Green Justice in the City

Germany`s urban green infrastructure policy in the European context

MSc Thesis Katharina Fesel / Urban Environmental Management / Wageningen UR

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Front: Stadt Köln, 2012

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"No less than our right to a decent environment; no more than our fair share of the Earth's resources" - Friends of the Earth Scotland, 2000

"Equality is a right, it doesn't deserve credit" – Santan Dave, 2020

Abstract

Urban green infrastructure has a great potential to accommodate several cultural eco-system services and the pathway to the sustainable development goal eleven. Cities are understood as critical global systems and central to humanity's effort to develop sustainably. This research explores the role of urban green infrastructure policy in the European Union throughout this journey. The data for this research was gained by document research and qualitative interviews with policymakers, city planners and thematic experts. The results are coded with the help of the software MAXQDA.
The emphasis of this research is on the discourse(s) surrounding urban green infrastructure policy at the different administrative levels within the European Union. Hence, the European level, the German national and federal level as well as two German cities are examined for their understanding and planning practices of urban green infrastructure policy. The focal point is placed on the awareness of social justice in the policy. To assess the awareness of social justice two concepts are studied – social sustainability and environmental justice. A conceptual lens is built along the lines of two justice aspects intra- and intergenerational justice. Each facet is divided into sub aspects so that an in-depth understanding of participatory and distributive justice is gained. Moreover, the aspect of time is stressed to underline the importance of a long-term and holistic planning approach. The discourses are explored according to the approach of Hajer. Thus, the discourses are studied for their storylines and possible metaphors and short-hands to express the importance and relationship between urban green infrastructure and social justice. The research showed firstly the great potential of urban green infrastructure to serve cultural eco-system services. Regarding social justice, urban green infrastructure policy displays awareness on each level. However, the discourse analysis showed that there are varying degrees to it. The European Union focuses more on the participative aspect of intragenerational justice and on the broader picture of intergenerational justice in terms of the Agenda 2030. The German level accommodates both aspects and is also focused on the intergenerational aspect of time. This is shown by the efforts to establish benchmarks and legislative regulations to compare and ensure developments. The city level focuses equally on participatory and distributive justice, which can be explained by the direct impact urban green infrastructure has on the reality of urban residents. The temporal aspect on the city level is still in its infancy and need to be further developed to ensure justice in the long term. Overall, this thesis shows the present awareness and importance of social justice in urban green infrastructure policy and planning.

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List of Abbreviations

European Union	EU
International Panel on Climate Change	IPCC
European Regional Development Fund	ERDF
European structural and investment funds	ESI
European Economic and Social Committee	EESC
Committee of the Regions	CoR
Green Infrastructure	GI
Urban green infrastructure	UGI
Städtebauförderung	SBF

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1. Chapter One: Introduction

1.1. Problem Statement

Cities have become the hotspot of human activities. Next to growing in their size, they also have become more complex due to all aspirations, user demands and climatic challenges. The United Nations predicts that there will be around five billion urban inhabitants by 2030. As of today, 55% of the world population already lives in cities (United Nations, 2018). The IPCC stresses that cities play a crucial role in the attempt to limit global warming to 1.5°C. Cities are identified as one of four *"critical global systems"* which can greatly improve the success of climate actions (IPCC, 2018:6). Thus, cities are a central part of sustainable development efforts. To emphasise the role of cities the United Nations phrased a sustainable development goal, that explicitly addresses the sustainability of cities. It is goal number eleven '*Make cities and human settlements inclusive, safe, resilient and sustainable'* (United Nations, 2019c).

This sustainable urban development path is also taken up by the European Union. The member states committed implementing this sustainable development goal into their policies (European Commission, 2019b). Furthermore, the European Union influences sustainable city development via its regulatory but also via its cohesion and structural policies. The latter will be the focus of this research. Such policies are funded by the European structural and investment funds (ESIF). The regional development fund (ERDF) plays a crucial role in sustainability and sustainable development efforts since it supports, among others, the low-carbon economy and urban transitions.

Therefore, sustainability has become a major topic for cities so that sustainability strategies, greening strategies and masterplans are developed to reach it (Pearsall and Pierce, 2010; Kabisch and Haase, 2014; Kabisch *et al.*, 2016; Rutt and Gulsrud, 2016). A reoccurring concept in such sustainability plans is urban green infrastructure (UGI). It is described by the European Commission as a "*tested tool for providing ecological, economic and social benefits through natural solutions*" (European Commission, 2013:2). Thus, urban green infrastructure is promoted by the European Union as a tool to reach urban sustainability. The sustainability of urban places, it understood as a three-dimensional construct including social, economic and ecological concerns.

Urban green infrastructure is a broadly based concept which aims to encompass all three pillars of sustainable development – economic, social and ecological. Moreover, urban green infrastructure includes many different typologies of green spaces, whereby it becomes flexible for the urban environment. The typology ranges over many different either private or public elements, for example, green roof gardens or walls, urban green spaces, urban forests, private lawns or backyards, street trees or community gardens (Kabisch and Haase, 2014; Wolch, Byrne and Newell, 2014; Botzat, Fischer and Kowarik, 2016; Haase *et al.*, 2017). It is recognized as a physical non-built environmental infrastructure (Slätmo, Nilsson and Turunen, 2019) and is defined as *"an interconnected network of green spaces that conserves natural ecosystems values and functions and provides associated benefits to human populations"* (Benedict and McMahon, 2001:5).

Benefits provided to society by urban green spaces are divided into the categories of environmental and social benefits (Kabisch and Haase, 2014). Environmental benefits of urban green infrastructure are recognized in the realm of climate adaptation and mitigation as well as biodiversity within the urban environment (Kleerekoper, Esch and Baldiri, 2012; Botzat, Fischer and Kowarik, 2016). In contrast, social benefits refer to mental and physical health, recreational benefits or simply places to

interact with civil society (Mell, 2009; Kabisch and Haase, 2014; Rutt and Gulsrud, 2016). The latter benefits will be studied in this research.

Because urban green infrastructure deploys several environmental and social benefits to the urban population and their environment, it was also suggested as a *"mechanism for effecting positive environmental change and sustainable development"* (Mell, 2009:32). However, urban green infrastructure is mostly implemented into existing urban environments, which are already under strain due to their scarcity of land and respective land-use conflicts (Haase *et al.*, 2017; Slätmo, Nilsson and Turunen, 2019). Adding urban green infrastructure into this tense situation influences the social conditions of residents and hence raises the question of justice (N. Heynen, Perkins and Roy, 2006; Mell, 2009; Rutt and Gulsrud, 2016; Haase *et al.*, 2017). Inadvertence towards changing social conditions due to urban green infrastructure can result in unjust developments for neighbourhoods or even entire cities. Pressing issues concerning the development of urban green infrastructure and injustices are the issues of eco-gentrification and increased property costs as well as disproportionate health impacts and implications for the overall well-being (Lafortezza *et al.*, 2013; Wolch, Byrne and Newell, 2014; Rutt and Gulsrud, 2016; Wüstemann, Kalisch and Kolbe, 2017).

Given the documentation of the negative impacts of urban green infrastructure on the social conditions of urban residents, it is important to examine the European policy development of urban green infrastructure, and its impact on member states and city. This is the intention of this research. The scope of this research is limited to the German federal government and the federal state of North-Rhine Westphalia. Attention will be paid to the policies' awareness of just social conditions in the pursue of urban sustainability. To explore the notion of just social conditions in the urban environment the concepts of environmental justice and social sustainability are examined.

1.2. Urban Green Infrastructure Development - Benefits

Urban green infrastructure is recognized to deliver economic, social and environmental benefits to the urban population. Social and environmental benefits are provided via so-called eco-system services (Lafortezza *et al.*, 2013; Mattijssen *et al.*, 2017). Eco-system services are mindful development from the idea of ecosystem conservation. By acknowledging the services of ecosystems, the focus is placed on the functionality for flora, fauna and human well-being. Green infrastructure increases the capacity of the eco-system to provide such services (Lafortezza *et al.*, 2013).

Mattijssen *et al.* (2017) classified eco-system services in the context of the GREEN SURGE project. There are four categories of services – provisioning, regulating, cultural and habitat supporting services. It is important to acknowledge that urban green infrastructure is composed out of a diverse typology, hence not all elements can provide each service (see Chapter 5.2.1).

Environmental services and related benefits to the urban population are various. These benefits are situated in the categories of provisioning, regulating and habitat services (Mattijssen *et al.*, 2017). A pressing issue for the urban environment is the technical problem of the urban heat island effect (Kabisch *et al.*, 2016). It implies that the air temperature is higher in the urban environment than in the surrounding rural environment. This is caused among other things by sealed surfaces and little vegetation. Kleerekoper, Esch and Baldiri (2012) recognize green infrastructure as an important concept to fight the urban heat island effect since it cools down the city via evaporation or shade. Green infrastructure is also useful for the technical problem of flooding, which many cities face today due to extreme weather events (Lafortezza *et al.*, 2013; Kabisch and Haase, 2014; Kabisch *et al.*, 2016). Moreover, green infrastructure contributes to the reduction of noise and air pollutants (Kabisch and Haase, 2014; Wolch, Byrne and Newell, 2014; Kabisch *et al.*, 2016). Furthermore, it is recognized to support biodiversity in the city and foster the connection of flora and fauna throughout urban and rural environments (Germann-Chiari and Seeland, 2004; Lafortezza *et al.*, 2013; Botzat, Fischer and Kowarik, 2016; Haase *et al.*, 2017; Slätmo, Nilsson and Turunen, 2019).

The added-value of urban green infrastructure is recognized not only to be ecological but also to be social (Lafortezza *et al.*, 2013). In the scheme presented by Mattijssen *et al.* (2017), beneficial social services to the urban population fall under cultural services. A clearly understood benefit of urban green infrastructure is the positive effect on mental and physical health (Lafortezza *et al.*, 2013; Kabisch and Haase, 2014; Wolch, Byrne and Newell, 2014; Botzat, Fischer and Kowarik, 2016; Haase *et al.*, 2017; Mattijssen *et al.*, 2017; Wüstemann, Kalisch and Kolbe, 2017). Physical benefits are described under the term of *"green exercise"* which increase life quality, expectancy and mental well-being (Lafortezza *et al.*, 2013:104). It is associated with stress reduction and recreation. Central elements are meeting people and interacting with the neighbourhood as well as with nature itself (Kabisch and Haase, 2014). Naturally, there are also negative effects of some typologies of urban green infrastructure. Allergies, an increased presence of insects or other small animals are negatively recognized. Also, urban green spaces can be perceived as unsafe and potential places for criminality (Kabisch and Haase, 2014; Wolch, Byrne and Newell, 2014). Environmental as well as social benefits are positive location factors and hence influence the prices of real estate, property and attractiveness of a neighbourhood (Cook and Swyngedouw, 2012).

Positive social benefits are also recognized by the European Union. The communication, which promotes urban green infrastructure stresses social benefits explicitly. The European Commission, (2013:3) states that green infrastructure *"creates a greater sense of community, strengthens the link with voluntary actions undertaken by civil society, and helps combat social exclusion and isolation. They benefit the individual and the community physically, psychologically, emotionally and socio-economically"*.

However, in contrast to environmental benefits, social benefits are less institutionally recognized and researched in literature especially "*in relation to social dynamics such as power asymmetries and how exclusions play out in unprecedented social conditions*"(Rutt and Gulsrud, 2016:124). While there are studies about the distribution of urban green spaces (Germann-Chiari and Seeland, 2004; Kabisch and Haase, 2014; Kabisch *et al.*, 2016), uncertainty prevails on e.g. how social green policy objectives are set and reached overtime, which social benefits are generated, to whom these benefits are available and to what extent social groups and non-institutional, citizen-based initiatives can co-produce greening strategies within cities (Pearsall and Pierce, 2010; Kabisch and Haase, 2014; Botzat, Fischer and Kowarik, 2016; Kabisch *et al.*, 2016; Rutt and Gulsrud, 2016; Haase *et al.*, 2017; Wüstemann, Kalisch and Kolbe, 2017). Such questions also bear on European green infrastructure concepts and policies.

1.3. Urban Green Infrastructure Development - Challenges

Given the benefits urban green infrastructure development has, it is promoted as a measure towards urban sustainability (Mell, 2009). However, there are several critical voices raising concerns about the currently prominent greening discourse in cities (Checker, 2011; Cook and Swyngedouw, 2012; Anguelovski, Connolly and Brand, 2018). Anguelovski, Connolly and Brand (2018) question the legitimacy of the democratic dialogue concerning greening actions, since it does not account for unequal power asymmetries. It is argued that greening actions, like urban green infrastructure, have become a part of the a-political and technocratic urban sustainability discourse, which does not provide sufficient attention to questions of justice (Cook and Swyngedouw, 2012).

Therefore, the notion of justice needs to be related to both described benefits. Environmental and social benefits are mostly not naturally occurring phenomena, especially not in cities. On the contrary, the provision of environmental and social benefits demands a focused policy and a smartly designed planning practice (Campbell, 1996). So, relating the notion of justice to environmental and social benefits implies to asks who is able to enjoy and co-create them.

A third, influencing factor in the urban environment are economic benefits (Campbell, 2013). Greening strategies are accused of being *"development-oriented"* (Anguelovski, Connolly and Brand, 2018:418). This means that greening actions, driven by market forces often imply the revitalisation or upgrading of neighbourhoods targeted at only high-income residents (Haase *et al.*, 2017). Such a development was coined by Dooling (2009:621) as *eco-gentrification* and has since then taken up much attention (Checker, 2011; Wolch, Byrne and Newell, 2014; Rutt and Gulsrud, 2016).

The *"green space paradox"* by Wolch, Byrne and Newell (2014) shows in a fairly straightforward manner the possible trade-offs between environmental, social and economic impacts in the urban environment. Picturing a case in which the aim of an initiative was mainly thought in environmental terms, e.g. by placing a public park in a disadvantaged neighbourhood. The park will provide environmental benefits to the surrounding neighbourhood. Yet, the same park also has an increasing

effect on the housing costs, thereby crowding out the residents of the disadvantaged neighbourhood. So, even though the environmental benefits were provided to the neighbourhood the residents will most likely not be the ones enjoying them in the long-term. Consequently, one dimension of urban sustainability was improved at the cost of another, namely the social one. The economic dimension profited since higher rental prices can be demanded based on a "better" environment.

Haase *et al.* (2017) take up this issue and describe it as an unequal socio-spatial distribution of quantity and quality when it comes to urban green elements. Another important aspect is the temporal variable in urban green developments (Lafortezza *et al.*, 2013; Rutt and Gulsrud, 2016; Mell *et al.*, 2017; Anguelovski, Connolly and Brand, 2018). Urban development is continuous and not every effect can be seen immediately. Walmsley (2006) in Lafortezza *et al.* (2013) therefore states that there is not enough attention for the long-term impact of land-use policy and land management practices and the respective positive or negative impact of urban green infrastructure.

All in all, greening actions have plenty of positive benefits but they do not automatically imply an equal improvement of life-quality for all residents (Campbell, 2013; Kabisch and Haase, 2014; Rutt and Gulsrud, 2016; Haase *et al.*, 2017). Therefore, it is worth to investigate urban green infrastructure policy with an eye for the notion of social justice. Consequently, this research aims to contribute to the holistic sustainability approach of the urban agenda in the light of the sustainable development goal eleven.

1.4. The European Regional and Development Fund

The research follows the European initiative concerning urban green infrastructure as enacted by the European Commission (2013). The policy is promoted within the frame of European cohesion and structural policy under the European Regional and Development Fund. Thus, a direct monetary and normative connection is established between the different levels, respective policy documents and experts.

A short insight is provided to understand the European funding mechanism in relation to its member states. The European Regional and Development Fund puts forward funding priorities, which then are operationalised by the federal states. There are ten European funding priorities for the period of 2014 - 2020. Two of them are of interest to this research. Number six *Erhaltung und Schutz der Umwelt sowie Förderung der Ressourceneffizienz* [1] and number nine *Förderung der sozialen Inklusion und Bekämpfung von Armut*[2] (Brandenburgische Technische Universität and Deutscher Verband für Wohnungswesen Städtebau und Raumordnung e.V., 2015). Based on the European guidelines the federal state of North Rhine-Westphalia created an operational program, which outlines its specific priorities for the European Regional and Development funding period (Landesregierung Nordrhein-Westfalen, 2014). There are four priorities in the operational program of North Rhine-Westphalia. Priority number four is examined in this research - *Nachhaltige Stadt- und Quartiersentwicklung/ Prävention*[3]. It is noted with 233 Mio. Euro (Bezirksregierung Köln, 2016). Furthermore, it is subdivided into more specific goals, out of which goal eleven is compelling *Verbesserung der*

[1] Conservation and protection of the environments as well as the support of resource efficiency
[2] Support of social inclusion and abatement of poverty
[3] Sustainable city and district development and prevention

Integration benachteiligter gesellschaftlicher Gruppen in Arbeit, Bildung und in die Gemeinschaft [4] and either goal twelve or thirteen one must be followed too. Goal number twelve stressest the *Ökologische Revitalisierung von Quartieren, Städten und Stadtumlandgebieten*[5] und goal number thirteen outlines the importance of *Entwicklung & Aufbereitung von Brach- und Konversitionsflächen zu stadtentwicklungspolitischen bzw. ökologischen Zwecken*[6] (Landesregierung Nordrhein-Westfalen, 2014; Bezirksregierung Köln, 2016).

The projects could be handed in until December 2016 and June 2017 and will be executed until 2023 (Bezirksregierung Köln, 2016). Interesting to note is that priority number four is a so-called mixed axis, which explicitly calls for a combination of funding goals and mechanisms. This implies that social prevention should be combined with ecological goals hence the idea of environmental justice is present (Nova-Institut, 2014).

1.5. Principle of Subsidiarity

An important aspect of European policy is the principle of subsidiarity. It is defined in Article 5(3) of the Treaty on European Union (EUR-Lex, no date; Panizza, 2019). Subsidiarity is a federal term and organizes powers between different levels of government (Jordan and Jeppesen, 2000). Hence, it balances the execution of competences by the European Union and its member states. From a historic account, subsidiarity was regarded as a tool to maintain sovereign powers. Fears of too much European involvement into national policies were settled this way. The guiding idea behind the principle is that decisions should be taken as close as possible to the citizens. Also, all actions taking place at the European level are best situated there and could not be better executed at the national, regional or local level. The presence of this principle has implications for environmental policymaking and hence this research objective. Environmental policies are limited in their scope of action by the principle of subsidiarity (Laky, 2019).

[4] Improved inclusion of societally disadvantaged groups into labour, education and the community
[5] Ecological revitalisation of districts, cities and neighbouring areas of the city
[6] Development and preparation of fallow and conversion areas for urban development and ecological purposes

2. Research Objectives & Questions

This research aims to understand how the policy discourse of urban green infrastructure is shaped by the notion of social justice. To explore this notion, the concepts of social sustainability and environmental justice will be analysed and placed into the urban context. Thereby, special attention will be given to the theories around environmental justice. The analysis will span over the four levels, which influence urban green infrastructure policy – Europe, Nation, Federal states and cities, taking as a role model Germany, North-Rhine Westphalia and two German cities Cologne and Lippstadt. Each level is expected to shape and promote the policy differently due to the varying planning demands.

This research aims to firstly investigate the policy discourse of urban green infrastructure policy documents and related public officials and external experts. The policy discourse will be scrutinized with the help of a combined analytical lens consisting of environmental justice and social sustainability insights. The objective is to identify the storylines and related metaphors embedded in each level. Furthermore, the research seeks to identify possible discursive influences between the different levels. Moreover, planning practices around urban green infrastructure in Lippstadt and Cologne are examined. Thereby the focus is placed on how the identified discourse(s) are embedded in planning practices.

This research is focused on providing an in-depth understanding of the policy discourse around urban green infrastructure with a focus on social justice. The notion of social justice is analysed from the perspective of urban sustainability and environmental justice. Thereby the latter will receive more attention because environmental justice is identified to be lacking in the European research and policy agenda (Rutt and Gulsrud, 2016; Haase *et al.*, 2017).

The main research question of this thesis is:

To what extent is the discourse of urban green infrastructure policy inclusive of environmental justice?

- *What are the prevailing discourses and their storylines on the European, national and city level and who shapes them?*
- *In which way is urban green infrastructure shaped by environmental justice and social sustainability?*

2.1. Research Scope

This research focuses on social and environmental (in)justices in urban green infrastructure policy within Europe and especially in Germany. Additionally, planning practices of cities are scrutinized for notions of social and environmental (in)justices. This research is informed by the theory of sustainable development and especially its concept of social sustainability. Additionally, the theory of environmental justice is recognized as a depiction of the causal relationship between environmental benefits and burdens respective to social conditions. The concept of environmental justice is approached with the dimensions of intra- and intergenerational justice. Intragenerational justice is understood in terms of distributional and participatory aspects. Intergenerational justice is operationalised with the variable of time. This adheres to the temporal impact of urban green infrastructure policy in cities.

This research addresses urban green infrastructure in Europe and particularly in Germany in the pursuite of urban sustainability, in light of the sustainable development goal number eleven. To examine urban green infrastructure policy in Germany the cities of Cologne and Lippstadt were chosen.

Cologne is the biggest city in North Rhine-Westfalia with 1,08 Million residents. Its population density is 2,700/km^2. Cologne has been founded in the 1st century AD and functioned as a capital of the Roman province Germania Inferior. Due to its position at the rhine is flourished in the Middle Ages as a trade route. It developed as one of the biggest cities in the Renaissance and medieval times. Cologne was one of the heaviest bombed cites in Germany, during World War II and lost much of its population due to evacuations. In the attempt to preserve historic buildings, when rebuilding the city, a unique city skyline developed. Nowadays, it is also a major cultural centre, housing many museums and galleries as well as big fairs like the Art Cologne or Gamescom.

In contrast, Lippstadt is a smaller town with 67.901 thousand residents and a population density of 597/ km^2. The town has been founded in 1185 by the Edelherrn Bernhard II. It has been the first Planstadt in Westfalia. The city has a rich history, which was fostered by its location at the river Lippe. Jumping in time, the industrial revolution enriched the citizens, which can be still seen in many Wilhelmina style houses. During the Nazi time, the city industrial function was geared towards war production. It was mostly spared from the bombing during the last war years, so it has many historically remarkable buildings. Since then Lippstadt developed towards a diverse city, which is also called the “Venice of Westphalia” due to its approximately 750 km of waterways.

2.2. Research Structure

Following the introduction of the research aim and question and its placement in the European green infrastructure debate and funding environment, chapter two provides the research objective and questions. Chapter three introduces the conceptual framework of this research. Firstly, it dives into the theories around social justice. Thereafter it conceptualizes social sustainability and environmental justice. This research approaches environmental justice from an American and European perspective. At the end of chapter three, the two concepts are discussed in relation to each other, and an own conceptual lens for the analysis is presented.

Chapter four describes the methodology, which is used to analyse the urban green infrastructure policy. The chosen method to examine the urban green infrastructure policy is a discourse analysis after Hajer and Versteeg (2005). He states that discourses are composed out of storylines, which are shaped by metaphors and practices. Additionally, chapter four presents the data on which this research is based.

In the fifth chapter, some background of the research topic is provided. It introduces the thought behind the sustainable development goals and emphasises the importance of urban sustainability. Also, it presents the urban green infrastructure typology and its development in Europe and Germany. This chapter provides a valuable basis on which the result chapter rests.

