

# / PARTICIPATORY SDG MONITORING/

Documentation of a transdisciplinary seminar  
to localize SDG monitoring at neighborhood level

Winter term 2022/23  
Institute of Urban Planning and Design,  
Department of International Urbanism

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## 1 Project summary

Franziska Laue, 2022



On the way to more sustainability, the United Nations have adopted 17 global goals for sustainable development, which are to be implemented by cities and communities at the local level. In order to determine the extent to which cities are fulfilling these goals (and what tasks are still awaiting them), the Sustainable Development Goals (SDGs) are supplemented by a system of targets and indicators intended to monitor and evaluate the implementation process.

The city of Stuttgart is one of the pioneer cities in the field of monitoring these global sustainable development goals. For several years now, the city has been examining the extent to which the existing targets and indicators for surveying the implementation of SDGs are suitable for mapping the status of implementation of the sustainable development goals and, based on this, for developing measures to improve sustainability in Stuttgart. So far, however, this has been done mainly on the basis of quantitative data and at the city-wide scale; Approaches to transfer the evaluation to the smaller scale of districts or neighborhoods do not yet exist. Also, the possibility of including qualitative aspects (such as the quality of green and recreational areas and not just their square footage) in the evaluation is missing in the overall context. Therefore, the seminar "Participatory SDG monitoring" aims to make a methodological contribution to the further development of these SDG indicators by addressing the following questions:

- How could qualitative aspects be integrated into the SDG assessment and its indicator system?
- How could qualitative data be co-produced together with residents of a selected neighborhood?
- How could the indicator system be transferred from the larger municipal level to the smaller level of the district and the neighborhood?

Within the seminar, students critically reflected on the suitability of current SDG indicators for the district level in the context of urban regeneration projects. They took a close look at exit instruments for urban regeneration and their potential for SDG implementation and monitoring. Furthermore, the students developed participatory formats for (qualitative) data collection and tested these formats in the field. Finally, these results were evaluated. This report describes the work process within the context of the seminar and summarizes key findings.

## 1.1 A brief background on localizing SDG monitoring

The Agenda 2030 with its Sustainable Development Goals (SDGs) published by the United Nations in 2015 provide a universal framework for sustainable development worldwide. With a total of 17 goals, far-reaching questions of sustainable development are covered. A set of targets and associated indicators operationalizes each of these individual goals and paves the way for assessing the current situation as well as measuring progress towards a more sustainable future (UN 2015).

Due to the universal nature of the SDGs, this assessment and the associated indicator system are mainly aimed at the national level and form the basis for national sustainability reports and the associated development policies. However, it is recognized that the implementation of the majority of the SDGs and their targets requires the commitment of cities and municipalities and thus the involvement of the municipal level in the SDG assessment and monitoring process (Misselwitz et al. 2015).

Despite this fact, cities and municipalities devoting themselves to this demanding task are currently facing considerable challenges: On the one hand, many of the targets and indicators defined in the context of the SDGs address aspects that cannot be measured at the municipal level. On the other hand, some aspects that are fundamental to sustainable development at the municipal level are not addressed adequately in the targets and indicators of the SDGs. It is therefore necessary to translate the global sustainability goals to the city and community level in order to take local framework conditions and processes into account.

The need for this translation of the SDGs to the municipal level has been widely discussed and has produced several notable results: In 2017, a German working group for the development of "SDG indicators for municipalities" (Bertelsmann Foundation 2020) started working on an indicator catalogue for cities and municipalities, and, as a result, published a first modular SDG monitoring system for the municipal level in 2018. This system was supported by a digital SDG portal for municipalities, which should bring together data from central sources in order to better understand corresponding SDG indicators at municipal level.

Based in these recommendations, some cities volunteered in piloting SDG monitoring at the local level. In the German context, Stuttgart was one of the pilot cities conducting a so-called "Voluntary Local Report (VLR)" at the municipal level between 2018 and 2019, with a refined follow-up version in 2021 (LHS 2021) and another one in 2023.

The methodology of this VLR was to check the indicator proposals formulated in the "SDG Indicators for Municipalities" project and their relevance for the Stuttgart context. In a further step, adjustments or own suggestions for local indicators were developed according to the specific situation of the municipality of Stuttgart and its data availability. Based on these results, recommendations for indicators were formulated, which were then fed back into the project "SDG Indicators for Municipalities" as a methodological contribution. In the long term, this iterative process aims at creating an optimized basis for the collection of SDG relevant data at municipal level. In the course of this process of transferring the SDG monitoring process to the municipal level, several important aspects became apparent: In order to generate tangible approaches to the sustainable transformation of cities, qualitative information must be taken into account in addition to the consideration and collection of quantitative data. For this purpose, the VLR of Stuttgart has developed a methodical proposal by integrating qualitative descriptions of special SDG-relevant projects. In addition to the municipal level, the district level could make an important contribution in the context of SDG monitoring. However, there are currently only a few projects that implement the transfer of the monitoring and indicator system at district level.

One of the few projects that consider SDG monitoring at the district level was developed for the Berlin district of Treptow-Köpenick in cooperation with local university partners. In this project, an individualized set of indicators was set up and published in an online SDG monitoring dashboard (<https://sdg-treptow-koepenick.de>). While this project is an ambitious and promising attempt to take a closer look at the operational district level, its main focus lies on quantitative data. The integration of qualitative data within the framework of SDG monitoring remains a largely open question - both at the municipal and at the district level.

Fig 1: SDG monitoring on the local level - recommendations for indicators and status reports



## Translating the SDGs to the district level - the inter- and transdisciplinary research project "GoGlocal"

The Institute of Urban Planning and Design at the University of Stuttgart (SI) has been engaged in the topic of localizing the SDGs for several years now. This commitment led to an interdisciplinary and transdisciplinary collaboration with academic partners from Windhoek, Namibia and urban and civil society actors from the city of Stuttgart and Windhoek. During a 15-month research project named "GoGlocal", which was funded in 2021-2022 by the Baden-Württemberg Ministry of Science, Research and the Arts (MWK), the research team established a cross-city learning network aimed at translating the Global Sustainable Development Goals with a focus on SDG 7 (affordable energy), SDG 11 (sustainable cities and communities) and SDG 13 (climate action) to the local level.

The result of this project consists of a multi-step method for localizing the SDGs to a specific neighborhood. Figure 3 shows a brief overview of the seven steps developed within the project.

While the first step consists of a critical analysis of the international indicators for the three selected SDGs, step two focused on identifying local needs through an examination of existing strategies, processes and actors concerned with upgrading and regeneration on the municipal and neighborhood level. This first and second step was carried out as an iterative process and led to the generation of so-called "integrated fields of action", which allows for the assessment of the SDGs not only in silos, but in an integrated way (Ley et al. 2022).

Step 4 evaluates whether the international and, if applicable, existing city-level targets and indicators are useful for the neighborhood context. Building on this, in step 5, alternative (or proxy) indicators are developed that are closely tailored to the local context. Step 6 then checks which data is available at city and district level and which methods are already being used. Steps 5 and 6 are in turn closely linked and are therefore again pursued iteratively. The final step 7 then focuses on filling the identified gaps in terms of SDG relevant data and testing methods to co-produce data to fill these gaps together with members of a selected neighborhood community.

Fig 3: 7-step method for localizing the SDGs developed during the GoGlocal-project



Fig 2: GoGlocal project partners

This last step was tested during a community workshop in an informal settlement in Windhoek, Namibia. Together with the residents of this community, students and employees from the University of Stuttgart and the Namibian University of Science and Technology (NUST) carried out participatory methods to collect information on SDG-relevant topics. In doing so, they used two instruments that are routinely used in the context of upgrading informal settlements: the instruments of (1) settlement profiling and (2) household enumeration.

Both instruments and their surveys were expanded to include questions allowing the collection of additional qualitative information. For the first time, the surveys were digitized with the aim of feeding the data collection process via tablets directly into a database. This was intended to enable faster analysis and visualization of the results of the data collection. The survey process itself was conducted within the framework of focus group discussions and individual interviews with residents. These participatory formats were prepared and enabled by the civil society partners of the process, namely the Namibian Housing Action Group and Shack dwellers federation of Namibia in cooperation with staff members from NUST.

The results of this process provide valuable information about changes since the last settlement profiling. They also provided insights into SDG-related issues that are of particular concern to local communities. Furthermore, they uncovered hidden barriers hampering the district's upgrading and SDG implementation process – some in areas the researchers had not initially considered. Each of these individual steps of the method and the testing of the approach in a neighborhood in Windhoek, Namibia, can be explored in detail in three training modules, available as video clips on the following website:

<https://international-urbanism.de/research/go-glocal-2021-2022/>



Fig 4: Awareness-building for SDGs during a community studio in Windhoek/ Namibia



Fig 5: Online training modules

Fig 6: Co-productive community studio in Windhoek/ Namibia



## Transfer of the “GoGlocal” method for localizing the SDGs to Stuttgart

The seminar Participatory SDG monitoring is a spin-off of the research project GoGlocal, which aims to continue inter- and transdisciplinary collaboration and to test co-productive methods in the context of a defined neighborhood, this time in the City of Stuttgart. Like the previous test phase in Windhoek, it takes up existing programs and initiatives for urban renewal and their methods, questions their potential for use in SDG monitoring and uses this potential with a focus on the development of local indicators and the co-production of qualitative data.

In this regard, the seminar project focuses on the Münster district of Stuttgart, which is currently part of an ongoing urban renewal program called “Social City”. As part of this funding program, a wide range of participative activities and measures have been implemented since 2019, and organizational structures for controlling and initiating the urban renewal process have been created. Thanks to the commitment and openness of the organizational team of the Social City of Münster and the members of the district council, the seminar participants were able to analyze the existing preliminary studies and development goals of Stuttgart Münster and examine their compatibility with the SDGs. Building on this, the students developed specific indicators that enable the collection of SDG-relevant information. Similar to the previous project in Windhoek, the focus was on including qualitative aspects in the co-productive data collection and testing the data collection methods as part of participatory events on site.

While the overarching method of localizing the SDGs was consistent across both projects, there was a crucial difference in the initial framework conditions of the two districts: In the informal settlement of Windhoek, the urban renewal process considered for the SDG monitoring was essentially driven bottom-up by citizens' initiatives, while in Stuttgart Münster this process was initiated and supported by the municipality. This circumstance gave space to reflect on the applicability of the method in different contexts and to outline its potentials, but also remaining questions and further research needs.

## Localizing SDG monitoring: motivation and potential

Both the GoGlocal project and the participatory SDG monitoring seminar have uncovered some fundamental questions about the motivation and prospective impact of the SDG monitoring process at the local level: Is the monitoring process mainly meant to make changes measurable and to document progress in achieving the SDGs? Or does it aim at a targeted assessment of needs tailored to the local context - as a basis for future action-oriented, co-productive development? Or does its main function and motivation consist in revealing obstacles in the area of implementation of the SDGs, again with the aim of overcoming these obstacles through appropriate action-oriented approaches? How can the monitoring process of the SDGs be supported at the local level by existing instruments for urban renewal, and what adaptations within these instruments might be needed to fulfill this role?

In the final, reflective part of this seminar documentation - in chapter 3 -, we will take up these questions and discuss them in the context of the seminar results; The following chapter 2 of this brochure initially focuses on the presentation of these results, which were divided into two work phases.

## 1.2 Context, structure, activities and methods of the seminar

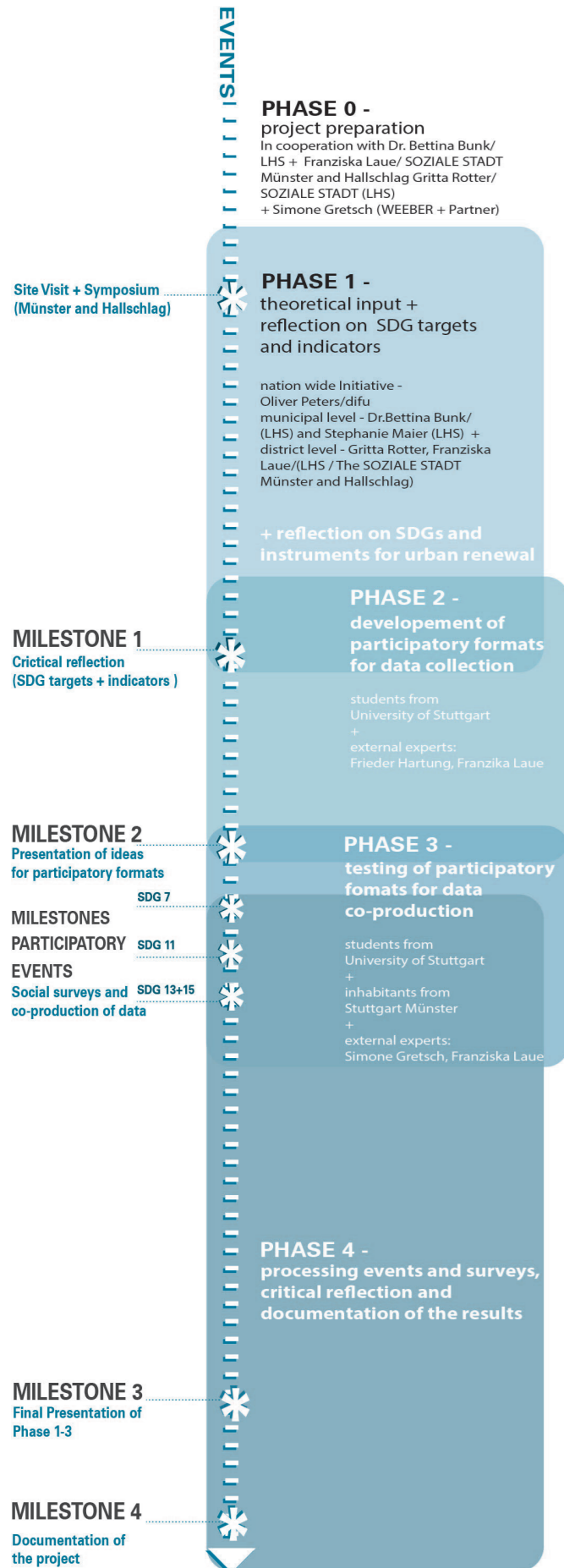


Fig 7: Timeline of the seminar

## Context of the Seminar

The seminar Participatory SDG monitoring at neighborhood level was offered by the department of international urbanism of the Institute of Urban Design (SI /IU) at the University of Stuttgart. It took place in the winter term 2022/ 2023 which lasted from mid of October 2022 until mid of February 2023. In total 28 students coming three different study tracks (Bachelor Architecture and Urban Planning, Master Architecture and Urban Planning, Integrated Urbanism and Sustainable Design) had enrolled. Within 13 approximately half-day long meeting sessions and additional self-study time, the students researched, explored and reflected on Participatory SDG monitoring at a neighborhoodlevel. Due to the time restrictions caused by Universities' semester structure, the content was selected in terms of feasibility for the students and important learning outcomes.

The concept of the seminar was developed in close collaboration with the city of Stuttgart and builds on the existing engagement of the city of Stuttgart in the context of the SDGs. Especially the Voluntary report and the aim for its further development as well as the motivation from leaders of the so called "Social City Program" were an excellent basis for the joint development of the seminar. Furthermore, the district Münster offered a great opportunity for exploring SDG monitoring in a participatory way. Due to the Social City Program and its ongoing urban renewal process it offered many starting points for interactions between students and local residents. In addition, the support of the local district councillor was crucial for establishing a strong connection between the current developments of the district and the participatory formats. These conditions were a fertile ground enabling students to gain insights into transdisciplinary research approaches and work with experienced actors in a real-world environment. Besides the results for the further development of Participatory SDG monitoring, this learning experience is unique in the education of future urban practitioners.

The project was financially supported by the "Stuttgart Change Labs", funded by the Ministry of Science, Research and the Arts Baden-Württemberg. This funding supported the integration of transdisciplinary project partners and the implementation of participatory elements with citizens of the Münster district as well as the dissemination of the seminar results.

## Structure and activities

The seminar Participatory SDG monitoring was structured in two main parts, the theoretical part and the participatory part. First, in the theoretical part (phase 1), the global sustainability goals of the UN were discussed and knowledge about the previous process of SDG monitoring using the example of Stuttgart was built. In addition (planning) instruments were analysed in the context suitable SDG monitoring on the local level. This was accompanied by a symposium, guiding articles and introductory lectures. The results of the theoretical part were presented and discussed with experts from the City of Stuttgart and responsible leaders from the Social City Program in Stuttgart Münster and Hallschlag.

