

Without detailed understanding of ecological interrelations and processes, targeted sustainability policies cannot be implemented. Decision-makers depend on the provision of spatially precise information to act according to the demands of their particular surroundings. Comprehensive data are the basis not only for realistic initial assessment and planning of measures, but also for their monitoring and, if necessary, adaptation. Yet, they are widely unavailable especially at the regional and local level. Certain particular research suggestions can be found in the chapter IV.2.2.

2. Improve the inclusion of the ES concept in regional and local policies.

To the extent that there is sufficient understanding of ecosystems and their services even at lower spatial scales, improved integration of this knowledge into political programs is still required. It is evident that the consideration of ES steadily becomes more indirect and altogether less from the international to the local level. Since none of this study's participants so far acknowledged the economic importance of ES by means of specific financial values, highlighting the services' monetary equivalents might attract attention to the concept and enhance its consideration. Simultaneously, it seems reasonable to proactively address the model in trainings of political functionaries, administrative workers and the like. In general, educating the politically active can lead to a more differentiated approach to ecological values, processes and interrelations on their part.

3. Establish permanent and integrative institutional infrastructure.

As even directly mentioned by one of the study participants (I4, 359-367), there is need for operational institutional infrastructure to better incorporate ecological behalves into decision-making. An appropriate panel should be permanent, simply structured, easily accessible to all people concerned, and well-integrated into the political processes. By bringing together politicians, stakeholders and scientists, it could take over analyzing, forecasting and coordinating functions that are essential for the implementation of the ES concept in decision-making (see Greenalgh & Hart, 2015; Maynard et al., 2011; Ranganathan et al., 2008). Furthermore, citizen participation should be enabled and encouraged.

In addition, it became clear that the way people currently exploit nature's goods and services is fundamentally unsustainable. It is therefore desirable to have a discussion at the level of society as a whole about the political, economic, and social changes that are necessary to maintain the world's ecosystems and human life in them in a desirable condition.

V Conclusio

This qualitative study researched how ecosystems and their services are perceived and considered by politically active people in a rural region of Eastern Austria. It offers insight into both the general conception of ecological values and their recognition in the context of specific decision-making processes. In accordance with the possibilities and goals of qualitative research, this work cannot provide quantifiable results, but it reveals multiple influences on ecologically relevant decisions. These range from the personal and professional background of involved individuals through the political, economic and social framework of thematic decision-making to perceived and anticipated environmental developments in the study region. The study showed that particular ES are already widely acknowledged, while at the same time the recognition of other services or of the concept as a whole needs to be enhanced.

With the help of this study's findings, it is possible to predict more realistically how local politicians and land use stakeholders will act in the near future regarding ES related topics. The results imply that decision-makers generally welcome environmentally friendly measures, but their biased and little conceptual viewpoints on the matter often oppose the implementation of truly sustainable action. Hence, the work also shows where there is room for improved ES consideration and provides suggestions how to achieve this goal. Last but not least, it points out further need for research and offers thematic indications for timely application. The results are of particular importance for the study region, where upon ample acknowledgement they can contribute to a sustainable development of the ecosystems in place. Simultaneously, with appropriate modification they can be transferred to other regions and contribute to an overall improvement of human-ecosystem interactions.

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Appendix

Appendix 1: Interview guideline

Kurzfragebogen

1. Welchen Geschlechts und Alters sind Sie? _____
2. In welcher Funktion nehmen Sie an politischen Entscheidungsprozessen teil?