Chapter six presents the results of the analysis in a three folded manner. The European, national and city level are examined for the discourses which evolve around urban green infrastructure policy. For each level, the storylines are carved out, which make up the discourses. Thereafter, the storylines are scrutinized in the light of environmental justice and social sustainability.

Chapter seven provides the discussion of the research as well as a reflection on the findings. The discussion reflects on the utilized methods, which informed this research and on the conceptual framework on which the analyses is based. The reflection of the findings provides a short synthesis and a comparison of the three levels itself with respect to urban green infrastructure policy and social justice.

The last chapter contains the conclusion of this research. It restates the research focuses and answers the sub and main research questions. Moreover, policy recommendations are made to foster a prosperous urban green infrastructure development.

3. Chapter Three: Conceptual Framework

3.1. Introduction

Urban green infrastructure has become the prevalent terminology when it comes to greening the urban environment in Europe. However, even before urban green played an important role in cities and has always been related to questions of equity in enjoyment, access, design and decision-making. Yet, urban green infrastructure is by definition bound vigorously to address the social conditions of urban residents.

Therefore, it is required to examine the understanding of urban green infrastructure policy about its impact on social conditions, especially given the fact that opposing voices criticize the social intention behind its development. Davies and Lafortezza (2017) raise the concern of it being a neoliberal concept since the value of green is predominantly seen in economic terms which in turn foster gentrification rather than reducing social or environmental inequalities. Such a development has also been reported by Wolch, Byrne and Newell (2014) in Chinese and American cities. Thereby, they also describe this development as paradoxical. Even though *"the uneven accessibility of urban green space has become recognized as an environmental justice issues"* the approach to change unfavourable and unhealthy situations for residents mostly result in the crowding out of the very same it was meant to benefit (Wolch, Byrne and Newell, 2014:235). This paradoxical relationship was also recognized in Germany by Haase *et al*, (2017), who relates it to the *"socio-spatial dimension of urban life"* (p. 42). The authors stress the need to better grasp the whole impact of urban green infrastructure on social conditions since a straightforward positive relationship is not the case. By this means, it implies to scrutinize the policy of greening actions to understand if socio-ecological trade-offs are unintended externalities, policy side-effects or if they are accounted for and antagonized.

Hence, this research will dissect the (acknowledged) social implications and change in social conditions in policy documents and expert interviews related to urban green infrastructure. Thereby, the notion of social implications will be approached with the help of two concepts – social sustainability and environmental justice. Both concepts will be examined, and their conceptual lenses will be analysed. Thereafter, an own conceptual lens is formed to analyse European urban green infrastructure policy.

3.2. Social Justice

To grasp the implications urban green infrastructure has on social conditions, the concept of social justice or equity needs to be examined (these terms will be used interchangeably). Social sustainability and environmental justice derive their argumentation from this concept. This step will be done independently for both theories because each of them might consider different aspects.

Any idea of social justice and its application demands the supposition that it is *"open to the influence of human agency"* (Burton, 2001:2). It implies that the concept acts as the basis for policies like land-use planning thereby acknowledging that injustices are not a random phenomenon.

This research will utilize the definition by Campbell (2013:76), who defines social justice as "*the explicit recognition of structural inequalities in the world"* including the pursuit of an equal distribution of resources in a proactive manner. Moreover, it provokes two different interpretations among whom inequalities are present and among whom resources should be redistributed. On the one hand, it is discussed that the "worse-off" are the ones requiring attention (Burton, 2001; Cuthill, 2010) whereas on the other hand social justice is extended to a broader understanding which

includes a more general redistribution of power and resources within our society (Burton, 2001; Eizenberg and Jabareen, 2017).

Furthermore, there are two aspects of justice recognized. Firstly, *intergenerational* fairness concerning the distribution of resources between current and future generations and secondly, *intragenerational* fairness addressing the fair allocation of resources between competing interests within the current generation (Eizenberg and Jabareen, 2017).

Burton (2001:2) argues that, next to recognizing the importance of social justice, a *"working definition"* and indicators are required to make it operationalizable in an urban environment. Otherwise, the design of equitable public policies becomes inconsequential. In her research, which analyses the impact of the compact city concept on the social dimension, she utilizes *distributional justice* as a social justice dimension. Thereby, she differentiates between two facets. Firstly, the *"fairness of the outcome (end-result)"* and secondly, *"the fairness of the action and procedures"* (Burton, 2001:3).

Among others, the aspect of distribution as an indicator of social justice is also taken up by Low (2013). According to Low (2013) *distributive justice* "*refers to the question of how the wealth, rewards, benefits and burdens of society should be distributed to achieve an economically just city"* (p.5). The dimension feeds from equity theory and assumes that if rewards are proportionally distributed, hence a fair allocation is established, fewer conflicts will occur. Relating distributive justice to public space implies equal availability and access for all people. Two more aspects are taken up in her research of public spaces and social justice. Firstly, *procedural justice*, which concerns the "*way that the process of negotiation and decision-making influences perceived fairness by individuals"* (p.6). The focus is placed on the participatory process and that even an unfavourable outcome can be less negatively perceived if the allocation process was designed fairly. Lastly, Low (2013:7) presents the dimension of *interactional justice* which involves the *"quality of interpersonal interaction in a specific situation or place"* and connects it with the attributes of respect, justification, propriety and truthfulness. Relating this to public space refers to the treatment of visitors in public parks experience. For example, discriminatory treatment in terms of racial insults or harassment by user groups will reduce the desire to visit a public park.

Comparing these two notions of social justice, two commonalities stand out even though they are phrased differently. Firstly, a just distribution as the outcome of public policy is emphasized by both authors. In each case, the *spatial outcome* is the determining variable. Furthermore, the dimension of *participatory justice* is also taken up by both, however, for Burton (2001) the dimension is subsidiary to the dimension of a just distribution whereas Low (2013) attributes an own dimension towards it. Yet, whereas both stress the decision-making or procedural aspect of it, Low (2013) only talks of it as 'perceived fairness' in comparison to Burton (2001). Another dimension is added by Low (2013) namely interactional justice, which can be attributed to her ethnographic research method.

According to the earlier described methodology, this research will focus on two of the three examined social justice dimensions in urban green infrastructure. It will work with the aspects of distributive and procedural justice. *Distributional justice* considers the spatial end-result of urban green infrastructure elements whereas *procedural/participative justice* addresses the process of decision-making and negotiation between the actors, thereby recognizing the perceived fairness of the process. This is translated into access to the process and the opportunity to even start such a process.

3.3. Social Sustainability

Social sustainability is recognized as one of the three concepts of sustainable development next to economic and environmental concerns. The term sustainable development was coined by the Brundtland report, which defined it as *"development that meets the needs of the present without compromising the ability of the future generations to meet their own needs"* (United Nations on the Environment and Development, 1987). The terminology of sustainable development evolved over the years. In the beginning, the concept was strongly linked to environmental sustainability, which then took up economic concerns in an equal manner before also recognizing social concerns too (Mehan and Soflaei, 2017). Yet, social sustainability received less attention in the public debate and eventually stood mostly in the shadow of environmental and economic sustainability debates (Cuthill, 2010; Pearsall and Pierce, 2010; Mehan and Soflaei, 2017).

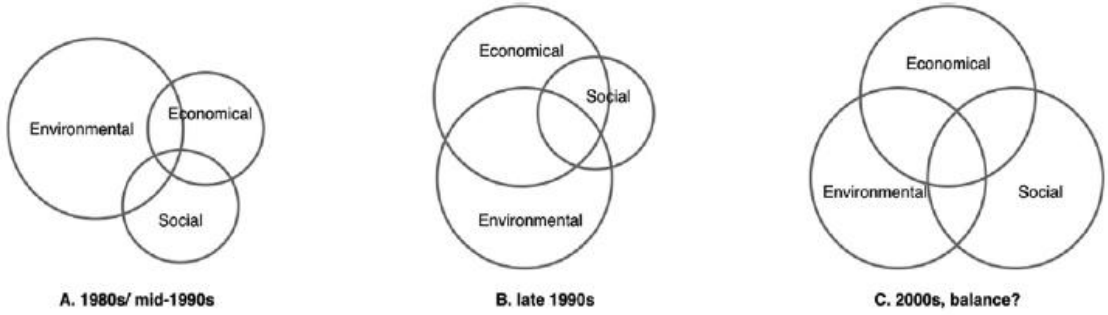

Figure 1 Different dimensions of sustainability and their relative importance through time by Mehan and Soflaei, 2017, p.294, Figure 1

3.3.1. The evolution of social sustainability

Vallance, Perkins and Dixon (2011) explored the evolution of the term social sustainability. Their short review enables to grasp the various building blocks of social sustainability, also in relation to economic and environmental sustainability. Figure 2 presents a visual overview of the three streams of social sustainability, advancing from the idea of sustainable development (Vallance, Perkins and Dixon, 2011).

The first stream is coined as *development social sustainability* and focuses on the basic needs of people, which include tangible and intangible goods. Tangible goods being e.g. medication, housing or food and intangible goods include e.g. employment, equity and justice. The rationale behind development sustainability is that if such basic needs are meet, which can be done by advancing economic development, then environmental concerns can be addressed successfully. Hence, social underdevelopment *"acts as a barrier to securing better social and bio-physical environmental outcomes"* (Vallance, Perkins and Dixon, 2011:344). This approach can be directly linked to the Brundtland report, which states that *"the distribution of power and influence within society lies at the heart of most environment and development challenges"* (United Nations on the Environment and Development, 1987:Article 43). Thus, in this perspective, a social development by all is required to face environmental problems.

The next steam of social sustainability is *maintenance social sustainability* (Vallance, Perkins and Dixon, 2011). It is identified as the most recent emergence in the pool of literature and deals with concerns about the development path of social and cultural preferences. It examines how social and cultural characteristics can be favourably integrated or even preserved over time without damaging the natural environment. Thus, it addresses every-day practices embedded into places and traditions which people hold on to or even wish to see improved since it constitutes their life quality. Interesting to note here is that the sustainability imperative presents itself as a challenge to maintenance social sustainability. This is because environmentally sustainable proposals often conflict with practices or lifestyles which people hold dearly. Hence, this approach examines the reasons of refusals to accept changes in favour of the environment. It also provides a pathway how to develop favourable social and environmental conditions by understanding their interactions and related practices.

The last stream of social sustainability is described by Vallance, Perkins and Dixon (2011) as *bridge social sustainability.* In contrast to social development sustainability, it does not assume that favourable environmental conditions will be achieved through development, but it aims actively to find common ground for the environment and people's behaviour. The aim is to foster a better connection (like a bridge) and to explore the human capacity to improve the environment. This stream can be divided into two sub-streams. Firstly, a non-transformative approach, whereby the intention is placed on providing information and promoting practices which improve environmental conditions e.g. recycling. Secondly, the transformative approach which questions how the environment is socially constructed and aims for a new understanding of the human-nature relationship. This view helps to understand and foster transitions and transformations to secure environmental conditions along with human consent and understanding.

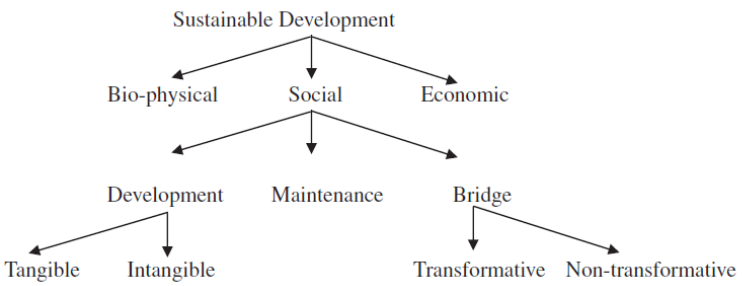

Figure 2 Three strands of 'social sustainability' by Vallance, Perkins, Dixon, 2011, p.345

Given these different understandings of social sustainability towards economic and environmental concerns, there is no clear-cut definition of social sustainability (Dempsey *et al.*, 2011; Eizenberg and Jabareen, 2017; Mehan and Soflaei, 2017). Rather, there is a pool of literature aiming to define the concept given the context in which it is studied. The context in which social sustainability is studied within this research is the urban environment.

3.3.2. Social sustainability in the urban context

There are several applications of social sustainability to the urban environment since human activities have becomes more concentrated in cities (Yiftachel and Hedgcock, 1993; Cuthill, 2010; Pearsall and Pierce, 2010; Dempsey *et al.*, 2011; Campbell, 2013; Eizenberg and Jabareen, 2017; Mehan and Soflaei, 2017; Kremer, Haase and Haase, 2019). The approach, which will be followed in this research, is guided by the third stream of social sustainability – transformative bridge sustainability.

Social sustainability can only be successful in the urban environment if it is informed by a theory-praxis link since local governments are the operational base from which urban social sustainability is executed (Cuthill, 2010). Because the concept entails many diverse concepts ranging from sustainability of a community, social equity/justice, social infrastructure, built form, social capital, social cohesion, social inclusion, equitable access etc. (Bramley and Power, 2009; Cuthill, 2010; Dempsey *et al.*, 2011) a *"shared language among stakeholders"* is key (Cuthill, 2010:364).

This research will utilize the conceptual framework by Cuthill (2010), who engaged in a theory-praxis informed process. Moreover, the presented framework is based on two premises which are in line with the authors understanding of 'social' in development (p.366):

1. Environmental problems are first and foremost social problems. You manage the people who impact on the natural environment, you do not per se manage nature itself.

2. Economics is meant to serve people, rather than a view that people serve economic interests. This is especially relevant in relation to equitable distribution of resources.

Cuthill's (2010) conceptual framework is constructed from four components social capital, social infrastructure, social justice/equity and engaged governance, which are interdependent and self-reinforcing. Each component will be shortly discussed based on the analysis of Cuthill (2010).

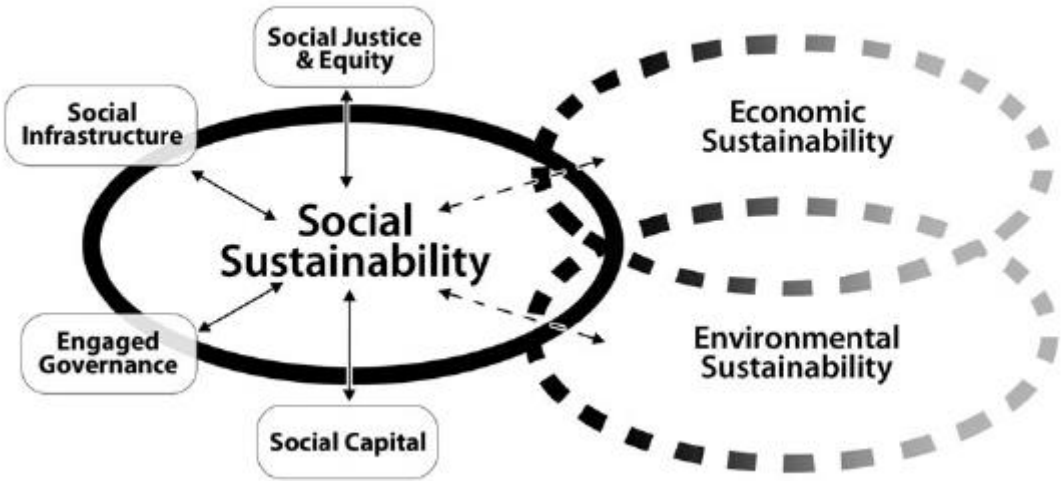

Figure 3 Conceptual framework for social sustainability by Cuthill, 2010, p.366, Figure 1

The first component is social capital, which is described as *"a theoretical starting point for social sustainability" (p.366)*. Social capital incorporates concepts like social networks, norms, trust and civic engagement and is argued to support social, democratic and economic outcomes next to improved community well-being (Fukuyama, 2001; Cuthill, 2010; Dempsey *et al.*, 2011). The

definition which will be used in this research comes from Fukuyama (2001:7), who describes social capital as *"an instantiated informal norm that promotes co-operation between two or more individuals".* In the context of urban sustainability social capital is recognized as a theoretical concept, which fosters the establishment of *"strong, resilient, healthy or socially sustainable communities"* (Cuthill, 2010:367).

The second component is social infrastructure, which is understood to include *"health, education, rural development, activity centres and transport-oriented developments"* (Cuthill, 2010:367) designed to meet the (special) demands of societal members (Germann-Chiari and Seeland, 2004). Furthermore, it also focuses on capacity building of citizens and community groups in order to enable them to cooperate with each other and governments. With the help of social infrastructure better social capital can be built and thus a stronger local government can be established. However, when developing social infrastructure awareness needs to be paid to the distribution. So, if the social infrastructure is deployed equitable Cuthill (2010:367) sees it as *"an opportunity to operationalize social sustainability".*

The next component, which he defines as important in the context of social sustainability, is engaged governance. The notion builds on the idea that there is a disconnect between the needs of civil society and the (local) government. Hence, engaged governance promotes more participatory governance which builds on a broader knowledge base of actively contributing citizens. Cuthill (2010:369) argues that engaged governance will result in *"informed and appropriate social sustainability policy, planning and practice".*

The last component of social sustainability is social justice and equity, whereby it is recognized as an *"ethical imperative" (p.368).* Thus, it implies that it should act as a guiding principle for policy formulation, strategies and all following actions. The focus is set on the worse-off in the communities and on the improvement of their conditions. The fulfilment of such basic human needs is argued to be *"not only as a fundamental tenant of social sustainability but as a prerequisite for sustainable development itself*" (p.368).

The presented concept of social sustainability recognized social justice as one of the four components. Moreover, it accredits its importance by calling it an ethical imperative next to a prerequisite for sustainable development itself. Based on the two premises, it clearly states its relationship with the economy and the environment, which rebalances the priorities in favour of the social dimension.

Examining social sustainability with respect to the earlier established characteristics of social justice, procedural justice stands out. Participatory aspects are strongly recognized in the social sustainability conceptual framework. They are stressed in the component of engaged governance. Thereby, a more top-down perspective is taken, in the way that participation is welcomed by local governments.

The other, earlier established aspect of distribution is emphasised when it comes to social infrastructure. Thereby, importance is given to a fair distribution because it causes differences in the capacity of people to be involved.

3.4. Environmental Justice

3.4.1. Environmental Justice - History

Environmental Justice in the United States

The foundation for the notion of environmental justice was laid in the context of civil rights and racial struggles in the United States during the 1980s (Pedersen, 2010; Laurent, 2011). A decisive point was the planned built of a toxic waste landfill close to an African American community in 1982. When the African American residents protested and opposed the built, the topic gained traction and local activism and grassroots networks pushed the topic further. This movement prompted research into similar cases and revealed that the placement of environment-harming facilities took the *"path of least resistance"* (Kaswan, 1997 in Pedersen, 2010). The United Church of Christ report in 1987 titled 'Toxic waste and race in the United States' showed empirical evidence for the environmental injustices (Laurent, 2011). Hence, environmental justice was early on also labelled *"environmental racism"* (Agyeman, Bullard and Evans, 2002:81). Based on the evidence and strong support for the topic in the population, the Environmental Protection Agency also recognized the topic and published a report acknowledging the issues in 1992. Two years later environmental justice moved from being a civic cause into a federal obligation due to an executive order the Clinton administration passed. Since then the topic stayed current and institutional development followed. As well as a clear definition is provided by the Environmental Protection Agency:

"Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, colour, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. This goal will be achieved when everyone enjoys: the same degree of protection from environmental and health hazards, and equal access to the decision-making process to have a healthy environment in which to live, learn, and work" (United States Enviornmental Protection Agency, 2020)

This definition highlights two aspects distinctively – fair allocation implying an equalized spatial protection from environmental burdens and a meaningful involvement in the process. Yet, this pro-active process does not imply that environmental justice is achieved in the United States. However, based on the history of environmental justice struggles the relationship between environmental conditions, individual welfare and respective social outcomes is recognized as straightforward (Laurent, 2011). It is argued that environmental justice is greatly successful because it provides a *"master frame"* through which environmental and social concerns can be articulated with the help of the discourse and rhetoric of the civil rights movement (Agyeman, Bullard and Evans, 2002:83).

Environmental Justice in the European Union

In contrast to the United States, environmental justice is a relatively young topic in Europe. The topic of environmental justice in the European Union is understood in the context of two different dimensions (Laurent, 2011). On the one hand, it concerns global environmental justice. The European Union faces an ecological debt towards developing countries in terms of e.g. resource uses or the carbon budget. On the other hand, environmental justice concerns firstly intragenerational justice thereby addressing local, regional and national levels and secondly, intergenerational justice for the future of the European Union.

The institutional beginning of the European environmental justice debate is situated in 1998 at the city of Aarhus, Denmark. On the 4th Ministerial Conference "Environment for Europe" the *Convention*

on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters was adopted. The convention establishes several rights to the public in regard to the environment. It provides for three elements. Firstly, the right to *"access to environmental information"*. This element obligates public authorities to actively provide the environmental information they hold. Also, it enables citizens to request information on the state of the environment from the respective authority. Such information includes policies and measures that also reflect the potential risk to human health. Secondly, the convention ensures *"public participation in environmental decision-making".* It enables citizens and non-governmental organisations to comment e.g. proposed measures, which will affect the environment. These comments have to be included in the decision-making process. The results need to be provided as well as the reasons for it. Lastly, the Aarhus Convention warrants "*access to justice"*, which implies the right to appeal against decisions that have been made without respecting the other two rights or environmental law (European Commission, 2020). In Germany, the Aarhus Convention is translated into federal law with the Umweltinformationsgesetz §3 (dejure.org, no date).

This convention marks the emergence of environmental justice concerns outside a civil rights discussion (Pedersen, 2010). It recalls upon two other important conventions, namely the Stockholm Declaration on the Human Environment (principle 1) and the Rio Declaration on Environment and Development (principle 10) (Agyeman, Bullard and Evans, 2002). Hence, the convention establishes citizens' right in the field of the environment and constitutes two rights distinctively. The *substantive right*, which implies the right for all individuals to be protected from environmental degradation and enjoy a healthy environment and *procedural rights*, which imply participation, the access of information and for decisions to be made in an informed manner (Agyeman, Bullard and Evans, 2002; Pedersen, 2010).

"in order to contribute to the protection of the right of every person of present and future generations to live in an environment adequate to his or her health and well-being, each party shall guarantee the rights of access to information, public participation in decision-making, and access to justice in environmental matters in accordance with the provisions of this Convention"
(United Nations Economic Commission for Europe, 1998:Article 1)

Yet, real uptake of environmental justice issues in social policy only started to occur in 2002 in Scotland. Since then the topic gained more traction in different European nations (Laurent, 2011; Kabisch *et al.*, 2016). Additionally, Laurent (2011) argues that environmental justice in the European Union is differently conceptualized than in the United States. This difference can be traced back to differences in public policy philosophies. Whereas the American public policy approach recognizes the universality of natural rights and the equal execution of them by all, the European public policy focuses on the social process and how it might produce inequalities.

Hence, European environmental justice efforts are focused on social conditions producing inequalities in contrast to American environmental justice where the racial dimension of discrimination and the exclusion from decision-making processes are central. Thus, Cutter in 1995 already argued that *"environmental justice moves beyond racism to include others (regardless of race of ethnicity) who are deprived of their environmental rights, such as woman, children and the poor"* (in Agyeman, Bullard and Evans, 2002:83). So, European environmental justice is discussed in terms of class issues and issues of exclusion not necessarily race (Agyeman, Bullard and Evans, 2002; Laurent, 2011). Furthermore, Agyeman, Bullard and Evans (2002) argue that the discourse around

environmental justice manages to unite people in their concerns. It fosters an understanding of experiences and supports awareness of parlous situations.