Based on this, the participatory part (phase 2-3) focussed on methodological questions of collecting and analysing qualitative data. Within this phase ideas on how these data can be collected together with the residents of the district of Münster/ Stuttgart were developed. To enable the development of specific interventions, four SDGs responding to the needs and potentials of the chosen district were selected in close cooperation with the city of Stuttgart.

- The selected SDGs were:
- SDG 7: Affordable and clear Energy
  - SDG 11: Sustainable cities and communities
  - SDG 13: Climate action
  - SDG 15: Life on land (Biodiversity)

After the conceptual development of the participatory formats, these were implemented and tested in the field. Through the implementation processes the students gathered data and gained knowledge on the suitability and feasibility of the proposed formats. The results were the basis for the evaluation and interpretation of the collected data, as well as for a methodological reflection.

Finally, the gained knowledge was linked back to the instruments and responding indicators (phase 4). From these reflections final conclusions and recommendations for the further development of participatory SDG monitoring at a neighbourhood level and supplementing or optimising the system of indicators were derived.

## Teaching methods

The seminar consisted of compact phases with lectures and workshops, accompanied by self-study research phases in which students developed their own ideas about participatory SDG monitoring. Within the theoretical part more inputs were provided, whereas in the participatory phases the aim was to guide the students based on their own proposals through tutoring sessions.

After a first introductory meeting the seminar started with an intensive, full day event. Within a symposium three inputs were given by external experts. The inputs illustrated three different levels of SDG monitoring. Oliver Peters from the German Institute of Urban Affairs held and introduction on SDG monitoring at a nation-wide level. Bettina Bunk from the city of Stuttgart followed with insights into the voluntary SDG monitoring on the municipal level in Stuttgart, and Gritta Rottner and Franziska Laue elaborated on the Social City Program and its connections to the SDGs. After this profound theoretical input, the afternoon was spent with a guided site visit through the district of Münster, led by the Team of the Social City Program. This intensive beginning of the seminar provided both theoretical knowledge and site-specific experiences. These were the basis for the further work of the students.

During the whole seminar, the students worked in four groups with 7-8 group members. Since the seminar was open to different study programs, the aim was to create a mixture of knowledge backgrounds in each group. The group work was supported by tutoring session throughout the semester to discuss open questions and the progress of the assignments. In addition, small lectures were held to point out important elements of transdisciplinary research and present inspiring cases of citizen participation. For example, a lecture on "Participatory Tools and Methods" as well as on "Social Research in Spatial Planning" were held before the tutoring sessions. Furthermore, Frieder Hartung presented interesting cases of participatory projects and Isabelle Willnauer held a workshop on fundamentals in academic writing and data analysis.

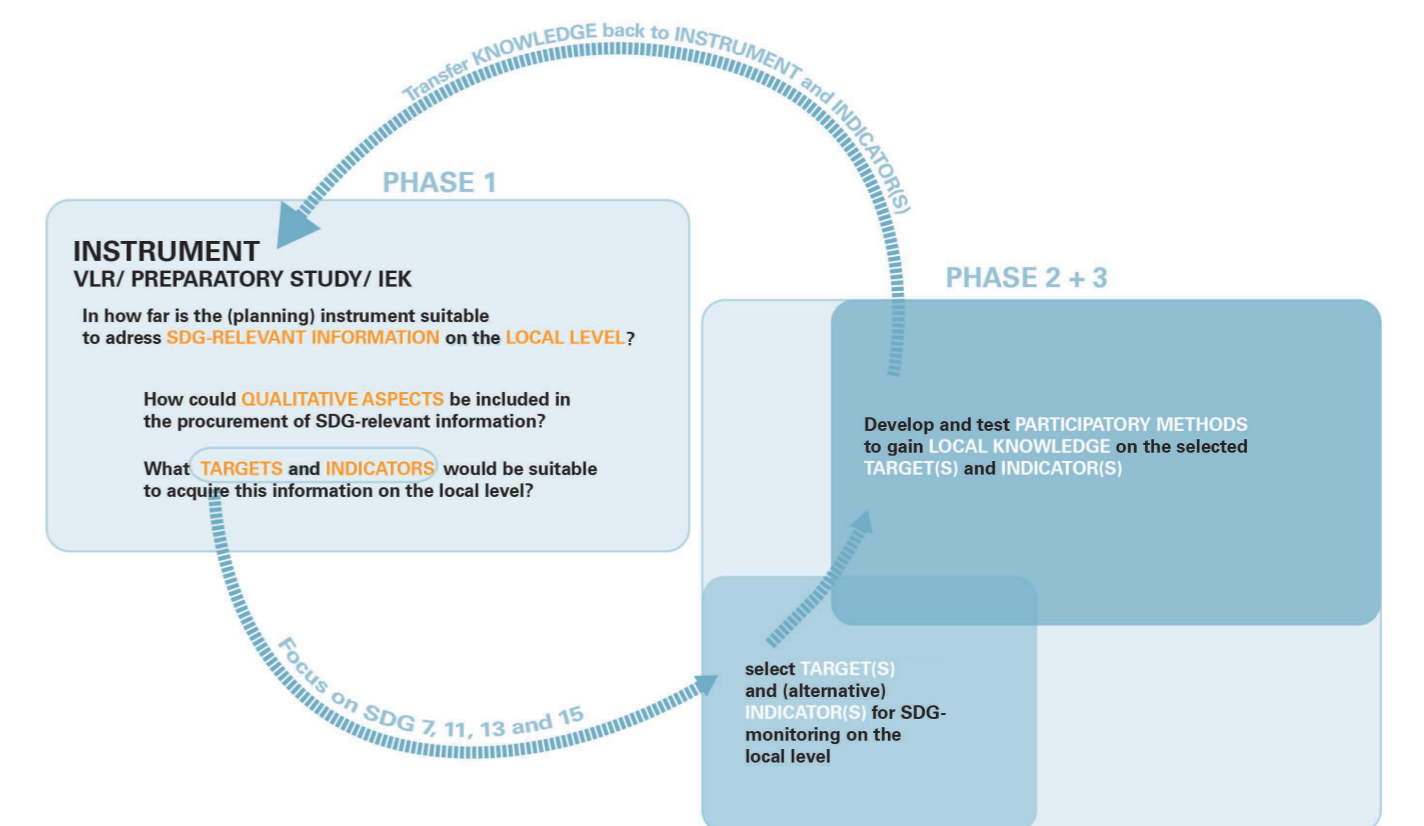
Another core aspect was that external experts were invited for each (intermediate) presentation. After the presentations, feedback sessions enabled the students to profit from the rich knowledge of actors in the field of SDG monitoring, planning processes, as well as specialists for the neighbourhood of Münster. These discussions enriched the progress of the students' work and enhanced the quality of the overall results.

- The following expert advised to the students within the seminar:
- Dr. Bettina Bunk / Coordinator for the global sustainability goals at the City of Stuttgart, External Relations Department
  - M. Sc. Franziska Laue / Department of Urban Planning and Housing, Soziale Stadt Münster-Program
  - Gritta Rotter / Department of Urban Planning and Housing, Soziale Stadt Hallschlag-Program
  - Renate Polinski / representative of district council Stuttgart Münster
  - Stephanie Maier / Statistical Office, City of Stuttgart
  - Wolfgang Döking / Member of district council Stuttgart Münster
  - M.Sc. Simone Gretsich / Weeber und Partner, Institute for Urban Planning and Social Research
  - Dr. André Müller / Federal Institute for Research on Building, Urban Affairs and Spatial Development
  - Alexander Altstadt / Institute for Energy Economics and Rational Energy Use

- Addition Inputs were given by:
- Oliver Peters / SDG monitoring on a nation-wide level
  - Frieder Hartung / Participatory formats in urban planning - Examples from citizen participation
  - Isabelle Willnauer / Academic Writing

For a detailed schedule of all seminar events, see the timetable on page 12.

Fig.8: Methodological concept of the seminar



# PARTICIPATORY SDG MONITORING /

## / TIMETABLE

WEEK	DATE	09:45 - 11:15	11:30 - 13:00	ASSIGNMENTS AND DEADLINES	
W 42	19.10.	<b>INTRODUCTION:</b> GENERAL INFORMATION ABOUT THE COURSE / ABOUT SDGs and MONITORING SDGs at the local level / RESEARCH&READING ASSIGNMENT 1	<b>WARM-UP-EXERCISE:</b> introduction PARTICIPANTS + team building	<b>START ASSIGNMENT #1:</b> RESEARCH & READING - SDGs at the local level - critical questioning of targets and indicators from the perspective of spatial planning	THEORETICAL INPUT AND REFLECTION: SDGs, TARGETS and INDICATORS
W 43	26.10.	<b>SYMPOSIUM:</b> INTRODUCTION / SDG MONITORING at the municipal level - a nation-wide initiative (Oliver Peters/ difu) VOLUNTARY SDG-MONITORING on the municipal level in Stuttgart (Dr. Bettina Bunk/LHS) / The SOZIALE STADT Programm (in Hallschlag and Münster) and its connection to the SDGs (Gritta Rotter, Franziska Laue/ LHS, Simone Gretschi/ WEBER+Partner)	<b>SITE VISIT (FULL DAY!!!):</b> MÜNSTER AND HALLSCHLAG - URBAN UPGRADING AND SDG IMPLEMENTATION		
W 44	02.11.	<b>LECTURES:</b> PARTICIPATORY METHODS AND TOOLS	<b>TUTORING SESSIONS</b> referring to Assignment #1 - critical reflection on SDG targets and indicators on the local level	<b>START ASSIGNMENT #2:</b> DEVELOPMENT OF PARTICIPATORY FORMATS FOR DATA COLLECTION AND SDG ASSESSMENT	DEVELOPMENT OF PARTICIPATORY FORMATS
W 45	09.11.	<b>LECTURE:</b> SOCIAL SURVEYS in SPATIAL PLANNING	<b>TUTORING SESSIONS</b> referring to Assignment #1 and 2 - critical reflection of SDG targets and indicators at the local level + complementary indicators for the local level and participatory formats to assess these indicators		
W 46	16.11.	<b>PRESENTATION AND DISCUSSION OF ASSIGNMENT #1</b> SDGs at the local level - critical questioning of TARGETS and INDICATORS from the perspective of spatial planning	<b>TUTORING SESSIONS</b> referring to the development of participatory formats for data co-production about SDGs in Münster	<b>UPLOAD 1 - 15.11., until 1pm</b> PRESENTATION ASSIGNMENT #1	DOCUMENTING THE PARTICIPATORY FORMATS AND THE RESULTS
W 47	23.11.	<b>PRESENTATION AND DISCUSSION OF ASSIGNMENT #2</b> IDEAS FOR PARTICIPATORY FORMATS for SDGs-assessment in Münster		<b>UPLOAD 2 - 22.11., until 1:00 pm:</b> ASSIGNMENT #2 <b>START ASSIGNMENT #3:</b> PREPARATION AND TESTING OF PARTICIPATORY FORMATS for SDG-Assessment at the local level	
W 48	30.11.	<b>TUTORING SESSIONS</b> referring to the piloting of participatory formats for data co-production about SDGs in Münster			TESTING THE PARTICIPATORY FORMATS
W 49	07.12.	<b>PARTICIPATORY WORKSHOPS AND DATA COLLECTION</b> Events and Surveys in Münster			
W 50	14.12.	<b>PARTICIPATORY WORKSHOPS AND DATA COLLECTION</b> Events and Surveys in Münster		<b>START ASSIGNMENT #4:</b> PROCESSING THE RESULTS OF THE PARTICIPATORY WORKSHOPS AND EVENTS + PREPARING A DOCUMENTATION	PROCESSING DATA
W 51	21.12.	On request: pre-Christmas tutoring sessions			
W 52		<b>WINTER BREAK</b>			DOCUMENTING THE PARTICIPATORY FORMATS AND THE RESULTS
W 01		<b>WINTER BREAK</b>			
W 02	11.01.	<b>WORKSHOP ACADEMIC WRITING</b> and TUTORING SESSIONS (referring to the data analysis)			DOCUMENTING THE PARTICIPATORY FORMATS AND THE RESULTS
W 03	18.01.	<b>INTERMEDIATE PRESENTATION OF ASSIGNMENT #4:</b> Intermediate FINDINGS and OUTLINE of the DOCUMENTATION			
W 04	25.01.	TUTORING SESSIONS (referring to the presentations)			DOCUMENTING THE PARTICIPATORY FORMATS AND THE RESULTS
W 05	01.02.	<b>FINAL PRESENTATION (START: 9am)</b> (Alternative: Evening event in Münster with presentations and discussions of the process&findings?)		<b>UPLOAD 2 - 31.01., until 1:00 pm:</b> final PRESENTATION on Ilias	
W 08	22.02.	<b>DOCUMENTATION</b> (UPLOAD only)		<b>UPLOAD 4 - 22.02., until 9am</b> final DOCUMENTATION	

## 2 Results of the seminar



In the following section the results from the four student groups are presented. Each group has structured their contribution in a similar way. In the first section, the methods and results of the theoretical phase are illustrated. Then the participatory formats as well as key insights are formulated followed by a critical reflection of the tested practices on participatory SDG monitoring at the local level.

The order of the presented results is arranged due to the level of the theoretical assignments of the groups. It ranges from analyzing attempts to monitor SDGs at a municipal level and reaches to the detailed investigation of integrated development concepts (IEK) at the district level. The first group had analyzed the voluntary local report (VLR) of the city of Stuttgart. Here the main task was to critically reflect on how this approach of localizing voluntary SDG monitoring could be taken further - from the municipal level down to the even more detailed level of a neighborhood. The second group investigated the "preliminary study" (VU) as a regular instrument for urban renewal projects. So far SDGs are not integrated in the study, but as its results determine which topic and projects are to be prioritized, the group examined possible linkages with the SDGs.

On a basis of preliminary studies, integrated development concepts (IEK) are formulated to define specific goals and measures for urban renewal of a neighborhood district. Here, the linkages between the specific goals of the IEK with SDG targets and indicators were explored by two groups for two different districts. One of these two groups investigated the IEK Hallschlag where the urban renewal process had recently been completed and the other group did research on IEK Stuttgart Münster which, will be implemented in the following years.

Later in the process, each group chose one SDG (SDG 7: Affordable Energy, SDG 11: Sustainable cities and communities, SDG 13: Climate action or SDG 15: Biodiversity) as their focus for developing the participatory formats. The selected SDGs supported the groups to develop specify and feasible approach and to test formats for participatory SDG monitoring.



For enhanced coherence the results of each group are presented as followed:

- 2.1 Localizing voluntary SDG monitoring at a neighborhood level +  
SDG 7: Affordable and clean energy
- 2.2 Anchoring the SDGs in 13 preparatory Studies for urba  
renewal +  
SDG 13: Climate action
- 2.3 Linking the SDGs with integrated development concepts  
(IEK) - based on IEK Münster +  
SDG 11: Sustainable cities and communities
- 2.4 Linking the SDGs with integrated development concepts  
(IEK) - based on IEK Hallschlag +  
SDG 15: Life on land

While the structure of each group's work remains similar, the results of the groups differ. Based on the analyzed SDG, the specified introductory topic of the theoretical phase and the participatory format developed, various starting points for testing participatory SDG monitoring were derived. After the individual presentation of the group-specific results, Chapter 3 summarizes and contextualizes the overarching key findings.

## 2.1 Localizing voluntary SDG monitoring at neighborhood level + SDG 7: Affordable and clean energy

Angie Carolina CAMACHO GUTIÉRREZ, Lucia CHOCANO VASQUEZ, Mateo EICHHORN GIANELLA, Adriana HAUKE, Olli JÄRVELÄINEN, Theresa MERK



The 2030 Agenda for Sustainable Development includes 17 Sustainable Development Goals (SDGs), which outlined measurable goals for sustainable development's social, economic, and environmental facets. One of the most important questions guiding the present work is how to localize the Sustainable Development Goals on a more local scale such as the city, and what could be the role of the citizens of a district in understanding and applying them. In this manner, the present brochure presents the work done during the semester of the seminar by first exploring the possibility of localizing the SDGs at a district level and secondly conducting a focused academic exercise in the district of Münster, Stuttgart - thus taking the opportunity of the ongoing collaboration and renovation project of the district.

