Vol. 156, No. xx · Research article

DIE ERDE
Journal of the Geographical Society of Berlin

Matching Local Network Structures and Local Needs Transforming Local Societies in Bamberg, Germany, Towards Climate Resilience

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Manuscript submitted: 7 August 2024 / Accepted for publication: 9 April 2025 / Published online: 2 April 2026

Abstract

Climate change poses major challenges for landscapes regarding their resilience-inducing and health-promoting effects for the local population. Beyond losing just a familiar aesthetic quality, landscapes become restricted in their function as a place of recreation and recovery, social participation, and physical activity. In this context, the consequences of climate change increasingly affect population groups already limited in their daily access to health-promoting elements of landscapes. Translating supra-regional climate resilience frameworks for the needs of local populations, municipalities are assigned a key role. However, this complex process can only be addressed in cooperation with local politics, science, businesses, and civil society engagement. Corresponding structures still need to be established in many places. Their acceptance will largely depend on public participation processes and the implementation of their results by local politics. Drawing from a case study in Bamberg, Germany, we conducted 92 street interviews revealing the specific needs of local residents regarding their everyday well-being and resilience. In addition, following a mixed-method approach, we engaged in participant observation of the promising local network structures. As a result, we suggest further optimization of existing network structures to match the needs of the local population: Further establishing network structures, especially for the purpose of knowledge and practice transfer between different local groups and stakeholders. Establishing network structures for the practical transfer of simple and often profitable changes in everyday health practices of the local population. Training pioneers of change from different social backgrounds to act as representatives for their respective peer groups.

Keywords climate resilience, therapeutic landscapes, health-related needs, transformative research, mixed-method

Neuner, A., Jelinski, S., Stadlmeier, A., Walker, B. B., & Kremer, D. (2025). Matching local network structures and local needs transforming local societies in Bamberg, Germany, towards climate resilience. *DIE ERDE*, *156*(4), xx–xx.

https://doi.org/10.12854/erde-2025-738

1. Introduction

Due to the effects of climate change, landscapes are at risk of losing their familiar aesthetic quality, for example, through the decline in biodiversity and the impact of extreme weather events such as heatwaves. These changes can alter the appearance of landscapes by causing the decline of characteristic plant species or modifying the structure of natural habitats, which also affects their function as places of recreation, recovery, social participation (Aurig, 1999; Schenk, 2006), and physical activity. When addressing the challenges imposed on local communities by climate change, combined efforts focusing on climate resilience, which includes both climate mitigation and adaptation strategies, are becoming increasingly important. Climate resilience refers to the ability of communities and systems to anticipate, prepare for, respond to, and recover from the adverse impacts of climate change, thereby reducing vulnerabilities and enhancing adaptive capacities. However, two major aspects are often precluded from the current debate: Beyond the widely researched risks for physical health in urban heat islands (Ho et al., 2020; Krstic et al., 2017), we still have limited knowledge about (1) the effect of a changing environment on mental and social health affecting everyday practices and (2) the effect of a changing environment on more rural environments often believed to provide per se sustainable shelters.

However, these issues are increasingly being noticed. Abraham et al. (2009) provide a scoping study on the well-known effects of landscape on physical, mental, and social well-being. Characterizing the self-reported perceived contributions of multifunctional landscapes to human well-being while comparing 13 European case studies, Fagerholm et al. (2020) especially highlight the dependence of human well-being on local landscapes. Fazey et al. (2021) name especially the importance of local communities when building coping capacities.

Addressing this demand, in a case study in Bamberg, Bavaria, Germany, we used a mixed-method approach composed of empirical social research and transformative research to answer the following main questions:

(1) Which resilience-inducing and health-fostering places and place-bound practices are important for the local population? How does climate change already affect those places? Which processes of adaptation are anticipated?
(2) Which networks facilitating potential transformation paths already exist in the region? Which transformative interventions can channel future efforts in the region?

Our main contribution is not to derive yet another recommendation for health-related action plans (e.g., Bayerisches Landesamt für Gesundheit und Lebensmittelsicherheit, 2023), but to contribute to a deeper understanding of both individual health-related needs across different social groups and structural requirements of locally informed practices of well-being and resilience. Simply assigning this task to the municipal level for implementation risks overburdening smaller municipalities, as it may strain their resources and challenge local public consensus. Therefore, within the scope of this project, we focus on: (1) identifying the needs of the local population to derive a shared vision for a sustainable landscape that supports individual health and well-being under climate change, and (2) analyzing the local actor network to develop an effective modus operandi that connects municipal and community actors in exploring and designing appropriate transformation pathways. The specific measures developed may vary significantly between regions, depending on spatial, societal, and political conditions. However, recognizing both individual needs and local engagement is essential for creating the foundation for a successful transformation process. In doing so, we contribute to the development of suitable methods for fostering sustainable efforts to address individual health and well-being in relation to climate change. Within the provided framework of transformative research, our goal is not only to comprehend existing structures but also to devise additional avenues for action.

To answer these questions, we first present theoretical perspectives on individual *well-being* and *therapeutic landscapes* and the special role of local communities and municipalities in maintaining them. We present approaches to transformative research collecting all social efforts in a multi-stakeholder transdisciplinary process. We then present the empirical results obtained by our mixed-method approach answering the two research questions. We discuss ongoing efforts for the consolidation of our interventions and conclude with a look at future engagement.

2. Background and Perspective

2.1 Well-Being and Therapeutic Landscapes

In contrast to clinical concepts of health, well-being is a highly complex and multidimensional concept that cannot be defined by straightforward criteria (Fleuret & Atkinson, 2007). Following Antonovsky's (1979) concept of *salutogenesis*, there is not only a state of disease, when one or more health components are irritated, but also a state of health-ease to be stabilized and developed by ongoing practices of resilience. The two terms illness and health form a continuous scale carrying individual well-being (Rathmann, 2020). Individual experiences of well-being cover joy, satisfaction, and happiness (Mayring, 1991), but also relaxation, stress relief, and social interaction (Münderlein, 2020). Secondarily, active resilience-inducing practices foster the positive feelings of general trust (Kistemann & Claßen, 2012) and self-efficacy (Rathmann, 2020) when dealing with stressors. Salutogenesis also covers the process of restoring lost or limited capacities (Münderlein, 2020).

The process of salutogenesis indispensably relies on geospatial resources (Timm, 2021). Landscapes positively influence not only our physical but also our mental and social health. Landscapes have been shown to positively affect physical health by promoting physical activity, reducing stress (Ulrich et al., 1991), and improving cardiovascular function (Maas et al., 2009; Mitchell & Popham, 2008). Access to green spaces, in particular, has been associated with lower rates of obesity and improved overall health outcomes (Cox et al., 2017). For instance, Walker et al. (2022) found a negative correlation between the density, visibility, and accessibility of green and water spaces and the risk of cardiovascular diseases and diabetes, further highlighting the health benefits of these environments. Recent studies have also identified the positive effects of green and blue spaces, especially on mental well-being (Chang et al., 2020; Chen & Yuan, 2020; Cox et al., 2017; Hunter et al., 2019; Taylor et al., 2015; White et al., 2021; Wood et al., 2017). Gebhard and Kistemann (2016) summarize that certain landscapes can promote stress recovery and mental fatigue relief, improve mood and trigger positive emotions, enhance concentration, increase sense of security, stimulate physical activity and social interactions, and have preventive effects on various diseases. Social health, however, is often mentioned only tangentially in studies on mental health. Social well-being includes, in addition to social integration, social actualization, and social contribution, the expectation that the social environment is predictable and usable (Keyes, 1998). Since spatial structures play a critical role in fostering a healthy social life (Kostrzewska, 2017), Thomas et al. (2014) call for a more detailed examination of these socio-spatial environments as part of a holistic perspective. Such environments can only be assessed through the individual perceptions of those affected.