Comparing the two origins of environmental justice reveals one common feature namely *procedural justice*. Both theories stress the need to share information and open access to decision-making procedures for citizens when it comes to environmental burdens and benefits. Yet, the second identified characteristic differs between the two theories. Whereas the definition by the EPA stresses the *distributive right*, the United Nations Economic Commission for Europe emphasises a *substantive right* to be unharmed by environmental degradation.

Moreover, when looking back to the social justice aspects, it becomes evident from the provided definitions that the United States environmental justice interpretation is more focused on *intragenerational* justice in comparison to the European definition which highlights *both intra- and intergenerational* justice. Hence, even though both concepts carry the same name a different conceptualization needs to be recognized.

3.4.2. Environmental Justice – Concept

Regardless the origin, there is no single definition of the concept and its dimensions are mixed irrespectively of the origin. Thus, it rather needs to be recognized as *"vague and nebulous"*, which can be acknowledged as an advantage because it implies the ability to bring people together and facilitate their discussions (Pedersen, 2010:29). Moreover, environmental justice is located at two distinct political levels. Firstly, at the local and activist level where it functions as a *"vocabulary for political opportunity, mobilization and action"* and secondly, as a policy principle at the government level (Agyeman and Evans, 2004:156).

Environmental Justice from an urban planner's perspective

Viewing the environmental justice concept from an urban planners' perspective reveals some more insights. Campbell (2013, 2016) presents the planners' triangle to guide urban developers towards sustainability. Each corner represents a planning goal for the urban environment and thus deconstructs urban sustainability. Even though it does not offer any concrete answers, it shows the underlying tensions planners' face in their work.

Interesting to note is that environmental justice is understood here in the light of the development conflict, as a tension between social justice and environmental protection (Campbell, 2013, 2016). The development conflict is thereby described as the most "*elusive*" one (Campbell, 1996:299). The conflict itself is characterised by the two accompanying conflicts of the triangle, the property conflict and the resource conflict. The first conflict arises from the competing claims of social justice and economic development regarding the ownership and respective use of land. It is defined by the *"property contradiction*" of moderns societies, in which private property relies on government intervention to uphold its beneficial social aspects (Foglesong, 1986 in Campbell, 1996). The latter conflict, coined as the resource conflict, describes the tension of natural resources being an economic utility vs an ecological utility. In

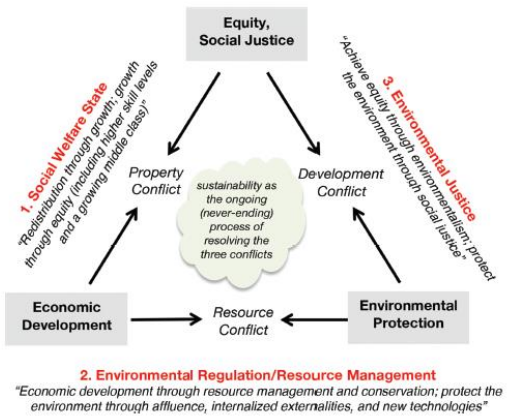

Figure 4 The Planner's Triangle by Campbell, 2016, p. 389, Figure 1

principle, it resembles the property conflict since both tensions are pondering how much is *enough* exploitation to still satisfy future demands.

The development conflict faces the challenge to satisfy both conflicts at once. It aims to find a way to increase social equity, protect the environment while providing a functional economic system. Yet, he warns that the hidden but very influential component in the development conflict is the "*imperative of economic growth"* (Campbell 2013:78). He distinctly approaches the merger of the two political movements from a planner's perspective. Even though he acknowledges environmental justice scholars' work, he states that urban planners require an own gateway to environmental justice since the paradigm is not completely applicable for urban planning community. Social justice, as well as environmental protection, are both understood to be *spatial* issues, joined in their effort to *"fight uneven development"* (Campbell, 2013:77). Hence, environmental justice is branded as a subset of urban sustainability (Campbell, 2013).

3.4.3. Environmental Justice – Dimensions

The concept of environmental justice utilizes different justice definitions to facilitate and foster its application. The lenses through which environmental justice is analysed vary depending on the concepts' origin, situation and spatial context (Cook and Swyngedouw, 2012; Low, 2013; Rutt and Gulsrud, 2016).

Environmental justice is spread over three major aspects (Pedersen, 2010; D'Alisa, Demaria and Kallis, 2015). Firstly, environmental justice has become a concept which is applied outside the *"anthropocentric social justice setting"* and instead focuses on the right of flora and fauna itself, independent from human needs (Pedersen, 2010:28). This stream of thought is coined as *ecological justice*. From this perspective, the city is seen as a consumer of resources and producer of waste. Urban life and its development stands in competition with the natural land and hence presents a growing threat to nature (Campbell, 1996). The second, rather young stream of thought is labelled *productive justice.* This perspective takes a more holistic perspective and questions the reasons and decisions *"controlling the production of environmental burdens"* (Pedersen, 2010:28). Thus, it does not focus on distributive or procedural injustices but focuses on the potential environmental risk decisions might have.

In contrast, the last aspect is concerned with the anthropogenic social justice setting and is referred to as "*environmentalism of the poor*" (D'Alisa, Demaria and Kallis, 2015:34). This perspective focuses on the consequences of decisions regarding environmental benefits and burdens. Throughout time and literature, several subsets of justice dimensions were added to this aspect. A historically anchored dimension is the one of *distributive justice* (Nik Heynen, Perkins and Roy, 2006; Pedersen, 2010; Cook and Swyngedouw, 2012; Kabisch and Haase, 2014; Wolch, Byrne and Newell, 2014; Kabisch *et al.*, 2016). The distribution of urban green spaces concerns not only the fair (re) distribution of environmental burdens but also the fair allocation of environmental benefits and its associated health implications (Rutt and Gulsrud, 2016). Additionally, the notion of *spatial justice* comes into play Fincher and Iveson, 2008 in Low (2013). This concept asks about the right to space of different uses, services and user groups. Hence, it highlights the spatial organization of public spaces. It asks the question: how do we allocate rights to space? Figure 5 shows quite bluntly the differences there are. The street has the same width, yet the rights of the space are allocated in contrasting ways.

Figure 5 Spatial Justice by EcoDistricts, 2019

Moreover, the notion of spatial quality needs to be examined since changes in population might also result in different user demands (Low, 2013; Kabisch and Haase, 2014; Rutt and Gulsrud, 2016). This aspect leads to a separate dimension, stressed by Low (2013), who emphasises an *interactional justice* in urban public spaces as elaborated earlier.

Secondly, the dimension of *procedural justice* gained ground in the United States as well as in the European Union. Thereby, two aspects are important. Firstly, as again stressed by Low (2013), the perceived treatment within the process and secondly, the fairness of the governance process itself implying its democratic quality and regard to power relations (Rutt and Gulsrud, 2016). Following procedural justice, two more related notions come into play – *recognitional justice* and *justice of capabilities* (Schlosberg 2003,2007 in Cook and Swyngedouw, 2012). The former relates to the recognition of disadvantaged groups and their pro-active involvement in the political process. Recognition of socially excluded groups needs to be recognized as an impact on the distribution but also on how procedures occur (Kabisch and Haase, 2014; Rutt and Gulsrud, 2016). *Justice of capabilities* is either seen as an alternative for the presented justice framework or as an addition to it (Rutt and Gulsrud, 2016). It describes the capacity for choice by people to fully make the best out of their lives. For example, Dooling (2009) showed how circumstances of homelessness may remove choice thereby complicating the previously mentioned aspects. Hence, justice of capabilities can function as a good reminder of demanded capabilities in distributional or procedural aspects to not foster or even maintain inequalities.

3.5. Connecting environmental justice and social sustainability

The compatibility of the two concepts depends greatly on the chosen interpretation of each and hence strong argumentations for both possibilities exist (Pedersen, 2010). Two more problems arise when aiming to combine or differentiate the concepts. Firstly, the concept of environmental justice has a European and United States origin story, which each gives the interpretation a different turn. Secondly, social sustainability, as shown is firstly only a subset of sustainable development and secondly, it encompasses different understandings when combined with environmental or economic concerns.

The approach to combine sustainability/sustainable development and environmental justice is not a new attempt in academic or practice (Agyeman, Bullard and Evans, 2002; Agyeman and Evans, 2003, 2004; Pearsall and Pierce, 2010; Pedersen, 2010; Campbell, 2013; Wolch, Byrne and Newell, 2014).

The 'just sustainability' concept is a frontrunner in arguing for the co-existence of the two (Agyeman, Bullard and Evans, 2002; Agyeman and Evans, 2004; Pedersen, 2010). The idea behind 'just sustainabilities' is that environmental quality and human equality are linked and hence need to be discussed jointly. In comparison with the earlier presented Brundtland definition, sustainability is here defined as *" the need to ensure a better quality of life for all, in a just and equitable manner, whilst living within the limits of supporting ecosystems*" (Agyeman, Bullard and Evans, 2002:78). This has been done due to the recognized lack of equity or social justice notions in the dominant definitions of e.g. the Brundtland report. The concept of just sustainability is developed from the idea that environmental justice and sustainability have overlapping topics and concerns. However, as shown earlier, diverting origins. Agyeman, Bullard and Evans (2002) argue that environmental justice has a reactive narrative. It aims to counter the effect of already existing injustices due to policies or strategies. Whereas sustainability is focused on the development of new policies and strategies to prevent injustices. The added value of combining these two approaches to injustices lies in its emphasis on *the "interdependence of social justice, economic well-being and environmental stewardship while focusing on the creation of sustainable communities able to facilitate global change"* (Agyeman, Bullard and Evans, 2002; Agyeman and Evans, 2003, 2004; Pedersen, 2010:45).

Contrasting juxtaposition

For this research, the two theories will be first examined for commonalities and differences. Thereafter, a theoretical lens is chosen with which urban green infrastructure policy will be analysed in regard to its awareness of social implications. The 'Just Sustainability' framework is recognized as valuable food for thought. Yet, attention is required since the task of this research is the combination of social sustainability (not sustainability as a whole) with environmental justice.

Environmental justice and social sustainability share some conceptual bases. Firstly, it needs to be recognized that the concept of social justice is strongly embedded in both approaches. Cuthill (2010) stresses social justice as the *"ethical imperative"* of the social sustainability concept. Similarly, environmental justice is defined by Campbell (2013) as the merger of social justice and environmental protection. Thus, social justice as the "*the explicit recognition of structural inequalities in the world"* including the pursuit of an equal distribution of resources in a proactive manner is centrally embedded in both concepts (Campbell,2013:76).

Secondly, social sustainability and environmental justice share the concern about the distributional and participatory dimension of justice. This commonality is grounded in the shared uptake of social justice as a basic ingredient. Interesting to note is that both take up the idea of capabilities in one or another manner. Within social sustainability, it is embedded in the idea of social infrastructure which supports the capacity building capabilities of citizens. Environmental justice takes up the dimension of capabilities more clearly and even as an own analytical framework.

Next to commonalities, there are of course differences across the two theories. Additionally, environmental justice needs to be differentiated in its origins. Viewed from a United-States perspective environmental justice is a reactive approach. It takes a bottom-up approach and aims to correct the injustices of already existing policies and practices. This course of action is embedded in its origin from the civil rights movement. Social sustainability, as a pillar of sustainable development,

is a proactive approach aiming to newly design policies and practices. Also, it is implemented in a top-down manner at first sight, even though initiatives like the local agenda 21 demands local (bottom-up) action. Environmental justice viewed through a European lens shows more similarities with a top-down and proactive approach. The Aarhus Convention is concerned with citizens' rights from an environmental perspective, hence providing a legal framework for citizens to count on.

An interesting difference can be found in the dimension of recognition-based justice. Within the United-States environmental justice approach explicitly stresses the necessity of recognition. This can be attributed to its origin and grounding in the civil rights movement. In contrast, social sustainability does not credit special importance to the recognition of different user groups. It recognizes only a general disconnect between civil society and the local government, yet does not specify it to any class group, ethnicity or else. However, recent literature takes up the necessity of recognition-based justice due to the continuous diversification of the European population. A trend which is especially relevant for cities.

Lastly, as also noticed by Agyeman, Bullard and Evans (2002) the two approaches and their respective discourses differ structurally and syntactically. As stated, the United-States environmental justice discourse builds on the civil right movement and has become, with its use of master-frames, a rather inclusive discourse. This means that issues of environmental justice easily appeal to people and the vocabulary is useful for people and groups to express their concerns. Hence, it is an accessible discourse. Yet, to note is that the discourse mostly addresses marginalized groups. In contrast, sustainability is a more future-oriented discourse and less tangible for a broader audience. Even though it aims to include wider social groups and policy goals. This also holds for social sustainability as a branch of sustainability.

The theoretical lens for this research

The following part will present the theoretical lens which is chosen to analyse urban green infrastructure policy with respect to its awareness of social implications.

Firstly, it is important to stress that this research acknowledges the interconnectedness of sustainability and environmental justice. Special emphasis is placed on the connection between environmental quality and human equality. This focal point implies that human inequality is recognized to be harmful to environmental quality. This understanding resembles the argumentation of the concept of just sustainabilities by Agyeman, Bullard and Evans (2002) and Agyeman and Evans (2003, 2004).

To explore the nexus 'Urban green justice' of environmental justice and social sustainability the following two broad dimensions – intra- and intergenerational justice are chosen, as the two analytical pillars of the theoretical lens of this research. It aims to relate these two aspects to the proactive or reactive nature of social sustainability and environmental justice. Often (social) sustainability efforts are proactive and at the same time future-oriented thereby only serving intergenerational justice. Nevertheless, intragenerational justice is required since social justice should not only happen in the future. Thus, the momentum of the environmental justice concept is taken up, to be also aware of reactive policies and planning practices.

Under the heading of intragenerational justice, there are two major categories distributional justice and participatory justice. Firstly, distributional justice is a key ingredient of both concepts as well as social justice theory. Within this framework, the aspect is understood within two geographical dimensions. Firstly, as allocation justice, which is understood as the fair allocation of environmental

benefits and burdens through the urban environment. However, as learned from the forgone research, the terminology of spatial justice is important too. Spatial justice concerns not the overall distribution within a city, but the balance of user demands given their socio-economic status in the urban space itself. It also implies to democratize the public space between user demands. Spatial justice can be understood as a design-oriented planning task.

The second analytical aspect is participative justice. This aspect is also embedded in social justice theory and hence present in both concepts. For this research, the notion of participation will be divided into two aspects. Firstly, into the engaged governance aspect inspired by social sustainability. This aspect addresses the disconnect between civil society and the (local) government. Thus, if engaged governance is practice correctly, an improvement in especially spatial justice is possible because user needs are better communicated. It highlights the need for local governments to be willing and open to participation. But it also implies to accept and translate user demands into spatial policy and planning practice. The next aspect of the participatory dimension is inspired by the United-States environmental justice theory. It focuses on recognition-based justice. This aspect acknowledges the diversifying civil society in cities and their varying capabilities to participate in policy or planning processes. Thus, by recognizing civil society groups and respective capabilities the participatory process will (possibly be) altered and hence distribution and spatial justice are impacted too.

Under the heading of intergenerational justice, the aspect of time is important. This variable implies an operationalisation of intergenerational justice. It was recognized to not have found yet enough attention in research, as shown in chapter 1.3. A temporal observation of policy and planning practices implies the understanding that planning actions do not show their effect immediately. In contrast, social and infrastructural change takes time. Hence, a temporal understanding of ones planning impact is important. Also, engaged governance would benefits since a long-term participatory perspective engages the public continuously and might create a valuable feedback circle. Figure 6 depicts the elements of the nexus urban green justice.

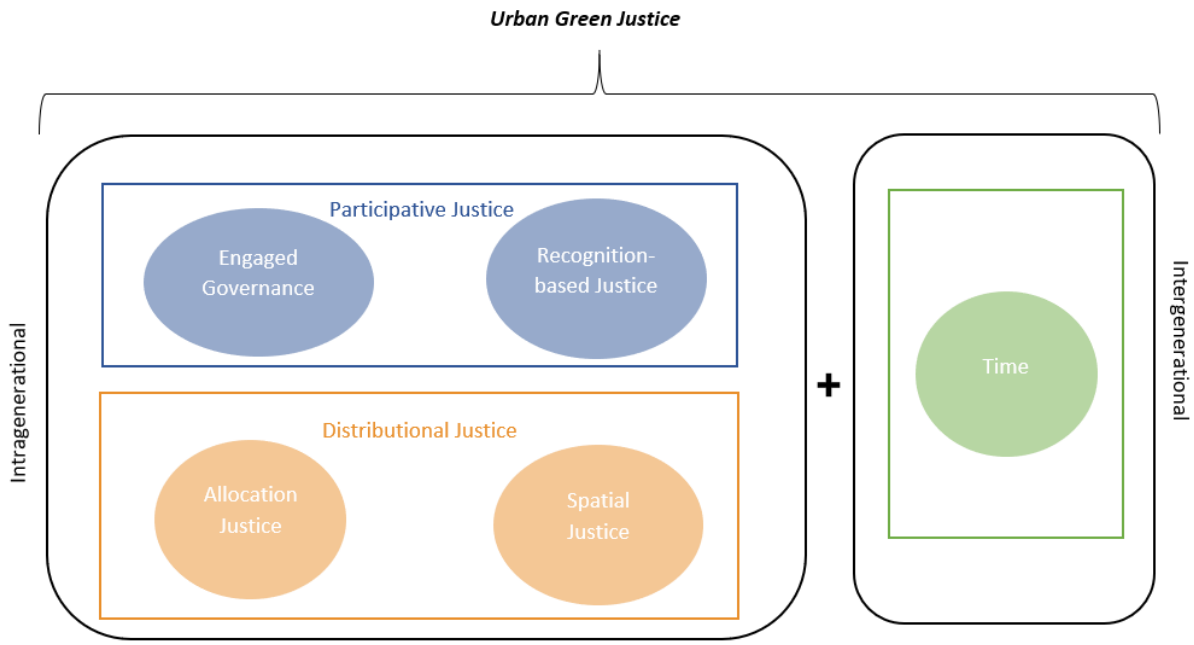

Figure 6 Conceptual Lens by Author

4. Chapter Four: Methodology

4.1. Discourse Analysis

To approach and deepen the research on the nexus of 'urban green justice' this chapter presents the concept of discourse analysis. Discourses are to be distinguished from discussions, even though those are often used interchangeably in everyday language. Discourses, in this research, are defined after Hajer and Versteeg (2005:175) and Van Den Brink and Metze (2006:67) as an *"ensemble of ideas, concepts and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices"*. This approach of discourses is understood as 'language in use' and belongs to the Foucauldian, socio-historical strand of discourse analysis (van den Brink and Metze, 2006). This understanding of discourses, as structures embedded in the language, is affiliated with the social constructivism tradition in social science, which "*assumes the existence of multiple, socially constructed realities*" (Hajer and Versteeg, 2005:176). Hence, greater importance is given to how society perceives and reproduces certain phenomena, dependent on situational conditions and which structures are upheld given the contributions of the participants in a discussion. Thus, the focus lays on how narratives construct a problem and which power language holds to influence policy-making (van den Brink and Metze, 2006).

Discourse analysis can then be understood as *"the examination of argumentative structure in documents and other written or spoken statements as well as the practice through which these utterances are made"* (Van Den Brink and Metze, 2006:66). A discourse analysis aims to examine the 'discursive structure' in a discussion and so to study the 'language in use' to identify regularities in debates. Discourses identified in a discourse analysis might not be obvious to the people engaging into the discussion but can shed light on underlying logical assumptions, democratic quality or controversies (Hajer and Versteeg, 2005; van den Brink and Metze, 2006).

According to Hajer in Van Den Brink and Metze (2006:67), there are two concepts which help to *"illuminate distinct features of discourse"* namely, metaphors and storylines.

4.2. Storylines

Hajer in Van Den Brink and Metze (2006:69) states that people utilize the concept of storylines as *"short hand"* in discussions. A story is built around a certain narrative and has mostly a clear start and end to it. Yet, according to Hajer, storylines show that people do not necessarily refer to a problem with a *"fixed identity but changing the problem definition "* (Van Den Brink and Metze, 2006:69). People, who use storylines in discussions simply assume that their conversational partner shares the same storyline thereby omitting an explanation of the issue at hand, yet this proves to be wrong (Hajer and Versteeg, 2005; van den Brink and Metze, 2006). So, analysing discourses can demonstrate how actors influence discourses by deploying their storylines, including metaphors and emblematic issues and how problems and respective solutions are framed.

Interesting to note here is that, even though people are swimming in a sea of incoherence, they manage to create a political coalition. In contrast, such cross-talk can even be favourable for the formation of coalitions when addressing a problem with high discursive complexity (Hajer and Versteeg, 2005; van den Brink and Metze, 2006).

4.3. Metaphors

A metaphor is "*a figure of speech in which a word or phrase literally denoting one kind of object or idea is used in place of another to suggest a likeness or analogy between them*" (Merriam Webster, 2019). According to Burke, it brings out the 'thisness' and 'thatness' of an issue (1969:247 as in Hajer and Versteeg, 2005). Thus, it shows how things are perceived, experienced and how meaning is created. The construction of meaning, especially in environmental discussions, is not to be underestimated since mostly visible change follows in terms of the "*revision of rules, the enactment of laws or the creation of institutions"* (Hajer and Versteeg, 2005:176). Hence, the established meaning provides the context in which environmental problems are discussed and also acted upon. Tracing this creation of meaning leads to "*emblematic issues"* which showcase the constructed understanding of environmental problems (Van Den Brink and Metze, 2006:68). With the help of such emblems, one can understand how not only change occurs but also how a conceptual shift in policy discourse and hence policymaking happens.

Often, actors are not aware of the emblems they bring into political discourses and with which they shape institutional politics. The focus of political actors is on making phenomena "*manageable for the structures of societies*", whereas discourse analysis aims to identify the mechanisms which influenced the creation of the phenomena which then creates outcomes (Van Den Brink and Metze, 2006:69).

4.4. Discourse Practice

Discourses are not detached from the situation there are used in or from the context in which a storyline is deployed. Hence it is important to use the concept of practice as *"embedded routines and mutually understood rules and norms that provide coherence to social life"* (Van Den Brink and Metze, 2006:70). Combining discourse and practice completes the earlier given definition. Discourses in politics can not only be found but also evaluated if one brings in the terms of power and dominance (van den Brink and Metze, 2006). According to Hajer discourses can be dominant in political arenas if two criteria are fulfilled, then the discourse is able to influence the discussion. The first condition is discourse structuration, that is *"when a discourse starts to dominate the way a given social unit conceptualizes the world"* and the second condition is discourse institutionalisation**,** implying that "*a discourse solidifies in particular institutional arrangements"* (Van Den Brink and Metze, 2006:70). Yet, politics often draws from more than one particular discourse thus a clear domination is hard to distinguish but often there is one discourse which has a "particular claim to power".

4.5. Data Gathering

The data basis to explore the discourses was gathered in a two-folded manner. Firstly, an informed but selective document search was conducted. This inquiry occurred on each level independently, guided by the European Commission Document 'Green Infrastructure – Enhancing Europe's Natural Capital' and the European Regional and Development Fund.