The first stage considered four of the SDGs. SDG 7 Affordable and clean energy, SDG 11 Sustainable cities and communities, SDG 13 Climate action, and SDG 15 Life on land were selected as they are considered potential in the development of the district in the chosen context, with the aim to elaborate in more detail their targets and indicators. On the other hand, the second stage addresses exclusively SDG 7. The second stage focused on energy consumption, on which existing indicators and possible new indicators could be proposed with the aim to allow citizen participation and to include quantitative values in the context of the district of Münster.

The research questions leading the stages of the present work are:

Stage 1: Are existing indicators suitable to assess SDG-relevant information on a local level? What other indicators could be proposed? How to include qualitative aspects in a proposal?

Stage 2: Based on the previous proposal and considering the current context of the district of Stuttgart Münster, how do people in Stuttgart Münster perceive the affordability and reliability of the energy service? How familiar are they with renewable energy sources and what are their preferences about them?

Finally, a reflection is presented with possible indicators, concepts, and questions to be asked in a local urban context for data collection, especially qualitative data, which is usually limited by the quantitative assessment of indicators used to measure the SDGs.

## Research methods

The research method used for the first stage consisted of reviewing the definition and indicators of the current SDGs and existing literature focused on localizing the SDGs at a municipal and local level, for the context of Stuttgart. Following the literature review, the group assessed which indicators, proposed by each of the documents, could be applied at the district level and they proposed new indicators where necessary. The result was a set of indicators for each of the four SDGs that could then be implemented through the second stage.

The literature review consisted firstly in the revision of the Sustainable Development Goals defined by the United Nations (UN General Assembly, 2015) and the subsequent targets and indicators created so that each of the territories could implement and monitor how these goals are achieved. The different territories (countries, cities) are free to define which indicators they apply according to their specific needs and potentials.

The present exercise is based on the assertion that cities have a relevant role to play in the implementation and monitoring of the SDGs - considering that they are implemented in a world where the population is largely urban and where urbanization has thrown up some of the world's greatest development challenges (SDSN, 2016). The SDGs are then an integrated roadmap for cities to improve the quality of life in urban environments. The strategy for adapting, implementing, and monitoring the SDGs in a specific spatial context is defined as localizing (SDSN, 2016). As stated by SDSN (2016), localizing can be initiated as part of a national agenda or by local governments taking the leading role in implementing them. In either case, local action plays an essential role in implementing concrete strategies and methods, considering the context and the actors involved (Ansell et al., 2022). Likewise, the aim of the present exercise is to put into practice the possible incorporation of the community in the collaborative adoption of the SDGs, in this case through the incorporation of qualitative values usually forgotten in the existing system of indicators.

In the case of Germany, an important document proposing indicators for the country's municipalities was revised. The document SDG Indicators for Municipalities (2022) was created jointly by several institutions including Bertelsmann Stiftung and the German Federal Institute for Research on Building. The document has had three versions published to date in 2018, 2020, and 2022 respectively. It has a suggested catalog of selected indicators for municipalities that enables checking the status of the seventeen SDGs, the catalog considered data availability, suitability for the German context, and practical examples as well. For the present academic exercise, the proposed indicators in the 2020th document were considered, and they were included in a flow chart for each of the studied SDGs (SDG7, SDG11, SDG13, SDG15) to determine how they evolved from the SDGs proposed by the United Nations. Two types of indicators were included in the document SDG Indicators for Municipalities (2022), named type I (qualitatively well suitable and readily available) and type II (qualitatively well suited, but not yet well available), both are considered in the academic exercise. As will be seen in the graphs below, several of the indicators proposed in this document are considered relevant and possible to incorporate on a smaller scale for the context of the district of Münster in Stuttgart.

For the specific case of the city of Stuttgart, the document Stuttgart a Livable City, the global 2030 agenda at a local level 2nd Voluntary Local Review (2021) was reviewed. The Voluntary Local Review (2nd VLR) was developed suggesting specific indicators for the city of Stuttgart and taking into consideration data availability and the national proposal of SDG Indicators for Municipalities (2022) mentioned above. The proposed 2nd VLR indicators gave a proposal that could be more easily incorporated at a neighborhood or district scale and therefore could more easily include citizen participation.

The result of the analysis is presented below, starting with a flow of indicators that shows the evolution of the indicators proposed by the United Nations, passing through those proposed by SDG Indicators for Municipalities, followed by those proposed by the Stuttgart 2nd Voluntary Local Review and finally including those that the current analysis considers appropriate for the application at the district level. This acts as a response to the research question proposed: are existing indicators suitable to assess SDG-relevant information at a local level? What other indicators could be proposed? The flow graphs are followed by specific results and comments for each of the SDGs studied, thus addressing the question of how to include qualitative aspects in the indicators proposal.

Fig. 1: SDG-Indikatoren für Kommunen document cover (Bertelsmann Stiftung et al., 2022)



Fig. 2: Flow of indicators SDG 7, evolution until the district level proposal, figure by Angie Camacho

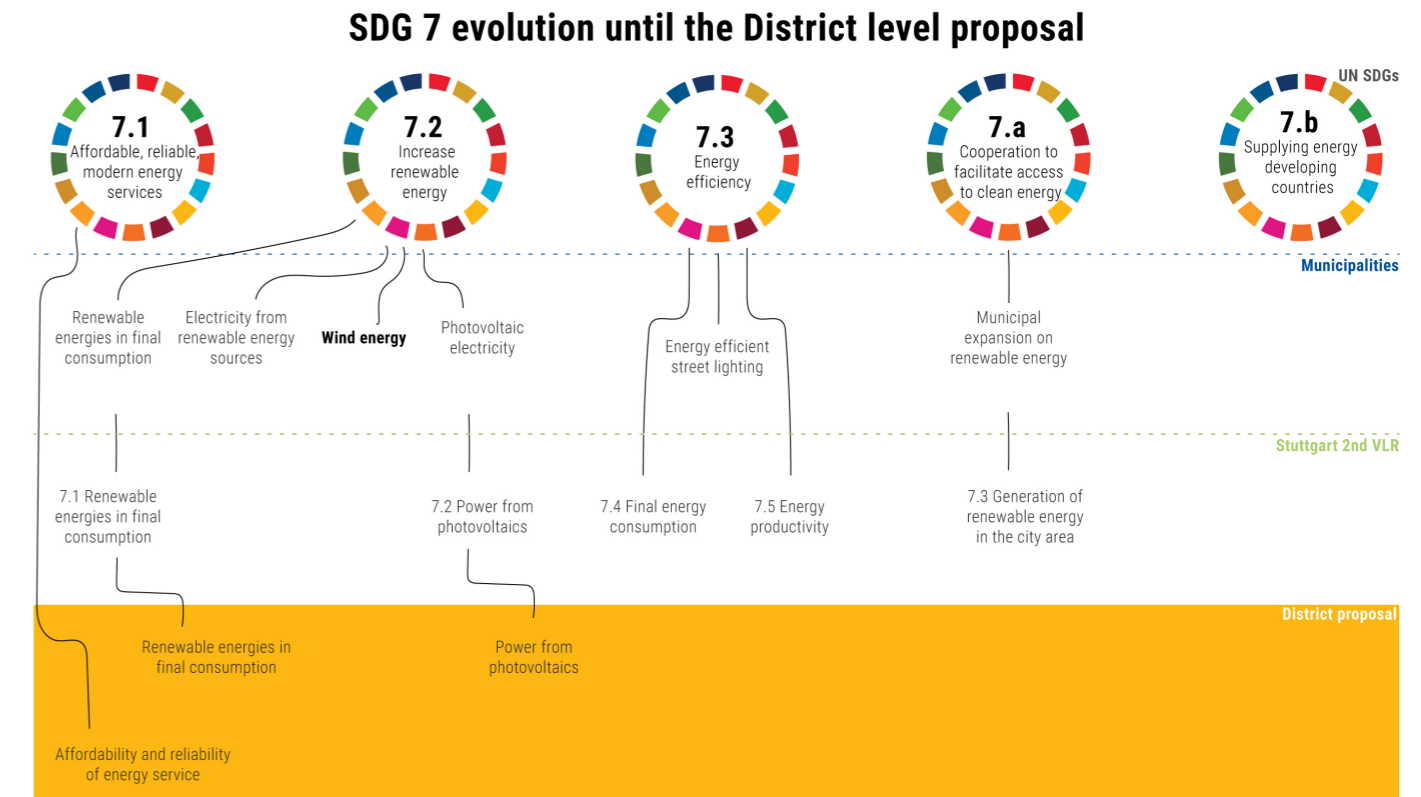


Fig. 3: Flow of indicators SDG 11, evolution until the district level proposal, figure by Angie Camacho

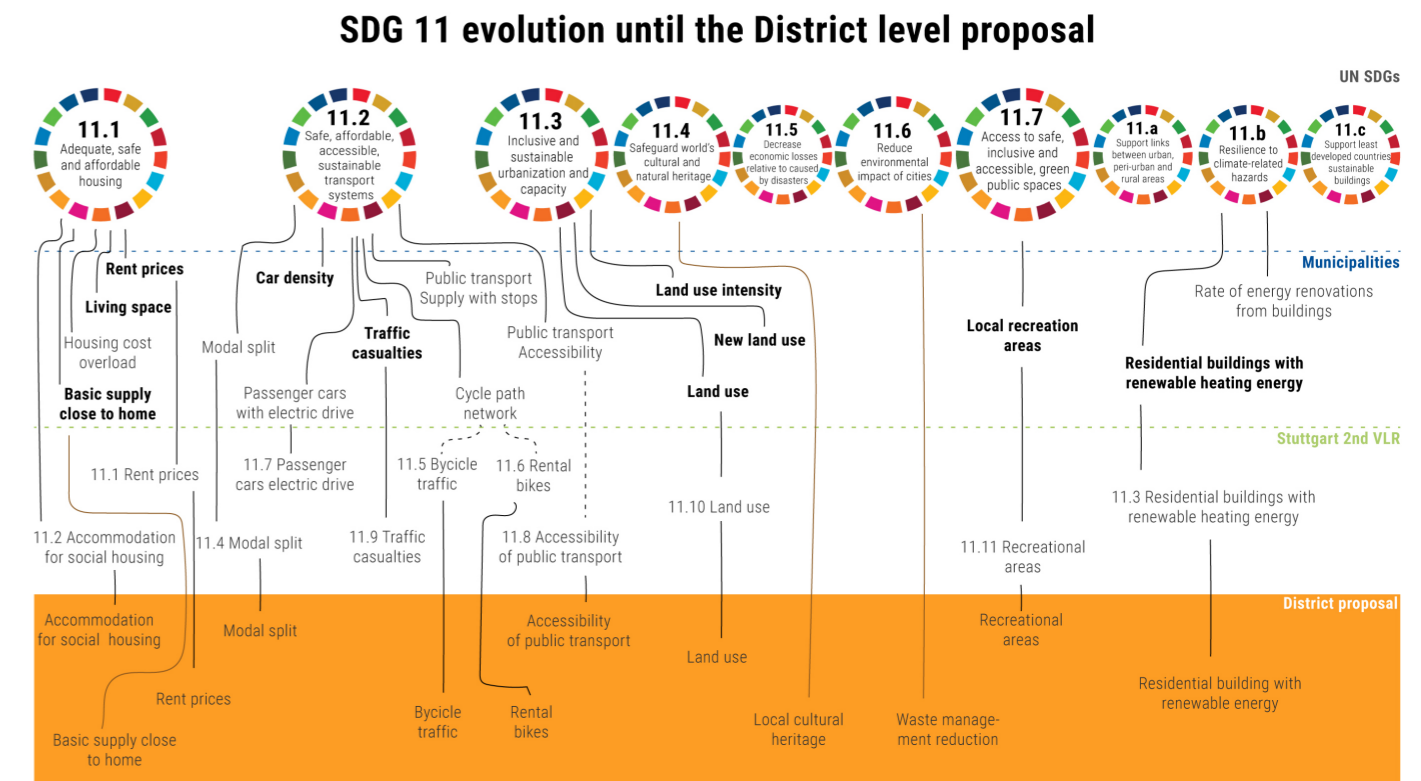


Fig. 4: Flow of indicators SDG 13, evolution until the district level proposal, figure by Angie Camacho

### SDG 13 evolution until the District level proposal

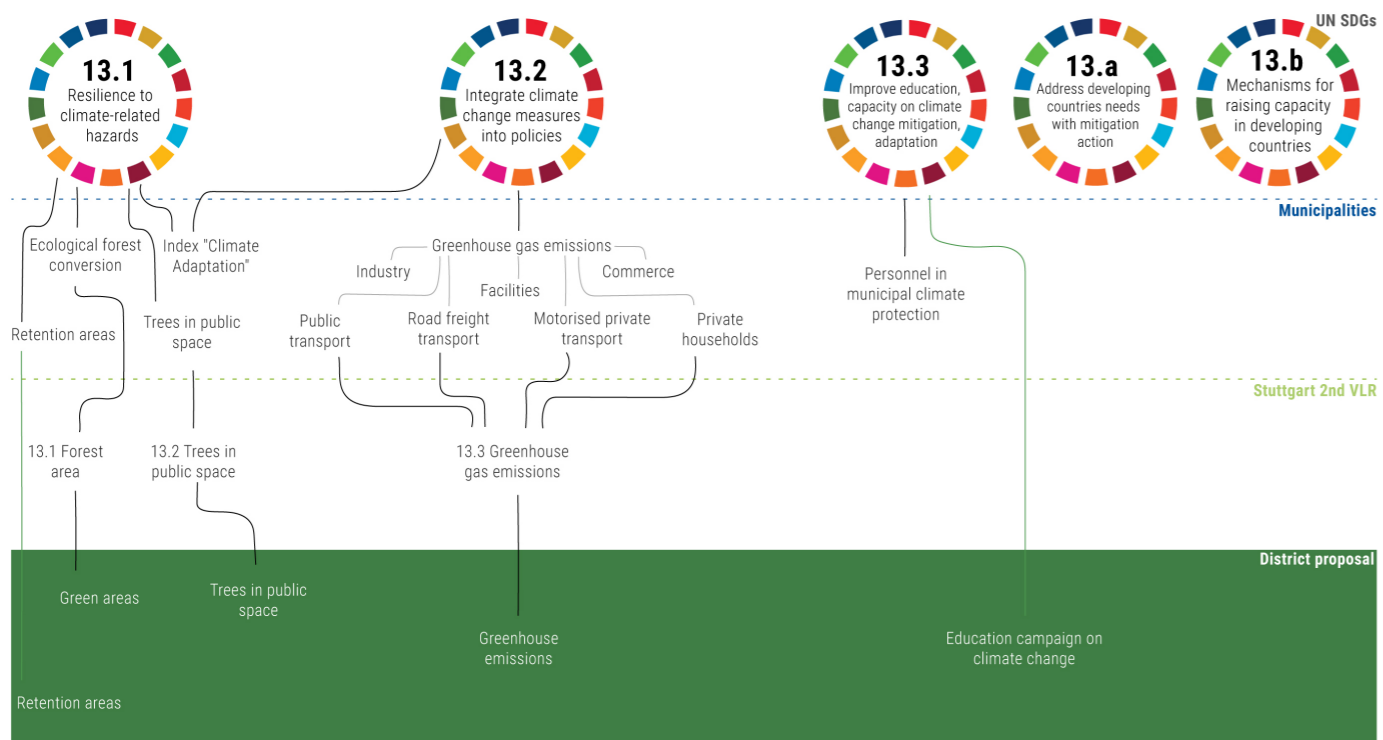
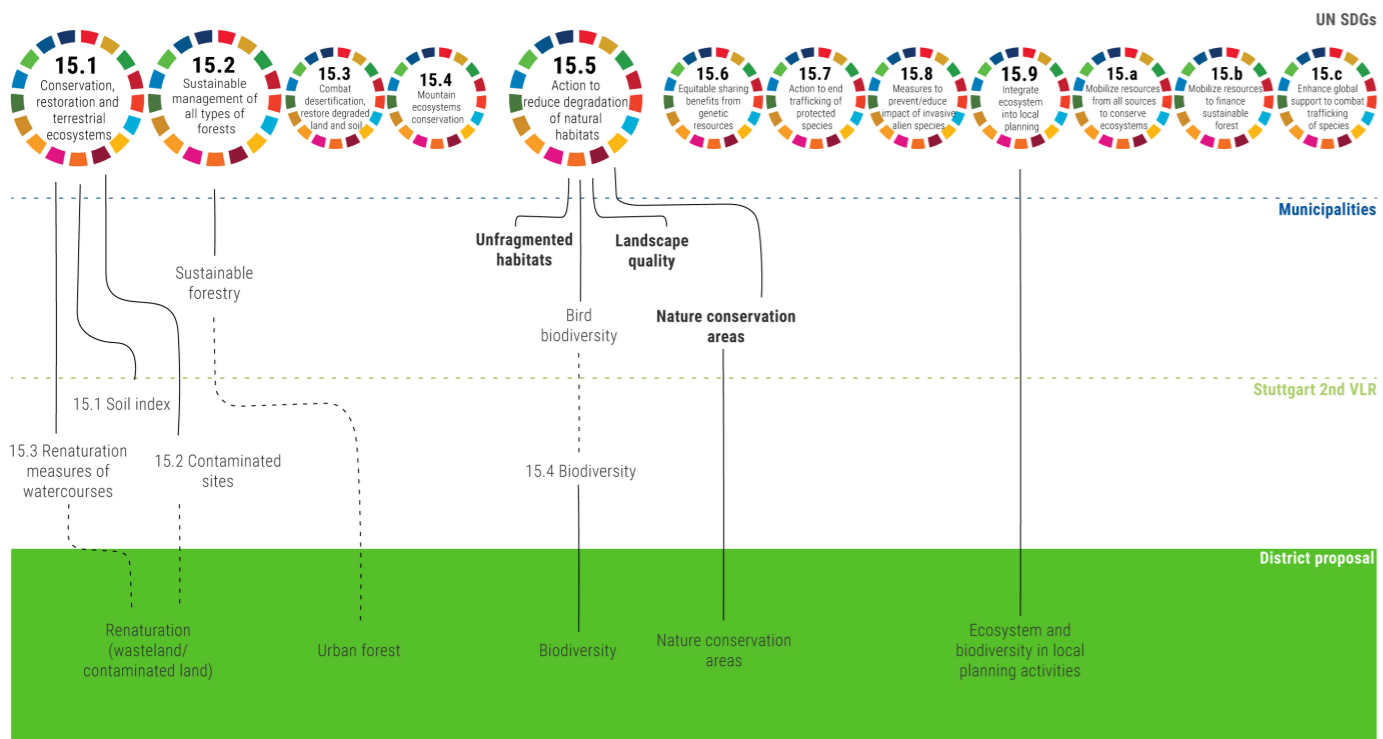