In synthesis, Gesler (1992) calls the mutual embedding of arrangements and practices (for background on the two concepts see e.g., Schatzki, 2002) needed for individual resilience therapeutic landscape (see also Rathmann, 2020). In contrast to other geographic concepts of landscape, therapeutic landscapes consist of *places of healing* (in the sense of Cresswell, 2004) providing health-easing experiences. Beyond the natural and built environment, it is especially the social and symbolic dimensions of places that provide those experiences (Curtis, 2010; Rathmann, 2020). Key to these landscapes are feelings of resonance, which describe a deep connection to the environment and others that fosters emotional engagement and well-being (Rosa, 2016), and coherence, referring to a sense of harmony and meaningful order that supports cognitive and emotional balance (Antonovsky, 1996). Practices of recovery are proven to be supported by scenic views of nature-like landscapes like beaches, waters, or mountains (Abraham et al., 2009). Positive effects cover improving cognitive as well as emotional capacities. Practices of gardening—literally getting in touch—are an accessible source of recreation even in urban environments (Münderlein, 2020).

2.2 Local Challenges and Agendas

However, the concept of therapeutic landscapes largely relies on the silent assumption that certain essential landscape features will remain unchanged in the future and will continue to provide spaces for recovery and resilience. Nevertheless, rising frequencies and intensities of extreme weather conditions due to climate change (Foken, 2021) put these functions increasingly at risk. Far beyond compromising their mere aesthetic appeal as green and blue spaces, this also covers their functions for recreation, social interaction, and physical activity (Aurig, 1999; Brasseur et al., 2023; Schenk, 2006). The effects of climate change on Bavaria include particularly longer-lasting heatwaves in summer (Brasseur et al., 2023, with the

hottest days increasing in frequency [Intergovernmental Panel on Climate Change, 2018]), especially in our study region (Foken, 2021). When heat waves prevent workout routines in the woods or meeting up with family and friends outdoors, this may severely affect both physical and mental health. The positive effects of landscapes on the mental and physical health of the population are thus faced with the challenge of substantial adaptation processes (Chan & Wichmann, 2020; Kaslegard, 2011; Plieninger & Bieling, 2012). Even within the context of climate change, land-use conflicts will further intensify regarding protection of local ecosystems, production of renewable energy, and even different health-related activities (e.g., hiking vs. biking; see Stadlmeier et al., 2025), not considering other processes in growing global populations like urban sprawl.

Assuring the well-being and health of the population is addressed at different political levels. The third goal of the Sustainable Development Goals (SDGs) adopted by the United Nations in September 2015 states that ensuring healthy lives and promoting well-being is essential (United Nations, 2015). The aim of such a sustainably oriented health policy is to reduce the health vulnerability and enhance the health resilience of all population groups. Gebhard and Kistemann (2016) emphasize the societal efforts to create the spatial conditions for well-being. Protecting health in the context of climate change is a recognized task at the state level. The Bavarian State Office for Health and Food Safety has issued guidelines addressed to municipalities for creating heat action plans to protect human health (Bayerisches Landesamt für Gesundheit und Lebensmittelsicherheit, 2023). The Bavarian State Ministry of the Environment and Consumer Protection offers extensive recommendations for climate adaptation, including a handbook and a strategy from 2016. These resources cover all areas of climate action, including health. These recommendations are addressed to municipalities, spatial planners, and decision-makers (Bayerisches Staatsministerium für Umwelt und Verbraucherschutz, 2016, 2021).

Despite all the efforts, implementation of climate adaptation measures on the municipal administrative level still lacks experience and best practice. In the German context, climate change adaptation is not considered a mandatory responsibility for municipalities but rather an optional task, with their core duties typically including supplying fresh water, providing electricity, and maintaining public infrastructure (Miosga et al., 2023). However, the protection of climate and biodiversity is often treated as a secondary priority. This limited prioritization can also be attributed to factors such as insufficient financial resources, lack of qualified personnel, and competing demands on municipal budgets. Consequently, such activities are often rated as lower-priority tasks, especially by municipalities facing economic strain. Miosga et al. (2023) thus proclaimed an ambition and implementation gap at the municipal level. Miosga et al. (2023) underscore that despite the global scale of climate change, local communities play a crucial role in developing solutions and shaping processes of change to support local administration in exploring and implementing local transformation paths leading to climate-resilient landscapes that foster health. This especially holds true in rural environments, where local administration relies on and is governed by local communities (e.g., local associations) on a daily basis anyway.

2.3 Transformative Research

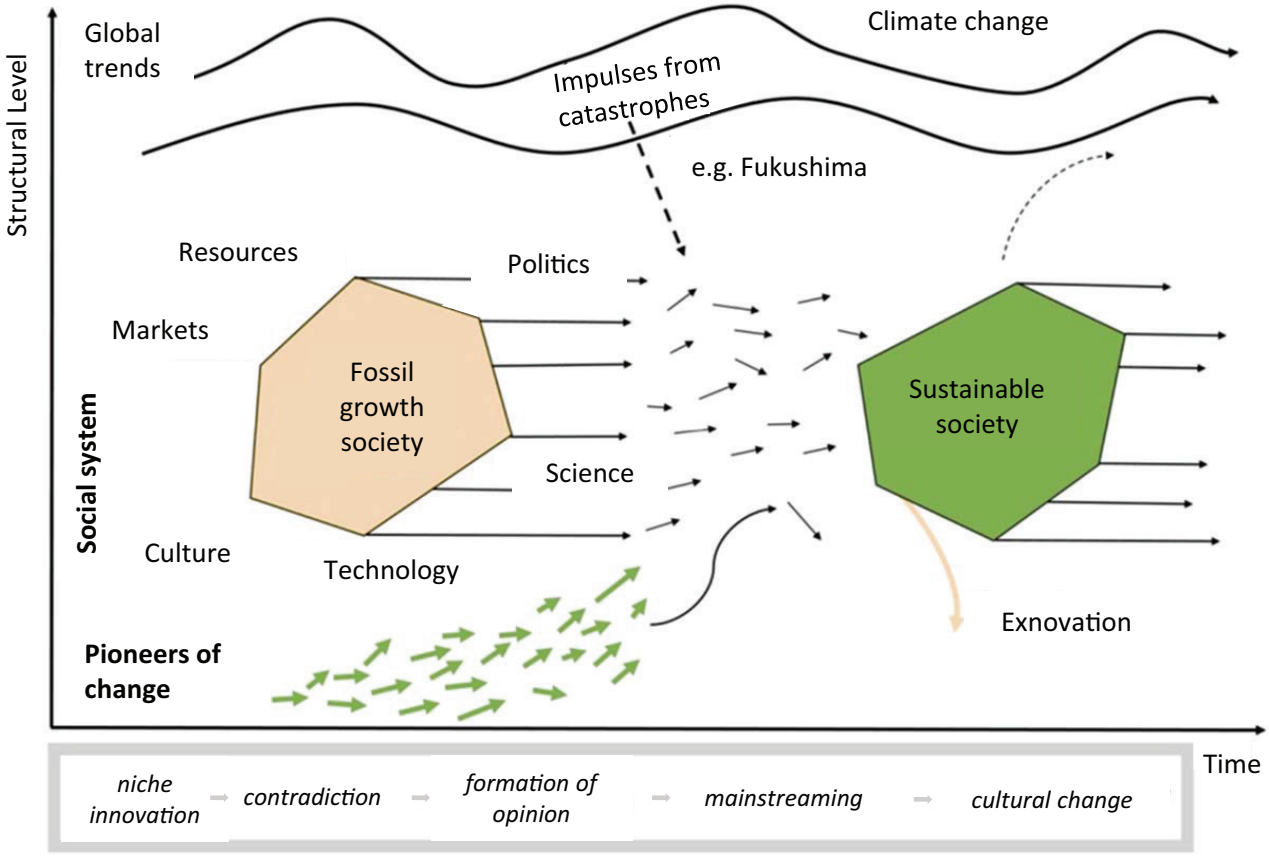
Fostering long-term changes at the municipal level and producing short-term actions at the same time, Miosga et al. (2023) argue that niche innovations and pioneers of change can close the gap. While niche innovations are commonly part of transition studies, transformation studies focus on broader systemic changes that require not only technical but also social shifts. Transformation studies emphasize how profound, long-term changes occur across societal structures, making the distinction clear between simply adapting existing systems and fundamentally changing them (Geels & Schot, 2010). Working towards deliberately developing resilience-inducing places, those changes are the prerequisite for establishing a broad local acceptance and consensus on the modus operandi of local communities consisting of various actors leading to feasible measures of climate resilience. Niches are considered spots where transformative innovations emerge. These innovations are not limited to physical or technical aspects but also encompass social innovations (Geels & Schot, 2007; Gregg et al., 2020). Pioneers of change are individuals, groups, organizations, or communities that develop and implement innovative ideas, approaches, or solutions to bring about positive changes (Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen [WBGU], 2011). Having social niches driving transformation processes and training pioneers of change can lay the foundation for necessary