For the European level the documents were found by an online search with the search terms 'Green Infrastructure', 'urban infrastructure', 'cities', 'social', 'justice', 'environmental justice', 'green', 'urban green'. The search engine EUR-Lex, with its expert search query, was utilized. At the federal level, the important ministries and institutions were searched for the same search terms as well as relevant and recent publications. On the federal state level, the same procedure was applied. The

project on the fourth level was identified according to the funding call of Nordrhein-Westfalen. The funding call classifies its projects according to the intervention. The intervention of interest within the European Regional and Development Fund is number 085 '*Schutz und Verbesserung der biologischen Vielfalt, des Naturschutzes und grüner Infrastruktur'* [7]. With respect to this research objective, this project call is interesting because it explicitly mentions *'Maßnahmen zur Entwicklung von Grünflächen als Beitrag zu mehr Umweltgerechtigkeit'* [8] (Bundesverband Garten- Landschafts- und Sportplatzbau e.V., no date). The resulting selection of documents can be found in Annex 2.

The interviews are expert interviews from responsible ministerial experts or content-wise related experts on the topic of green infrastructure, social development and policy, European funding and urban planning. The interviewees were found based on the research documents. In total ten interviews were conducted. The interviews were held either via skype/telephone or in person. Moreover, all interviews were recorded in agreement with the interviewees and if requested a transcript was provided. Upfront a tailored questionnaire was provided to all interviewees. However, the interviews were free to develop further than only the questions provided.

The results are based on the coded documents and interview transcripts. For coding the program MaxQDA was used. The codes were developed based on the described methodology and the theoretical lens developed in the conceptual framework.

[7] Protection and Improvement of biological diversity, nature protection and green infrastructure
[8] Measures for the development of green spaces as a contribution to more environmental justice

5. Chapter Five: Research Background

5.1. Sustainability & Sustainable Development

Sustainability and the concept of sustainable development surfaced around the 1970s and since then developed into a politically recognized discourse throughout the world (United Nations on the Environment and Development, 1987; Agyeman, Bullard and Evans, 2002; Agyeman and Evans, 2004; Cuthill, 2010; United Nations, 2012, 2019b). It can be argued that the discourse started with the *"limits to growth"* discussion at the 1972 UN Stockholm Conference. Later on, the term sustainable development was coined by the Brundtland report, which defined it as *"development that meets the needs of the present without compromising the ability of the future generations to meet their own needs"* (United Nations on the Environment and Development, 1987). The accompanying concept of sustainability implies the quest to balance economic, ecological and social development.

There are two different conceptualisations of sustainability. Agyeman, Bullard and Evans (2002) present the strong and weak sustainability narrative. Strong sustainability stresses that "*renewable resources must not be drawn down faster than they can be renewed*" (p.81). In contrast, weak sustainability states that "*certain resources can be depleted as long as they can be substituted by others over time*" (p.81). Thus, the two narratives suppose a different utilization of natural capital (natural resources) and its substitutability with manufactured capital. However, it is important to stress that some natural materials or services cannot be substituted by manufactured goods or so-called "*techno-fixes*" (p.81).

Independent of the conceptualization, this research agrees with Campbell (1996:301) that *"in the battle of big public ideas, sustainability has won: the task of the coming years is simply to work out the details and to narrow the gap between its theory and practice"*. This quest is can be seen when examining the three pillars of sustainability, which haven't found equal attention (Campbell, 1996; Agyeman, Bullard and Evans, 2002; Cuthill, 2010). The economic and environmental pillars are argued to have found the most attention (see chapter 3.3.). Yet their joint or even development needs to be viewed critically since the imperative of constant economic growth contrasts environmental sustainability (Robbins, Hintz and Moore, 2014).

In light of this research objective, the relationship between the environmental and social dimension is of interest. The social dimension of sustainable development is thereby understood as socially equitable development towards a better quality of life. Agyeman, Bullard and Evans (2002) distinguish between three dimensions when it comes to the links between environmental quality and social equity. Firstly, the authors examined that human inequality is bad for environmental quality. Studies found that countries with more equal income distribution, higher literacy, civil rights and political liberties manage to have better environmental quality. Secondly, people at the bottom of the socio-economic latter must endure more environmental burdens. This situation is worsened by the fact that these parts of civil society are not the cause of environmental degradation. In contrast, the more affluent groups in society practice a high consumption lifestyle, which worsens environmental quality. Also, Campbell (2013:85) raises concerns about *"green bubbles for rich people".* Thereby, environmentalism is paired with economic elites who are wealthy enough to purchase green products and live a greener lifestyle. The third-dimension questions the earlier presented sustainable development definition. It is argued that sustainability requires a greater emphasis on justice and life quality for all. The reason behind this is that *"unless society strives for a greater level of social and economic equity, both within and between nations, the long-term objective of a more sustainable world is unlikely to be secured"* (Agyeman, Bullard and Evans, 2002:78). This

perspective demands a change in resource use and as well as lifestyles. Moreover, it requires to broaden public perception towards the *"unborn generations and unseen others"* (p.78), while changing the current behaviour. Given this shift in perspective is it necessary to review the currently most holistic concept of sustainability, the Sustainable Development Goals.

5.1.1. Sustainable Development Goals

The Sustainable Development Goals (SDG) are the centrepiece of the '2030 Agenda for Sustainable Development', adopted by all member states of the United Nations in September 2015 at the UN Sustainable Development Summit. The 2030 Agenda pledges to be a "*blueprint for peace and prosperity for the people and the planet*" and builds upon long-lasting efforts to eradicate poverty and other deprivations (United Nations, no date b). Besides, the aim is to achieve *"universal peace in larger freedom"* by jointly taking transformative steps to steer the worlds' development towards a sustainable and resilient path (United Nations, 2015).

The 2030 Agenda draws from years of efforts to realize sustainable development, kickstarted in 1992 at the Earth Summit in Rio de Janeiro. At this summit, Agenda 21 was created, emphasizing the joint goal by 178 countries to engage in sustainable development to improve human life and protect the environment. Prior in 2000, at the Millennium Summit, the member states adopted the eight Millennium Development Goals (MDG) to reduce extreme poverty by 2015 (United Nations, no date b). The Sustainable Development Goals are the successor of the MDGs and were introduced at the United Nations Conference on Sustainable Development (Rio +20) in June 2012, again in Rio de Janeiro. More precisely, the summit produced the Resolution 66/228 *"The future we want"* in which the SDG process was launched (United Nations, 2012). Also, the UN High-level Political Forum on Sustainable Development was established in the wake of this Summit and now serves as the review forum for the SDGs. Additionally, the Division for Sustainable Development Goals was created in the United Nations Department of Economic and Social Affairs (UNDESA), which is used as a secretariat to provide support and capacity building for the goals and their respective related thematic issues. It also plays a key role in the evaluation, studies and reviews of arising challenges. Within the 2030 Agenda it is recognized that countries face different challenges and hurdles to the implementation of the diverse SDGs.

There are in total 17 SDGs and 169 targets which cover a wide range of topics, spanning over all three dimensions of sustainable development: economic, social and environmental. The five P's cover the action areas in which the SDGs are aiming to stimulate change, namely People, Planet, Prosperity, Peace and Partnership (United Nations, 2015).

Figure 7 Road to SDG11 by United Nations, no date a

As shown in the problem description the SDG number eleven is the point of departure for this research. This goal states to "*make cities and human settlements inclusive, safe, resilient and sustainable*" (United Nations, 2015). This stand-alone SDG purely focused on cities, demonstrates well the urgency to create sustainable cities for sustainable development of the earth. Moreover, urban issues are recognized in other SDGs as well, underlining the cross-cutting nature of urban development. Figure 7 depicts the pathway to the SGD eleven, however, it has not stopped since then (United Nations, no date a). In 2016, the New Urban Agenda was adopted as the result of

the Habitat III Conference. The focus of the Agenda is to provide national and local guidelines for the development of cities through 2036.

The SDG eleven features seven sub-goals, whereby goal Nr.11.7 is the most relevant to this research *'By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities'* (United Nations, 2015). Additionally, two indicators were developed by the Inter-Agency and Expert Group and agreed upon at the 47th session of the UN Statistical Commission in 2016 (United Nations, 2019a). The two indicators for the SDG 11.7 are firstly 'Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities' and secondly 'Proportion of victims of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months'.

The UN Knowledge Platform also provides a progress update for the respective SDGs. The updated related to SGD 11.7 from 2019 concluded that most cities "*struggled to ensure that their populations have convenient access to open public spaces*", whereby access is defined as within 400m walking distance (United Nations, 2019c). Here it is important to note that access is not defined in the same manner around the world, the EEA recommends access to urban green spaces within a 15 min walking distance, which can be roughly translated to 1000m (Kabisch *et al.*, 2016). Nevertheless, as stated by Kabisch *et al.* (2016) and the United Nations (2019b) this does not mean that there is too little land made available for urban public and green spaces but that it might be rather an issue of availability to the public or distribution, respectively.

The European Union, as an agglomeration of UN member states, has "*committed to implement the SDGs both in its internal and external policies*" (European Commission, 2019b). The EU strives to create a common vision, which is also in line with the overall development of the world when it comes to urban issues. The shared aim is to be prepared for the major urbanization process building up over the coming years. With respect to the SDG number eleven, the previously mentioned New Urban Agenda plays a crucial role. The European Union included it into their legislation. The European Council supports the four priority areas brought forward by the European Commission (Council of the European Union, 2016; European Commission, 2019b). These four areas are

1. *Promoting the social dimension of sustainable urban development through inclusive and save cities*
2. *Promoting green and resilient cities*
3. *Promoting prosperous and innovative cities*
4. *Promoting good urban governance*

Within these priority areas, two more streams of thoughts, presented earlier can be found, namely green cities (urban green infrastructure) and the social dimension of sustainability (urban social sustainability).

5.1.2. Urban Development

The urban sustainability debate has gained traction during the last years, especially since the establishment of sustainable development goal number eleven. This attention is accompanied by a shift in focus from cities being the source of many problems towards an understanding of cities as the major player to resolve and create sustainability agendas (Finco and Nijkamp, 2001, IPCC, 2018).

There are many different takes on urban sustainability agendas and approaches. It is important to note that every city faces its unique challenge due to geographical, demographical, economic, environmental and social circumstances. Kremer, Haase and Haase (2019) presented four common approaches to urban sustainability which can be found in the literature. Firstly, *smart growth* with the focus on a compact city concept, multi-use and dense urban design, secondly, *nature-based solutions* which focus on ecosystem services as well as green infrastructure, thirdly the *low and zero impact* approach which emphasises the role of technological innovation and lastly a concept building on *fairness and equity* accompanied by the emphasis on social justice. This research will be focused on the approach of nature-based solutions since urban green infrastructure is in this line of thought.

Nevertheless, some general planning notes are important to grasp the complex task at hand. The main issue of urban development is the concept of urbanization which is understood to be *"dominated by both population and urban land area expansion, the need to provide new housing developments for more city residents"* (Kabisch and Haase, 2014:129). Another accompanying issue is the difference between continuous and discontinuous urban growth, also called urban sprawl (Lafortezza *et al.*, 2013). From this issue the idea of the compact city arose, which advocates *"high-density, mixed-use urban form"* (Burton, 2001:2). The compact city is argued to have environmental as well as social benefits since it e.g. conserves the countryside and reduces the travel distances to name a few. However, Burton (2001) also found that the concept has a negative impact on access to urban green spaces. Yet, all these decisions are land-use planning choices. And prioritization of either one by urban planners and residents, policymakers or politicians will decide how our future cities will look like.

5.2. Green Infrastructure

Urban Green Space History

Green areas have a long history within the urban environment with diverse and changing purposes. Moreover, their historical development differs per country, respective to the era but also the economic status and political situation.

Examples of 'urban' gardens can be traced back to ancient Egypt, where those served to provide food or places for spiritual and religious activities. However, taken a more direct link to special planning and the urban built environment, the Renaissance and Baroque époque changed the meaning of urban green. It served a representative purpose for castles of the more affluent and ruling class. There was no functional use for the broader society. At the beginning of the 18th century the 'English landscape garden' emerged, opposing the Baroque geometrically planned gardens while embracing the natural landscape. Even though also these gardens were planned they aimed to present the more liberal worldview, which also meant to be open for the public to recreate. Hence public green areas were incorporated within urban areas (Bläser *et al.*, 2012).

During the industrialisation, cities grew rapidly and hence fewer green spaces were present in urban areas. During the 19th century, urban parks and spaces were intentionally created to provide recreational possibilities for urban residents. Urban gardens did not only serve decorative or recreational purposes, but their nature was also functional, as it can be seen in Berlin or other German cities where allotment gardens were encouraged to provide food during war times. There were also visionaries like Ebenezer Howards '*Garden City*', Lebrecht Migge '*Kolonialparken*' or Le Corbusier of '*Ville Contemporaire*', who proposed a radically different set up of cities to foster efficiency and self-sufficiency. Such urban design can be found in German cities like Berlin or Dresden. However, the integration into public policy differed greatly between the cities and a coherent green public space planning was only established after 1945 in Germany (Bläser *et al.*, 2012).

Since the 1970s the culture of usage changed again due to the 68er movement, which demanded "Rasen-Freiheit", hence the right to the use of public green spaces. Another aspect which altered the culture around urban green spaces was the diversifying civil society and their diverting usage demands (Bläser *et al.*, 2012; Kabisch and Haase, 2014). The discussion around the improvement of the living environment in relation to ecology gained traction. The 1990s re-introduced the aspect of integration and participation in urban green areas, aiming to provide a space to meet different cultural groups of civil society but also to improve the aesthetic of the built environment. Thereafter, the discussion developed into the direction of biodiversity, human health to balance the urban development burdens (Botzat, Fischer and Kowarik, 2016).

Urban Green Infrastructure

Infrastructure is traditionally understood as *"the basic systems and services, such as transport and power supplies, that a country or organization uses in order to work effectively"* (Cambridge Dictionary, 2019). Such infrastructure is often described as *grey infrastructure* and in combination with *social infrastructure*, which represents hospitals, schools etc., they constitute our *built infrastructure* (Benedict and McMahon, 2001). Built infrastructure is recognized to be crucial for the persistence of our society. Besides, within urban settlements, this infrastructure is particularly under pressure due to its quick and sometimes uncoordinated growth, as the urban sprawl. Over the last two decades, a new infrastructural term was established, namely *green infrastructure*. Benedict and McMahon (2001) are described as earlier developers of the terminology, followed by scholars in England and lately by the European Union (European Commission, 2013; Lafortezza *et al.*, 2013; Mell *et al.*, 2017). Yet, the idea of green infrastructure is not new, since it was already introduced during the eighteen and early nineteenth century by the landscape architect Frederick Law Olmsted, who recognized the added value of connecting previously isolated green spaces to increase the benefit for people. Moreover, the benefit of connection was also recognized by biologists and ecologist since conservation showed better results when areas were connected rather than fragmented (Benedict and McMahon, 2001). Thus, green infrastructure in contrast to urban green spaces is not an amenity but rather a necessity for land use, its conservation and planning trajectories (Benedict and McMahon, 2001; Matthews, Lo and Byrne, 2015).

Next to the terminology green infrastructure, the term *nature-based solutions* gained tracked in the debate around a greening the city (Haase *et al.*, 2017). Both concepts address the ambition to green the city to improve health benefits, well-being and ecosystem services. Whereas green infrastructure emphasises multifunctionality of spaces and offers a strategic planning approach, nature-based solutions stem from the idea of biomimicry, whereby natural processes are copied to support and

improve ecosystem services in the built environment. Both approaches assume a relationship between their workings and *"the socio-spatial dimension of urban life"* (Haase *et al.*, 2017:42).

Anyway, the focus of this research is placed on the planning approach of green infrastructure and even though urban green infrastructure is not a new term, there is no agreed-upon definition. However, over time key components were identified which mostly overlap. A short review of different key components is provided below.

Two key components which can be found in all descriptions of green infrastructure approaches are *connectivity* and *multifunctionality* (Mell, 2009; Davies and Lafortezza, 2017; Haase *et al.*, 2017; Mattijssen *et al.*, 2017; Slätmo, Nilsson and Turunen, 2019). Another aspect with is often stressed is the *strategic planning* intention of green infrastructure (Mell, 2009; Davies and Lafortezza, 2017; Haase *et al.*, 2017). Moreover, the intention of *integration* of grey and green infrastructure is mentioned, next to the general ambition to *"increase greenery"* (Davies and Lafortezza, 2017; Mattijssen, T.J.M. *et al.*, 2017; Slätmo, Nilsson and Turunen, 2019:1). The social aspect is stressed by the Green Surge project with the principle of *social inclusion* (Mattijssen *et al.*, 2017) and also picked up by Mell (2009) with the element of *access*. Lastly, it is interesting to note that Davies and Lafortezza (2017) emphasise also the *multi-scale* characteristics of green infrastructure, thereby stressing that different spatial levels are integrated into its planning approach.

Hence, there is a vast pool of terminology around green infrastructure. To achieve more clarity Davies and Lafortezza (2017) categorized the terms related to planning approaches and process next to general policy themes. Since their analysis was focused on the European Green Surge project and compliance in green space planning and policy, these categories are adopted in this research. Table 1 presents the respective categorization.

Planning approach	Connectivity, multifunctionality, (grey-green) integration, multi-scale
Planning process	Strategic, inter-transdisciplinary, socially inclusive
Policy themes	biodiversity, ecosystem services, climate change adaptation, green economy, human health, social cohesion

Table 1 Green Infrastructure Categories by Author

With respect to the aim of this study, it is especially relevant to specify the socially inclusive aspect of the planning process. Since no in-depth definition is given in the paper itself, the Green Surge project will be used for a detailed understanding. In the green infrastructure planning guide, social inclusion is defined as *"collaborative and participatory planning - UGI planning aims for collaborative, socially inclusive processes. This means that planning processes are open to all and incorporate the knowledge and needs of diverse parties"* (Mattijssen, T.J.M. *et al.*, 2017:13). The focus is thereby laid not only on equal access but so on the incorporation of different user group's values and needs next to the inclusion of diverse stakeholders' knowledge in planning and design issues.

Awareness to the social dimension of UGI is important since the concept also faces criticism of being a neo-liberal concept, with blindly follows market forces thereby neglecting its impact on socio-spatial separation and so distributing environmental burdens and benefits unequally (Laurent, 2011; Davies and Lafortezza, 2017; Haase *et al.*, 2017; Slätmo, Nilsson and Turunen, 2019). If such a development occurs, it is often coined as eco-gentrification, whereby UGI raises rental prices and living costs in a neighbourhood pushing out former residents in favour for more affluent ones (Kabisch *et al.*, 2016; Haase *et al.*, 2017). Other arising issues are the impact on the cultural identity of an area and its relation with the biodiversity (Kabisch and Haase, 2014; Botzat, Fischer and

Kowarik, 2016). These issues are mentioned in the Green Surge project, yet the evaluation of Davies and Lafortezza (2017) found that different weight is placed on policy themes, with emphasis on health and underrepresentation of themes like the green economy, social cohesion or social justice.

5.2.1. Green Infrastructure Typology

Urban green infrastructure gained increasing attention due to its multi-functional character in the urban environment. It is adaptable to the built environment and hence takes various forms. Therefore, it is important to establish a UGI typology. In general, UGI consists out of hubs and links, whereby hubs function as an anchor for flora and fauna e.g. open spaces and links present connecting elements between the hubs e.g. green corridors (Lafortezza *et al.*, 2013). Wilker (2017:21) presents this in a visual manner below.

Figure 8 Green Infrastructure Scheme
By Wilker,2017, p.21, Abbildung 1

Moreover, urban green infrastructure can be placed vertical and horizontal. This feature is especially useful in densely built cities, yet also presents a limitation since not all benefits can be delivered vertically. Urban green infrastructure consists out of urban green spaces. Those can be owned publicly or privately (Wolch, Byrne and Newell, 2014). Within this study, the focus is placed on publicly owned urban green spaces since those are supported by the investigated European funding mechanism. Yet again, there is no unified typology so that many different elements can belong to a UGI. Such elements can vary from parks, rooftop or community gardens, permeable vegetated surfaces, green walls, urban wetlands, single trees, green alleys to urban forests (Nik Heynen, Perkins and Roy, 2006; Kabisch and Haase, 2014; Wolch, Byrne and Newell, 2014; Haase *et al.*, 2017).

An extensive inventory of urban green spaces was established in the course of the Green Surge project. It comprises 44 elements, which however do not all apply to the urban environment (Cvejić *et al.*, 2015). Those 44 elements were then later clustered by Mattijssen, T.J.M. *et al.* (2017) into eight groups to be more comprehensive for urban planners. These categories are; allotments and community gardens; natural and semi-natural and feral areas; building greens; private, commercial, industrial and institutional green space/ green space connected to grey infrastructure; parks and recreation; agricultural land; riverbank green; blue spaces.

5.2.2. Green Infrastructure Agenda in Europe

The topic of green infrastructure in the European Union gained traction since the year 2011. This occurred in the context of the Biodiversity Strategy and Recourse Efficiency roadmap (European Commission, 2011a, 2011b). The intention behind these documents is to reduce biodiversity loss and

promote sustainable resource use. Green infrastructure was identified as a tool which can contribute to these aims (European Union, 2013). This early engagement of green infrastructure was also focused on territorial cohesion as this concept is understood to embody *"the spatial representation of sustainability"* (Camagni, 2007 in European Environment Agency, 2011). Thereby, the environmental dimension of territorial cohesion is targeted, which is represented strongly by the Natura 2000 network. By emphasising the importance of improved territorial cohesion with the help of green infrastructure, landscape value should be restored and given more attention at the decision-making level. Hence, in May 2013 the European Commission published a communication to the European Parliament, the Council and the European Economic and Social Committee and the Committee of the Regions, in which it laid out the framework for '*Green Infrastructure – Enhancing Europe's Natural Capital*' (European Commission, 2013).

The European Commission published guides to assist authorities and different stakeholders to implement green infrastructure (European Union, 2013). Moreover, many more reports were published by the European Environmental Agency elaborating on green infrastructure and its benefits (European Environment Agency, 2011, 2014, 2015). Also, the project GREEN SURGE (Green Infrastructure and Urban Biodiversity for Sustainable Urban Development and the Green Economy) was initiated in 2013 and ran until 2017 to establish an academic base for green infrastructure planning and implementation. GREEN SURGE was funded under FP7-environment. The most recent applied research happened under EPSON and was named 'GRETA' (Green infrastructure: Enhancing biodiversity ecosystem services for territorial development). This research was concluded in August 2019 and focused on the physical and functional dimensions of green infrastructure. The lasted European document picking up nature-based solutions and hence incorporating urban green infrastructure is the European Green Deal (European Commission, 2019a).

The presented green infrastructure policy demands European Member states to be involved in projects and initiatives of strategic and applied nature, as explained earlier with the operationalisation of the funding priorities. This European strategy is worked into existing legislation and utilizes already present funding mechanisms and policy instruments. This set-up demands a translation to national and sub-national scales and thus an integration into existing planning frameworks (Mell *et al.*, 2017). Hence, implementation of green infrastructure planning varies between the national and sub-national level, resulting in diverted framing of green infrastructure policies and hence different results on the project level (Mell *et al.*, 2017).

Davies and Lafortezza (2017) conducted a survey to understand the influence of different policy levels considered in greenspace planning and policymaking, dependent on five planning families. They found that for the European average, the municipal policy is the most influential aspect. Moreover, Slätmo, Nilsson and Turunen (2019) conducted an online survey with mainly government experts via the EPSON network to find, among other things, that the main responsibility for the development of green infrastructure strategies is situated on the national level whereas the implementation responsibility is set at the local level. Additionally, the European Union's strategy focuses predominately on nature protection and biodiversity and aims to balance the concept of 'people, planet, profit' (Slätmo, Nilsson and Turunen, 2019).