Fig.5: Flow of indicators SDG 15, evolution until the district level proposal, figure by Angie Camacho

### SDG 15 evolution until the District level proposal



## Results

SDG 7  
Affordable and clean energy

For SDG 7, which consists of ensuring access to affordable, reliable, sustainable and modern energy for all, the following three indicators were proposed to be included at the district level. Firstly, an indicator named 'Affordability and reliability of energy service' is proposed for the district level resulting from target 7.1 of the United Nations (2015). This indicator does not exist at the municipal level nor in the Voluntary Local Report, however, affordability, understood as the ability to be afforded, and reliability understood as the quality of being trustworthy is considered to be essential values to consider in order to gain access to energy service or possible renewable sources of energy. Furthermore, considering the current situation of conflicts affecting the energy supplies of Germany, the affordability and reliability of energy supply have become a relevant topic. When applying this indicator, it is especially important to also measure qualitative aspects because both affordability and especially the reliability of the energy service are subjective matters.

Secondly, 'Renewable energies in final consumption' was proposed in the 2nd VLR coming from the target 7.2 "Increase renewable energy" of the UN SDG (2015). It is a relevant topic at the district level where the implementation consumption of energy per household could be measured. Additionally, there are different factors having an impact on the results of this indicator at the district level, for example, the purpose of use of energy (e.g. residential or industrial) and the level of wealth of the residents in the corresponding district are aspects that should be taken into account. In 2020 in Stuttgart 14% of energy was consumed by industry, 35% by households, 31% by business, commerce, and services, 16% by traffic and transport, and 4% by municipal properties (Landeshauptstadt Stuttgart, 2022). This indicator would not need to be modified at the district level, but it should be compared to other statistical data about the district. The results of this indicator are always dependent on the proportions of these functions in the corresponding area. This is why it is important to measure energy consumption by fields of action. It should also be considered how accessibility, price, and outlook can impact people's perceptions.

Finally, the indicator 'Power from photovoltaics' from the 2nd VLR is proposed as suitable to include on a district level, as the previous indicator, this also stems from target 7.2 "Increase renewable energy" of the UN SDGs (2015). After the current analysis, there is the suggestion that the power from photovoltaics could be modified by considering the available roof area per building. In this manner, the district-level indicator can be specified as "Power from photovoltaics per applicable roof or land area". It can be also useful to measure the produced photovoltaic power in different building types both private and public to see the efficiency implemented in the different fields of action.

SDG 11  
Sustainable cities and communities

SDG 11 focuses on making cities and human settlements inclusive, safe, resilient, and sustainable. UN proposal includes ten indicators many of which can be brought to the district level as depicted by the 2nd VLR of Stuttgart. The present analysis resulted in the inclusion of the following indicators on a district level: accommodation for social housing, a basic supply close to home, rent prices, modal split, bicycle traffic, rental bikes, accessibility of public transport, land use, local cultural heritage, waste management reduction, recreational areas and residential buildings with renewable energy. Continuing the exercise, the example of three indicators is presented including the adaptation strategy and the incorporation of qualitative variables.

Firstly 'Accommodation service for social housing' derives as an indicator in the 2nd VLR. During the last ten years in Stuttgart, the number of social rental apartments has been halved, and the waiting time has increased as well as the demand for social housing (State Capital Stuttgart, 2021). Therefore, the 2nd VLR Stuttgart focuses on the accommodation service rate for social housing. For the present proposal, the indicator is applicable at the district level with no change to the calculation method. A way of including qualitative aspects is focusing on the community's perspective of public transport or local services accessibility from social housing.

Secondly, the indicator 'Modal split' from the 2nd VLR is proposed as suitable to include on a district level. According to the State Capital Stuttgart (2021), more than half of Stuttgart residents use environmentally friendly means of transport for getting to work, and the number of car owners especially among young people decreases. By offering more modal opportunities, there will be fewer cars, and some streets could be given back to the people. Since calculating road users is difficult on a district level, qualitative aspects are particularly important. Thus, one could look at why some means of transportation are more popular than others and find ways to encourage the use of the less popular means of transportation.

Finally, the indicator 'Recreational areas' is proposed in the 2nd VLR, deriving from the target 11.7 (UN, 2015). The current proposal is to add the accessibility of the green areas into the calculation. A way to include qualitative aspects would be to collect the community's perception and knowledge of the use of the existing green areas. As well as the community's input on existing or potential activities in the green areas. Another qualitative aspect would be the perception of the inclusivity, safety, and accessibility of recreational areas.

SDG 13  
Climate action

For SDG 13 which consists of taking urgent action to combat climate change and its impacts, the following indicators are considered relevant to be included at the district level. The majority are derived from both the document SDG Indicators for Municipalities and proposed in document 2nd VLR Stuttgart, lastly to be included at the district level.

Firstly, indicator 13.2 'Trees in public spaces' is proposed by the 2nd VLR to calculate the number of trees in public spaces and their favorable impact. A change that can improve the results of the calculation at the district level is to take into account the trees in private spaces. Those trees also have a favorable impact on the local air quality and microclimates and this qualitative value can be supported by the "Stuttgart Tree Protection Statute", which protects trees on private lands. The qualitative value could be incorporated by considering, for example, the age, foliage volume, and shape of the tree, thus calculating the CO2 absorption and positive impact.

The second indicator 13.3 'Greenhouse gas emissions' is separated in the 2nd VLR study into four categories. The first one is proposed to calculate the CO2 emissions equivalent due to trade, commerce, services, and industry with the number of employees subject to social security contributions. The qualitative value in this calculation could be incorporated by considering the categorization of the different sectors ordered from most to least polluting. The second one is proposed to calculate the emissions of CO2 equivalents due to private households with the number of residents. The third one is proposed to calculate the CO2 emissions equivalent due to transport with the number of residents. A change that can improve the results of the calculation is, instead of dividing by the number of residents, dividing by the number of active cars (in the district). The qualitative value in this calculation could be incorporated by considering, for example, the age/year of fabrication of the polluting cars. The fourth one is proposed to calculate the emissions of CO2 equivalent of all sectors, better said, the additions of the three previous categories.

The third indicator 13.1 'Forest Area' is also considered with possible relevance for implementation at the district level, although the indicator could be adapted to reflect a bigger interpretation of what a forest is. The calculation could change by incorporating in a district context the green areas with a high density of trees approximating the function of a forest.

Another indicator presented as appropriate for its implementation in a district context is the one about the "Education campaign in climate change". It can be implemented to directly measure the knowledge and engagement of residents with their neighborhood environment, thus allowing authorities to know the needs and wishes of specific locations.

SDG 15  
Life on land

The following indicators were proposed to be included at the district level. Firstly 'Renaturation of wastelands and contaminated areas' is proposed as a combination of two existing indicators in the 2nd VLR, it is considered potential insofar as citizens can provide information on residual areas (private or public) that could be renatured. Secondly, the 'Urban Forest' indicator is proposed, through which the community could report on the extent to which natural spaces such as urban forests in or near the district are relevant to them; this indicator comes from the proposed indicator of forestry within the document SDGs for municipalities (2022). Thirdly, a 'Biodiversity' indicator is proposed through which citizens could provide inputs on activities and perceptions related to existing fauna and flora species, monitoring, bird watching, etc.; although modifications are proposed this indicator is derived from the document 2nd VLR. Fourthly, the 'Nature conservation areas' indicator is proposed, to scale down species conservation to a local scale and to identify with citizens, conservation strategies, e.g., insect hotels, wild vegetation for native species, etc. This indicator is derived from the document 2nd VLR Stuttgart. Finally, an indicator not considered in the documents reviewed but derived from the United Nations indicator 15.9 (Integrate ecosystem into local planning) is proposed and named 'Ecosystem and biodiversity in local planning activities'. This would include the need to incorporate these issues in the local and collective planning of the district and citizen participation insofar as they can give suggestions on how to do it.

Continuing the exercise, the following strategies are proposed for incorporating qualitative variables into some of the proposed indicators. The 'Biodiversity' indicator, on the one hand, is proposed for the district scale to include species other than endangered species and instead species that citizens can identify. The qualitative value could be incorporated by considering, for example, the evaluation of the knowledge or perception that citizens have of certain species of flora and fauna, as well as by identifying the advantages and services that people identify in these species. It may also be the case that there are specific species of higher value to a specific district or that there are potential biodiversity-related activities and monitoring such as bird watching that should be considered in the assessment of perceived biodiversity.

In the 'Natural Conservation Areas' indicator, on the other hand, it is proposed that for the district scale, it should include not only high protection status areas but also smaller areas that could contribute to species conservation. The qualitative value could be incorporated by assessing community awareness of the need for the protection of ecosystems, habitats, or species in the region; the community input on nature changes in the district, and the interest and knowledge toward nature-related topics that may result in specific conservation interest.

## Reflection and recommendations

The literature review and following analysis provided insight into the potential of various indicators to be applied in the district context. It also became evident that localization is a process that responds to the priorities of the territories and is therefore susceptible to changes or adaptations as suggested here for the district strategy in Münster. It also became evident that some indicators are easier to locate and relate to the local urban context than others. It is a major challenge, but not impossible or less important, to adapt the indicators of, for example, SDG 13 Climate action and SDG 15 Life on land. Moreover, the community can be of great help to recognize the existing values of these indicators and be a guide for their adaptation. On the other hand, it is worth noting that even at the local level there is an interconnection between the different SDGs that needs to be taken into account. A summary of recommendations per SDG is presented below.

## SDG 7 Affordable energy

To evaluate centralized energy production at multiple scales. To raise people's awareness of the climate impacts on their energy consumption decisions, such as the usage of renewable energy.

## SDG 11 Sustainable cities and communities

To connect social housing with other services such as public transportation. Consider people's quality of life through the inclusion of their perspective on accessibility and inclusion of urban services.

## SDG 13 Climate action

To make the definition of protection more versatile at the local scale, for example by broadening the definition of areas as forests or including private areas as contributors to climate action.

## SDG 15 Life on land

To include the population's knowledge of ecosystems, fauna, and flora species. Include activities that facilitate the protection or improvement of natural habitats with citizen participation.

In addition, 4 learnings from phase one and one question that apply to all SDGs analyzed are compiled below.

Through the re-interpretation of SDGs indicators, local-based needs lose and gain importance. The reinterpretation of the indicators must respond to the local context, in this case for the district of Münster. This learning is tested in step two, in which the importance of the question of the affordability of energy services in a context of rising prices and for a population where, as it turned out, there is concern about the service, especially in relation to price increases.

Even when having the challenge of being comparative SDGs can and should be context-based. One of the challenges of focusing on local scales is to compare progress in the implementation of the SDGs, however, the present analysis and subsequent participatory process highlight the inclusion of the SDGs as a tool but also as an objective taking part of urban renewal projects.

Some indicators could have been summarized and put into groups and under groups in order to be applicable on a local level. The number of indicators and their implementation can lead to the loss of work. A strategy for their implementation and monitoring could be to group them together in order to use the same tools, data, or even citizen participation methodologies to address the corresponding challenges.

There is potential of including qualitative aspects in the SDGs indicators. Qualitative aspects become more important when adapting SDGs on a district level, the current work presents throughout the document strategies to include these aspects but this needs to be related to factors such as the city's capacity. Qualitative aspects can and should be related to people's awareness, attitude, perception, preferences, and behavior. People are the driving force behind the implementation and monitoring of the SDGs in urban areas. This is why, through participatory mechanisms, led by state entities but also by private or civil society actions, qualitative aspects such as attitude, perception, preference, or behavior toward multiple issues can be addressed.

To conclude stage one of the literature review and move on to the implementation stage, the question of reliability is left open. How can qualitative values be presented as reliable? How to make them reliable through the inclusion of representative actors from the community? How to include different age groups? This leads to the second stage where the focus is on SDG 7 Affordable energy.



Fig. 6: Reflection and recommendations stage one literature review, figure by Olli Järveläinen

## SDG 7: Affordable and clean energy

Based on the previous proposal and considering the current context of the district of Münster, Stuttgart, this second stage aims to understand firstly how people in Münster perceive the affordability and reliability of the energy service. Secondly, how familiar are they with renewable energy sources and what are their preferences about them?

In this manner, the proposed SDG 7 indicators for the district scale "Affordability and reliability of energy service" derived from target 7.1 (UN, 2015), and the indicator "Renewable energies in final consumption" derived from target 7.1 (UN, 2015) were tested for the district of Münster in the city of Stuttgart. As both targets address issues that are present in the daily life of the residents of a residential district such as Münster therefore the test focused on including qualitative aspects of the SDG implementation and monitoring.

The first indicator is relevant directly to the economy of households and thus of individuals, while the second deals with environmental issues that are very common in political and non-political discussions. Furthermore, the geopolitical context during the development of the project only increased the importance of both topics in the personal lives of the residents.

Although target 7.1 (UN, 2015) deals with ensuring access to affordable, reliable, and modern energy services, a topic that encompasses a broader context than the district, placing it at a regional or even national level of importance, the context of an energy crisis together with rising prices raised the following question: how can the residents of Münster become energy "independent" of the current supply? Within the UN target, one indicator used to measure the results of this SDG is 7.1.2 Proportion of the population with primary reliance on clean fuels and technology. This indicator, in addition to providing an answer to the question posed within the target 7.1 objectives, is well suited to the smaller district context as in the case of Münster.

In this way, the topic of reliability and accessibility gains weight in the energy discussion. It also offers further insight into the personal situation of the district residents by offering superficial access to their economic situation when the affordability of the energy service is asked. In this way, three topics help to evaluate the progress of a target and at the same time provide data that explain the social and economic context of a district like Münster.

Target 7.2 proposes, along the lines of SDG 7, a substantial increase of renewable energy sources. Within this target, Indicator 7.2.1 uses the amount of renewable energy shared in the total final energy consumption as an element to measure progress. It considers sources such as wind and solar energy, the latter being the most used in the context of the city of Stuttgart. This target has



Fig. 8: Participatory formats, figure by Olli Järveläinen and Angie Camacho

been divided into multiple targets at the municipal and Stuttgart level, "Power from photovoltaics" being one of these new goals.