systemic changes (Miosga, n.d., see Figure 1). Figure 1 illustrates the multi-level perspective of transition and transformation, highlighting the interactions between niche innovations, socio-technical regimes, and broader societal landscapes that shape long-term systemic change.

Capturing the multitude of social innovations, evaluating their potential, and continuously improving them is the task of *transformative research* (Hölscher & Frantzeskaki, 2021; Mertens, 2008). Fedele et al. (2019) emphasize the need for a persistent, innovative, multi-scale, and systemwide adaptation of society. Other than merely observing transformation processes, transformative research engages actively in the public debate as a stakeholder proposing and moderating change (Fedele et al., 2019). While doing so, researchers try to avoid normative actions by involving a broad network of transdisciplinary partners (Michel et al., 2019).

Cooperation is often organized by gathering and connecting partners from different contexts in *living labs* or *transformation platforms* (Bulkeley et al., 2016; Miosga et al., 2023; von Wirth et al., 2019; Voytenko et al., 2016). Maintaining transformation platforms covers general networking activities like identifying key actors, exchanging knowledge and sensitization efforts, but also proposing shared values, goals, and a common working process (Marx et al., 2019). Addressing the specific needs of municipalities and local communities, regional transformation platforms then cascade locally developed successful social innovations to the next political level (Miosga et al., 2023) and trigger impulses for regional activities (Miosga, n.d.). In this regional context, living labs provide the prerequisites in which pioneers of change can initiate, test, and establish sustainable practices. Emphasizing the civil society, these transformation platforms serve as drivers for adapting local politics (Miosga et al., 2023).

Figure 1 Niche Innovations and Transformation Research



Note. Source: Own translation from Miosga, n.d., according to Geels & Schot, 2010, p. 25, and WBGU, 2011, p. 7, 285.

3. Methodology

The study region of Bamberg, Germany qualifies itself as a suitable study region for a number of criteria:

(1) Detailed research on the micro-climate of the region is available and indicates that Bamberg will increasingly be affected by heat waves, intense precipitation events, as well as droughts in the near future (Foken, 2021, 2025).
(2) The region is composed of the administrative units of the city and the district of Bamberg, which represent more urban and more rural societal and political aspects but are forced to relate to each other in common cooperations. At the same time, Bamberg holds the title of World Heritage for its large inner-city green spaces, attracting locals and tourists for recreation, and parts of the district form an urban agglomeration around the city of Bamberg.
(3) In the region, we found a very active network in administration, research, and public addressing sustainable transformation. We were able to involve pre-existing partners in the project setup, acting as gatekeepers for accessing the network.

Investigating the effects of climate change on the local population and exploring ways to counteract it is therefore mandatory. In essence, we used a mix of qualitative methods composed of guided interviews, providing us with an insight into the needs of the population, and participant observation, revealing the potential of Bamberg's local sustainability network (Schreier & Odağ, 2010). Guided interviews were conducted identifying places prone to the effects of climate change. Perspectives and experiences can be freely articulated by the interviewees using open interviews (Hopf, 1995), which enables an explorative analysis of the responses (Kruse, 2015). Nevertheless, a guideline was applied to specifically address health-related topics.

The data collection process was conducted as part of a bachelor course "qualitative social research," framed by the ongoing project Resilienz durch Kulturlandschaft im Klimawandel (REKKE [resilience through cultural landscape amidst climate change], Bayerisches Staatsministerium für Umwelt und Verbraucherschutz, 2024) at Friedrich-Alexander-Universität Erlangen-Nürnberg. Before conducting the study, we provided the course with an outline of a qualitative research process involving (1) a comprehensive lecture on qualitative methods; (2) an overview of the ongoing project, goals, and pre-existing knowledge; as well as (3) a detailed planning process of the data collection process in the study region. Informed by the Sozialstrukturatlas (Bamberg atlas of social structures, Stadt Bamberg, Amt für Inklusion, 2023), we decided to represent specifically three socioeconomically disadvantaged neighborhoods of Bamberg (Gaustadt, Gereuth, and Bamberg East) in our study, complemented by the well-situated district of Hain. Semi-structured guideline interviews were conducted with the assistance of students, supervised by the authors. The guidelines consisted of four main questions:

- What are the well-being places in the region?
- What concerns do the respondents have about their well-being places due to climate change?
- Who bears responsibility for addressing these impacts of climate change?
- What measures do the respondents suggest to counteract these impacts of climate change?

In addition to the guidelines, information leaflets about the research project and data privacy statements were prepared for the respondents. To ensure consistency and familiarization with the interview guideline, we conducted pre-tests. The students worked in pairs, with one team member actually conducting the interview while the other member recorded speech and monitored the interview situation to check for potential biases.

The 92 actual interviews were conducted between June 22nd and June 26th, 2023, and lasted on average between 5 and 10 minutes. The interviews were primarily conducted in German, with some also in English. The students approached the interviewees in public. Additionally, a few door-to-door surveys were conducted to balance our sample regarding age and gender. The majority of respondents were Bamberg inhabitants, although the duration of residency varied largely.

Data from the speech recording process were subsequently transcribed using an offline instance of OpenAI Whisper (2022). Qualitative coding was then implemented using MAXQDA. The coding hierarchy consists of both deductive and inductive categories. The four interview questions from the guideline were used as primary categories for the coding system. We ensured intercoder reliability by setting codes inde-

pendently and discussing their applicability amongst the authors. The pre-established deductive categories were instantiated by inductive codes that emerged from recurring patterns observed through careful reading of the transcripts.

Investigating local sustainability efforts, we analyzed the network of stakeholder groups in the study region of Bamberg (Stadlmeier et al., 2025). Our main goal was to identify how the existing network in the sustainability scene in Bamberg is able to respond to the needs of the population and whether it covers means and resources to address the problems expressed. For a deeper understanding of the thematic focus, available resources, and internal structures, as well as the interconnections between various groups in the sustainability network in Bamberg, participant observation was chosen as the main method.

Participant observation embodies a methodological framework wherein researchers immerse themselves in the research context, thereby gaining firsthand information through direct engagement (Bachmann, 2009; Jackson, 1983). It is crucial to acknowledge the dual role of the researcher as both an observer and a participant, thereby recognizing the reciprocal influence inherent in such engagement (Keiding, 2011; Kühl et al., 2009). This approach yields dense, contextually embedded data, facilitating a holistic comprehension of the mechanics of local transformation platforms (Bachmann, 2009).

Within the whole process, local actors are considered to be equal, transdisciplinary partners in the transformative research process (Miosga et al., 2023).