5.2.3. Green Infrastructure in Germany

This research focuses on Germany and hence it is important to examine firstly the general planning structure in Germany to acknowledge how green infrastructure can be deployed and secondly to understand the already developed green infrastructure.

Planning in Germany

Germany is organized after the principle of federalism, which influences the planning structure. There are four planning levels in Germany. Firstly, the federal government, which constitutes the federal building code hence the urban planning law. Secondly, there are 16 federal states (Länder) in Germany, three of them are city-states. These 16 federal states represent the second planning level in Germany. They are actively engaged in the federal legislative process but also have their legislative catalogue. Moreover, they determine spatial and regional planning guidelines and have the authority to enforce e.g. building permits, which is however mostly done through the municipalities. Each federal state has different administrative districts, under which then the third layer is situated. The third layer also called regions, is separated into two columns due to varying organizational structures namely the urban commune and the case whereby the district and commune are separate entities (Bundesinstitut für Bau-Stadt und Raumforschung, 2016; Buchholz, 2017).

In this study, only one organizational structure will be of interest, the urban commune. The urban commune presents the fourth planning level and can also be described with the term municipality. At this level, the authority for urban land use planning is situated (Buchholz, 2017).

The Germany planning systems operates after several principles which need to be upheld according to the Bundesinstitut für Bau-Stadt und Raumforschung (2016). A principle which is overlapping with the European approach is the one of *subsidiarity*. It states that actions should be executed at the lowest level possible and hence gives cities a greater capacity to act. This is also in line with the *municipal planning authority* principle which is constitutionally protected and enables cities to choose their development path. Nevertheless, another important principle is the *multi-stakeholder approach*, which demands the involvement of civil society and business at all levels. The goal is to design processes and objectives in society as a whole, which is acknowledged as a prerequisite for sustainable urban development. This also relates to another principle namely, *achieving fair balance.* This principle cares about the transparency between the involved actors and their equal participation in processes. Yet, local authorities can favour interests in case their engagement is required to pursue balance. The last principle is the *countervailing of influence*, thereby aiming to balance out the hierarchical top-down objective setting by the federal state and states towards municipalities. The aim is to include experiences and objectives by municipalities to create realistic objectives, which all can agree upon.

A guiding document for sustainable urban development is the Leipzig Charta (Bundesministerium für Umwelt Naturschutz Bau und Reaktorsicherheit, 2007). This document targets sustainable European city development and was created during the German EU Council presidency. It highlights the role of cities for a healthy economy, culture and society in the future. Furthermore, it states that a common European strategy is required to make a sustainable urban future reality. Thereby, it is important to stress that all three pillars of sustainable development are supported. Also, possible conflicts are highlighted between economic development and social equality in relation to environmental conditions. The European building ministers, who signed the Charta, also stress that a holistic and strategic approach is required to tackle the challenges and welcome the importance of cities in the European territorial agenda. Thus, they are demanding to overcome the narrow understanding of a

city in favour of a wider city-region understanding. Lastly, it is important to mention that the Leipzig Charta explicitly points out that an integrated urban development is required to reach the European sustainable development goals.

The Leipzig Charta on the European level can only be as strong as it is in its member states. In Germany, the corresponding commitment is the *National Urban Development Policy* (Bundesministerium für Verkehr Bau und Stadtentwicklung, 2012). This policy outlines the mindset for urban development as a joint undertaking by many individuals shaping the atmosphere of a city with their backgrounds and cultures. It points out the involved stakeholders, thereby emphasising the role of civil society and its engagement. It stresses to include all civil society groups. The policy also sketches out the development challenges and the necessity for an integrated approach to improve the overall life quality of urban areas.

In the light of the New Urban Agenda, presented by the United Nations in 2017 (United Nations (Habitat III), 2017) three implementation challenges in Germany are identified. Firstly, the demographic change which takes up the issue of social sustainability, addressing the change in population, city- and neighbourhood structures or the sense of place. The second challenge is placed in the energy and climate policy sector focusing on the changing climate in cities and the need for resilience as well as a required change in e.g. energy efficiency or transport. Lastly, economic restructuring is identified in the wake of the smart city and changing competitiveness of cities and regions.

Urban Green Infrastructure Planning in Germany

Green infrastructure cannot be boiled down to one clear definition as shown earlier, rather there are varying approaches and definitions. The intention behind this broad understanding is to facilitate the adaptation in many different policy areas.

Yet, given the earlier described planning structure in Germany, there is a clear legislative frame in which green infrastructure can be situated. Two laws are framing urban green infrastructure. Firstly, the Town and Country Planning Code (Baugesetzbuch or BauGB) which states in §1 that area development planning (Bauleitplanung) has the aim to guide any form of use in the municipality. It is the most important planning tool for urban development in Germany. Area development planning is municipal planning authority. It is subdivided into two aspects. Firstly, the Flächennutzungsplan (§§ 5-7 BauGB) and the Bebauungsplan (§§ 8-10 BauGB). The former entails the entire municipal area and has a preliminary nature whereas the latter has a binding character and only covers a distinct area of the municipality.

However, area development planning needs to respect and adapt to the Raumordnung (§1 Abs. 4 BauGB, Anpassungspflicht). Raumordnung requires the balancing of different usage demands and if necessary mediate possible conflicts. Each areal unit in Germany is required to make a Raumordnung respectively the federal area, federal state area and regions. There is one from the federal government and one from each federal state, which is required to adapt to the former one. Also, a sustainable Raumordnung is demanded implying the harmonization of social and economic needs in accordance with the ecological function of the area (§2, Abs. 2 ROG).

The §1 BauGB places high requirements on the area development planning. For example, in § 1 Abs. 6 Nr. 7 BauGB it requires to be aware of environmental protection measures in terms of nature protection and landscape management. Therefore, the area development planning is often jointly developed with landscape planning (Landschaftsplanung), grounded in §§ 8-12 BNatSchG. Hence,

the second important law is the federal law of nature protection (Bundesnaturschutzgesetz; BNatSchG). This law entails in §9 landscape planning and the respective requirements for nature protection and landscape management. For example, Natura 2000 is taken up under §9, Abs. 4d BNatSchG. §11 BNatSchG introduces the Grünordnungsplan, which determines which plants might be planted or introduces façade or roof green. It is, however, not strictly required and always follows federal state law in its procedure and jurisdiction.

An analysis of the impact of the German planning structure on green infrastructure has been done by Mell *et al.* (2017). Within their paper, a three-stage approach is presented as a framework to examine the development and deployment of green infrastructure in Germany and the UK. The model has been adopted from Alexander and Faludi (1989) and Carneiro (2013) and consists of stage one with the focus on *scoping and development* implying the establishment of responsibilities between the planning levels and a coherent and continuous planning context and procedures and stage two in which *implementation* is key and its consistency between the structures and uptake of the established main principles and stage three in which the *evaluation* of the set-out approaches are examined as well as the outcomes and if necessary fed back to stage one and two are given for improvement (Mell *et al.*, 2017:338-339).

Based on Mell *et al.*, (2017) a short recap of the German case is provided to present the rationale behind green infrastructure policy, planning and implementation in Germany. Firstly, it is important to recognize that the re-unification, which happened in 1990, impacted East and West municipalities strongly and demanded a reorganization of planning policies. Next to this, an identified trend in the German planning system are informal approaches in forms of e.g. masterplans for regions. These informal plans often complement formal plans and are associated with a "*lack of flexibility and responsiveness of formal planning structures"* (p.339). As established the German planning system is coined by its decentralized and multi-layered characteristics, each with its clearly defined responsibilities. Green infrastructure is situated in the sphere of landscape planning hence is a sectoral planning branch, which is yet also promoted outside of its sector.

Green infrastructure planning in Germany shows rationality and coherence at the federal level on which all other levels can build on. Also, there is a strong discursive process between the levels in Germany. Yet, due to the principle of subsidiarity, there is less consistency when it comes to a coordinated delivery on green infrastructure approaches. Here, "experimental regionalism" takes up an important role by developing informal approaches along with diverse partnerships to take up more practical implementation and increase efficiency. Thus Mell *et al.* (2017) conclude that green infrastructure planning in Germany is predominantly located in stage one and two, whereby regional experimentation and local implementation differ due to the federal structure. Furthermore, a transition from stage one to two is observed but a proper engagement with stage three cannot yet be found. The rather static nature of the German planning system and its great scope to voice discontent hinders the development beyond the initial development stage.

6. Chapter Six: Results

The results are divided into three parts. The parts are devoted to the European, German and city level. Each part firstly identifies the discourse(s) supporting or opposing the case for urban green infrastructure. Then highlighting the different storylines making up the discourse. The relevant storyline(s) are later analysed through the conceptual lens of urban green justice (see Chapter 3.5). The aim is to explore the awareness for social implications of urban green infrastructure.

All mentioned discourses are identified by the author based on a limited number of documents and interviews. The same goes for the storylines. It is acknowledged that there might be more or more differentiated stories to tell, yet for this analysis, choices were made. These choices imply that some storylines are agglomerated, and not presented in full detail. Consequently, no claim of completeness is made, and the findings are presented as an explorative rather than conclusive investigation.

6.1. Result I: European Union

Sources

The European discourse on urban green infrastructure is explored with the help of four reference points. Three of them are documents and one is an interview with Steffano Martinelli from the European Economic and Social Committee. The first document is the *Communication from the commission to the European Parliament, the council, the European economic and social committee and the committee of the regions Green Infrastructure (GI) — Enhancing Europe's Natural Capital - COM (2013) 249 final*. It introduced the topic in 2013 to the European Community and sparked further research and comments on this topic. The next two documents are *opinions* from the European Economic and Social Committee (EESC) and the Committee of the Regions (CoR) (see Annex 2). In these documents, the respective European Institution comments on the Communication from the European Commission. Their perception on the topic is given along with approval and criticism towards policy areas, interventions or missing issues.

Discourse

On the European level, one dominant discourse can be identified. This discourse acknowledges urban green infrastructure as a concept which is a multifunctional *tool* to promote mostly green but also blue elements within cities while taking on all three corners of the sustainable development triangle. Hence, it is recognized as a *mean* and not necessarily an end. The idea of a multifunctional nature of green infrastructure is supported by its embedding into three major policy domains of the European Union namely Regional Policy, Climate Change and Disaster Management and Natural Capital. Hence, the constructed narrative around green infrastructure is broad and aimed to fit into diverse situational conditions.

The dominant 'multifunctional discourse' on the European level is fed with several storylines. The first storyline is deployed to separate this discourse from the discourse of Natura 2000. The communication of the European Commission states that Natura 2000 is an important *backbone* yet the opinion of the EESC declares that green infrastructure should be separated from it.

"In contrast to Natura 2000, the promotion of green infrastructure is not a legal instrument […] it is not the objective of the green infrastructure initiative to create an additional nature protection network alongside Natura 2000" (Opinion of the EESC, p. C67/154)

The narrative is created that urban green infrastructure adds to the man-made environment and its incorporation into the direct living environment is of great value to societies. The added-value is created by acknowledging the diverse eco-system services, which are provided by urban green infrastructure. By calling Natura 2000, the backbone on the one hand and the other hand confine from it, this storyline aims to present a different governance approach to it. It stresses the importance of it but also leaves more room for its member states to establish urban green infrastructure in their style. Natura 2000 is a top-down approach whereas UGI is more situated on the national state or even city level. This clear distinction can also be ascribed to creating politically separated fields of actions. So, even though the two policies are identical in their names, political stewardship is divided between different administrative entities.

The second storyline addresses the interconnected nature of the sustainable development triangle. The European Commission argues that urban green infrastructure is supportive of all three corners in an equal manner. The *opinions* of the EESC and CoR take up this narrative and add to it as well. Also, the Deputy Head of Cabinet from the EESC, who is in charge of sustainable development argues that all three goals are required to be pushed together since they are interdependent of each other (Interview, Martinelli, 2020). Still, three separate sub-storylines are developed to showcase for each element the relevant positive benefits.

The first sub-storyline evolves around the ecological benefits of urban green infrastructure. This relates to the policy domain of natural capital and hence topics like agriculture or forestry. Thereby, the terminology of *ecosystem services* is deployed to recall the issues at stake. Especially *regulatory* ecosystems are found to be useful in the city. This relates to the ability of green infrastructure, compared to grey infrastructure, to combat heat stress and ease out heavy rain events. It is identified as either a good complementary or even subsidiary element since it can save on cost and deploys several benefits. Fewer costs and benefits are mainly related to the policy domain of Climate Change and Disaster Management. It is also linked to the overall durability of buildings. Furthermore, in the *opinion* of the Committee of the Regions, the term *no net loss* is utilized to define the requirements more precisely in relation to biodiversity. Thus, this storyline especially centres around regulatory ecosystem services in the urban environment and biodiversity of urban green spaces.

The second sub-storyline addresses the possible socio-economic benefits of green infrastructure by creating local job opportunities and new engagements for small and medium enterprises. This storyline is carried in the initial *communication* from the EC as well as in the *opinions* from the EESC and CoR. The last sub-storyline concerns the social or societal benefits of green infrastructure development. A wide variety of societal benefits are emphasized addressing e.g. health, social cohesion and community spirit. This storyline is anchored in the Regional Policy domain. The analysis of this storyline will happen under the header of urban green justice.

Two more storylines are identified in the multifunctional discourse on the European level. Both storylines focus on the governance roles of the European Union vis-à-vis the member state.

The first aspect concerns the subject of subsidiarity. It carries the narrative that the main responsibility of urban green infrastructure actions is located at the member state level and even at the regional and local level. Picking up the earlier stressed responsibility located at the lower levels of government as the nature of UGI policy. Moreover, the respective bodies for infrastructure and sectoral policies play a crucial role in the deployment of urban green infrastructure. Nevertheless, it is also stressed that a certain level of consistency in actions should be present to ensure the potential

of the initiatives. The initial *communication* from the European Commission stresses that this policy should, therefore, provide an *enabling framework.* The European Union clearly outlines its function and its demands towards the member states. Only European green infrastructure projects will be centrally supervised. For all others, the European Union aims to be an enabling partner and a connector.

The next aspect of the European governance storyline focuses on the development of knowledge and database. Hence, it addresses the need to collect reliable spatial data and to share knowledge on how to do so. This encompasses not only data to develop green infrastructure but also to evaluate its benefits. Furthermore, the scientific community has been invited to participate in knowledge creation and data collection efforts to ensure effective implementation. The European Union thereby offers to be a central player in terms of data and knowledge management without interfering too much into national activities. This honours the earlier described principle of subsidiarity.

DISCOURSE	STORYLINES	
MULTIFUNCTIONAL DISCOURSE	1. It is not Natura 2000	Valuation of eco-system services to the urban society
	2. Interconnected corners a. Environmental b. Economic c. Societal	Sustainable Development demands the joint development of all three corners since interdependent benefits are present – yet individual storylines are developed
	3. European Governance	
	a. Subsidiarity yes but be consistent	The implementation responsibility lies with the member states, yet some consistency is required to develop GI full potential
	b. Shared data & knowledge base	Exchange in data and monitoring, as well as evaluation techniques, are crucial for effective implementation and evaluation of initiatives

Table 2 European Multifunctional Discourse by Author

<u>*Urban Green Justice*</u>

This research focuses on the social implication of urban green infrastructure policy. Thus, an in-depth analysis is provided. The most interesting aspect of the *European multifunctional discourse* is the societal sub-storyline (2c, Table 2). This storyline is predominantly anchored in the domain of Regional Policy. The storylines stressed the importance of social aspects for urban green infrastructure development. In the *opinion* of the CoR, it is recognized that green infrastructure is based on *ecosystems and the associated human cultures, which are both extremely diverse for biological and historical reasons (p. C 356/46)*. Thus, the social storyline carries the narrative that social and ecological changes need to happen hand in hand. This perspective is painted in light of a mutual and positive influencing relationship. This includes a positive impact on the economic dimension of sustainable development. The idea of diverse benefits is promoted by this storyline. According to the *communication* from the European Commission, these benefits include *(p.3)*:

- *A greater sense of community*
- *Strengthened link with voluntary actions undertaken by civil society*
- *Combats social exclusion and isolation*
- *Benefits for individuals and the community in terms of*
    - *Physically*
    - *Psychologically*
    - *Emotionally*
    - *Socio-economically*
- *Connecting rural and urban areas*
- *Creates an appealing place to work and live*
- *Urban food production*
    - *Education*
    - *Tackles the disconnect between production and consumption and increases the perceived value*
- *Strengthens regional and urban development*
    - *Including maintaining or creating jobs*

Hence, the societal storyline of urban green infrastructure development is utilized as a *short-hand* for several complex societal benefits.

Given the assumption of a beneficial relationship between social and green outcomes due to urban green infrastructure, the presented theoretical lens is used to evaluate the awareness of its social implications.

The first facet which will be examined is participatory justice with its two aspects of engaged governance and recognition-based justice. In total *engaged governance* received the most codes in the analysis. There is a strong call for partnership and multi-level governance, based on a broad variety of actors. Engaged governance is promoted in development as well as in the implementation of urban green infrastructure. Thus, cooperation is not only demanded between governmental and civic society, but it is also regarded as a necessity for success since social acceptance determines the durability of urban green infrastructure. This aspect is also related to educational activities. Educational activities are especially centred around urban gardening projects or biodiversity awareness underlining the importance of provisioning ecosystem services. Furthermore, participation is recognized as a central element in this storyline with the characteristics of *early*, *shaping* and *active*. The participative aspect is grounded in the environmental right provided by the Aarhus Convention of Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters. Interestingly, this Aarhus Convention is not mentioned in the initial *communication* from the European Commission but taken up by the EESC in their *opinion* on the communication. Another noteworthy aspect is that when engaging in participative planning processes, it is recognized that there are not only *win-win* situations according to the EESC. For some stakeholders, it can even mean disadvantages since conflicting issues regarding land uses are present.

The next aspect of participative justice is *recognition-based justice*. There is increased awareness of diverting social problems in the European Union. This can be seen at the slogan *no one is left behind* by the von der Leyen Commission. This slogan needs to be understood in the context of the implementation of the sustainable development goals. It also includes the sustainable development goal eleven, which is the reference point for this research. Within the social storyline, concerning

urban green infrastructure, there is an emphasis on the participation of those who are directly involved in spatial planning and land use management next to the local communities. As earlier already recognized, urban green infrastructure is impacted by the diverse cultures which can be found, yet this aspect is not more specified. Three distinct civil society groups are mentioned namely the young, old and disadvantaged when it comes to the design of urban green spaces, which should adhere to the needs of all groups. Moreover, the narrative is established that there will be competing but legitimate interests of different stakeholders which require the establishment of conflict resulting mechanisms.

Turning to the next facet of *distributional justice* with the aspect of allocation and spatial justice. *Allocation justice* was only coded two times in the documents and interview on the European level. Yet, if mentioned, environmental burdens and benefits were both mentioned in relation to a fair distribution. Moreover, the element of access was taken up, especially in non-motorized form. *Spatial justice* was only coded once and needs to be added with precaution since the only reference was made quickly with the formulation of *well-designed parks* by the EESC.

The next perspective of the theoretical lens concerns intergenerational justice with the aspect of *time*. The sustainable development goals are set out to be reached until 2030, thus clearly taking a long-term perspective. Henceforth, the sustainable developments goals are perceived as a good pathway over time to achieve social and environmental justice on the European level (Interview, Martinelli, 2020). Concerning urban green infrastructure, it is recognized that there is the need to act now due to the increasing costs of measures in the future, given the currently occurring damage. Moreover, the temporal aspect of the social storyline is described as a *revolution*. Hence, the pathway might produce differences in the long and short run. In the short run, there might be people that suffer due to the impacts whereas in the long run relief for all is aspired. Therefore, implementation is crucial. Acknowledging this conflicting impact urban green infrastructure policy can have over time, the *opinion* of the Committee of the Regions calls for the inclusion of urban green infrastructure into the Directive 2001/42/EC, which assesses the effects of plans and programs on the environment.

Hence, there is awareness for the intergenerational aspect of justice. Moreover, it is recognized that the impacts of urban green infrastructure policy might not be visible directly and hence a later and periodically review is necessary.

Intragenerational Justice	
Engaged governance	*Early, active, shaping participation; multi-stakeholder process; engaged governance as a success factor for UGI development & implementation*
Recognition-based justice	*Young, old, disadvantaged; affected local communities; legitimate competing interests of stakeholders*
Allocation justice	*Access element of UGI in a non-motorized manner*
Spatial justice	*"well-designed parks"*

Table 3 European Intragenerational urban green justice storyline by Author

Intergenerational Justice	
Time	*SDG as a pathway; quick action is required due to increasing costs; review overtime to balance possible conflicting impacts, which are visible in the long run*

Table 4 European Intergenerational urban green justice storyline by Author

6.2. Result II: Germany & NRW

Sources

The discourse(s) around urban green infrastructure in Germany and North-Rhine Westphalia is examined utilizing three documents and five interviews. Two documents originate from the federal ministry for the Environment, Nature Conservation and Nuclear Safety. These documents are *Masterplan Stadtnatur Maßnhamenprogramm der Bundesregierung für eine lebendige Stadt* [9] and *Weißbuch Stadtgrün Grün in der Stadt – Für eine lebenswerte Zukunft*[10]. The latter proceeds the former as a white book containing suggestions and procedures based on the expertise of several federal institutes and federal offices. Hence, the former is the implementation of the white book based on the coalition agreement of the 19th legislative period. The third document, *Urbanes Grün – Konzepte und Instrumente Leitfaden für Planerinnen und Planer*[11] is published by the Ministerium für Bauen, Wohnen, Stadtentwicklung und Verkehr des Landes NRW and provides a guideline for city planners in North-Rhine Westfalia.

Additionally, the Städtebauförderung (SBF) will be examined since it is recognized to be a shaping funding element on the German level. This is done with the help of the administrative agreements, which are signed every year between the federal government and federal states. Additionally, the concept of *doppelte Innenentwicklung* has been identified as an important concept. It is examined with the help of the document *Doppelte Innenentwicklung – Perspektiven für das urbane Grün. Empfehlungen für Kommunen*[12] by the Bundesamt für Naturschutz (no date).

The interviews are spread over the two respective levels. Thereby a broad view upon the topic is provided. The overview of interviewees can be found in Annex 1.

Two discourses

On the German level, two discourses are identified. The first discourse is clustered around the language in use of *Stadtnatur/Stadtgrün.* Even though this discourse is not dominant, it is an important *language in use*. It structurally differs from the green infrastructure discourse. That is why it is important and interesting to examine. The second discourse builds up around the language in use of *urban green infrastructure.* The striking thing about the two discourses is that they are approaching each other in terms of their language in use via the funding mechanisms of EFRE and SBF. They are sometimes even used jointly or as a sub-aspect of one another.

Discourse "Stadtnatur"

The discourse around *Stadtnatur* takes up the multifunctionality discourse from the European Union. It stresses the added value of green in the city in various sectors like life quality, health, recreation, exercise and nature experience. Hence, it takes up the notion of multifunctionality of public green spaces. It spans, as proposed by the European Commission, over the three corners of the sustainable development triangle.