In this manner, some of the specific questions asked focus on photovoltaic energies as they are more easily accessible to any household and are a very well-known topic among people. In this way, it is possible to measure both the use of renewable sources and the level of knowledge a person may have of the topic, as well as to show the interest that a person may have in the subject and its potential motivation for making the change into a renewable energy source.

### Christmas tree with an open question

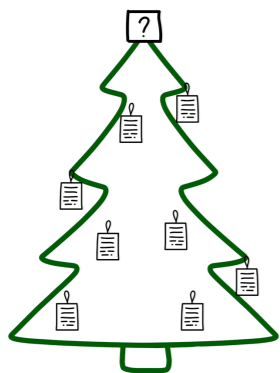
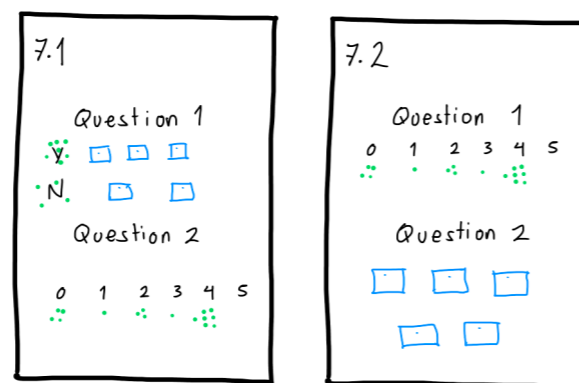


Fig. 7: Participatory formats, figure by Olli Järveläinen and Angie Camacho

### Board with questions



## Participative methods

To collect data, different participative methods were implemented. They were used to encourage people to participate, keep them interested and help start a conversation.

The first format, addressing the indicator of affordability and reliability of energy service, was the participatory Christmas tree, also related to the particular time of year in which the event took place. The residents of Münster were encouraged to write their personal answers to the question: "what do you do to save energy in the current situation?" on paper ornaments. And by doing that they help decorate our Christmas tree. The question should catch people's interest because of the importance of the topic, especially during the current energy crisis. And it gives them the opportunity to share their ideas to save energy on a household and personal level.

The second format, addressing both indicators, was a participatory board with different types of questions. Questions were solved either by voting with pins, by adding post-its, or by voting with paper. This variety was possible by including open, voting, and Likert scale questions.

The board consisted of three questions on the topic of affordability and reliability. The first question was how affordable the energy supply is, given the current situation. The second question was closely linked to the first question: What percentage of your household income is it? This question gave a deeper understanding of what affordable means for each person. And gives an impression of what would it mean for them if prices continue to rise. The third question was a reaction to the current situation by asking how the reliability of the energy service



Fig. 9: Staging of the event in front of SozialeStadt, photo by Mateo Eichhorn



Fig. 10: Participatory formats on 7th december, photo by Angie Camacho

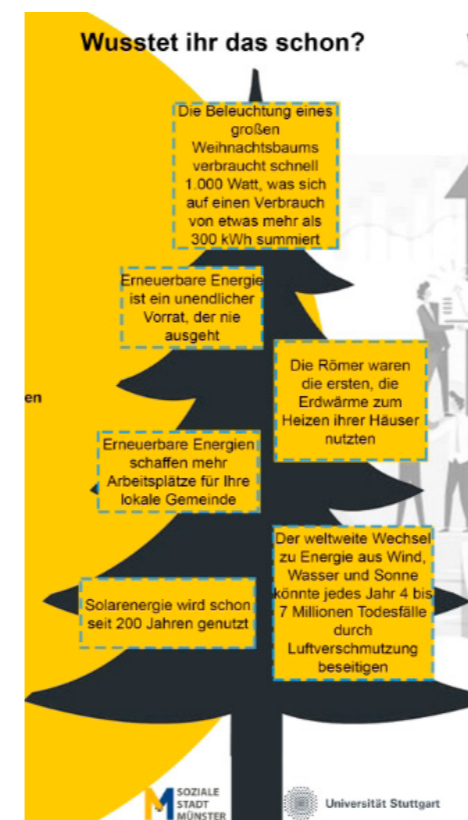


Fig. 11: Section of the flyer given to participants, figure by Theresa Merk and Nadja Vujović

during the current situation is. This question was intended to help us understand how high or low the trust in the energy sources we have now allows us to make conclusions about how motivated the people in Münster are to look for renewable energy sources.

The board also included four questions related to the indicator about renewable energy sources, focusing on familiarity with energy sources and preferences for them. Two of the questions were about renewable energy in general and two about photovoltaics more specifically. Firstly, to get the prior knowledge of Münster residents, the question of familiarity with renewable energy sources was asked. By a voting system, the participants were able to vote for the five most common renewable energy sources -wind energy, biomass, photovoltaic, hydro energy, and solar thermal- in the categories familiar, somehow familiar, and very familiar. The second question tackled the question: What do the residents of Münster consider the most important when choosing a source of energy? The options were: price, environmental aspects, reliability, ethics, and accessibility of options. The second question gave us an idea of what is important to the residents of Münster, therefore what renewable energy sources are based on their choices of interest for them.

The last two questions had their focus on photovoltaics. We chose to ask about this energy source specifically because it was already an indicator in the 2nd VRL Stuttgart, further it is a renewable energy source most people are familiar with. Do you use photovoltaic systems as a source of energy? Would you consider using it if you had the opportunity? The first question was a yes-no question. The follow-up question was an open question to collect personal reasons for not using photovoltaics. Finally, considering that the exchange of information was useful, information on energy sources was provided through a flyer to participants.

Considering the scale of the event, the formats used proved to be useful for information gathering and further discussion with residents. Some of the more interactive questions such as the Christmas tree question and the voting question were of more interest to some people. However, the questions that involved placing pins on the board also received quick answers for those people who did not want to lengthen the answers on post-its or conversations, for example.

# Results

## Research question 1

How do people in Münster perceive the affordability and reliability of energy sources, especially given the current situation?

The first question stated, "How affordable is energy for you in the current situation?" On the scale from not affordable (0%) to affordable (100%) half of the answers landed between below and half of the answers above 50%. Also, none of the answers got under 25%. So the participants were divided on their perception of affordability but none of the participants were seeing energy as absolutely unaffordable.

The second question was "How much percent of your household income do you spend on energy?" For this question, the average seems to be around 20%. In 2020 German households spent 6.1 percent of total consumption on energy (Wehrmann, 2022). Compared to that number our result seems to be extremely high.

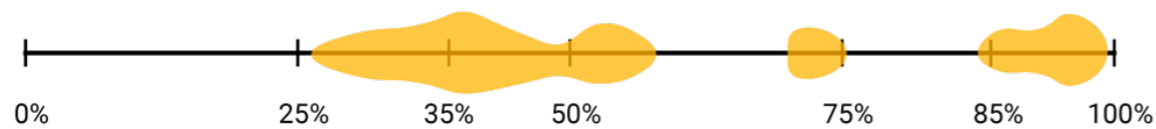
The third question was "How reliable is the energy service in your opinion in the current situation?" Here half of the answers were over 75% but it is still widespread in the answers from 25 to 85%.

The overall results indicate that there is a difference between affordability and reliability perception on people, while it is still somehow affordable, the reliability is decreasing. Most people lean towards trusting the energy service but there seems to be some uncertainty. As part of the outcomes, it is suggested to adapt affordability in times of uncertainty as an opportunity to talk about it and to make people more aware of the cost of energy.

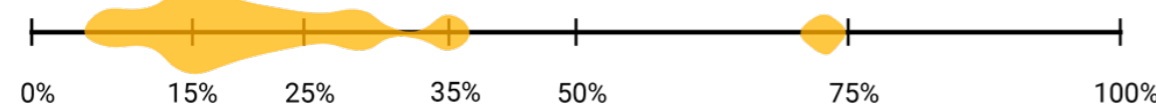


Fig. 13: Participatory formats, figure by Olli Järveläinen and Theresa Merk

### AFFORDABILITY OF ENERGY SOURCES



### PERCENTAGE OF INCOME



### RELIABILITY OF ENERGY SOURCES

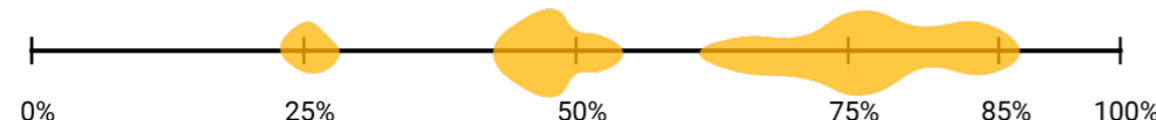


Fig. 12: Results research question 1 affordability and reliability of energy services, figure by Mateo Eichhorn

## Research question 1.1

Given the current situation, how are people in Münster saving energy?

This question was stated: Do you try to save energy or not? (Versuchen Sie Energie zu sparen oder nicht?) And as a follow-up: How do you save energy? (Wie sparen Sie Energie?). The aim of this question was to find out whether people are taking action in saving energy and what are their methods of doing so and also to create a visual presentation of the answers on site by hanging up the written answers. The overwhelming majority of the answers (97%, 28 out of 29) stated taking action to save energy. We sorted the answers to categories electricity, heating, and transportation but there is an overlap between these categories.

The ways of saving energy seem to be mainly about reducing consumption. The majority was reducing electricity or heating use. Over 50% of the answers mentioned electricity use and 30% mentioned heating. Only a minority of participants said that they had made investments or new arrangements in their sources of energy in order to save energy. This might be due to the abruptness of the change in energy prices that people didn't prepare for. It might also be due to a lack of general opportunities to do so. For example, people who don't have ownership of their dwellings have no say in making energy investments. Nevertheless, the answers show clearly that people are doing what they can to energy saving.

The study was implemented in December 2022 and that also shows in the answers. Seasonal aspects like heating and Christmas lights are mentioned a lot. The results don't give answers to how people would save energy in different seasons, for example, summer. Naturally, houses don't need to be heated but instead, the use of air conditioning would be relevant. We also don't know if the relevance of photovoltaics would rise in people's minds during summertime. We were also collecting the answers on the street near a U-Bahn station which potentially creates a disproportion of people without a car.



Fig. 15: Results research question 1.1 affordability and reliability of energy services, photo by Mateo Eichhorn

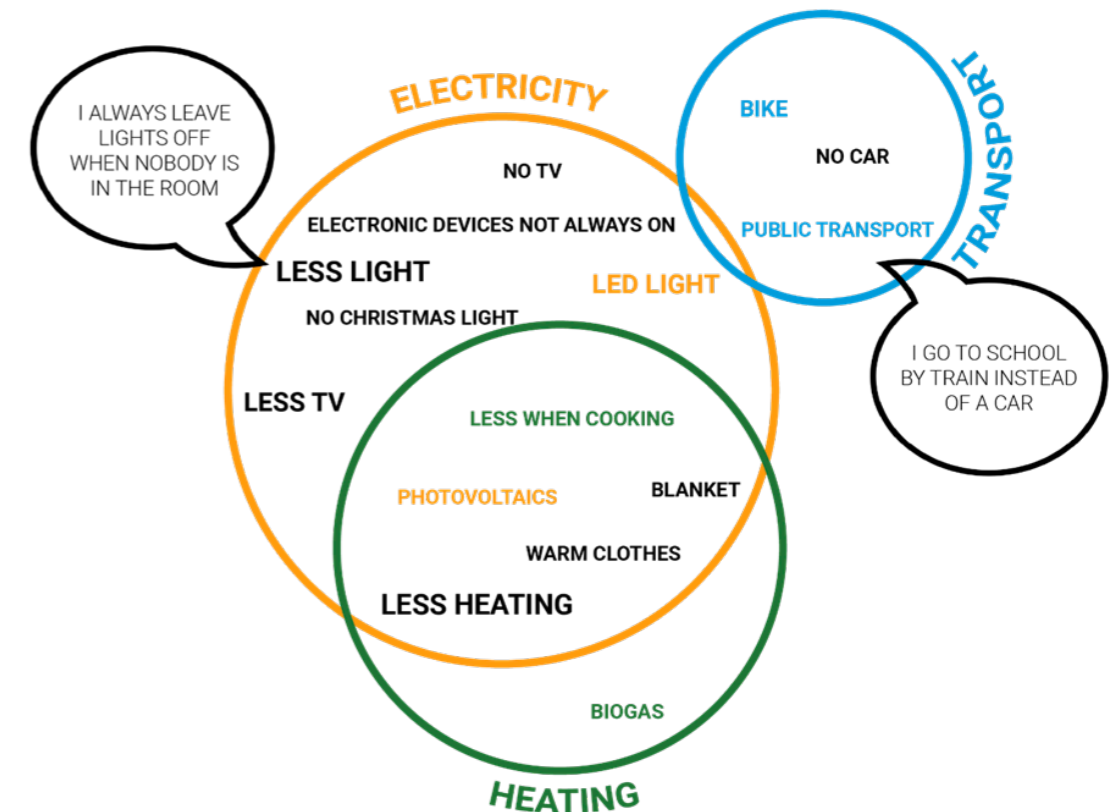


Fig. 14: Results research question 1.1 affordability and reliability of energy services, figure by Adriana Hauke

**Research question 2**  
How familiar are the people in Münster with renewable energy sources and what are their preferences about it?

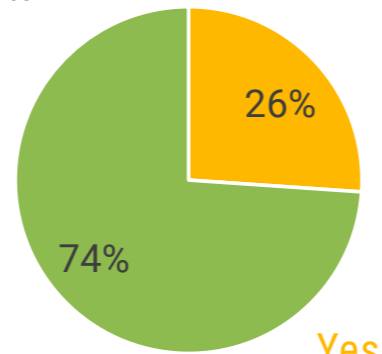
In the first question, participants were asked to choose two factors that most affect their choice of energy source. In the results, environmental aspects and price overwhelm the other options clearly. Their popularity is not necessarily surprising. However, the lack of answers in the rest of the answers is somewhat surprising. There were only two participants who chose the accessibility of options. However, when having more informal discussions with the participants a stronger feeling of lack of options emerged. This might be because the question not being specific enough. The results may have been different if the question had specified electricity and heating as different answers.

What we learned from these results is that the price and environmental effects are the main factors for the majority. It seems that the energy needs to be both environmentally friendly and affordable to convince the participants. What we could have delved deeper is how free or capable people feel to make choices on their energy sources.

In the next question, participants were asked to rate the different forms of renewable energy by how familiar they are with them. The categories were: not familiar, somewhat familiar, and very familiar. While water, photovoltaics, and wind energy all seem to be reasonably known by the participants. However, biomass as well as geothermal energy seem to be a lot less known. That is surprising because biomass is the third most used renewable energy source after wind and photovoltaic energy (Destatis, 2023) but it is surprisingly not well known in the results. On the other hand, geothermal energy is very unused in Germany so it is more understandable that participants were not so familiar with it.

As overall results, participants' preferences are related to environmental and price-related aspects. People are usually willing to use renewable energy but there is no general knowledge about the different available options. As an outcome, we consider that more options for renewable energy for households

CURRENT USE OF PHOTOVOLTAICS



POTENTIAL USE OF PHOTOVOLTAICS

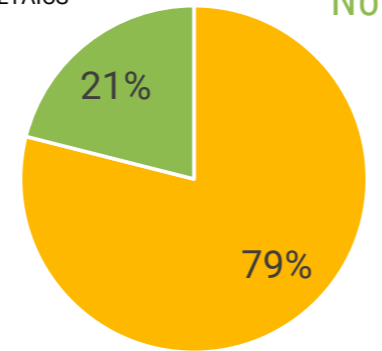


Fig. 17: Results research question 2 renewable energy sources - use of photovoltaics, figure by Adriana Hauke

could be offered or more incentives to implement better energy strategies in buildings. There should be a focus on house owners when implementing energy changes and there is a potential to raise the awareness of people about different types of resources.