The initial network establishment can be shown in Table 1 in Stadlmeier et al. (2025), which illustrates individuals and organizations active or developing in the region on the levels 1) interregional; 2) intermunicipal; and 3) municipal.

Table 1 Initial Network Establishment

	Interregional	Intermunicipal	Municipal
Civil Society	• Transition Europe e.V. • Forum 1.5 Bamberg Coburg e.V. • Scientists for Future • Psychologists for Future	• Change e.V. • Fei obachd • Bamberger Klimaschutz-bündnis	• Urbaner Gartenbau Bamberg • Solidarische Landwirtschaft Bamberg • Civic Associations • MeiEssn

Administration	• State Office for Health and Food Safety
	• State Office for the Environment
		• Educational Region Bamberg
		• Health Region Plus Bamberg
		• Flussparadies Franken
			• Administration of Bamberg
			  • MitMachKlima
			  • Education for Sustainable Development
			• Administration of the District of Bamberg
			  • Education Office
			  • Regional Development
			  • District Specialist Advisory Service
			  • VHS-Land
			  • Economic Development

Politics	• RENN Süd	• Climate Advisory Board	• Municipalities in the District of Bamberg

Science	• Universität Bamberg
	  • Department of General Psychology and Methodology
	  • Department of Cultural Geography
	• Hochschule Coburg
	• Universität Erlangen-Nürnberg
	• Helmholtz Association
	  • REKLIM		

Economy	• Körber Stiftung	• Climate Advisory Board	• Sustainchange • Sustainact

Note. Source: Abbreviations and translations: Regionale Netzstellen Nachhaltigkeitsstrategien e.V. (Regional network offices Sustainability strategies [RENN Süd]); Regionale Klimaänderungen und Mensch (Regional climate change and humans [REKLIM]); Bamberger Ernährungsnetzwerk e.V. (Bamberg Nutrition Network [MeiEssn]); *fei obachd* (Community Supported Agriculture Bamberg Franconian dialect „be aware“); Bamberger Klimaschutzbündnis (Bamberg Climate Protection Alliance); Flussparadies Franken (Franconia, a river paradise); Urbaner Gartenbau Bamberg (Urban gardening in Bamberg); Solidarische Landwirtschaft Bamberg (Community Supported Agriculture Bamberg); MitMachKlima (Participate for Climate), Volkshochschule Bamberg-Land (Community Education Center Bamberg-Land [VHS-Land]).

The process to scan the existing network and to set up reliable partnerships with the local sustainability scene started in autumn 2022. Being partners in the REKKE project, the Bavarian State Office for the Preservation of Historical Monuments and the World Heritage Center of the city of Bamberg acted as the main gatekeepers. Further involvement as well as analysis of the current network state was established via a temporary stakeholder platform ("Stammtisch" [round table]) called Transformation zur Nachhaltigkeit im Raum Bamberg (Network Transformation to Sustainability in the Bamberg region), organized in cooperation with the district administration office. We were able to set up a monthly recurrent meet-up with invited local actors, allowing for different analysis and intervention tools, including workshops and topic-ed discussions. The resulting set of transdisciplinary experts is classified into five domains: (1) local, municipal politics, for example, mayors; (2) civil society, for example, co-founders of the association "Transition Europe," (3) activist research, for example, locally engaged scientists; and (4) local administration, for example, employees of the district administration office (Stadlmeier et al., 2025). For the purpose of this study, we complemented these groups with (5) stakeholder groups acting as or promoting sustainable entrepreneurship. Regarding the scale and range of the stakeholder groups, we distinguish between interregional, intermunicipal, and municipal actors.

Based on the findings from the interviews, we designed interventions not only on, but in the established network with the help of our partners. From an earlier project phase (see Stadlmeier et al., 2025), we learned that health is closely related to other urgent topics in a transformative society (e.g., nutrition, education, or democracy). Especially in the context of social health, the need for places of relaxing *and* encounter and exchange was evident. In response, we designed our interventions developing or supporting general platforms reusable by our partners beyond the scope of our project, but placing topics of health on any request or occasion (e.g., self-care in heat waves) amongst other topics set by our partners.

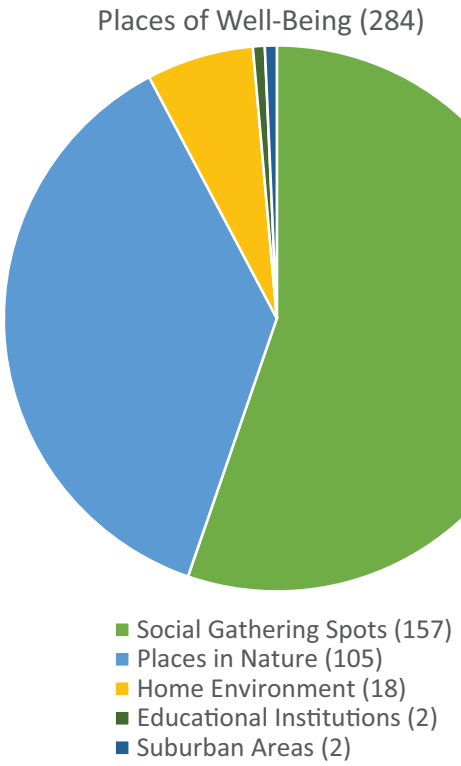
4. Results

4.1 Needs of the Local Population

4.1.1 Places of Well-Being

From 92 interviews conducted, a total of 1,236 codes have been derived. Initially, the participants were asked about their "places of well-being." Based on this main question, two main categories have been derived. The first of these actually collects "places of well-being." In total, 284 place descriptions were mentioned, resulting in five codes depicted in Figure 2.

Figure 2 Places of Well-Being—Hierarchical Code Subcode Model



Note. Source: Own elaboration.

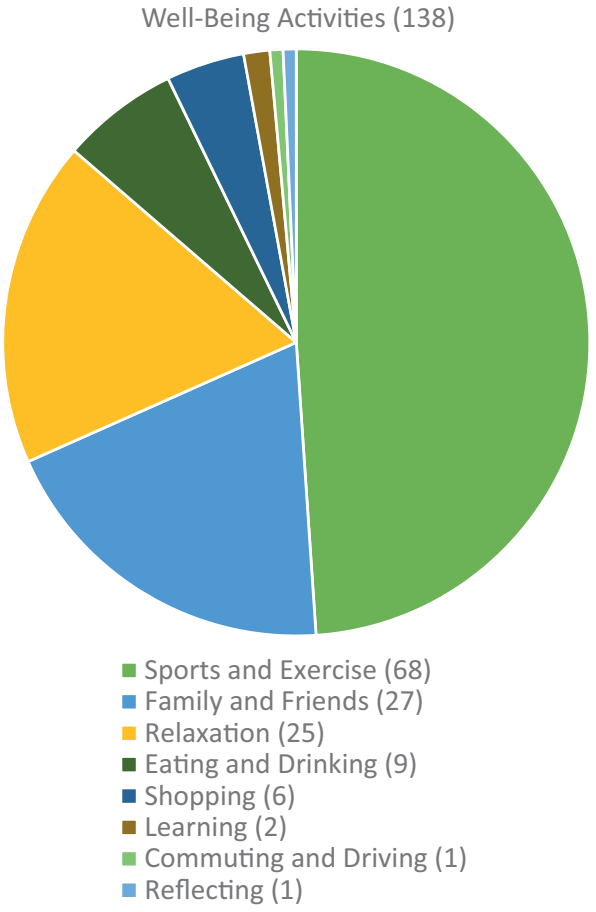
With 157 coded elements, "social gathering spots" are the most frequently mentioned "places of well-being." "Social gathering spots" cover "public spaces" in general (42), "gastronomy and retail" (37), the "city center" (26), "public pools and bathing areas" (18) or "sport facilities" (10). The second prominent class of "places of well-being" is "places in nature" with 105 coded elements, including "parks and urban gardens" (61), "rivers and bodies of water" (22) or "forests" (12).