Yet, this discourse is fuelled by the storyline centred around the notion of the quantity of green areas. These fulfil multiple functions like recreation, health or social activities. Hence, the importance lies in the quantitative improvement of green areas in the city and not necessarily in the systematic arrangement of such. Thus, there is not a categorical understanding of *Stadtnatur* as a system. The

[9] Masterplan Stadtnatur - Federal government's program of measures for a lively city
[10] Whitebook Stadtgrün – Green in the city for a lively future
[11] Urban green - concepts and instruments Guidelines for planners
[12] Double interior development - perspectives for urban green. Recommendations for municipalities

storyline rather concludes that green infrastructure will be the end product and is not the required planning tool or mentality.

A fellow storyline supports this view by stating that the terminology of infrastructure carries a notion, which is too technical and hence does not live up to the idea of *Stadtnatur*. A distinction is wished in terms of value perception between urban green and other infrastructural elements like water or built infrastructure. Moreover, Stadtnatur via Lanschaftsplanung[13] und Grünordnungspläne[14] have already established norms in the BauGB. A change in terminology is rejected. Furthermore, the idea is already present in the Städtebauförderung and therefore an extra impulse is not necessarily seen as needed. The topic of Städtebauförderung will be later explored in greater detail since it plays an important role in the harmonization of the two discourses. Still, within this discourse, there is the utilization of the terminology of urban green infrastructure. It is predominantly used to describe the connection between biotopes or mobility-related aspects. Hence, in areas where an infrastructural understanding is present anyway like Natura 2000 (biotopes) or transport infrastructure.

DISCOURSE	STORYLINES	
STADTNATUR	1. Multifunctionality	Stadtnatur as a broad field of operation benefiting all three corners of the sustainable development triangle
	2. Quantity	The amount of green is promoted or the connection of specific green areas, yet there is not a systematic development.
	3. Non-technical Quality	Aims for a difference in value perception

Table 5 German Stadtnatur Discourse by Author

This discourse is still formative even though it loses its dominance. It rather shimmers through when analysing older documents in which the concept of green infrastructure is its infancy. A good example of this is the document *Urbanes Grün – Konzepte und Instrumente Leitfaden für Planerinnen und Planer (2014).* Green Infrastructure is here recognized as a sphere of activity. It includes allotments, sports areas and graveyards, which are predominantly meant to be connected thereby supporting the green infrastructure idea. Yet, it is focused on a limited typology of urban green and solely their connection in the cities required context.

Discourse "Urban Green Infrastructure"

In contrast, the discourse around *urban green infrastructure* stresses the need for a systematic approach. The discourse can be viewed as shaping even though it is not yet fully bloomed. It builds on several storylines, which spread over a wide variety of topics and areas of activities.
It feeds especially from the storyline that green in the city needs to be viewed in a technical and even network-like manner, similar to grey (e.g. streets, pipes) or blue infrastructure (e.g. waterways). It aims to create a narrative that it has the significance, and thus the needs of maintenance and investment, such as grey and blue infrastructure. The focus is placed on the functionality of the entire system and not so much on the multifunctionality of each individual area. As one respondent

[13] Landscape planning
[14] Structural greening plans

from the Umweltministerium NRW describes it as *"more than the sum of its parts"* to stress its core characteristics as a system (Wilker, Interview, 2020).

This *technical quality* is recognized as the core characteristic of urban green infrastructure, which is in line with the earlier done research upon the concept and the underlying idea. It resembles the planning approach of connectivity and planning process as strategic (see table 1). However, this technical notion is not yet fully accepted. Contradicting notions are made when it comes to the relationship between Stadtnatur and urban green infrastructure. One the one hand the narrative is established that they are synonymous and on the other hand their disparity is stressed. The difference is seen mainly in the systematic approach of it and the resulting planning practice.

The urban green infrastructure discourse is fed by several more storylines, spreading over a wide variety of issues. It takes up storylines from the European discourse. Each storyline will be presented and tested on its similarity to the European storyline. Again, the social storyline elements will be examined later on under the header *urban green justice* with the help of the earlier constructed theoretical lens.

Multifunctionality

The storyline of *multifunctionality* is fully adopted from the European discourse. All three corners of the sustainable development triangle are discussed. There is an understanding of the need to connect the three corners to create synergies and hence create added-value for cities and their residences. The three corners are also approached and discussed in greater detail separately, same as on the European level. Firstly, the ecological aspect is seen in terms of biodiversity and ecosystem services like fresh air corridors. There is a strong argumentative structure for climate adaptation measures in case of heavy rain events or hot summers. Thus, the regulatory aspect of ecosystem services is taken up again. Urban green infrastructure on buildings plays a central role. Again, it is regarded as a good substitute or complementary element to grey infrastructure within cities. An expert from the BBSR describes it as a *dritte Haut*[15], which is necessary to include in our thinking to protect our buildings from climatic changes or extreme weather events (Dr. Fischer, Interview, 2020). Even though, there is still room for improvement it is already possible to depict urban green infrastructure on buildings in Germany. Such prediction can be made in the context of the Bewertungssystem nachhaltiges Bauen[16] (BNB) and more precisely in the BNB Außenanlagen[17].

In the economic corner, urban green infrastructure is regarded as a cheaper solution to climate adaptation measures than grey infrastructure solutions. It can be set-up in a more decentral manner hence adapting better to the situations at hand. Nevertheless, it is recognized as a costly investment which requires appropriate support by the government. Furthermore, urban green infrastructure is also said to create local jobs. These jobs are directly related to the maintenance and care of urban green infrastructure elements. Thus, a newly educated workforce is required and is aimed to be trained. However, as the expert from the BBSR remarked difficulties arise since gardening companies, which install new green infrastructure, especially on buildings, do not necessarily receive the (follow-up) maintenance job (Dr. Fischer, Interview, 2020). This often makes it unattractive to innovate in urban green infrastructure for private companies. Also, building sustainable houses increases construction costs, which is not generally perceived as something favourable. Yet, the

[15] Thrid skin
[16] Sustainable building rating system
[17] Outside facilities

perspective matters a lot. Costlier buildings now will often have reduced costs over their life cycle. This thought, however, still needs to be mainstreamed.

Another crucial aspect is the maintenance of urban green infrastructure elements. Horizontal and vertical urban green infrastructure elements can only deploy any beneficial ecosystem service if they are well taken care of. This is a rather challenging task because it connects with economic, social and climate change issues. It needs to be acknowledged that the functional part of urban green infrastructures' life-cycle is the costliest too. Hence, municipalities might often receive money for urban green infrastructure development yet not necessarily an increase in their yearly budget to take care of them. Climatic issues also put pressure on urban green infrastructure when it is most needed. For example, green roofs which should ease urban temperatures also experience stress heat and need smart care in these times. Germany addresses this issue with research on an *intelligent green roof* at the TH Bingen. Here new planning and management practices are required to maintain the positive benefits of urban green infrastructure not just socially but also economically.

Governance

The next storyline resembles the European one of *governance*. Germany is a federal country and the principle of subsidiarity is important. The planning authority always lies with the municipalities when it comes to urban green elements. Thus, the same as the European Union does for its member states, the federal government in Germany aims to provide an enabling framework for its federal states. It fills this enabling frame with guidelines like the *Masterplan Stadtnatur* and supports topic related research in its federal offices and institutions. Moreover, it initiates model projects to explore new possible urban green elements, their related benefits and embedding into the legislative frame. However, the federal states also have the power to initiate model projects or provide different enabling frames. This depends on the legislative frame like the Raumordnung and the decision of the federal state minister, who is responsible for the issue. Furthermore, district councils (may) take up the task differently so that, depending on the employee's, different perceptions are present. This impacts the possible development path as well as the applied planning opportunities and practices. Generally, the communication between the different levels, departments and employees is found to be crucial to foster urban green development. The topic is (mostly) recognized to be an interdisciplinary one whereby integrated thinking and a joint approach is needed. Yet, this still seems to be a challenge, based on the interviews. Another required development is the cooperation of private and public property. This implies a shift but also new alliances between public and private owners of urban green infrastructure elements.

Doppelte Innenentwicklung – spatial development concept

The next storyline addresses the tactic of future urban development. In Germany, the concept of *doppelte Innenentwicklung* is dominant. This resembles the idea of the earlier introduced compact city concept. Shortening distances and integrating smart mix-used urban areas is regarded as a good approach to increase life quality, decrease costs and to adhere to the goal of sustainable development in terms of reduced land utilization. Hence, the language in use *doppelte Innenentwicklung* is utilized as a short-hand for a bulk of urban development ideas related to urban green areas. The Bundesamt für Naturschutz (no date) developed the report called *Doppelte Innenentwicklung – Perspectiven für das urban Grün Empfehlungen für Kommunen*. This document is also used as the official reference in the *Masterplan Stadtnatur.* Moreover, it is in line with the underlying idea from the Leipzig Charta (Bundesministerium für Umwelt Naturschutz Bau und Reaktorsicherheit, 2007).

The concept argues for urban development within the city rather than outside the city to prevent leap-frog developments. It states that the inner-city development needs to occur in a smart and integrated manner when it comes to green and built development. It argues to find synergies and to acknowledge the importance of green areas within cities for life quality and durability. The topics of energy preservation, mobility and regulating ecosystem services are emphasized. The necessity of an integrated action plan is stated to develop urban development strategically taking into account all relevant aspects. Still, it is stressed that each city faces its unique challenges and that there is no one correct path. Cities must assess their demographic development, spatial circumstances, existing and future development opportunities. Besides, it is emphasised that political support is crucial. This aspect was confirmed throughout the interviews.

To assess future development opportunities there is a call for proper data collection to develop oversight of all urban areas which are suitable for development. However, it is not yet possible to measure detailed how many green areas are developed and how they contribute to climate adaptation in the cities. There are currently research projects running at the federal state and the federal government level, executed by the federal office BBSR.

The concept in combination with the European emphasis is greatly welcomed since there are fears that the development of urban green would lose out against many other pressing urban issues like residential property development. Hence, it is appreciated that an argumentative structure is provided by the European Union and the German federal government, which emphasises the value of urban green. But also, there is room for improvement, concerning the spread of the first storyline and its related planning practices.

Legislative framework

The next storyline concerns the *legislative framework* for urban green elements. This aspect is also taken up by the *doppelte Innenentwicklung*. There is awareness in Germany that in order to establish proper urban green or urban green infrastructure it needs to be covered by the law. Firstly, there are voices in the report from the Bundesamt für Naturschutz (no date) that green areas and green infrastructure needs to be stronger recognized in the Flächennutzungsplan (§§ 5-7 BauGB) with e.g. a conservation requirement or in the Bebaungsplan (§§ 8-10 BauGB), as the second instrument in area development planning. Moreover, it is suggested to include it into the Landschaftsplanung (§§8-12 BNatSchG). Yet a challenge, which arises, is the diverting laws regarding the Landschaftsplanung. Hence, depending on the federal state stricter or weaker laws can be in place protecting and planning green infrastructure differently. Even more interesting is the new legislative push which originates in the *Masterplan Stadtnatur.* There is an attempt to evaluate if too little green or insufficient reachability of public green is a städtebaulicher Misstand[18] (§136 BauGB). This aspect includes an appropriate provision of life quality and social demands based on mixed usage, traffic or vacant areas. But also, the appropriate adaptation to climatic changes. Secondly, it is also tested if this otherwise constitutes a städtebaulichen Funktionsverlust [19](§ 171a BauGB). This implies that there is not an appropriate adaptation to either climatic or residential property demands. It stresses the general improvement of the environment and vacant areas in an appropriate use for climate adaptation measures.

[18] Urbanistic shortcoming
[19] Urbanistic loss of function

DISCOURSE	STORYLINE	
URBAN GREEN INFRASTRUCTURE	1. Technical Quality	Systematic understanding, which aims for a value perception at the same level as grey infrastructure
	2. Multifunctionality a. Environmental b. Economic c. Societal	2a Regulation ecosystem services especially with UGI on buildings 2b new workforce, cheaper measure for climate adaptation measures 2c see urban green justice
	3. Governance a. Subsidiarity b. Shared Data & Knowledge Communication	3a Planning authorities lies with the municipalities – federal government provides an enabling frame 3b Support for topic-related research through federal offices or research institutions – initiation of model projects Communication between the levels, departments and employees is crucial – the establishment of a shared understanding
	4. Doppelte Innenentwicklung	Short-hand Smart and joint development of urban and green development within the city Welcomed as an argumentative ground
	5. Legislative Frame	Integration into legislative frames (§§5-10 BauGB & §§8-12 BNatSchG Appropriate acknowledgement of grievances (§136 & § 171a BauGB)

Table 6 German green infrastructure Discourse by Author

Städtebauföderung

The alignment process of the discourses is fostered by two main elements. Namely the European funding mechanisms EFRE and the German Städtebauförderung. The first process is the earlier described EFRE mechanism with its explicit funding for green infrastructure projects. The detailed explanation can be found in chapter 1.4.

However, on the German level, an important driver for the uptake of the notion of urban green infrastructure is the Städtebauförderung. This program is a cooperation of the federal government and federal states of Germany. Since 1971 it provides financial aids to municipalities and cities to reinvent and develop sustainable for the future. The financial aids are always supported by financial means of the municipality or federal state. The prior aim of this financial support is to strengthen German cities and municipalities as lively economic hubs and qualitative places of residence. It especially aims to create a level playing field when it comes to social shortcomings or urban development. Each year the federal government and the federal states agree on an administrative

agreement (Verwaltungsvereinbarung) which presents the total funding budget as well as the funding parameters and programs.

In light of this research, the administrative agreement is very interesting to look at. Urban green infrastructure is utilized as a language in use since 2018 within the program of *Zukunft Stadtgrün*, which is described in Article nine, and was continued in 2019 in the same program (Bundesministerium des Inneren für Bau und Heimat, 2018, 2019). Article nine takes up the first storyline of urban green infrastructure on the German level by stating that the program especially funds

"…Maßnahmen zur Verbesserung der urbanen grünen Infrastruktur sind bestimmt für städtebauliche Maßnahmen der Anlage, Sanierung bzw. Qualifizierung und Vernetzung öffentlich zugänglicher Grün- und Freiflächen im Rahmen der baulichen Erhaltung und Entwicklung von Quartieren als lebenswerte und gesunde Orte…" [20](Bundesministerium des Inneren für Bau und Heimat, 2019:13).

The characteristic of connectivity as the planning approach is again stressed in Article 9 (3). It emphasises the interconnectedness of green and free spaces (Grün- und Freiräumen). The development of the narrative of green infrastructure increases in its importance in the administrative agreement in 2020. It is elevated to Article three, which presents the funding requirements. In Article 3(2) climate adaptation measures are identified as a crucial aspect of each measure. Urban green infrastructure is appointed as a major feature of climate adaptation measures in cities. Given the earlier discussed discourse it is interesting to note that here Stadtgrün/Stadtnatur is presented as an example for green infrastructure.

„… Vorraussetzung für die Förderrung sind im Rahmen der Gesamtmaßnahme Maßnahmen des Klimaschutzes bzw. zur Anpassung an den Klimawandel, insbesondere durch die Verbesserung der grünen Infrastruktur (beispielsweise des Stadtgrüns) [21]*…"* (Bundesministerium des Inneren für Bau und Heimat, 2020:5).

Before wrapping up the shaping role of Städtebauförderung in Germany a core characteristic needs to be examined. Whenever a city or municipality requests funding an integrated action concept is required. This resembles the requirements from the EFRE mechanism. The resembles can be traced back to the Leipzig Charta (Bundesministerium für Umwelt Naturschutz Bau und Reaktorsicherheit, 2007). As mentioned in chapter 5.1.2. a holistic and strategic approach is required to hold up to the agreed development targets for European cities. Strategic action concepts adhere to foster this holistic understanding of urban development. The central aspiration is an integrated and communicative approach of all responsible administrative and political offices and persons.

Even though two different discourses are still present the take-up of the language in use *urban green infrastructure* by the European and German funding mechanisms (EFRE & Städtebauförderung)

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[20] Measures to improve the urban green infrastructure are intended for urban development measures, the renovation or qualification and networking of publicly accessible green and open spaces within the framework of the structural maintenance and development of neighborhoods as livable and healthy places

[21] Climate protection measures or to adapt to climate change, in particular by improving green infrastructure (e.g. urban green spaces)

shows that it is now a shaping element in the urban development debate. Due to the funding parameters, the narrative of urban green infrastructure needs to be taken up at least on the city level. One expert of the DIFU speaks of *"Antragsprosa[22]"*, which is requested by each municipality in their funding application (Böhme, Interview, 2020). Thereby, it necessitates an argumentative structure which is in line with the urban green infrastructure discourse.

Urban Green Justice in Germany

There is awareness for the social implications urban green infrastructure has in Germany. Moreover, the policies and people engaged with urban green infrastructure utilize the language of environmental justice to situate social implications in urban green infrastructure development. Firstly, a short overview of environmental justice in Germany and especially NRW is provided. Thereafter the respective aspects of inter- and intragenerational justice are examined.

In Germany, the topic took up traction since 2003. Several key players advanced the topic over the years. The Umweltbundesamt and the Robert-Koch Institut explored early on the relationship between noise, pollution and social status. Thanks to the Robert-Koch Institute there was especially attention paid to the unequal health status of children and young adults. Another important player has been the Deutsche Umwelthilfe e.V., who contributed information concerning the participative justice aspect in procedures. Moreover, from 2012-2014 the Deutsche Institut für Urbanistik executed a research project, which was concerned with environmental justice in urban spaces. Based on the findings policy recommendations were given to implement environmental justice ideas into communal procedures. There are two central policy recommendations. Firstly, the topic needs to be connected to already established procedures and secondly, it requires departments to cooperate and needs to be backed by the local politics. It is also argued that in Germany topics of environmental justice are taken up without explicitly working on them under the header of environmental justice. Both aspects are accredited by this research.

Political backing for the topic can be found in various political and procedural developments (Ministerium für Klimaschutz Umwelt Landwirtschaft Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen, 2016). For this research, the development in the Städtebauförderung is especially interesting. As a language in use environmental justice pops up for the first time in 2016 in the administrative agreement. It is placed within the context of the funding program *Soziale Stadt* [23](Bundesministerium für Umwelt Naturschutz Bau und Reaktorsicherheit, 2016:9). Since 2018 the topic environmental justice is also integrated into the program *Zukunft Stadtgrün* (Bundesministerium des Inneren für Bau und Heimat, 2018:18). This constitutes the first formal connection between urban green infrastructure development and concept of environmental justice on the federal government level.

At the federal state level of Nordrhein-Westfalia, the topic gained more attention since 2003 and was a central topic in the *Aktionsprogramm Umwelt und Gesundheit* in 2004. The program was kick-started by the World Health Organisation (WHO) in 1994. It has intended to show the importance of environmentally related health protection. NRW took up this call and run the program from 2000 until 2010. The respective follow up is the *Masterplan Umwelt und Gesundheit*, which has been initiated in 2013 by a cabinet decision. Three years later it was adopted by the federal government. Within the Masterplan Umwelt und Gesundheit environmental justice is a central topic. The issue of

[22] Application prosa
[23] Social city

Mehrfachbelastung is crucial and more precisely its prevention. It implies that three constitutive steps are taken. Firstly, to avoid them on the planning level. Secondly, if they are present, to minimize them. There are already established tools to tackle and balance Mehrfachbelastungen out. Lastly, if not otherwise possible, compensation is provided, whereby urban green is a valued tool. Moreover, during the red-green coalition in NRW, the topic found political backing by being included in the coalition agreement. The topic has been picked up by acknowledging the need to investigate the *"Zusammenhänge zwischen Umweltbelastungen und sozialer Benachteiligung systematisch aufzuarbeiten*[24]*"* (NRWSPD - Bündnis 90/Die Grünen NRW, 2012:53). Unfortunately, there is no continuation in the new legislative agreement (CDU Freie Demokraten FDP, 2017).

An important remark has been made by Dr Fiebig, who is an expert for environmental health issues from the Umweltministerium NRW. She notes that the translation of environmental justice to Umweltgerechtigkeit in Germany has been problematic. She stressed that the term environmental justice, which originally originated in the USA (see Chapter 3.4.1), is characterised by its social dimension. However, in Germany, the terminology is in many cases understood in terms of "environmentally friendly (environmental protection)". Thereby, the social dimension is often disregarded. This would make it difficult to set the topic appropriately, which would appear to be a principal problem in Germany (Frau Dr Fiebig & Frau Sahl, Interview, 2020).

Turning now to the earlier identified storylines and the aspects of intra- and intergenerational justice. Interestingly the topic is taken up straight forward as a (dominant) language in use in the documents of the federal ministry for the Environment, Nature Conservation and Nuclear Safety. Within the *Masterplan Stadtnatur* it is explicitly mentioned that urban green will contribute to environmental justice. The importance is even acknowledged with an own chapter (Chapter 5). Same as in the *Weißbuch Stadtgrün Grün in der Stadt* (Chapter 4).

Engaged governance

In the first category of intragenerational justice, the aspect of *engaged governance* received the most attention with 26 codes. This is in line with the importance attributed to the topic on the European level. Most importantly the aspect is anchored in the EFRE funding requirements as well as in the SBF. In both funding mechanisms, it is a required aspect of the integrated action plan. For concepts or projects, it implies that without the component of active public participation, it is non-fundable. Also, in the earlier discussed storyline of *doppelte Innenentwicklung,* it is identified as a central element. Here, the characteristic of *early* and *proper* participation is highlighted again. It is also understood that even though participation processes might be challenging they are rewarding too. Overall a better acceptance for any sort of project is assumed when there has been a participative procedure.

There are two central aspects of engaged governance on the German level. On the one hand, there is a strong focus of interdisciplinary work within the ministries as well as between the different city offices. This is acknowledged to be difficult since there are diverse narratives given the respective professions in the departments. Hence, a common language often needs to be established since the terminology used might be the same, yet the meaning varies. On the other hand, there is an emphasis on good cooperation between public and private actors and the local government. This is

[24] Systematically work out connections between environmental pollution and social disadvantage

required based on several aspects. Firstly, there is a need to communicate the respective benefits and issues of urban green infrastructure development. Based on this communication different views and possible conflicts can also be brought up and addressed. Secondly, urban space is not only owned by the local government. Thus, to create a coherent system public, private and governmental property owners need to cooperate.

Another narrative which is promoted to foster engaged governance is the use of technology. Hereby e-governance is endorsed to be included in the landscape planning practice. This should ensure quicker and uncomplicated access and exchange of information between the people and the local government. Also, citizen-science is promoted to interest people and collect even more data to gain a better overview of the situation at hand. Furthermore, the SBF aims to simplify its procedures with the help of technology. This relates to the Onlinezugangsgesetz in Germany (BGBl. I S. 3122, 3138). This implies less bureaucratic procedures and a better overview of the funding steps. This action is greatly appreciated by several actors since the procedures are perceived as lengthy and unbalanced in terms of costs and benefits.

Hence, *communication* and *simplification* are the wished key attributes for engaged urban green infrastructure governance. Yet, the development of any new governance tool is the authority of the federal state if not otherwise anchored in the federal law. This might present a challenge for a new take on engaged governance.

Recognition-based justice

The next aspect of intragenerational justice is *recognition-based justice.* This aspect found especially strong attention in the storyline of *doppelte Innenentwicklung.* It is acknowledged that, given different social and educational situation as well as different cultural backgrounds, participation processes might be taken up differently. This acknowledges the diversification of our current society and their respective demands. To still involve civil society, city district managers are established. They fulfil an intermediary position between the citizens and the local government and its bureaucratic apparatus. Those offices, spread over the city, need to be understood as community organizers. They are often closer to the community and hence can help to engage everyone. Again, the involvement of the directly impacted local community is stressed.