FAMILIARITY OF THE RENEWABLE ENERGY SOURCES

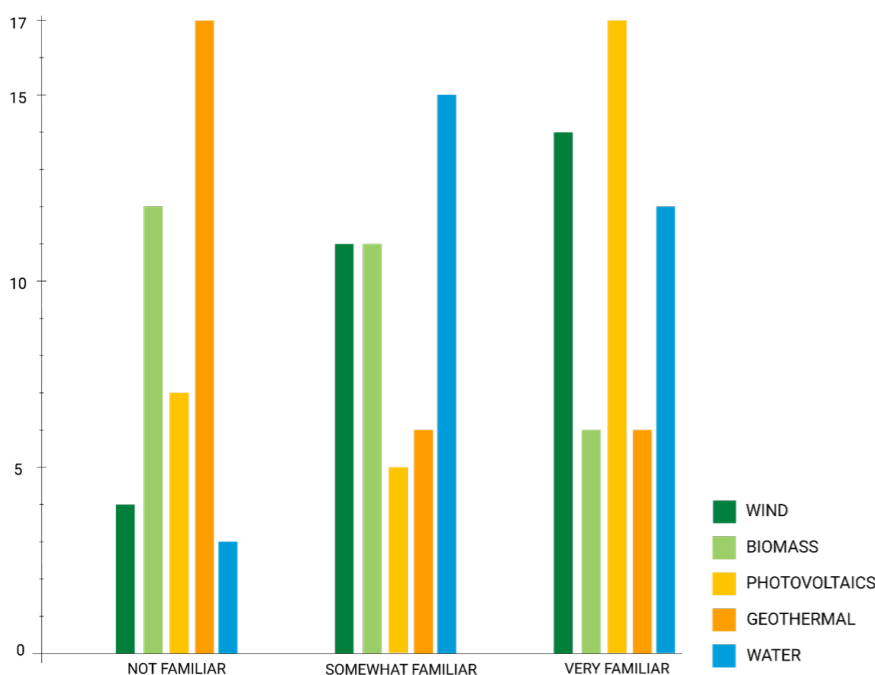
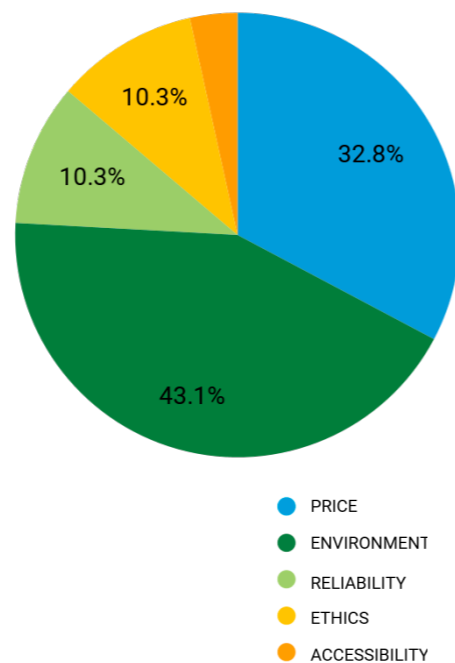


Fig. 16: Results research question 2 renewable energy sources - familiarity and preferences on renewable energy sources, figure by Adriana Hauke

PREFERENCES ON RENEWABLE ENERGY SOURCES



## Reflection and recommendations

After analyzing the graphics of the research methods it is important to say that it was a successful gathering of participants. The people that wanted to take part in it were open to talk about the subject that we had to analyze (Affordable and Clean Energy). Although it is very important to consider the topic on a daily basis, it is necessary to say that due to the actual energy crisis, it has gained relevance, and now more than ever should the population take action against the actual problem.

Despite the successful gathering of people and with it the successful answering of questions, we can agree that some questions could have been more specific in order to improve the data. An example of that could be the question "How much percentage of your monthly income is given to the energy supply?". In this question, we made a scale from 0% to 100% and it would have been better if we shortened the scale to a more realistic percentage such as 10% to 50%, and thus have more specific data on the percentages.

As part of the result of the research method, we concluded that an environmentally friendly energy supply is important to participants. Nevertheless, they are not familiar with all forms of renewable energy, and we think that is due to the lack of information and awareness of the topic. Besides the preference for an environmentally friendly energy supply, there was also a large number of participants that also considered the affordability of the energy supply as something important. This may also be something that due to the current crisis has become important since prices have never been so high.

Another important result of our research method was the answers to the question "How do you save energy?", which is summarized in that a great majority of the participants are saving energy today. This not only encourages us in the sense of knowing that our topic is making a positive impact on the environment but also shows us that now is the time to make people aware of this problem (excessive and unconscious use of energy) with public campaigns to continue having an improvement.

Something that we have learned with this activity is the importance of both quantitative and qualitative data, since these complement each other. Qualitative data is very useful for assessing the reliability of quantitative data since inconsistencies are thus found.

Lastly, we can express our awareness about people who might have answered differently the questions issued if the research method were anonymous. However, we can consider our research method as successful since we obtained valuable data that helped us with our analysis. Based on our experience we want to conclude the project with concrete recommendations.

The **research method** used was **successful at gathering participants**

People were very **open to talk** about the subject of energy probably due to the **current relevance** of the topic

Some questions could have been **more specific** to gain more clear data

**Environmental friendly** energy is important to participants but they are **not so familiar with all forms** of renewable sources of energy

**Quantitative** and **qualitative** data are **complementing** each other, qualitative are very useful for evaluating the reliability of the quantitative and finding inconsistencies

Fig. 18: Reflection and recommendations stage two participatory format implementation in Münster, figure by Adriana Hauke



## Reflection and recommendations

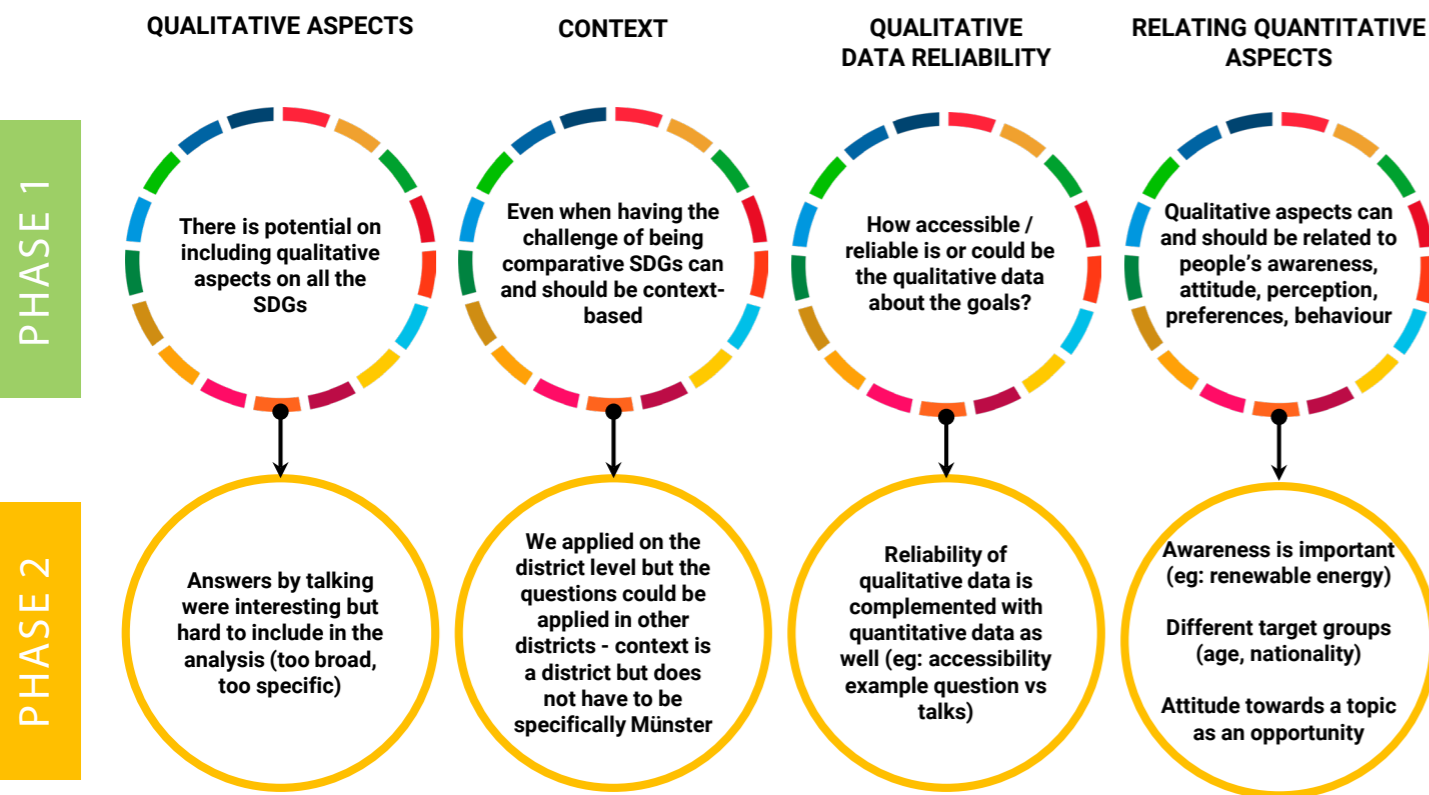


Fig. 19: From theory to practice, comparison between learnings from stage one to stage two, figure by Nađa Vujović

Firstly, let's include people's opinions. Although qualitative aspects are not usually included in the indicator proposals in many cases. Nevertheless, they constitute a reliable source of information on a local scale by including local perspectives, preferences, and attitudes toward a topic. We think it is most effective to implement a research method that collects both quantitative and qualitative data since those two can complement each other.

Secondly, let's facilitate more local actions toward sustainability. We realized that most people are aware and worried about environmental topics (and also about price issues), however, when it comes to the implementation, at least with the energy topic there is not a lot of clarity about different ways of acting. House owners especially play a major role in energy transition at the district level and it can be beneficial to support them.

Thirdly, let's use the current energy situation as an opportunity. During our study, the energy topic was very interesting to people to discuss since the current situation was influencing almost all of them. The crisis constitutes an immense opportunity for awareness raising and further implementation of for example different energy sources. For example, with the energy reduction questions in the study, most of the answers were about reducing the consumption of energy, which is ok for the scale but there seems to be a lack of attempts to do systematic changes in the consumption of energy. The green transition can offer one solution to both the current energy crisis and the climate crisis.

Last, let's adapt the indicators to the people. Indicators must be adapted to be implemented locally. We need to identify the different opportunities people have and collect the potential data according to that. For example, in order to know if people would implement renewable energy sources we asked people about their preferences but we did not include the land tenure factor which matters only in this specific household scale.



Fig. 20: Final learnings, figure by Angie Camacho

## 2.2 Anchoring the SDGs in preparatory studies for urban renewal + SDG 13: Climate action

Kacper RAIKOWSKI, Katharina PETROVSKIY, Lucie VAN ZYL, Marcelo CANDIA, Mina DAVIDOVIĆ, Saksham RAI, Shalini RAO



The Sustainable Development Goals (SDGs) serve as a collection of 17 interlinked objectives, all tackling individual deprivations, and are meant to provide "a shared blueprint for peace and prosperity for people and the planet, now and into the future" (Ansel, 2022). Being formulated and introduced in 2015, they are a part of the United Nations General Assembly Resolution Agenda 2030, and are meant to guarantee not only the satisfaction of nowadays world's needs, but also the capability of the following generations to do the same. The 17 SDGs can be divided into 169 targets with additional subgoals, which strive to end several inequalities (such as hunger or poverty) across the world in a global partnership amongst 193 governments of the UNO's members until the year 2030. To reach those aims, it is mandatory to work on the following three elements: economic growth, social inclusion and environmental protection.

Since SDGs aspire for global impact, applying them at a local level can raise newer ideas and challenges that need acknowledgement and iterative discussions. To be able to employ them as contextual guidelines and workable actions for the development of today's cities, implementing participatory monitoring of SDGs at a preliminary stage becomes critical. Participatory monitoring describes a process of data collection used to assess urgent disputes within the local community. It not only engages residents as direct and active actors to discussions about their home's future, but also serves as a way to spread awareness about concerns and potentials amongst them. This approach is especially important for "guiding local decision-making [...] and addressing emerging issues in the course of implementation" (Destatis, 2022). Following this, new research questions can be brought up, which need to be dissected further. How could qualitative aspects be integrated into the SDG assessment and its indicator system? How could qualitative data be co-produced together with residents of a selected neighbourhood? Can the indicator system be transferred from the larger municipal level to the smaller level of the district and the local community?

Participatory monitoring is one way of generating the data needed to close the information gaps and achieve the evidence base needed for robust implementation of the SDGs. In this manner, the data/information pouring in from the participatory monitoring will complement, and not intended to substitute, the monitoring based on the non-participatory data compiled by the authorities at the national, regional and global level (Bertelsmann Stiftung et al., 2022).

# Part I - Theory/ Research methods

## 1.1 Anchoring SDGs in participatory studies: An introduction

Anchoring SDGs in participatory studies instils a strong foundation and overarching understanding of what the bigger picture towards urban renewal is. It also helps navigate specific SDGs, contextualise needs and create a footing to develop action-plans, facilitate actors and stakeholders, test and implement pilot projects and continue monitoring to validate global SDGs. Furthermore, the process of anchoring SDGs has been further interpreted as:



Fig02: Illustrations by Rai, S (WS 2022-23); Studio Alternativi (Free License)

## 1.2 VU studies: Relevance in urban renewal of Münster

With the Urban Development Support Programme (UDSP), Germany expands their goals to be "co-operative (between federal government, states and local municipalities), integrated (in planning and implementation at local levels), flexible (needs-oriented), participatory (to include communities) and feedback-driven (to monitor and evaluate for continuous development)" (Landeshauptstadt Stuttgart, 2022).

VU studies, or preliminary feasibility studies, are preparatory surveys and questionnaires conducted to gauge, measure and gather first-hand responses from people prior to the start of a project. These include, but aren't limited to, SDG-related queries, and are directed at local district and community levels. Questions may be both quantitative and qualitative, which enable establishing relevant indicators, action-plans, implementation of and monitoring projects.

VU Studies are currently used to determine the area for urban regeneration, following which results from the collected data are used to decide if the project qualifies for public funding, or additional parameters are required for re-evaluation.

A key question here was to ask if VU surveys can be located at the start, as well as during the life cycle of a project - in the form of periodic feedback.

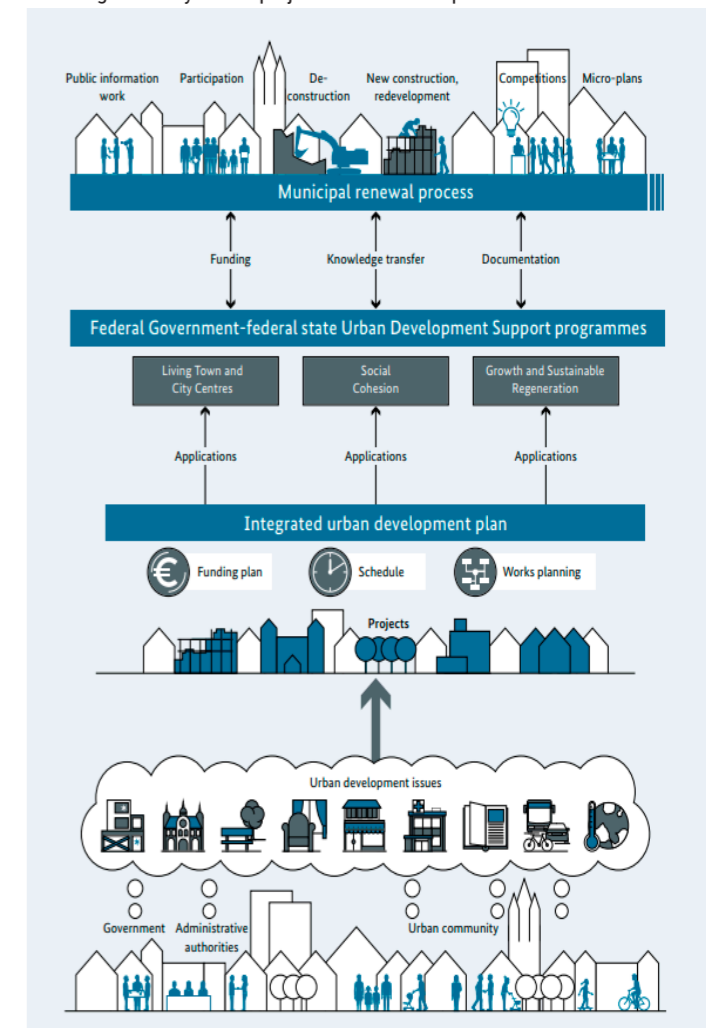


Fig03: UDSP Source: 50 Years of the Urban Development Support Programme, Germany

### Survey sheets: Analysis from Münster

Having analysed survey sheets from both Münster and Hallschlag, in Münster, it became apparent that there were three questionnaires with over 40 questions. This also became our focus area. Of the 40 questions, 7 questions were related to SDGs about workplace environments; 5 to building and landscapes; and 7 to housing and built environments. Up on choosing relevant example questions for specific goals, we were able to identify certain deprivations. These have been discussed in the next sub-sections.