4.1.2 Well-Being Activities

When asked about "places of well-being," interview participants actually responded not only with physical locations but also with different spatial activities. In total, 138 elements have been identified here, which are assigned to eight codes.

The most frequently mentioned code in the category "well-being activities" is "sports and exercise." The most frequent subcodes in this code are "walking" (32), "cycling" (11) and "swimming" (6). Other frequently mentioned "well-being activities" are spending time with "family and friends," "relaxing," and "eating and drinking" (see Figure 3).

Figure 3 Well-Being Activities—Hierarchical Code Subcode Model

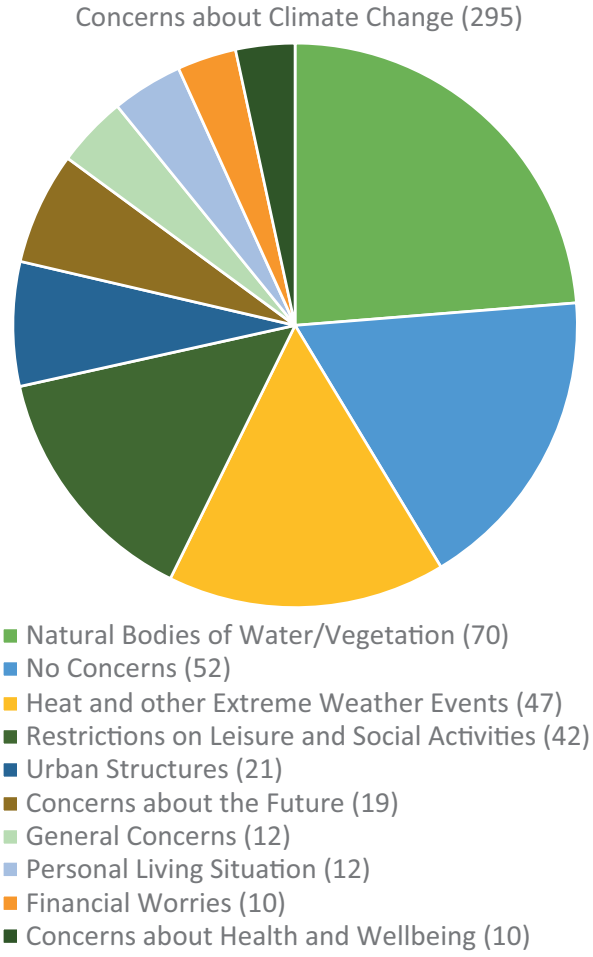


Note. Source: Own elaboration.

4.1.3 Concerns About Climate Change

The third category, derived from the second question of the interview guideline, is called "concerns about climate change" (see Figure 4). There are 295 elements defined in this category, which make up a total of 10 additional codes.

Figure 4 Concerns About Climate Change—Hierarchical Code Subcode Model



Note. Source: Own elaboration.

Concerns about the "natural bodies of water/vegetation" were particularly frequently mentioned. This code especially includes concerns about damaged and dry vegetation, as well as water scarcity and water pollution:

> In Erbapark, it's evident that the ground is highly stressed and dry, and this is generally the case in the forests too; it's just too dry there. (Participant 6)

> Sometimes the water turns bad or becomes too warm, almost regularly. So, it's not good for the fish. It's not good for nature as a whole. (Participant 10)

Furthermore, many of the interviewees responded that they are concerned about the increasing amount of litter in their city.

The second most frequent code in the category "concerns about climate change" is actually "no concerns." For example, several interviewees stated that the effects of climate change are not noticeable in their everyday environment or that they have just already become accustomed to warmer conditions and therefore have no issues with it:

> Do you have any worries? Any worries? No worries. I come from India, so there is a certain degree of temperature. (Participant 54)

> And are there already times when you say I won't go out at all because it's far too hot? Well, I'm already used to it, so I don't mind at all. (Participant 84)

Concerns about "heat and other extreme weather events," as well as "restrictions on leisure and social activities," report about ongoing practices of adaptation:

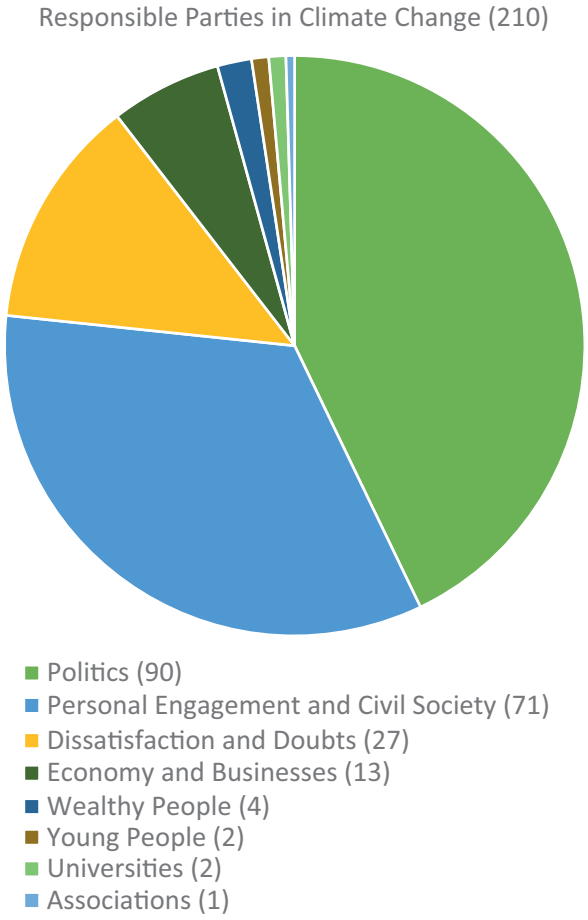
> So, I simply go to the park at different times of the day because in the afternoon, when the sun is blazing down, I don't need it anymore. It's just too stressful for me. (Participant 9)

4.1.3 Responsible Parties in Climate Change

The fourth category resulting from the third interview question is "responsible parties in climate change," aiming at identifying the actual stakeholders thought to be in charge of applying countermeasures. A total of 210 elements have been defined here, which are divided into eight codes (see Figure 5).

With a total of 90 coded elements, "politics" were particularly often seen as responsible for taking on actions against climate change. The code "politics" mainly consists of the subcode "political institutions at the local level" (52). Here, especially the politicians of the city of Bamberg were seen as responsible.

Figure 5 Responsible Parties in Climate Change—Hierarchical Code Subcode Model



Note. Source: Own elaboration.

The second subcode of "politics" is "political institutions at the national or international level" such as the German or European government.

Furthermore, the code "personal engagement and civil society" was frequently mentioned. This is because many interviewees believed that each individual can play a role in counteracting climate change, regardless of profession or social status.