The *Masterplan Stadtnatur, as well as the Weißbuch Stadtgrün both,* acknowledge that the transformation of urban green is a task which requires broad civil societal involvement. However, it is also addressed that people might not be able to participate or voice their concern about their poor environmental conditions. This often traces back to other more pressing issues of such people like making ends meet at the end of the month. That is why the local government or city government is responsible to create an overall better situation also for people who are not able to strongly voice their concerns. This responsibility is recognized. On the other hand, there is also an initiative in NRW with which the federal ministry of Heimat, Kommunales, Bau und Gleichstellung des Landes NRW encourages citizen and citizen groups to take initiative. Such models are designed to leave citizens room to call upon their initiative and creativity.

Special attention is given to the user group of children and youngsters. Even though the concepts aim to address all ages, *Naturerfahrungsräume* are specially designed for the younger generation. These urban areas are supposed to be educational and motivational to explore nature. Moreover, they aimed to be designed as public spaces which invite to meet the neighbourhood and to build social networks. They are a central aspect of environmental justice in the *Masterplan Stadtnatur.* It is

noteworthy that it is intended to incorporate them into BauGB so that a binding character is established for all federal states.

Allocation justice

The next aspect of intragenerational justice is distributional justice with the two sub-aspects of allocation and spatial justice. The aspect of *allocation justice* is understood in its American terminology throughout the documents. Socially disadvantaged city districts often lack an appropriate quantity and quality of urban green elements. This nuisance is recognized and aimed to be tackled in numerous ways. To determine the current state an environmental monitoring system is aimed to be established, whereby social-economic data and quantitative data concerning urban green areas are overlapped. Given this database, it is intended to make more informed decisions where investment priorities need to be. Furthermore, nationwide points of references will be developed to ensure a just allocation not only in cities but also in each federal state. This task is located with the BBSR, which already published a report in 2017 (Bundesinstitut für Bau- Stadt und Raumforschung, 2017). There are already some federal states, who apply such points of references, yet this begs the questions of equality throughout Germany. These nationwide points of references are also meant to firstly provide an argumentative structure for political procedures and secondly, to balance out or even defend urban green areas in the wake of re-densification. However, as an expert on environmental justice remarks the pure data-driven improvement of urban green areas will probably not be enough to address societal and justice issues (Böhme, Interview, 2020).

Yet, the even allocation of urban green elements is not an easy task given the land-use conflicts in urban areas. The need to build apartments is pressing in most places. The *Weißuch Stadgrün* stresses the need to be aware of the value accumulation if green areas and residential areas are developed jointly. Thus, the possibility of eco-gentrification is recognized. However, it is also stressed that landscape plans or Grünordnungspläne do not have the tools to balance out the increase in property values. Other urban planning tools like social housing or rental brakes are required. This, however, again demands the cooperation of city offices and planning authorities. In the end, all documents agree that there is *no alternative.* Implying that greening the city has become a necessity and that there are sufficient tools to counter eco-gentrification. These tools, like the Bebaungsplan, lie with the authority of the municipality.

Another important aspect of urban green infrastructure allocation concerning the social dimension is its typology. As established earlier there are several different typologies (see chapter 5.2.1). Not all typologies provide the same direct social benefit. Hence, it is difficult to assess or provide a social impact measurement for all typologies equally. Furthermore, due to the concept *doppelte Innenentwicklung* the allocation might be screwed. This could happen when there is no systematic thinking about the allocation since mostly vacant areas will be taken up. Hence, there is the danger to counteract storyline one. Not that much attention is paid towards the aspect of diverting social benefits according to the urban green infrastructure element.

Spatial justice

The last aspect is *spatial justice*. Given the importance of engaged governance, it can be assumed that the design or re-design or urban spaces are often done according to the interests of the community. The *Masterplan Stadtnatur* also stresses the need to include communities, who have a green development nearby. Co-creation is favoured over top-down planning. However, here also potential conflict is found. Ecological and social usage of the same urban green space can contradict or exclude one another. Another aspect of spatial design and justice is the usage culture of people. It

has been recognized that participative inclusion improves the respect and shifts the behaviour of people.

A widely promoted form of green space design is urban gardening. Urban gardens are said to improve community networks and strengthen social cohesion. Moreover, urban gardens also educate about vegetables and fruits and their planting methods. Hence, especially, for children, there is a high pedagogic value.

An important keyword, when it comes to urban green, is *Baukultur*. This topic is especially stressed in the *Weißbuch Stadtgrün.* Urban green is classified as a part of the *Baukultur*. It is defined as the *"Herstellung von gebauter Umwelt und den Umgang damit*[25]*"* (Bundesministerium für Umwelt Naturschutz Bau und Reaktorsicherheit, 2017:47). It is recognized as a central element in the sustainable city, independent of its development path. The stated aim was to establish it as a fixed part thus integrating it into urban planning law too. This aspect of spatial design especially takes up the tradition of the garden culture (see chapter 5.2) and its continuation in urban spaces despite land-use conflicts. By establishing urban green as an element of Baukultur it gains more recognition. In the latest report *Baukultur Bericht – Erbe – Bestand – Zukunft* the importance of public green is stressed as an element which contributes to life quality (BauKULTUR Bundesstiftung, 2019). Thereby the terminology green infrastructure is picked up and the added value for people and the urban climate, in terms of regulating ecosystem services, is emphasized.

Time

The second part of environmental justice is intergenerational justice with the aspect of *time*. Generally, there is a review of all projects which are funded by EFRE or STB. Moreover, EFRE money is an earmarked fund hence it ensures that e.g. a re-designed park does not turn into a residential area shortly after. However, it does not monitor developments like gentrification. The emerging of a monitoring system, which combines social-economic status data with green area development is the first and important step to establish a monitoring system to track possible adverse developments. However, this is up to the municipality to implement so far. Due to the planned development of points of reference, a temporal tracing of the development will be also possible. To manage temporal effects, it has become clear that there is a need to combine several instruments from different ministries and city offices. Yet, this development is still in its infancy and only Berlin has implemented a monitoring system on the district level.

Intragenerational Justice	
Engaged governance	*Integral part of funding mechanisms; communication & simplification*
Recognition-based justice	*Diversification of urban societies; city district managers & open call initiatives; Naturerfahrungsräume*
Allocation justice	*Data monitoring; points of reference; No alternative; doppelte Innenentwicklung*
Spatial justice	*Co-creation, Usage culture, Baukultur*

Table 7 German Intragenerational urban green justice by Author

Intergenerational Justice	
Time	*Review of funding mechanisms; points of reference (Orientierungswerte)*

Table 8 German Intergenerational urban green justice by Author

[25] Manufacturing built environment and handling it

6.3. Result III: Council Districts & cities perspectives

Sources

The last level will be examined from the perspective of two cities namely Cologne and Lippstadt. One expert of each city was interviewed. Moreover, two council district members, who are involved in the EFRE funding procedures, were interviewed. Additionally, as background information, the cities' integrated action concepts have been examined, respectively *Vielfalt vernetzen* and *Grüne Infrastruktur Lippstadt Südwest*. See Annex 2.

Discourse

On this level, a change in perception has happened. The concept of urban green infrastructure is recognized and accepted mostly as the language in use. However, its focal point shifted from a more multifunctional and technical notion to a social standpoint. Thus, the social perspective, coined as *urban green justice*, has become a leading idea which dominates the construction of the urban green infrastructure discourse. Keeping the structure of the earlier chapters, the accompanying storylines will be explored.

First storyline: Environmental benefits

The first storyline revolves around the *environmental benefits* which urban green infrastructure provides. Yet, here again, the discourse of Stadtnatur shimmers through. The technical notion is refuted by some, and it is argued that the narrative of Stadtnatur better describes urban green. It is stressed that the narrative of green infrastructure has been connected with the Natura 2000 network. Hence, it is not appreciated that this narrative is now utilized for urban green elements. Here a disconnect throughout the levels can be identified. On the European level, there has been the emphasis that urban green infrastructure is not identical with Natura 2000 and neither aims to substitute for it. Yet, the utilization of the same terminologies complicates the distinction.

Another interesting aspect is that in Germany the project monitoring is situated with the federal state nature conservation authority (Dezernat 51), which is normally also responsible for the Natura 2000 network. This department recognizes the added value for biodiversity in the city but also stresses that the nature protection law does not capture green in the city.

This connects to the federal state intentions to alter the Landschaftsplaung legislative framework, represented by the fifth storyline on the German level. Hence, the ongoing transition can be directly observed. It needs to be recognized that each district council takes up the task differently and is at another stage of the transition of Stadtnatur towards urban green infrastructure.

Another narrative, which is strongly recognized in the environmental benefit storyline is the regulating ecosystem services. It picks up the change cities face due to climate change. Urban green infrastructure is recognized as an important backbone for problems like the urban heat island or heavy rainfalls. To harvest these environmental benefits, in the wake of climate change, the adaption of new plants and maintenance methods is required. There is a need to alter the strains of plants planted since they need to be more heat resistance as well as able to cope with less water. Additionally, due to climate change, the maintenance of urban green areas changed. There is a season creep and often fewer mowing and more watering are needed. A practical adaptation has been made by the city of Cologne, who adapted by buying a water tank extension for their lawnmower.

On the city level, the argumentative structure of urban green infrastructure is recognized. Only a systematic approach will result in resilience. Thus, there are two types of green projects. Firstly,

projects which improve already existing green areas in a qualitative manner and secondly, projects which strive to connect the established urban green areas. Yet, land use pressure is recognized too. This can be seen with the example of *Kleingärten,* which are in high-value residential property development areas. The value of this green is often neglected in favour of more high-value apartments. Yet, their location is also of high value to urban green infrastructure since they are often located near city centres or train tracks. Thereby providing valuable urban green spaces e.g. biodiversity, local recreation areas and noise compensation.

Second storyline: Economic Issues

The second storyline takes up the *economic pressure* urban green infrastructure development places on cities. Firstly, the maintenance of improved and extended urban green infrastructure places stress on the city budget. However, both cities stress that they feel the hype and respective funds for green infrastructure. Political backing is experienced in both cases which are greatly appreciated and helpful. Another important aspect of urban green infrastructure development in a systematic way is the necessity to acquire new property. This especially requires the support of the local government and cooperation of private property owners. The city of Lippstadt experienced such a case for the realization of the project *Allenweg*. This projects also picks up strongly the connectivity planning approach of urban green infrastructure. It connects several already established urban green areas like the Theodor-Heuss-Park, Grüner Stirper-Höhe and the Freizeitanlage Boschstraße.

Third storyline: EFRE

The next storyline evolves around the *funding mechanism of EFRE* itself. Both cities and council district members experience high pressure given the bureaucratic demands. This implies a high demand on the city office, which often lacks the appropriate amount of personal. There is the impression that green offices in the city require more support, especially given the new demands of urban green to elevate climatic pressure in the city. It is also argued that this lack of funding can not come from the European level, but rather needs to be situated at the local level.

On the hand, the funds are greatly appreciated. Particularly, at the district council level, the funding of EFRE is appreciated because it aims to inspire to combine different funds. It is fittingly described by an expert with the metaphor *"über den Tellerrand hinausschauen*[26]*"(Lange, Interview, 2020)*. The cities also appreciate the funding since it enables them to tackle projects which were too expensive to address otherwise. Moreover, EFRE funding provides repeating support for cities. The city of Cologne takes this up structurally to improve their entire urban green infrastructure over the years.

Fourth storyline: Urban green justice

The last storyline is the one of *urban green justice*. This storyline is at least for the cities the dominant narrative for urban green infrastructure development. This can be traced back to the necessity of the funding mechanisms to include the social and participative element into each project. Even though on the European level the social storyline was (only) one aspect of the multifunctional nature of urban green infrastructure. It evolved into the shaping element based on the requirements of the integrated action concept.

The aspect of *engaged governance* still has the highest priority. Moreover, there has been a systematic change over the years how green space planning is done. As described by an expert from Cologne today's approach is to more or less take a white piece of paper and let the people fill it up

[26] beyond one's own nose

(Heidbreder, Interview, 2020). The urban planners and the municipality provide the enabling framework in which this planning can happen. This framework is shaped by the Bebaungsplan, infrastructural specifics or already fixed developments. Hence, there has been a change in approach to actively engage governance in comparison to the past. However, as mentioned by both experts the participative process can also not be endless. The citizens will grow tired of events or planning procedures eventually. It is recognized that the entrainment of the people along the development is crucial too. Their involvement in the development of the area plan, showing the construction side and lastly a grand opening in which the ground is open and "handed" to the residents. Another important aspect of engaged governance on the city level is communication via media outlets or social media. Thereby it is important to be aware of the target groups and their news behaviour/intake. Thus, e.g. it is important to use free newspapers next to the regular newspaper, social media feeds like Twitter or Facebook. Still, the personal informative evening is important. This process also improves the usage culture of the people with the urban green area. Hence it prevents trash or misguided behaviour and thereby reduces maintenance costs.

This broadly set up participative process also encourages other civil society institutions to change their approach to urban green areas. A good example is Cologne and its Strebergarten/Kleingarten culture. Germany has a long and strong tradition with Kleingärten. Yet, they are disputed to not be very nice looking or particularly inviting to the general public. Yet, due to changing demand and pressure on the Strebergarten-Colonies they started to alter their usage model and outlook. Hence, it is now possible to rent a plot with several people or your house community. This fits more the usage culture of young families, who might not have enough time to rent one alone or don't want to rent for several years immediately. This change has been initiated by a stronger focus on urban green infrastructure.

On the district council level, the urban green infrastructure call implied to bring together different departments to join forces and to tap in different funding pots and knowledge pools. Thus, the intention of the policy to have a multi-disciplinary take on urban green infrastructure development worked well. However, it needs to be also recognized that every cross-departmental work requires the cooperation of the respective employees. Hence, even though the task might be set-up in a multi-disciplinary manner it still relies on the willingness of the people involved.

The second aspect of participative justice is *recognition-based justice*. This aspect is deemed to be of importance since there is a strong awareness that one plans for the residents of the neighbourhood or the city. It is also acknowledged that there are diverse and conflicting user demands, which need to be perceived, discussed and mediated. Thus, there is a strong emphasis to involve them actively. However, it is also understood that there might be reservations to cooperate with the municipality or with its bureaucratic system. The municipal planners turn to intermediaries like the city district managers or organisations close to green areas, where people frequently meet. These outlets are then used to introduce the plans and discuss the development with the community. Also, other civil society organisations are involved like seniors, sports or gardening associations. Other people of trust, which are known, like church pastors, are also invited to join the procedures to attract and secure people in their fears. Hence, importance is placed on providing an outlet for everyone to speak up. This is accommodated from the city's side by providing an argument for and against every idea according to the city expert (Heidbreder, Interview, 2020). No idea is simply thrown overboard but acknowledged and discussed. This broad set up also enables then the municipality to legitimate their development plans and defend them towards criticism.

Another interesting aspect of recognition-based justice on the city level is the uptake of the educational task mostly covered by the sparking interest in urban gardening. Different educational levels in terms of vegetable and fruits growth and nutritional values are present. This nuisance is actively combatted by hiring a pedagogic teacher, who actively involves children with the matter.

The first aspect of distributional justice is *allocation justice*. This aspect is challenging due to two reasons. Firstly, there are land-use conflicts in expanding cities next to higher user demands and quantitative usage of urban green spaces. The municipal task is thereby recognized to be one of a strategic planning entity. It happily takes in all the different wishes of its residents but also needs to mediate them spatially. For example, outdoor sport has become an increasingly popular activity yet not every park can turn into an outdoor sports area. Hence, the municipality can mediate wishes to more suitable spots in the city. Moreover, they recognize their task to connect the established areas to provide a systematic urban green infrastructure which accommodates diverse usage demands. Hereby the expertise of the employees is helpful due to their strategic overview of the city's green spaces. This also needs to be done to mediate between social and ecological functionalities. Often those do not go hand in hand with the another.

This leads directly to the next aspect of distributional justice namely *spatial justice*. On the city level, it can be recognized to be the most important aspect (maybe next to engaged governance). Spatial justice is about the enjoyment of urban green spaces by all. Public spaces need to be designed in a manner that they accommodate different user demands, feel welcoming and secure. It is fittingly described with the metaphor "*Wohnzimmer der Menschen*[27]" by one expert. Yet, naturally, cities can not fit every demand into one area hence a good connection between the green areas need to be established. Also, when designing urban green spaces for either social or ecological functions it is wise to be aware of the culture of usage. If this is not the case and urban planners do not communicate with the people using the space, a carefully breed ecological meadow will be used to barbeque simply because it has been done for ages. Lastly, urban green infrastructure also incentivises the alteration existing spatial arrangement to open them up to more user groups by re-designing it amply.

The aspect of intergenerational justice is taken up slightly. As earlier established, there is a mandatory review of the funds which takes care that the areas are not used differently. But there are not yet any systematic approaches to monitor urban green developments injunction with the social status over time. However, due to the federal principle cites can be front runners. This is the case with Lippstadt. There is good cooperation between the statistical office, which holds socio-economic data and the urban green planning office. The latter interrogates the database to then design the public space according to the socio-economic parameters like age. Still, this planning approach does not aim to analyse the development into the future.

A further reflection and comparison of the discourses in this and the two previous chapters is provided in the discussion of this research.

[27] Living room of the people

DISCOURSE	STORYLINE	
URBAN GREEN JUSTICE	Environmental Benefits	Regulating Ecosystem Services (Heat & Rain) Integration into the German Law Differentiation from Natura 2000
	Economic Issues	Maintenance of urban green elements High investments required to adapt to climatic circumstances
	EFRE Funding Procedure	High bureaucratic demands Incentives to combine funds and to think multi-modulate, inter-disciplinary
	Societal narrative	*Engaged governance*: municipality guidance as an enabling framework – citizens as a creator *Recognition based justice*: Intermediary needed to let all voices be heard – assistance by city district managers *Allocation Justice*: Mediation of user demands – systematic connector of enabling all citizens to equal enjoyment *Spatial Justice*: Design and communicate to elevate enjoyment and culture of usage *Time*: Specialization of data in its infancy for temporal review of socio-economic changes due to UGI

Table 9 German Urban green Justice Discourse by Author

7. Discussion and reflection on findings

This thesis research aimed to explore the urban green infrastructure policy discourse on the European level and in the European member state of Germany. The following part will reflect on the methods, used theoretical concepts and results of this research.

7.1. Reflection on methods

The results of this research have been achieved with the method of discursive analysis. The chosen approach follows the discursive methodology of Hajer. It focuses on socially produced narratives and how those are expressed in language in use. The discourses are deconstructed by identifying their storylines and utilized metaphors. Also, possible short-hands are examined.

The illustrated storylines were carved out by coding the chosen documents and interviews. The coding has been done with the help of the software MAXQDA. All documents were coded with the same codebook, however, in-vivo codes were used to highlight characteristics of respective documents or the entire level. Two limitations are important to highlight. Firstly, the coding has been done purely by the author. Secondly, only a limited number of documents and interviews were coded. The choice of documents has been limited, given earlier described criteria but also due to the scope of this research. The interviews were restricted by time availabilities of the interviewees and the scope of this research. Still, a good picture could be obtained to answer the research questions with confidence.

This research also showed that the combination of official policy documents and interviews is important, as though the latter more in-depth and up-to-date information could be gained. Also, operational and bureaucratic problems in the execution of policy directives could be better understood thanks to the interviewees. It needs to be recognized that every interviewee coloured the issue at hand based on their personal experience, opinion and position.

This research laid its focus on German policy in relation to the European policy. The European discourse can be regarded as universal yet the adaptation of it to the German context will probably not resemble the up-take in other European countries. Additionally, the focal point of North-Rhine Westphalia has been chosen. Due to the federal structure of Germany, it is difficult to generalize the presented discourse to the other federal states.

7.2. Reflection on the conceptual framework

This research has been informed by the theory of sustainable development and especially its concept of social sustainability. It is recognized that sustainable development is a broadly and diversely interpreted issue, however all conceptualizations share their origin in the Brundtland report. Additionally, the theory of environmental justice is recognized as an illustration of the causal relationship between environmental benefits and burdens respective to social conditions. The concept of environmental justice has been approached with the dimensions of intra- and intergenerational justice. Intragenerational justice is understood in terms of distributional and participatory aspects. These two aspects are respectively broken down into two more sub-facets. Intergenerational justice is operationalised with the variable of time. This adheres to the temporal impact of urban green infrastructure policy in cities. The conceptual framework of this study, called urban green justice, is depicted in Figure 6.

The choice to review two broad concepts has been challenging yet rewarding. Both concepts have different backgrounds, and both have been shaped by historical circumstances in which they developed. A short overview of each concept is provided. Social sustainability belongs to the broad theory of sustainable development, which has been specified with the help of the sustainable development goals. The ideas around sustainable development and its respective development goals are pushed by the United Nations and strongly adopted in the European Union. However, social sustainability has been the little brother of economic and ecological sustainability. It found less attention and its relationship with economic and ecological sustainability remains somewhat questionable. There are many concepts about how the three corners of the sustainable development triangle behave towards each other. This research encourages a *transformative bridge social sustainability* and the urban-focused operationalization by Cuthill (2010).

In contrast, the terminology of environmental justice has its origin within the civil rights movement in the United States. It received a considerate amount of attention and has been institutionalized by the Clinton administration. The European Union took longer to acknowledge the terminology of environmental justice. Only with the Aarhus Convention in 1998, the topic has been institutionalized. The concept of environmental justice is spread out over several dimensions. Based on a literature review, an overview has been achieved and subsequently, dimensions were chosen. The summary of environmental justice in the United-States and Europe can be found in chapter 3.4.

The utilization of both concepts has been a challenge since they are both nebulous constructs. There are several conceptualizations of them, and it can be argued that their vagueness comprises partly their strength. Their merger as urban green justice (see chapter 3.5) shows, however, the added value. On the one hand, environmental justice has a reactive nature, focusing on the correction of already existing inequalities. On the other hand, social sustainability is more proactive and future-oriented emphasizing to create new policies and practices to shape the equality of the future. By using their joint perspective, pitfalls could be avoided for either existing injustices or the creation new injustices. So, urban green infrastructure policy can be aware of the already tense spatial and justice situation in cities as well as aiming to create a better one in the future.

Overall, the merger to the urban green justice lens was worth the effort. The merger proved valuable when analysing the documents and interviewing the experts. Both aspects (intra- and intergenerational justice) were regarded as important and the sub-categories were found back with regards to the content.

Even though the attempt to merge environmental justice and sustainability are not entirely new, as shown with the concept of *just sustainability* (Agyeman, Bullard and Evans, 2002; Agyeman and Evans, 2003, 2004) the attempt of this thesis to merge particularly social sustainability with environmental justice proved useful and helpful in analysing urban green infrastructure development.

7.3. Reflection on findings

Concerning the three analysed levels, a lot of knowledge has been gained. Urban green infrastructure policy and its design concerning urban green justice aspects are now better understood. Especially, the discourses on each level with its diverse storylines are telling about the adaptation and adjustment of European policy to a city level. Here follows a short reflection of each levels' results and the relationship between these levels.