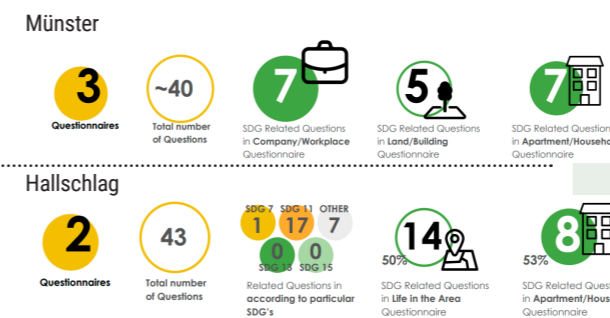


Fig03: Research method. Icons: authors' elaboration; www.thenounproject.com

1.3 Results: Identified gaps and bridging opportunities at VU stages

**Gaps:**  
Through the analysis of the VU survey sheets of the district of Münster (and Hallschlag), we could identify certain gaps that affected the utility of VU studies in the Münster area. These constitute challenges for policy makers and urban practitioners to improve their scope when starting a project.

Some of the most important challenges according to the evaluation were broken into workable categories – actors, role of SDGs, data collection and process.

Regarding actors, the greatest challenge was their intention, involvement and how it was dependent on the citizen's will and motivation to participate. In the case of the role of SDGs in VU studies, there seemed to be an under representation of SDGs 13 (climate action) and 15 (life on land). Concerning data collection, a big challenge was the use of qualitative information in the research methods applied. Some questions were vague, which could hinder first-hand responses. Finally, with respect to process, we found a disconnection between VU surveys, which had more of a quantitative scope and associated insights upon testing. These would invariably have an impact on how budgets, resources, legitimacy and importance are routed towards local municipalities such as Münster.

1.4 Theory: Reflections and recommendations

As discussed theoretically, there is potential to locate VU surveys at preparatory stages, as well as during the life cycle of a project – if they validate citizen needs at timed milestones, municipality budgets and ecological concerns.

It may be possible to start small by testing a specific SDG, associated sub-target and indicator at the street level. To keep the momentum of valid questions and relevant actions alive, it would be necessary to include a combination of active and passive participatory methods and quantitative and qualitative questions. This would enable diverse participation (in-person and digital), open a repository of feedback and make people of the locality as well as urban practitioners aware of change. This would allow a transparent scale-up and across various actors, stakeholders, finances, resources, projects and ecological changes – both in Münster and its influence on the global SDGs.

It is also necessary to assess if the nature of questions will lead us to indicators, or if the questions need to be tailored towards specific indicators.

The next section explores theoretical insights from VU analysis by testing SDG 13 Climate action on the streets of Münster.

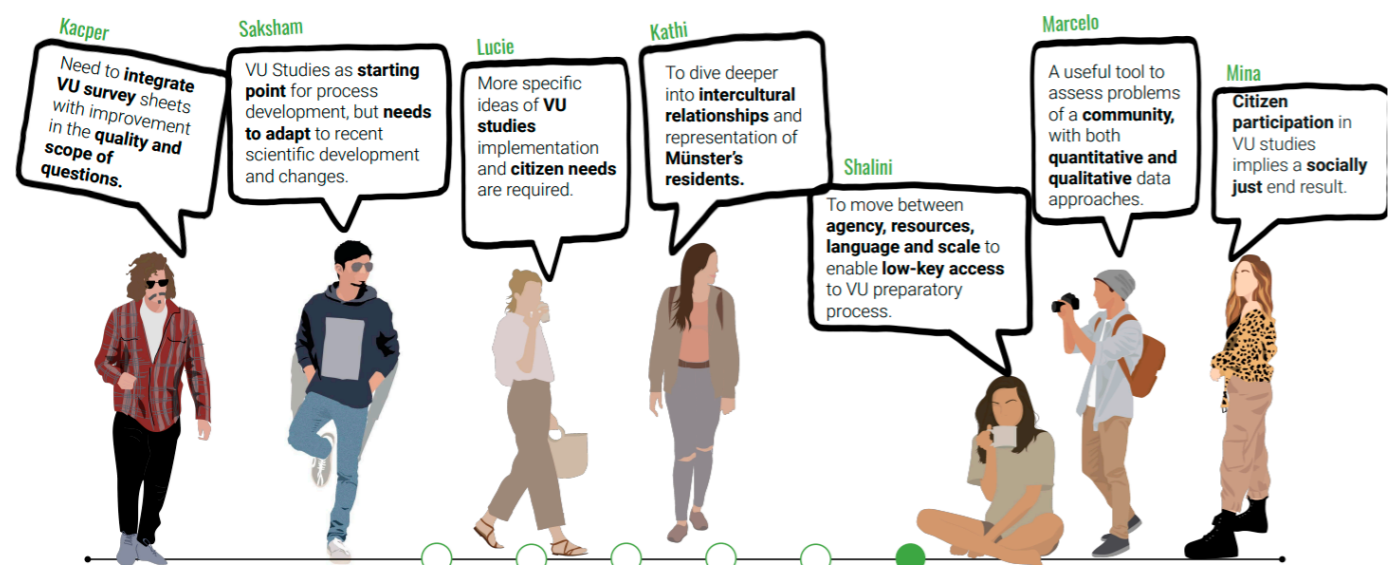


Fig04: Team conclusions. Illustrations by Rai, S (WS 2022-23); Studio Alternativi (Free License)

**Bridges:**  
To propose bridging opportunities, we contemplated on how the above gaps can pave way to bridges. At the onset, it would be wise to question 'best practices' from elsewhere, thereby ensuring that policy and practice remain relevant to the area of interest (i.e., Münster). This would enable contextualised participation. It would be critical to engage citizen participation at the preparatory stages, as well as at timed consultations to validate preliminary learnings. Regarding the role of SDGs, including qualitative questions related SDGs 13 and 15 in VU surveys would improve their position for action-oriented initiatives. With data, questions need to be simple, broken down and open-ended. Then, they have the potential to be interpreted as close to the original narrative as possible for qualitative insights. These may be measured or categorised further to find balanced responses with quantitative counterparts. Lastly, with process, an important bridge would be to incorporate an iterative participatory testing with the community, while factoring annual budgets, resources, temporal electoral cycles that may impact Münster. This would help in the assessment of qualitative indicators throughout the project life cycle.



Fig05: Parameters to assess VU survey sheets. Icons from www.thenounproject.com

Part II – Participatory event/ SDG 13 climate action

2.1 SDG 13 Climate action: An Introduction


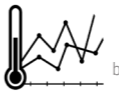



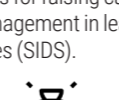
Sustainable Development Goal 13 (SDG 13) is one of the 17 goals established by the United Nations as part of the 2030 Agenda for Sustainable Development. SDG 13 is focused on 'climate action', and aims to take urgent action to combat climate change and its impacts.

2.2 Relevance of SDG 13 in Münster

Several issues of flash flooding, congestion due to cars and the power station were brought to our notice by members of the Stuttgart Münster council. Furthermore, the scope of SDG 13 seeks to address both local and global concerns. It aims to ensure that the world takes urgent and significant action to combat climate change and its impacts, in order to protect people, the planet, and its ecosystems for present and future generations.

2.3 SDG 13: Sub-targets

SDG 13 has the following sub-targets:

- Target 13.1** Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters. 
- Target 13.2** Integrate climate change measures into national policies, strategies, and planning. 
- Target 13.3** Improve education, awareness-raising, and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning. 
- Target 13.4** Implement the United Nations Framework Convention on Climate Change (UNFCCC) and its Paris Agreement. 
- Target 13.5** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries (LDCs) and small island developing States (SIDS). 
- Target 13.6** Mobilize and increase the availability of financial resources to address the challenges of climate change. 

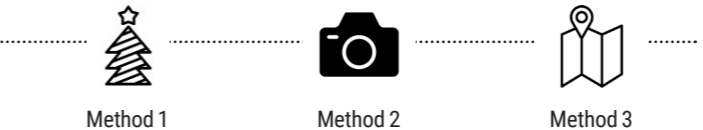


Fig06: (a-f): SDG 13 Sub-targets; www.thenounproject.com  
Fig07: (g-j): Sub-goals for testing; www.thenounproject.com  
Fig08: Participatory methods; www.thenounproject.com

2.4 Research question and focus sub-target

Our research question was, 'how can the foundations of knowledge and capacity building help meet climate change in Münster?' Our focus sub-target – 13.3 'Improve education, awareness-raising, and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning' – proved to be a path to investigate the essence of SDG 13. Climate action involves both a mitigative and an adaptive part, and they are place-based parameters. In using Target 13.3 as the foundation, we aimed to address the research question and test the following indicators:

- **Awareness** of the effects of climate change, its underlying causes and means of mitigation.
- **Knowledge** of 'climate change' related issues in the neighbourhood raised by the community.
- **Ability and willingness** of the community to engage in climate actions.

2.5 Sub-goals for testing

An overarching set of sub-goals were discussed in preparation of testing Target 13.3 via participatory methods. These proved to be valuable checkpoints for us as a group. These include:

-  **Socio-inclusivity:** To include active and passive participation, and all user-groups.
-  **Spatial analysis:** To create a space for exchange of ideas, and test local knowledge.
-  **Capacity building:** Within a short timeframe, how many 'SDG 13' insights were we able to exchange with the community.
-  **SDG monitoring:** Will we succeed in implementing participatory methods, gather raw data, analyse and synthesise information before reflecting on our methods?

2.6 Indicators for testing

- Target 13.3 was contextualised and interpreted to Münster's needs as the following qualitative indicators:
- **Awareness:** How aware were the people of Münster about climate change in the area?
  - **Knowledge:** With awareness, how much 'spatial and climatic' knowledge did the people of Münster have of their neighbourhood, with regards to challenges or potentials?
  - **Capacity:** With awareness and knowledge, what were their crunch points, self and collective capacities to support their council and find local solutions?

2.7 Participatory Methods

As part of the 'Lebendiger Adventskalender' (Soziale Stadt) event in Stuttgart Münster, on 21.12.2022, we set up three participatory methods. The intention was to validate the overarching sub-goals as well as specific indicators. Each indicator was linked to one method, thereby creating three participatory methods to test awareness, knowledge and capacity. The methods were intended to generate a collection of qualitative responses, and were:

- **Method 1:** Active participation/ Mein Klima Wunsch (my climate resolution)
- **Method 2:** Passive participation/ Fotowettbewerb (digital photo contest)
- **Method 3:** Active participation/ Münster map



Fig09: Method 1 - Mein Klima Wunsch; Christmas tree photo © Rao, S. (WS 2022-2023).  
Fig09a: SDG 13 inset image - www.sdgs.un.org



Fig10: Method 2 - Fotowettbewerb; Poster design by Petrovskiy, K (WS 2022-2023).



Fig11: Method 3 - Muenster map; Illustration by Candia, M. (WS 2022-2023).  
Fig12: Method 3 - Inset photos © Petrovskiy, K (WS 2022-2023).

About 30 people participated at the event from 15:00 to 19:00hrs. As incentives, we also gave out 'climate-action' related informative cards with festive pendants to align with the holiday season. The cards were specifically designed with messages to help instil personal awareness, knowledge and capacity about climate action.

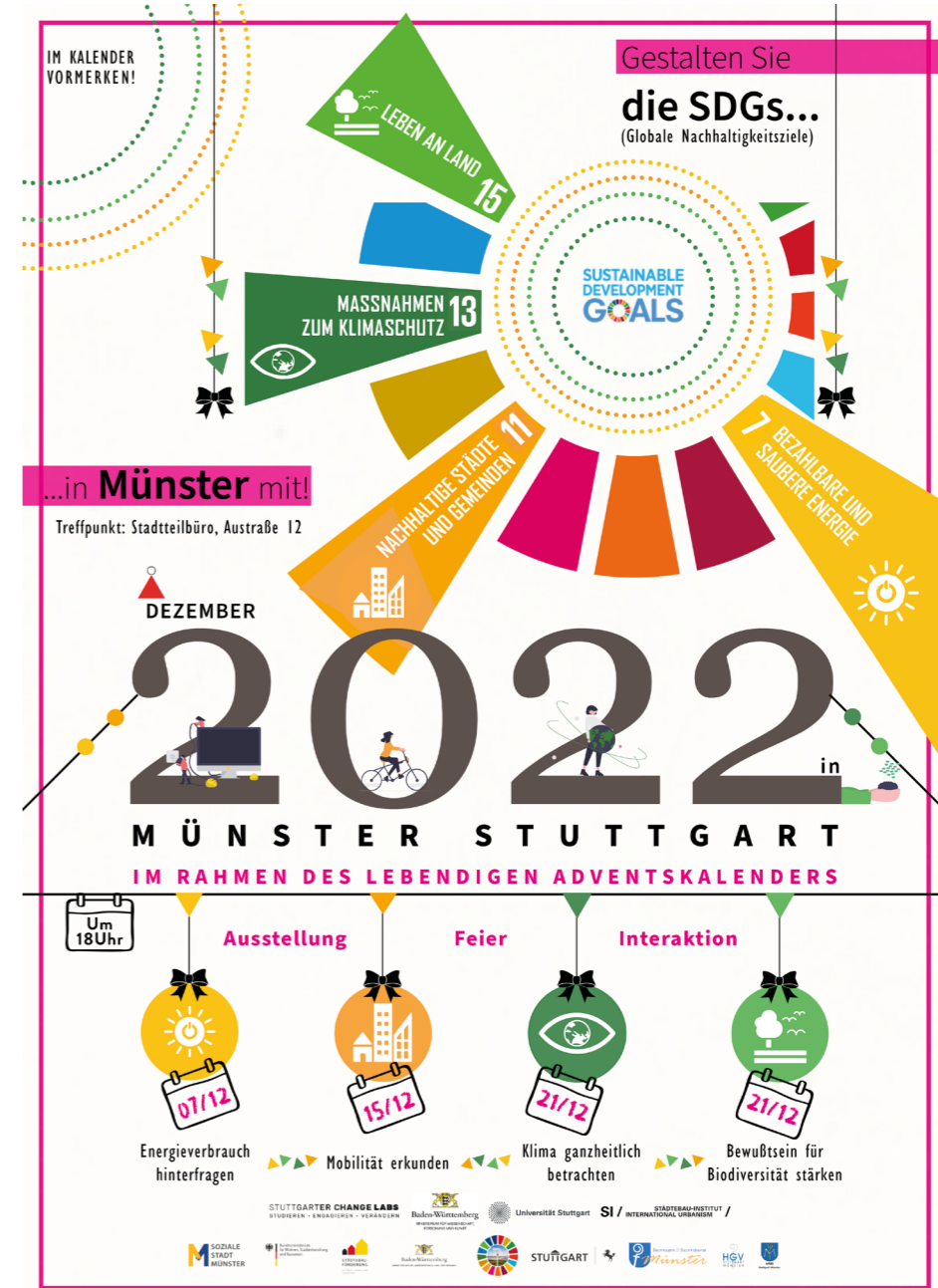


Fig13: Participatory event; Poster design by Rao, S. (WS 2022-2023).



Fig14: Participatory event day photo © Rao, S. (WS 2022-2023).

Incentive cards



Fig15: Incentive cards; Design by Davidović, M. & Petrovskiy, K. (WS 2022-2023)



Fig16: Incentive cards photos © Rao, S. (WS 2022-2023).

2.7a Method 1: Active participation/ Mein Klima Wunsch (my climate resolution):

• Description

With the help of a wooden Christmas tree, green (adults) and red (children) cards, pens and pegs, participants were encouraged to pin their climate resolutions for Münster. The associated indicator was 'capacity' with the intention to gauge self and collective capacities of participants towards their neighbourhood.

• Question

What is my climate resolution for Münster? / Was ist mein Klimawunsch für Münster?