Some of the respondents were also dissatisfied with the existing political measures, expressing frustration over the perceived lack of progress and meaningful action. They doubted that the current measures were sufficient to address the scale of climate change or lead to substantial change. One respondent shared a strong sense of disillusionment, stating:

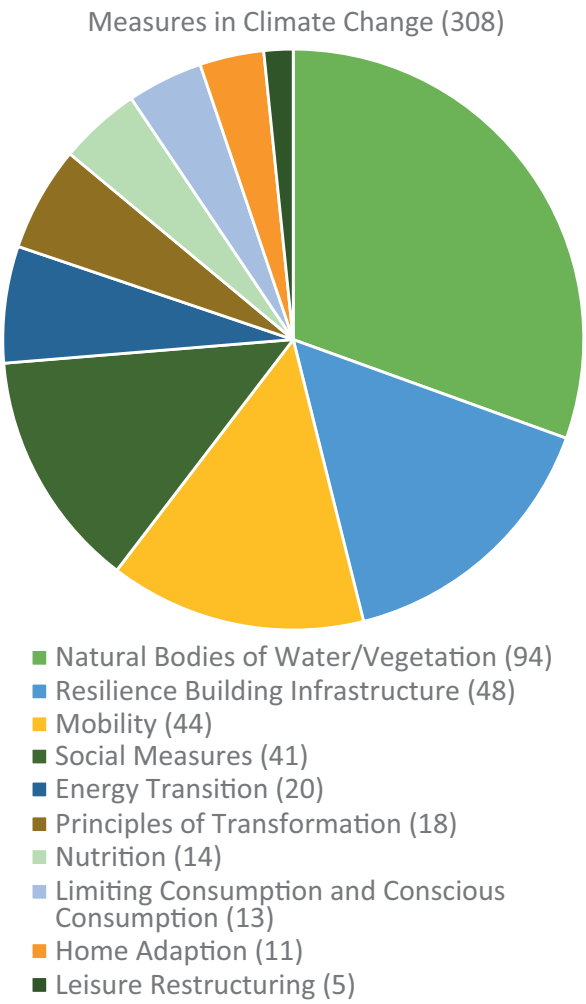
> In politics, nothing changes. Yes. And that's why I'm no longer interested in politics. I don't vote

> anymore. It doesn't interest me, because if one party has a good idea, the other automatically has a good counter-idea. So, it's worse than kindergarten. (Participant 25)

4.1.4 Measures in Climate Change

The fifth category, resulting from the fourth interview question, is called "measures in climate change." In total, there are 308 elements included here, which are divided into the following ten codes (see Figure 6).

Figure 6 Measures in Climate Change—Hierarchical Code Subcode Modell



Note. Source: Own elaboration.

> Measures relating to the "natural bodies of water/vegetation" code were mentioned particularly frequently. This code is about protecting and promoting nature, like creating more green spaces or using water more sparingly: "Bamberg is already a quite green city, but I think there is still room for improvement." (Participant 6)

The second most frequently defined code here is "resilience building Infrastructure." This primarily includes structural measures such as installing more fountains and water features and more shaded areas:

> I think that would also be so good if playgrounds that have, I don't know which ones have water or something with water, where the children can just cool off a bit, and in the sandpit, they also have some cover. With shade? Yes, with shade, that wouldn't be bad either. (Participant 47)

> There really was a fountain there, it was at least a bit cool. If you sat there where the children went, you could splash around a bit and so on. (Participant 31)

Measures in the area of "mobility" were also frequently suggested. In this context, it was often mentioned to travel less, use the bicycle more often, or rely more on electric cars.

"Social measures" were also frequently mentioned. Many of the respondents wished for more information and awareness-raising in the area of climate mitigation.

> Well, I'm also thirty now, and it wasn't such a big issue for us at school back then, it came up, but if I could think back now, I might have needed it a bit more when I was at school or even at nursery school, to make sure that you're polarized to the issue, and I think that makes the biggest difference, because people who already, let's say, give little for climate change are more difficult to convince than someone who is just growing up, where you can perhaps raise awareness of the issue a bit better. (Participant 31)

Furthermore, there was frequent mention of the high costs associated with engaging in climate mitigation efforts. Consequently, there is a prevailing sentiment that environmentally friendly options, such as foods and modes of transportation, should be more affordable:

> And if things like that were simply cheaper, maybe subsidized, so if vegan food or something like that, or generally certain offerings, public transportation, if they simply become cheaper and more accessible, better developed, then there would be many factors where people would already switch, simply for cost reasons alone, not even out of any concerns. So, I think it just has to be easier for people to switch. (Participant 75)

4.2 Code Relations

The identified codes were also examined for cross-category relationships. Using the Code Relations Browser in MAXQDA, it was investigated which codes frequently appeared together in interviews. It was checked whether certain "places of well-being" or "well-being activities" are related to specific "concerns about climate change," opinions about "responsible parties in climate change" or proposed "measures in climate change." No noteworthy correlations were found in the data.

To sum up individual environment-related needs, "places of well-being" strongly relate "places of mental and social health" to "places of encounter and gathering," even being mentioned more frequently than "green and blue spaces." Even if we did not explicitly ask for it, the question also revealed a deep insight into environment-related activities of well-being not bound to specific places. All elements of therapeutic landscapes, reaching from physical activities, social events, and places of relaxation, were covered. When asked about their main concerns, interestingly, participants' arguments more often deemed themselves unaffected than expecting restrictions in social and leisure activities, although they expressed concerns about the environment in general. When asking for agency, we found almost as many arguments on individual responsibility as on politics in general. When asked for measures to counteract negative impacts of climate change on local places of well-being, we found arguments touching all transformation paths, ranging from environmental adaptation to necessary transformations of energy supplies or resilience-building infrastructure.

4.3 Network Analysis and Interventions

As introduced in the beginning, the local sustainability network is a very differentiated mesh of overlapping and intersecting interests (see Stadlmeier et al., 2025). Although sharing the vision of local action, regional political interests (e.g., Regionale Netzstellen Nachhaltigkeitsstrategien [RENN-Süd], n.d.) as top-down initiatives often do not connect with grassroot engagement organized in local groups at the community level (e.g., Transition Bamberg, n.d.). Transformative funding programs (e.g., Körber Stiftung, n.d.) complement transformative research conducted in the region (https://www.uni-bamberg.de) assisted by education-oriented associations (CHANGE e.V.; Bildungsregion Bamberg, n.d.). As an overall finding, the fragmented structure hampered the free flow of knowledge and succeeding best practices of change and caused redundant efforts. Practically, the different actors even lacked such simple things as a shared calendar or a shared mailing list. At the same time, the heterogeneity of actors provides easy access to a whole range of interest groups marginalized or invisible in one single, large transformation platform otherwise.

In effect, the interviews with the Bamberg residents thus informed carefully placed interventions in the local sustainability network. At the same time, credible research communication is crucial to reach a broad variety of target groups. At this point, local networks and platforms can provide the transdisciplinary partners necessary to (1) share and distribute not only knowledge but also successful practices of health and well-being alongside necessary adaptations of everyday routines in general. Depending on the target group of the specific platform, we are then able to (2) provide specific target groups with specific information according to their identified needs.

On the different scales identified (interregional, intermunicipal, and municipal), we conceptualized different interventions addressing those needs. In congruence with the local health-related needs identified (Chapter 4.1) and appreciating all pre-existing efforts in the network, all interventions aimed at co-creating formats and opportunities to catalyze and channel negotiation on suitable measures to support the local health-related needs with all actors involved. To a certain extent, our project thus contributed to shaping transformation paths towards climate-resilient local communities in general. As a first intervention,

together with the educational office of the district of Bamberg, we founded the monthly round table Transformation to Sustainability in the Bamberg region ("table of tables"), inviting representatives of all other active networks to participate and contribute to the development of a local top-level transformation platform. Although efforts were appreciated, it quickly became evident that the intervention spread in three different directions. (1) An education-oriented network carried by local administrations aimed at a regular exchange of information for strategic long-term coordination on common events (e.g., a publicly available series labeled "klimafit" [fit for climate]). Although inviting partners from the table of tables-approach, many other actors eventually chose to opt out. (2) The already pre-existing network Bamberger Klimaschutzbündnis (Bamberg alliance for climate protection) used the intervention to invite all actors to a separate special interest group for coordinating group strategies. As it continued to stage local activist (short-term) events otherwise, this network was not accessible for administrative stakeholders.

(3) Spilling over from the neighboring cities of Bayreuth, Erlangen, and Nürnberg, the intervention accompanied the formation of a forum1.5 Bamberg-Coburg as a regional network aiming at a long-term multi-stakeholder lobbyist approach situated between local universities, unions, and associations. Although closest to a table of tables and also embracing health-related concepts like planetary health and planetary diet, this systemic approach misses the level of individual community-based needs of everyday well-being by a large margin. Yet, the intervention was a success, as a number of key players now hold multi-memberships in different groups or at least registered for their communication channels, which eases information flow in the network.