3. Wie häufig nehmen Sie diese Funktion aktiv wahr? _____
4. Seit wann nehmen Sie an politischen Entscheidungsprozessen teil und seit wann in Ihrer jetzigen Funktion? Seit _____ Jahren, davon seit _____ Jahren in der jetzigen Funktion
5. Gehen Sie neben dieser Funktion derzeit noch weiteren beruflichen oder ehrenamtlichen Tätigkeiten nach? ☐ Nein ☐ Ja, und zwar

Offene Fragen

	Leitfrage (= Erzählaufforderung)	Wichtige Themen und Fragen (Nachfrage, sofern nicht von selbst angesprochen)	Aufrechterhaltungs-, Steuerungsfragen
I	Thema politische Entscheidungsprozesse: Wie schätzen Sie Ihre Rolle innerhalb dieser ein?	- Definition „politischer Entscheidungsprozess“ - eigene Handlungsoptionen, Wirkungsreichweite - persönliche Haltung und Position	- nonverbale Aufrechterhaltung
II	In welchem Zusammenhang sehen Sie politische Entscheidungen und Ökosystemleistungen?	- Definition und Arten von „Ökosystemleistungen“ - Verhältnis Mensch <-> Ökosystem - anzustrebender Grad der Berücksichtigung	- Können Sie etwas ausführlicher erklären, was Sie damit meinen? - Haben Sie dazu ein Beispiel?
	<i>Auf Nachfrage (!) Ökosystemleistungen erklären als:</i> - alle Formen des Nutzens der Natur für den Menschen - 4 Gruppen: - unterstützend (z.B. Nährstoffkreislauf, Bodenbildung) - bereitstellend (nutzbare Ressourcen, z.B. Wasser, Nahrung) - regulierend (z.B. Luft- und Wasserreinhaltung, Bestäubung) - kulturell (z.B. Erholung, Ästhetik)		- Wie finden Sie das? - Wie ist das mit ...?

III	Welche Rolle spielen Ökosystem-leistungen konkret bei den Entscheidungsprozessen, an denen Sie beteiligt sind?	- persönliche Wahrnehmung und Berücksichtigung - evtl. unterschiedliche Wertigkeit verschiedener (Gruppen von) Ökosystemleistungen - Stellenwert im gesamten Entscheidungsprozess: Ist- und Soll-Zustand	- nonverbale Aufrechterhaltung - Können Sie etwas ausführlicher erklären, was Sie damit meinen?
IV	Wie bewerten Sie die Versorgung mit Ökosystemleistungen in Ihrer Region?	- zentrale Leistungen - Status und Trend - Einfluss des Klimawandels	- Haben Sie dazu ein Beispiel?
V	Bitte gehen Sie etwas genauer auf die Situation folgender Ökosystemleistungen in Ihrer Region ein: - schützenswerte Lebensräume und Arten - Bestäubung durch Insekten - Trinkwassergewinnung	- Bedeutung für eigene Region - Berücksichtigung in Entscheidungen - Status und Trend	- Wie finden Sie das? - Wie ist das mit ...?
VI	Möchten Sie gerne noch etwas ansprechen?		

Appendix 2: Applied transcription rules

Since the focus of the study lay on the content of the interviewees' statements, a simplified transcription method was sufficient and suitable. Overall, sentence structure and choice of words were predominantly retained despite repeated grammatically incorrect use. Wherever applicable without changing the content of the spoken words, however, slight adjustments created better readability. For instance, unnecessary repetitions of individual words or syllables to fill pauses were not written down. Here follow more explanations on the applied transcription rules:

- Since the interviews were conducted in German, all spoken words as well as relevant side notes are in this language, too.
- Statements from the interviewer are characterized by a preceding "IVR", those from the interviewees by their respective ID.
- All statements that directly refer to the identities of the interviewees were anonymized by omitting or substituting the relevant words. At the respective places, inserts or explanations are provided in square brackets.
- Interim comments are inserted in brackets into the longer speech phases of the respective other interlocutor.
- Particularly conspicuous non-verbal expressions like laughter are noted in brackets.
- Particularly emphasized words or sentence fragments are indicated by underlining.
- Unexpected interruptions of sentences are indicated by hyphens. That a hyphen does not have another grammatical function becomes apparent in the context.

- Pauses are indicated by dots in brackets. Two dots mark noticeable breaks of up to two seconds in length. Three dots stand for breaks lasting for three or more seconds.
- Noteworthy events such as interruptions of the conversations are written in brackets without being assigned to either of the interlocutors.

Appendix 3: Interview transcripts

All interview transcripts can be found on the enclosed CD.