European Union

The discourse on the European level is undisputed, when it comes to the three examined institutional bodies – the European Commission, European Economic and Social Committee and European Council of the Regions. All institutional bodies agreed on the discourse centred around the notion of multifunctionality. Moreover, a clear distinction was made towards the Natura 2000 network, rather stressing the necessity to jointly develop all three corners of the sustainable development triangle. Natura 2000, in contrast, focuses on the ecological corner. The peculiarity of urban environments is recognized too. The acknowledgement of conflicting interests and land-use plans has especially been pointed out by the European Economic and Social Committee and the Committee of the Regions. The aspect of governance is divided into two aspects. Firstly, the importance of subsidiarity is stressed and that there is no intention to reduce national or even regional and city planning authority. In contrast, the nature of lower level government responsibility, from the national and sub-national level, is encouraged. Secondly, the European bodies share the understanding of an enabling partner in terms of knowledge and data. A focal point is set by sharing monitoring and evaluation techniques as well as working initiatives.

Concerning the focus on urban green justice, the European social storyline is situated within the realm of the sustainable development triangle. It is used in the discussion as a short-hand for many social benefits (see chapter 6.1). It is interesting to note that the European Economic and Social Committee has been the institution that emphasized the importance of the Aarhus Convention in the context of urban green justice. The aspect of engaged governance found the most attention on the European level. It is characterised with the attributes of early, active, and shaping. Recognition-based justice is geared explicitly towards three societal groups the young, old, and disadvantaged. Also, it recognizes the very local effects of urban green infrastructure implementation hence it is stressed to consider the locally affected communities and possible competing interests. Thus, the aspect of participative justice is fairly well addressed. This is not the case for distributional justice. The element of access, in a non-motorized manner, is mentioned when it comes to the allocation of urban green elements. But this already excludes several typologies of urban green infrastructure e.g. green walls. The other facet of distributional justice namely spatial justice was barely addressed. In contrast, the aspect of time, hence intergenerational justice, was deemed important. The sustainable development goals are viewed as a temporal pathway towards more urban justice. Also, the circumstance that effects of urban green infrastructure are not directly visible is taken up. A review is recommended to keep track of conflicting issues. Lastly, the European discourse calls for quick action since the cost of implementation increase over time.

Germany & Nordrhein-Westfalen

On the German level two discourses are identified. First, there is the discourse around the notion of Stadtnatur. It takes up the terminology of multifunctionality from the European level. However, the storyline focuses more on quantity, not so much on a systematic connection between the urban green areas. It emphasises its intention to be understood as a non-technical aspect of the urban environment. This implies a different value proposition than the European discourse. The European discourse understands urban green infrastructure as a systematic need for urban environment, hence ascribing it a technical functionality.

The second German discourse centres around the notion of urban green infrastructure. It adopts the notion of multifunctionality within the sustainable development triangle. Same goes for the storyline of governance. The German government respects the subsidiarity principle and aims to be an enabler

for knowledge and data exchange as well as a facilitator for communication. But it contrasts the storyline of Stadtnatur by explicitly demanding to be regarded as technical infrastructure Two new storylines, geared towards German urban development, emerged too. Firstly, the storyline of doppelte Innenentwicklung, which is utilized as a short-hand for compact and smart urban development. Secondly, the integration of urban green infrastructure terminology into the legislative frame. This is not yet completed, but it shows the serious up-take of the concept.

Turning to the analysis of the urban green justice on the German level. Both intra- and intergenerational justice have been recognized. Engaged governance is understood as an integral part of each project. This is engrained into law as well. Moreover, the requirements of the operational program of NRW and the EFRE funding mechanism demands appropriate engaged governance. The aspect of recognition-based justice is examined by acknowledging the diversification of urban societies and hence the adaptation to diverse needs. Especially the younger generation is addressed with the concept of Naturerfahrungsräumen. As well as the general wish to create public spaces to encourage engagement of civil society groups. Both aspects require validation from a citizen perspective, which has not been possible in this research.

Turning to distributional justice allocation and spatial justice found attention too. However, the topic of allocation justice found fewer attention than anticipated. Especially the systematic development of green elements presents itself as a challenge due to land use conflicts and the concept of *doppelte Innenentwicklung*, which firstly addresses vacant areas. An aspect which has been expected to be a bigger topic, in terms of allocation justice was eco-gentrification. There was little concern for this aspect of greening. Rather urban green infrastructure was regarded as not the appropriate tool to tackle this possible arising issue. Other departments and especially the city's policy are the signalman, who can steer the overall city development through zoning plans and rental brakes. Spatial justice has been addressed in the narrative of BauKultur, which deems the design as an important part of urban development.

A possible shortcoming and future challenge for urban green justice will be the achievement of justice within buildings due to UGI. This relates to green infrastructure on buildings which also has a cooling effect regarding the urban heat island. Thus, this aspect is about life quality inside our apartments or work buildings in an sustainable manner. The participative justice aspect will be able to cover the various user demands, depending on the circumstances of the residents and the building itself (e.g. new vs. old building, huge window fronts). However, distributional justice applies less to the circumstances urban planners face when re-thinking the inside of buildings. Other categories are needed to cover the just design to ensure life quality for all residents inside their homes. The aspect of time is still relevant because the re-design of building takes up a lot of time, patience and money. This aspect will gain more and more important not only for residents but also for housing companies, which aim to rent out apartments

Council District, Cologne and Lippstadt

Based on the analysed documents and the interviews, the discourse on the lowest level is depicted by the notion of urban green justice. In contrast to the other two levels, the social storyline dominates the discourse. Each aspect of urban green justice finds sufficient attention. Only the aspect of time and its operationalization still presents a challenge to municipalities. This challenge is supported by the development on the German level. The cities regard themselves as the enabler for their citizens and aim to provide a proper framework, in which the residents can develop realistic ideas. Also, there is the awareness that giving each citizen a voice presents a challenge. Cities

acknowledge that and seek help at district managers, who are closer to the citizens. Thus, a mediator is needed because the distance between the municipal personal and the citizens is too great. Both aspects of distributional justice are regarded as important. This is especially the case to provide equal enjoyment for all user groups. This also improves the culture of usage by visitors. The three other storylines are centred around economic, environmental, and funding procedure concerns. Especially the latter point appears to be a challenge to municipalities and district councils. European funding has high requirements, which can easily overtax the personal capacity of cities. This might even hinder some municipalities to engage in European funding. Economic issues on this level relate to the maintenance costs of urban green infrastructure. Even though the initial investment is given by funds the operating costs still stay with the municipality. It is crucial to support these types of costs too. Otherwise, the wished environmental benefits cannot be harvested. Environmental benefits are viewed as regulatory and cultural services, which improve life quality in the cities. Urban green areas are viewed structurally, connecting the diverse regulatory and cultural ecosystem services are regarded as essential.

Comparing the three levels

Hence, reviewing the findings shows that the emphasis shifts depending on the governmental level. The narrative development illustrates that direct contact with residents, as on the lowest level, spurs the understanding of the green urban justice in its entirety. Each aspect of inter- and intragenerational justice had been addressed and even more importantly proactively dealt with. This implies that the proximity of citizens initiates a more hands-on understanding of urban green justice.

Another interesting aspect, based on the reflections of findings, is that there are two national discourses simultaneously. The established Stadtnatur discourse did not yield to the European multifunctional discourse. Not even after seven years since the European urban green infrastructure debate had started. This illustrates that national discourses hold power in addition to their embeddedness in law or procedures. However, it is interesting to note that this does not hold for the lowest level. Cities adapted quicker to the promoted discourse by the European Union. There is only one discourse found on the city level, which greatly resembles the initial European discourse. Hence, the emphasis jumped a level in its development. Even though an adaption to the discourse occurred quickly, the formal demands of the European Union put stress on municipalities. Thus, funding is a mixed blessing. On the one hand, it brings in new funds and structural ideas for urban green with an emphasis on social aspects. But on the other hand, the funds are formally structured and demand much bureaucratic work.

This research showed that there is a unique dynamic between the three levels when it comes to the development of urban green infrastructure. It is recognized that the attention paid to social justice, operationalised by urban green justice, varies throughout the levels. However, it is important that there is policy on all three respective levels. Firstly, European policy enables the policy topic to apportion the idea among all European member states. Otherwise a consequence could be isolated applications, which would lead to an unbalanced European urban green infrastructure. Secondly, the acknowledgment of urban green infrastructure on the European level provides a good argumentative base for urban governments and developers on the lower levels. Thus, it helps the agenda setting, the formulation and legitimization of urban green infrastructure. Moreover, by creating an enabling framework, which focuses on sharing knowledge and data, European policy helps to develop urban green infrastructure in a knowledgeable and efficient manner. Also, the European policy is connected with European funding, as investigated in this research. This funding is important to foster its

development in European cities. However, cities still struggle to maintain urban green infrastructure after the initial funding investment has been received. This is the result of an economically tense situation in many German cities. The adaptation to national policy, in this case German policy, is important too. It enables the adaptation of the European policy to the national circumstances. This allows the take-up in national legislation. This in turn fosters the argumentative base for urban green infrastructure again. It reassures the importance of the topic and the support of national law makers. Also, it introduces additional funding opportunities. Hence, having European and German policy concerning the development of urban green infrastructure is crucial in order to build up a reliable argumentative base and practical support for the development of urban green infrastructure. Somewhat individual adaptation at the city level is a necessity simply because each city faces different social, economic, geographical, environmental, demographic challenges.

Yet, it is important to underline that the awareness to social justice difference throughout the levels. This should be regarded as a further challenge and a detailed recommendation concerning this aspect is given in chapter 8.1. The European level focuses especially on participative justice, which is a topic that generally is of importance to European policy makers. Simply because the nature of Europe is to unite 28 different national perspectives. In contrast distributive justice is a spatial aspect, which is generally less present in European policy making. At least not in urban spatial terms. As stated, there is growing understanding of the importance of distributive justice the further down the level urban green infrastructure policy goes. Thus, improving all aspects of social justice in each level, the voices of cities need to be given more weight.

Lastly, it needs to be stated that this research focuses mostly on green elements in urban green infrastructure. Yet, it is important to keep in mind that blue elements, like rivers, ponds play an important role in the urban eco-system too.

8. Conclusion

This research explored urban green infrastructure policy in the European Union and its member state Germany with a focus on North-Rhine Westphalia. The emphasises was placed on the discourse(s) on each level – Europe, Germany and North-Rhine Westphalia and the cities of Cologne and Lippstadt. The aim has been to shed light on the respective discourses and their underlying storylines with particular attention towards the dimensions of environmental justice and social sustainability.

To examine the discourses and their storylines for environmental justice and social sustainability both theories were analysed and placed within one framework – urban green justice. It is composed out of two broad categories intra- and intergenerational justice. Intergenerational justice is operationalized with the variable of time. The intention is to assess the awareness of policymakers that social impacts and not always immediately seen. Thus, it aims to scrutinize the long-term planning perspective of urban actors about urban green infrastructure elements. Intragenerational justice is divided into two broader aspects distributive and participative justice. The latter contains the aspects of engaged governance and recognition-based justice whereas the former depicts allocation and spatial justice. The facets of engaged governance and recognition-based justice analyses the engagement of all societal groups and the openness of the design process of urban green infrastructure. Distributive justice addresses the spatial dimension of justice and sustainability. It concerns the spatial distribution of urban green elements throughout the city and the design of urban green elements (e.g. parks) to be inclusive of various user demands.

The main research question of this thesis is:

To what extent is the discourse of urban green infrastructure policy inclusive of environmental justice?

To answer the main research question, two sub-questions were posed.

What are the prevailing discourses and their storylines on the European, national and city level and who shapes them?

On the European level, there is one articulated discourse centred around the notion of multifunctionality. Urban green infrastructure is regarded by the European Commission, European Social and Economic Council and Committee of the Regions as a tool to bring together all three corners of the sustainable development triangle. It is stressed as a particular challenge in the urban environment, distancing it from the Natura 2000 framework. Furthermore, all institutions regard their role as an enabler to foster the capacity of cities and regions to implement urban green infrastructure. The intention of this policy to have the initiative originating from the national or even sub-national level is emphasized by all.

On the German level, not one centrally articulated discourse has been found. Two discourses are present, which approach each other. On the one hand, there is the discourse of Stadtnatur. This discourse contains three storylines emphasizing a quantitative and non-technical notion of urban green elements. It also picks up the European storyline around the multifunctional nature of urban green infrastructure.

On the other hand, there is the discourse of urban green infrastructure. This discourse is fed by five storylines and is more influenced by the European discourse. It also stresses the multifunctional aspect of urban green elements and the enabling role the federal government has to play as a

communicator and distributor of knowledge and data. So, it supports the policy nature of lower level government responsibility and aims to support cities in their capacities to built-up urban green infrastructure. The major difference to the Stadtnatur discourse is found in its emphasis on the technical quality of urban green infrastructure. The added-value is found in its systematic planning practice to maximize regulatory and cultural eco-system benefits. An added shorthand storyline is doppelte Innenentwicklung, which provides an argumentation for the joint development of built and green areas in the urban environment. It is also utilized as an argumentative ground for urban green elements. This short-hand is welcomed by municipalities because urban green feels the squeeze of various land-use demands. The last storyline in this discourse is fed by a legislative initiative. There is the ambition to include the technical notion of urban green infrastructure and its associated regulative and cultural eco-system benefits into the Baugesetzbuch [28] and Bundesnaturschutzgesetz[29]. Both discourses are articulated on the national level letting them somewhat merge and become indistinct. There is also no clear separation regarding which institutions or federal offices support or critiques them. Both discourses can be found back in documents from each institution. This supports the argument that they are approaching each other.

The examined city level conveys one socially centred discourse. The societal narrative prevails and the constitutes the shaping element of this discourse. Three other storylines are presented. Firstly, the regulatory benefits of eco-system services for cities. These include the adaptation to the urban heat island effect and urban floods. It distinguishes itself from Natura 2000, based on the special circumstances one finds in the urban environment in terms of land-use conflicts or diverse stakeholders' interests. The second storyline broaches the issue of economic hardship. Municipalities experience economic challenges with maintaining urban green elements. Without proper care of the elements, no regulative or cultural ecosystem services can be derived. Appropriate funds need to be allocated in the municipal budget yearly. Also, to establish a green infrastructure municipal land must be freed and appropriated sometimes from private parties. Political backing and necessary investments are therefore required. The last storyline concerns the EFRE funding procedures. These are experienced as formal and highly bureaucratic. Even though support from the district councils is offered, many municipalities reach their capacities. A positive design aspect from the EFRE funding is the possibility to combine funds and hence achieve appropriate funding for bigger projects. This discourse is mainly shaped by the municipal staff in direct coherence with the residents.

In which way is urban green infrastructure shaped by environmental justice and social sustainability?

The lowest examined level – the city and district councils – are the strongest shaped by aspects of environmental justice and urban sustainability. As stated, the social narrative is the shaping element of the discourse. The other storylines wrap around the social benefits. Environmental benefits are aimed to be improved to elevate the life quality of urban residents. Economic issues restrain the capabilities of the municipality to deliver on the regulatory and cultural ecosystem services. And the complex EFRE procedures demand great patience from residents, who participate in the process. The social storyline addressed the intra- and intergenerational aspect. The intergenerational aspect is in its infancy based on the still needed development of databases. Yet, the city of Lippstadt already utilizes social data when designing urban green elements.

[28] Federal Building Code
[29] Federal Nature Conversation Act

All four aspects of intragenerational justice are regarded as highly important on the city level. Engaged governance places the citizens as the central creator of urban green elements. The municipality takes the role of an enabler. The municipality needs to actively engage in stimulating all civil society groups to adhere to the recognition-based justice aspect. This task is recognized and strived for. It is acknowledged that this cannot be done alone by the municipal staff since the perceived distance is too big. Thus, municipalities take up the help of district managers or community centres to connect with a wide variety of citizens. Because these two aspects are working so well the spatial justice aspects finds sufficient attention too. A good design of public green spaces is strived for to create an enjoyable environment for all and to elevate a respectful culture of usage. There is good awareness of allocational justice on the city level. This aspect is connected on the one hand to the mediation of diverse user demands but also to the appropriate allocation of different urban green land uses. It is recognized that there is limited awareness of the broad typology of urban green infrastructure. Mostly urban parks, with diverse design aspects are discussed. These aspects range from urban gardening, outdoor sport, education or recreation to urban forests. Thus, mostly grounded horizontal land use options.

On the German level, the importance of intra- and intergenerational justice is stressed too. The need to develop especially the intergenerational aspect of time is strongly recognized. This is done to make the development comparable but also to define binding standards. These then, in turn, can work as a quality benchmark to ensure equal enjoyment by all residents. Also, the mechanism of the operational program of NRW and the EFRE mechanism itself ensure a purpose limitation periods. This implies that established green elements cannot be immediately changed again. Yet, this appropriation does not consider long term effects on the surrounding areas like eco-gentrification would have. All aspects of intragenerational justice are recognized. Engaged governance is engrained into the funding requirements hence it is a necessity. The diversification of urban societies is addressed too. It is regarded as a challenge to create inclusive spaces and, same as on the city level, help is sought with district managers. Moreover, the importance to open up possibilities for citizen groups to take action is seen and realized with “open call initiatives”. The aspect of allocation justice is taken up in a technical manner and somewhat rationalized. On the one hand, a technical system of points of references is established to ensure a (somewhat) evenly distribution. On the other hand, the land scarcity and competition are recognized and with the principle of doppelte Innenentwicklung vacant spaces are priorities to develop green. Lastly, the aspect of spatial justice is recognized even as an (almost) historical heritage in terms of Baukultur. It is connected with a respectful culture of usage and a joyful and designed green urban environment.

On the European level, the participatory dimension of intragenerational justice receives the most attention. Engaged governance finds strong advocacy. It is characterised with the adjectives early, active and shaping and described as a multi-stakeholder process for a successful urban green infrastructure development. Recognition-based justice is especially emphasized for the young, old and disadvantaged but also for the locally affected communities. In contrast, the distributive dimension is somewhat neglected. Neither allocation nor spatial justice is elaborated in a deliberated manner. In terms of allocation justice, the only emphasized element is one of access in a non-motorized manner. To spatial justice, no attention is paid adequately.

Hence, in light of the main research question, it can be concluded that urban green infrastructure policy is inclusive of environmental justice to varying degrees. The attention paid to environmental justice reflects the approximation of the level to the citizen itself. On the European level, there is

awareness for the importance of participative justice but the translation into distributional justice is insufficient. The temporal aspect is generally recognized by overarching themes like the Agenda 2030. The German discourse is twofold, representing on the one hand a self-developed understanding of green in the city (Stadtnatur) and on the other hand adapting and advancing the European discourse according to the national circumstances (urban green infrastructure). The German level, based on its exchange with lower levels and mandatory participative aspects, reflects well onto inter- and intergenerational justice. The discourse on the city level is the strongest coined by environmental justice. All discursive storylines evolve around the social component of development, considering the positive and negative feedback from the residents.

8.1. Recommendations

The first recommendation concerns the agenda setting ability of European policy. The European discourse emphasized the importance of participative justice. This aspect then could be found back strongly throughout the national and city level. It has also become a mandatory aspect when it comes to the funding of projects via the European Regional Development fund. In contrast, the distributional characteristic of urban green justice is not taken up strongly on the European level. However, cities deem this aspect, and especially spatial justice as important as engaged governance. Therefore, an uptake of distributional and especially spatial justice could support European cities in two manners. Firstly, it could support cities in their argumentation for spatial justice procedures in terms of citizen participation or investments for appropriate structures in urban spaces. Secondly, it could make it a mandatory aspect within the European Regional and Development funding scheme. This would elevate the importance and hence awareness of the aspect, next to enabling cities to directly connect funding to it.

This leads to the second recommendation, which concerns the financial situation of cities. Cities, which are willing to implement urban green infrastructure appreciate the funding through the European Regional Development fund, however, the maintenance of urban green infrastructure elements is the costliest part of the life cycle. This intensifies due to the season creep, the urban heat island effect or urban floods. As seen in the city of Cologne, this requires different and new equipment to take care of urban green element in a responsible fashion. Hence, cities require more financial support for the maintenance of urban green infrastructure elements, if the according eco-system services shall be delivered. This financial support should be realized in the way of a general budget increase for the respective city department. More financial support is always a beneficial, yet hard to come by. City budgets are based on different supports from the nation and federal state as well as their own income due to the cities' productivity. Earmarked funds for urban green should therefore be established. Yet, due to the complex set-up, tax regulations and competences financial redistribution requires a future research in possible economic support mechanism for urban green elements. Even though this might seem challenging it resembles the discussed funding mechanisms for climate adaptation in Germany.

The third recommendation concerns the citizen perspective on the funding of urban green infrastructure via the European Regional Development fund. This research investigated the awareness of social justice from a policy perspective. However, this is only one aspect of the story. Further research into urban green infrastructure projects in cities, told with the citizens perspective, on the aspects of urban green justice could and will reveal important aspects too.

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Annexe

1. List of Interviewees

	Person	*Position*
Europe	Steffano Mattinelli	European Economic and Social Committee - Deputy Head of Cabinet in charge of Sustainable Development
Germany (federal)	Dipl. Ing. Christa Böhme	Deutsches Institut für Urbanistik Stadtentwicklung, Recht und Soziales
	Dr. Bernhard Fischer	Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) im Bundesamt für Bauwesen und Raumordnung (BBR) Ref. II 6 – Bauen und Umwelt
Germany (federal state)	Evamaria Küppers-Ullrich	Ministerium für Heimat, Kommunales, Bau und Gleichstellung des Landes Nordrhein-Westfalen
	Dr. Jost Wilker	Ministerium für Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen Ref. III-1 Haushalts- und Querschnittsaufgaben, Naturschutzgroßprojekte, EU-Projekte im Naturschutz – Geschäftsstelle Grüne Infrastruktur
	Dr.Claudia Fiebig & Ricarda Sahl	Ministerium für Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen, Abteilung 5 & Ref. V-6 Umwelt und Gesundheit
Germany (district council)	Dagmar Schlaberg	Bezirksregierung Arnsberg Dezernat 51 Höhere Naturschutzbehörde
	Andreas Haubrok	Bezirksregierung Düsseldorf Dezernat 51 – Natur- und Landschaftsschutz, Fischerei
Germany (City)	Dipl.-Ing. Michael Heidbreder	Amt für Landschaftspflege und Grünflächen der Stadt Köln
	Michaela Lange	Fachdienst Grünflächen der Stadt Lippstadt

2. List of documents

	Document	*Source*
Europe	Communication from the commission to the European Parliament, the council, the European economic and social committee and the committee of the regions Green Infrastructure (GI) — Enhancing Europe's Natural Capital	Brussels, COM (2013) 249 final
	Opinion of the European Economic and Social Committee on the 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Green Infrastructure (GI) — Enhancing Europe's Natural Capital'	Official Journal of the European Union C 67/153 Adalbert Kienle
	Opinion of the Committee of the Regions — Green infrastructure — enhancing Europe's natural capital	Official Journal of the European Union C 563/43
Germany (federal)	Masterplan Stadtnatur Maßnahmenprogramm der Bundesregierung für eine lebendige Stadt	Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit Juni 2019
	Weißbuch Stadtgrün Grün in der Stadt – Für eine lebenswerte Zukunft	Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit April 2017
Germany (federal state)	Urbanes Grün – Konzepte und Instrumente Leitfaden für Plannerinnen und Planer	Ministerium für Bau, Wohnen, Stadtentwicklung und Verkehr des Landes Nordrhein-Westfalen 2014
Germany (City)	Grüne Infrastruktur Köln Integriertes Handlungskonzept „Vielfalt vernetzen"	Stadt Köln November 2016
	IHK „Grüne Infrastruktur Lippstadt Südwest"	Stadt Lippstadt