Regarding health, civil society in the region of Bamberg largely addresses nutrition and food as important factors (e.g., urban gardening, solidarity farming). This issue is also reflected by regional transformation platforms (forum1.5, 2022). Interestingly, food-providing practices (ranging from growing to cooking, see individual needs) provide places of social health. Individual self-protection measures, e.g., in heat waves, are mainly propagated by administrative or economic stakeholders (e.g., GesundheitsregionPlus [Health Region Plus] or health insurance companies). As a main outcome, however, participation is deemed to be the single most important feature of social health across all topics in the whole network (see also Stadlmeier et al., 2025). Solidarity farming and Transition Europe, on the level of active engagement accompanied by the funded project MitMachKlima, the program klimafit of REKLIM, and different funding programs of Körber-Stiftung on the structural level, contribute to that realm. In congruence with the findings from the individual needs, self-determined action (for self-determination theory see Ryan & Deci, 2000) seems key to achieving efficient and accepted progress in local transformation paths.

In response to the lack of need-activities for specific groups, we thus designed additional interventions at the level of local communities to reach out for participatory, self-empowering events for local rural communities. A first pilot of staging a local sustainability festival in the municipality of Oberhaid (close to 5,000 inhabitants) was held in October 2023 with the help of a local green election list (Unabhängige BürgerVertretung [UBV]). Aiming especially at the often-precluded target group of young parents, the festival with the label *gscheid schlau!* (really clever!) attracted up to 250 visitors and provided us with community-generated information on important topics of everyday needs in this specific community (renewable energy, sustainable mobility, and up-cycling). Several topics directly relate to health and well-being, like sustainable nutrition or means of sustainable gardening. Deliberately attached to that event, another local municipality (Lisberg, around 3,000 inhabitants) staged a follow-up event in April 2024 with slight modifications in focus (sustainable renovation instead of sustainable mobility) under the same label.

Following up on these successes, we then deliberately designed a network event explicitly aimed at health and self-care. Organized with the help of the climate protection office of the Bamberg district, we implemented a workshop addressing all 36 district municipalities to (1) present, (2) evaluate, and (3) discuss all local achievements and success stories regarding heat mitigation, water supply, and health-related self-protection, which were key themes that emerged from our street interviews. When asking the local mayors for their expectations, it became evident that, in addition to individual measures, the need for collaboration and exchange between the municipalities was frequently viewed as a crucial success criterion for implementing transformative actions. While heat mitigation measures referred especially to heat protection of buildings and the building up of green spaces,

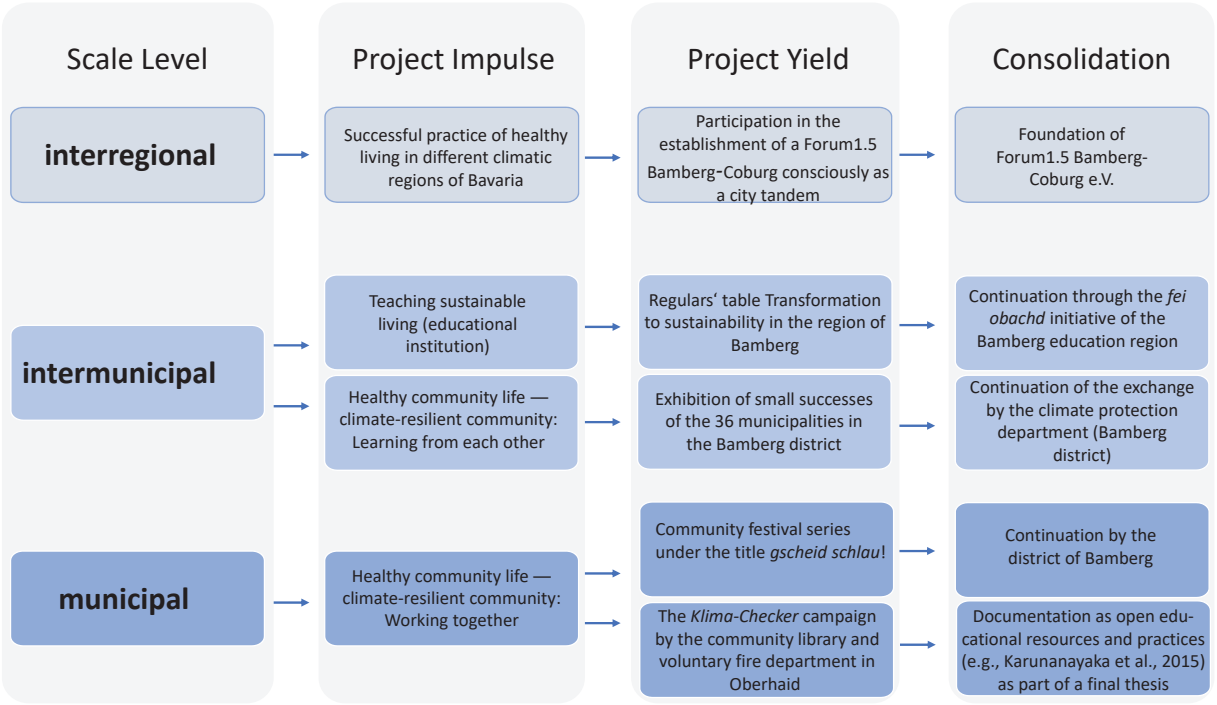
self-protection focused particularly on the need for local regulations to foster both unsealing and the build-up of vegetation on private properties. When talking about water supply, ways to keep water in the "sponge village" were discussed. Responding to the need for ongoing coordination, the climate protection office of the Bamberg district agreed to take over the hosting of this platform event on a regular basis.

At the same time, we intensified our efforts to address the health-related needs of specific vulnerable target groups in local rural environments by setting up a local initiative named *Klima-Checker* (The Climate Checkers) together with the municipal library of the rural village of Oberhaid to foster awareness for self-protection and practices of heat mitigation for persons ages 8 to 12. The resulting one-day workshop focused on (1) adapted behavior for children in heat waves and (2) careful use of drinking water during hot days in summer. The children identified possible measures for keeping indoor environments cool and using off-peak hours of the day for outdoor activities as alternatives to the excessive use of clean water for private pools, but they also learned how important it is to drink more water than usual on hot days.

Figure 7 provides an overview of all the platforms developed or supported so far, aggregated on the scales of inter-regional, inter-municipal, and municipal impulses.

Conclusively, the project was setting interventions with the goal of establishing climate-resilient communities via (1) a table of tables approach inviting all important actors in the local sustainability network allowing for easy transfer of both knowledge and best practices, and (2) a series of sustainability festivals in local rural communities fostering special interest groups at the community level. Fortunately, we were able to consolidate many of these efforts so far: The table of tables was adopted by the project *fei obachd* (Franconian dialect for "be aware", Bildungsregion Bamberg, n.d.), while the district of Bamberg committed itself to continue the local sustainability festivals as well as a regular exchange of knowledge and best practices for policymakers on health-related issues induced by climate change.

Figure 7 Overview of Interventions in the Local Sustainability Network of the Region of Bamberg on Different Scale Levels Including Results and Consolidations Achieved



Note. Source: Own elaboration. Translations: *fei obachd* (Franconian dialect for "be aware"); *gscheid schlau*! (Franconian dialect for "really clever"); *Klima-Checker* (The Climate Checkers).

5. Discussion

Evaluating our results, we see a general bias of the answer rate. In single quarters, we had to deal with a refusal rate of up to 70% as soon as we only mentioned the term climate change. However, this seems to be an important result on its own that in some quarters a majority of inhabitants is not even willing to think about the consequences of climate change on their individual health and well-being or even deny it. To assure equal representation, we tried to cover that issue with a cutoff value of the number of interviews conducted in all quarters, that is, the total number of people addressed firsthand varies significantly between quarters. In single cases, we combined addressing participants in public places with doorstep surveys to fill the gap. Although we were able to cover a broad range of age groups, addressing in public only, we might have missed arguments, especially from vulnerable groups bound to their home environments. In general, however, two factors contributed to a diverse range of opinions. One factor pertains to the age of the interviewees. Also, individuals who have lived in Bamberg for a long time (over 40 years) and likely witnessed significant changes in the cityscape were surveyed alongside others who have recently moved to Bamberg.

Accessing the local sustainability network via gatekeepers, we were able to identify a number of initiatives and actors aiming at individual health and well-being on different levels. Although we were able to exchange with all of them, our network is mainly rooted in the district of Bamberg, as the town itself already hosted a number of similar initiatives. We discussed all of our interventions carefully with our partners in the network before staging them.

In general, when promoting individual well-being in the local sustainability network, we found health to be a well-received concept to talk about transforming society to become more climate-resilient. When asking people in Bamberg about their landscape-bound, resilience-inducing everyday practices, we found three different types: practices relying on (1) specific places like local green spaces, (2) outdoor activities like running or biking that require suitable (green) infrastructure, and (3) social activities relying only on suitable places to meet up, e.g., private homes and gardens. Firsthand, by discussing health-related issues with local mayors and children, we identified several options for self-care and self-protection ranging from keeping homes cool to shifting outdoor activities to off-peak hours of the day. Yet, the infrastructure for all three types can be provided and maintained by local municipalities, especially to address the needs of vulnerable social groups that lack access to therapeutic landscapes, specifically by designing (green) places for activity (physical health), relaxation and restoration (mental health), and encounter (social health). Only with the help of ongoing administrative-private-civil society collaboration will it be possible to provide the underlying preconditions for those practices and infrastructures, especially in the case of concerns regarding sustainable water supply during heatwaves. As we focus on the structural preconditions in this paper, a more detailed analysis and evaluation of specific health-related measures is presently in preparation as a future publication.

Analyzing *local challenges and agendas*, our phenomenological approach revealing individual needs of well-being proved to act as an important concept for group-specific, self-determined courses of action when urgent local needs have to be shaped as local transformation paths. By turning the question from "how can our local community get climate neutral?" into "how can we assure stable conditions of well-being in our local community?," we were able to involve even political stakeholders who still struggle with concepts of the climate crisis, while emphasizing that climate neutrality is a key prerequisite for long-term well-being. When local, consensus-driven policies are crucial for exploring, evaluating, and communicating the development of local, situated transformation paths, we found that community cohesion, participation, and lived democracy are in and of themselves indispensable salutogenetic practices of social health.

All of these issues are well reflected in the local sustainability network, ranging from inter-regional, scientific activities to local, spontaneous actions. However, only a few of them try to scale out inter-regionally (e.g., forum1.5 Bamberg-Coburg or Transition Europe e.V.), represent the needs of specific target groups (e.g., CHANGE e.V.), or allow easy participation for not yet engaged individuals (e.g., Transition Europe e.V.). In response, our interventions as transformative research mainly tried to involve different target groups not covered yet regarding their well-being-related needs, especially in addressing rural areas, young parents, and children. In addition, we continued to foster transformation platforms for knowledge and practice transfer on the administrative/municipal level to al-

low for an easy roll-out of first success stories regarding health care amongst peer stakeholders.

Of course, we have no exclusive authorship of our interventions, as the interventions were co-designed and co-staged in the sense of a living lab with a number of partners in the network. We just added some extra power to their efforts. However, involving them at that early stage made it possible to consolidate almost all of the interventions set in the network during the runtime of our project. In general, our efforts contribute to the field of transformative research evaluating qualitative mixed-method approaches for staging local transformation platforms.

6. Conclusion

Following theoretical perspectives of salutogenesis and therapeutic landscapes, we engaged in transformative research aiming to provide a better understanding and representation of individual needs for well-being in the context of climate change. Conducting a qualitative mixed-method study, we combined guideline interviews with participants in socio-economically vulnerable parts of the population in our study region in Bamberg, Germany, with participating observations in the local sustainability network. In effect, this allowed us to co-design and co-stage interventions in the network addressing specific health-related individual needs and providing sustainably maintained platforms for self-determined action at the same time.

The local sustainability network in the region is a very differentiated mesh of overlapping and intersecting interests. Regional political interests, grassroot engagement, and education-oriented associations complement transformative research conducted in the region. As an overall finding, the fragmented structure hampered the free flow of knowledge and succeeding best practices for change and caused redundant efforts. At the same time, the heterogeneity of actors provides easy access to a whole range of interest groups that are marginalized or invisible in one single, large transformation platform otherwise.

Guideline interviews revealed places of well-being to be strongly related to places of mental and social health, with places of encounter and gathering even mentioned more frequently than green and blue spaces. Even if we did not explicitly ask for it, the question also revealed a deep insight into environment-related activities of well-being not bound to specific places. All elements of therapeutic landscapes, reaching from physical activities and social events to places of relaxation, were covered. When asked about their main concerns, interestingly, participants' arguments more often deemed themselves unaffected than expecting restrictions in social and leisure activities, although expressing concerns about the environment in general. When asking for agency, we found almost as many arguments on individual responsibility as on politics in general. When asked for measures fostering a more sustainable society, we found arguments touching all transformation paths, reaching from environmental adaptation to necessary transformations of energy supplies or resilience-building infrastructure.

Co-designing and co-staging interventions with partners in the network aimed at establishing climate-resilient communities via (1) a table of tables approach inviting all important actors in the local sustainability network, allowing for easy transfer of both knowledge and best practice, and (2) a series of events in local rural communities complementing the health-related needs regarding infrastructure and everyday practices on an administrative level as well as on the level of invisible, yet vulnerable groups like children. While heat mitigation measures referring to individual behavior, like using off-peak hours of the day, are well-known, we found a need for administrative action, especially regarding regulation towards (1) unsealing and building up vegetation on private properties and (2) assuring a sustainable drinking supply in times of water shortage in heatwaves, when an even increased amount of water is used for refreshment and private pools in rural areas.

In the local stakeholder network, we experience a high engagement for education and knowledge transfer on sustainable development, but also concerns raised by both experts and the public about the societal impacts of the necessary transformation paths towards local landscapes and infrastructures promoting physical, mental, and social health. When exploring, evaluating, and communicating local, situated transformation paths in local stakeholder networks, we found community cohesion, participation, and lived democracy to be indispensable assets of social health in their own right, especially when quick action and response to health-related climate-induced hazards is needed.

In general, our efforts contribute to the field of trans-

formative research evaluating qualitative mixed-method approaches for co-designing and co-staging local transformation platforms on different scales. Further establishing network structures is mandatory though, especially for the purpose of knowledge and practice transfer of early success stories regarding health care and well-being between different local stakeholder groups. Fortunately, we were able to consolidate many of our interventions co-designed and co-staged with partners in the region, especially in addressing rural areas, young parents, and children.

Yet, we still see a large potential in the further development of transformation platforms explicitly addressing the needs of specific social or local groups. Suitable transformation paths regarding everyday practices of health and well-being might differ even in close proximity between wood covered hills and open valleys as well as between elderly people and children. Alongside fostering success stories to prove the feasibility of local transformation paths, we propose investing more in the specific training of pioneers of change who can act both as representatives and multipliers within their related peer groups. Eventually, this will lead to the development of self-determined and thus both more responsive and better-accepted local transformation paths, especially in rural areas.

Acknowledgments

The research project is funded by the Bavarian State Ministry of the Environment and Consumer Protection (StMUV) as well as the Bavarian State Ministry of Health, Care and Prevention (StMGP) within the scope of the compound project "climate change and health."

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