• Experience

Apart from having to explain the method and question to some, most participants were eager to share their thoughts on the tree. It also resulted in general conversations about the climate additionally. Most of those who did participate were on their way back from the local U-Bahn station, and were not in a rush to catch their train.

• Result

There was a combination of overlapping and generic answers, with some having little to do climate resolutions, but more to do with waste management, air pollution, traffic congestion and urban greening. However, there was a consensus that by recycling waste, controlling electricity in public spaces at night, using lesser cars but more public transport, and enhancing local greenery, Münster would become a better environment for living.

• Data synthesis

The data collected from this method could be mostly grouped in 4 categories: waste management, air pollution, mobility and greenery. The distribution of the answers was even amongst these categories. There were 21 responses in total, but several answers raised multiple topics or subjects spanning across multiple categories, with interdependencies on other SDGs. The responses varied in form; most of them indicated that 'something' needs to be done 'Mehr Grünanlagen/ Bäume pflanzen' (more green areas/ plant trees), some notes named just the general issues: 'Staub (Autos), Kohlekraftwerk (EnBW), Müll' (car pollution, coal power plant, waste), and a few indicated some form of personal initiatives: 'use less plastic, walk more, use public transport more.'

-A significant group of respondents raised concerns about the waste and littering in public. Additionally, there were voices expressing a need for better waste sorting and recycling. One exceptional response to fit into this category was a remark about a food sharing concept. It is worth mentioning that the person who made that comment is personally engaged in the introduction of the idea to the local community.

-Furthermore, air pollution and a wish for better air quality were commonly mentioned. It was seen as an issue of a general nature - a problem rooted in vehicular mobility or the nearby power plant.

-Answers attributed to the mobility cluster mainly contained wishes for more use of sustainable transport modes as an alternative to cars. Participants mainly expressed that the cycling and public transport infrastructure should be improved in the area. At the same time, there were a few respondents who mentioned a need to change people's mobility habits.

-Responses in the greenery category focused mostly on the development of public green and leisure areas. The common topics were tree planting, introduction of new green areas and playgrounds, as well as refurbishment of certain spaces in the neighbourhood (cemetery). One exceptional comment mentioned was that there is a need for better biodiversity in the area.

-Finally, there was one comment that proposed a reduction of streetlight use at night, which could either be attributed to light pollution reduction or energy conservation.

-Feedback about the method: Participants found the method quick and interactive.



Fig17a: Method 1; Photo © Rao, S. (WS 2022-2023).

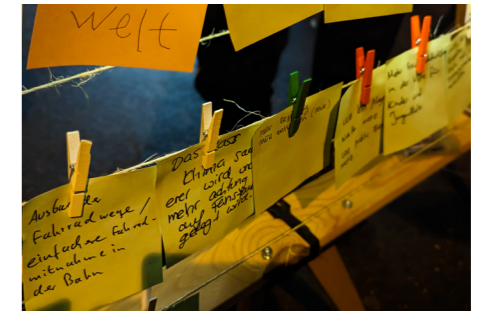


Fig17b: Method 1; Photo © Rao, S. (WS 2022-2023).

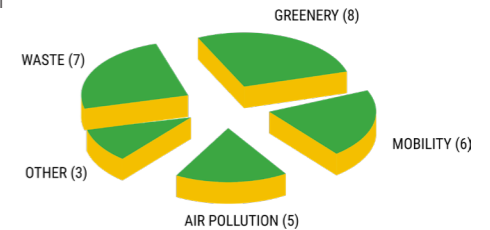


Fig18: Method 1 - Result; Illustration by Raikowski, K. (WS 22-23).

•Data interpretation

- One of the main conclusions from this method was that there were few signs of participants' personal declarations or capacities. Most respondents treated the task as their wish list, and not a collection of resolutions. This may be due to two reasons:

- The task was explained poorly, and it was not clear enough that participants were supposed to name own resolutions.
- There is a lack of personal responsibility for climate change mitigation amongst Münster residents.

-We deduct that the outcome resulted from a combination of the two factors. First, few participants needed additional explanations to complete the task, and due to the spontaneous character of the interaction, we were not able to provide a sufficient explanation to all participants. There might have been a lack of proper visual guidance as well. Second, the task question may have been ambiguous due to the English-German translation: the German 'Klimawunsch' could be understood both as a climate wish and a climate resolution.

- On the other hand, participants mostly named issues that could be solved by someone else, not them personally, which suggests that there is a prevailing view that climate change mitigation is a task for the authorities. When tested against the associated indicator of 'capacity', there appeared a lack of self-capacity.

- The next learning from the method also supports that claim: some typical climate change mitigation methods were not mentioned, especially ones that could be easily implemented by individuals. None of the participants referred to the personal energy use consumption or general reduction of resources used in daily life. Therefore, the link between changing living habits and climate change mitigation could not be well understood.

-To conclude, this task revealed certain areas for improvement in the field of climate change mitigation capacity amongst Münster residents - residents need to be made aware that climate change mitigation is a common responsibility and requires action taken by everyone, and that initiatives that could be introduced in daily life need to be promoted.

## 2.7b Method 2: Passive participation/ Fotowettbewerb (digital photo contest):

## • Description

We designed a **digital photo contest** ahead of the event day, and shared a call for entries via [www.nebenan.de](http://www.nebenan.de) and other physical locations in Münster, where permitted. We **created an email account** and asked people to send us their pictures of 'signs of climate change in the area', and set basic guidelines such as 'no personal identities' and 'public spaces acceptable.' The associated indicator to test was 'awareness' of climate change in the area.

## • Question

**What are the signs of climate change in Münster?** / Was sind die Zeichen des Klimawandels in Münster?

## • Experience

We couldn't get permissions to put up the posters at several locations. The method turned out to be **too complicated for people**, and **nobody participated**.

## •Result

We **didn't receive any response** for this method, and hence **could not synthesise any data**.

## •Data interpretation

-As the research team received no entries for the competition, **we looked for underlying reasons** with the help of **feedback questionnaires on the event day**.

-All but one participant that filled the feedback form indicated that they were **not aware of the competition**. One person expressed that they had known about the contest, but had been reluctant to participate due to the complicated nature of the task.

-Based on that, we present **our own reflections**. First, the task required an **unaided initiative from the residents**, was **too demanding**, and offered **little reward** for the effort. Second, the **information about the competition wasn't widespread enough**. We interpret that to mean that it would have been advantageous to approach certain target groups more directly. An **improvement** to this could be to **introduce the contest at the local school with the direct help of the teaching staff**. Additionally, the **competition could be reintroduced outside the scope of the SDG seminar** and linked to the council's email address.

-**Feedback about the method:** Participants found the method **difficult**.



Fig19: Posters at Soziale Stadt; Photo © Rao, S. (WS 2022-2023).

## 2.7c Method 3: Active participation/ Münster map:

## • Description

An A1 sized **map of Münster** was presented with **photographs of local areas** labelled and pinned on it. This was done to help participants orient themselves spatially. 'Likert-scale' like stickers were provided with place to write additional comments. The coloured stickers represented a range of satisfaction to dissatisfaction with the area (green = very satisfied to blue = least satisfied). The **associated indicator was spatial and climatic 'knowledge'** of Münster, with the intention to gather place-based climate challenges or potentials.

## • Question

**Where do you see potentials or challenges in Münster regarding climate change? Are there places you are currently satisfied or dissatisfied with?** / Wo sehen Sie Chancen oder Herausforderungen in Münster?

## • Experience

The method **encouraged continued conversations** with participants after they had completed the task. It sparked curiosity amongst residents, in that they tried to align both climatic and spatial ideas.

## • Result

It resulted in us having to **explain and reiterate our questions on the spot several times**, since input on climate challenges and potentials required an additional spatial reference. We received **many generic responses** that had little to do with peoples' knowledge of persistent challenges or potentials. Most **participants skipped the labelled photos** altogether. We also observed a **pattern where responses for the map reflected responses from the tree in 'Method 1'**, with most notes asking for better management of prominent green areas (Spielplatz), waste management and air pollution in the area.

## • Data synthesis

- In this method, responses encompassed **6 main categories: waste, air pollution, mobility, greenery, biodiversity and awareness**. There were 23 answers in total - 2/3rds of which were positive or expressed an opportunity of improvement. **Spatially, most responses were clustered around public green areas of the neighbourhood**.

- The category that gathered the most answers was **waste management**. The issue of littered public spaces was mentioned by several respondents. That is also a category that features the most negative comments.

- A similar number of remarks was made about the **greenery** in the area. **Residents were pleased with the parks in the neighbourhood**. A few participants were also content with the **Neckar River**, but at the same time wished for it to be cleaner.

- There were also a few comments about the **air quality** in the area – a negative one about the **power plant**, as well as one **suggesting better air quality in Münster compared to neighbouring districts**.

- Additionally, **mobility** was mentioned with a positive remark that **praised the introduction of electric car charging stations**.

- We also identified 2 exceptionally insightful topics. **First** of those subjects was **biodiversity** - there were positive comments about supporting the presence of flora and fauna in the neighbourhood (especially the insect meadow). The **second** concerned itself around **awareness building**. The remarks praised actions that continue to raise climate change related awareness of the residents (Let's Putz, Energie-Sparkonzept).

- **Feedback about the method:** Participants found the method **difficult**.

## • Data interpretation

-Overall **results aligned with the outcomes from Method 1: Klimawunsch** – the main topics mentioned in the two tasks mainly overlap. Here, it is worth mentioning that the respondents did not limit their answers to SDG 13, and several **interlinkages with other goals were clearly visible**. This may indicate that it is **important to gather and interpret SDG related data in context of multiple goals**, as limiting the scope of the study would neglect many findings.



Fig20a: Method 3; Photo © Rao, S. (WS 2022-2023).



Fig21b: Method 3; Photo © Rao, S. (WS 2022-2023).

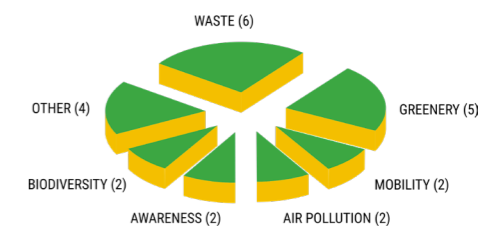


Fig22: Method 3 - Result; Illustration by Raikowski, K. (WS 22-23).

- Moreover, **participants struggled to read the map** and identify labelled locations on it, which might have distorted the spatial results. Nevertheless, residents demonstrated a strong attachment and interest towards local green areas.

- Finally, we propose our **recommendations** based on the findings of this method:

- There is a **need to develop a tool to easily gather spatial data** - using a regular map is significantly flawed.
- There is a **need to integrate spatial knowledge with that of an awareness of climatic challenges and potentials** affecting the locality.
- This task, as well as Klimawunsch, provided hints of the **lacking awareness and knowledge in the subject of SDG 13**. Thus, it is crucial to consider the following:

- Information on the **links between climate change and personal consumption habits need to be underlined**.
- Residents should be made aware of the aspects of **climate change mitigation methods**, that were not mentioned (reduction of consumption, conservation of energy, aware buying decisions).
- Information **needs to be adapted and spread across different media** – analogue or digital.

## Part III - Final conclusions/ VU & SDG 13

### 3.1 Bridging VU studies and participatory event: Critical reflections and recommendations

#### 3.1a Participation

There are **multiple people whose points of view are not taken into consideration in the process of SDG monitoring**. It may be because **not everyone is willing or able to participate** in VU studies and participatory events. We discovered that with timed participatory methods, we can only reach a small fragment of residents, and only those that are eager partake voluntarily. This opens further questions of **whom to include** at both VU and participatory stages, as well as explanations on **demographic distinctions** (participants = residents vs. passers-by; adults vs. children; age, socio-economic, cultural backgrounds, etc).

When awareness, knowledge and capacities are co-produced with residents of a neighbourhood, there is a greater probability of successful iterative testing to arrive at improved VU survey sheets. This can be tested at small scales through awareness-drives, posters with response-links, door-to-door surveys, neighbourhood walks with different participants each time, street-plays, discussions at schools, secured feedback boxes or online portals, thereby accommodating a range of socio-demography. Suggestions from these may then be reflected as qualitative (and quantitative) questions in VU survey sheets, following which, doors may be widened to conduct participatory research methods for a larger audience at the neighbourhood scale. With increased resources and funding, as well as prior knowledge rooted in qualitative research, participatory methods may yield deeper insights when testing awareness, knowledge and capacities again. Data from this scale and time may be projected against other sub-targets, indicators, the larger district, city, national and global SDGs.

#### 3.1b Quality of questions

The complexity of questions could lead to misunderstandings and distortion of collected data. Hence, it is of great importance to make the process (VU surveys + participatory events) low-key, accessible, and easy to understand or interpret. In section 1.4, we posed a question of whether **'the nature of questions will lead us to indicators, or if the questions need to be tailored towards specific indicators.'** At the onset, we created questions and derived associated qualitative indicators. At the event, we managed to test identified indicators, albeit with varying responses. It may be an option to get iterative with questions, as well as indicators, based on the pattern of participation and subsequent data synthesis and interpretation.

#### 3.1c Quantity vs. quality of data

Comparing the results of VU studies and our participatory event, we concluded that **both quantitative and qualitative methods of SDG related data collection are possible**, however, their outcomes are useful for different purposes:

- The **solid quantified results of VU studies are easier to compare with other case studies**, whereas **qualitative data of the participatory event helped to identify areas for specific interventions**.

- Here, it is also worth noting that to improve the usefulness of VU Studies in SDG monitoring, and reduce research bias, there is a **need for a unified and specific guideline on the scope of the survey questions and subsequent interpretation of results**. The VU questionnaires analysed by the research team were different in their structure and questions asked, as compared to data gathered at the participatory event. Therefore, it was difficult to compare the results with common indicators.

- Furthermore, we identified a significant **underrepresentation of certain SDGs in VU survey sheets (SDGs 13 and 15)**. These need to be incorporated in the questionnaires to make VU studies useful for SDG monitoring, and testing afterwards.

- Additionally, **most questions in VU Studies were quantitative in nature**. To collect data that is more citizen-oriented, we suggest **introducing small-scaled participatory events at VU stages**. Residents are more likely to provide detailed answers with an **improved sense of belonging and accountability to their place**.

- The **results of the methods are ambiguous** when it comes to answering the question - **whether residents are aware of local issues** (flash flooding etc.), as, for example, some see the relevance of greening the area, but don't necessarily blame high surface im-permeability to be the problem, and that it could be an area of improvement.

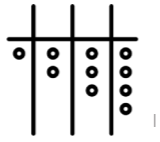
This could enable diverse participation (in-person and digital), check on council budgets at timed intervals, open a repository of feedback and make people of the locality as well as urban practitioners aware of frustrations and desires. This will help with better workable action-plans.

- Lastly, we asked if it was always necessary to **quantify qualitative data**, or if there are alternatives to help rationalise qualitative insights. To help **break down or measure qualitative responses**, the research team suggested a combination of below factors, and used them in interpreting results from each method:

#### Linkages with other SDGs



#### Number of topics



#### o Number of participants



#### o Behavioural patterns



#### o Comparison with other case studies



#### o Data clusters



Fig23: (k-p): Factors to interpret qualitative responses; www.thenounproject.com

#### 3.1d Data interpretation

We identified that **individual SDGs should be analysed in the context of all 17 goals**, as there are many **interlinkages** amongst them. As many participants do not understand the differences and nuances of individual goals, data interpretation, without the consideration of global impact, may result in incomplete or ambiguous results. Furthermore, **clustering the collected qualitative answers** proves useful for data interpretation. Identifying common topics and patterns enables a tangible, measurable response.

#### Final thoughts:

We offer our conclusions in that an improved VU survey will lead to an enriched participatory process. It is of high importance and value in SDG participatory monitoring. By breaking down the parameters of the process of facilitation and implementation, it provides an opportunity **'to hear the 'voice' of the community and identify unexpected outcomes'** (Mbah and East, 2022). It is an opportunity to gather the most personal insights into the reality of SDG policies and their implementation. Not everything needs participation, however, with the right questions at every stage, the gap between community and administration may be bridged.

We leave you with the above learnings and the intention to design processes for positive change for and with the people of Münster.



Fig24: Raw data synthesis by research team; Photo © Rao, S. (WS 2022-2023).

Figs25-29: Research team on event day; Photos © Rao, S. (WS 2022-2023).



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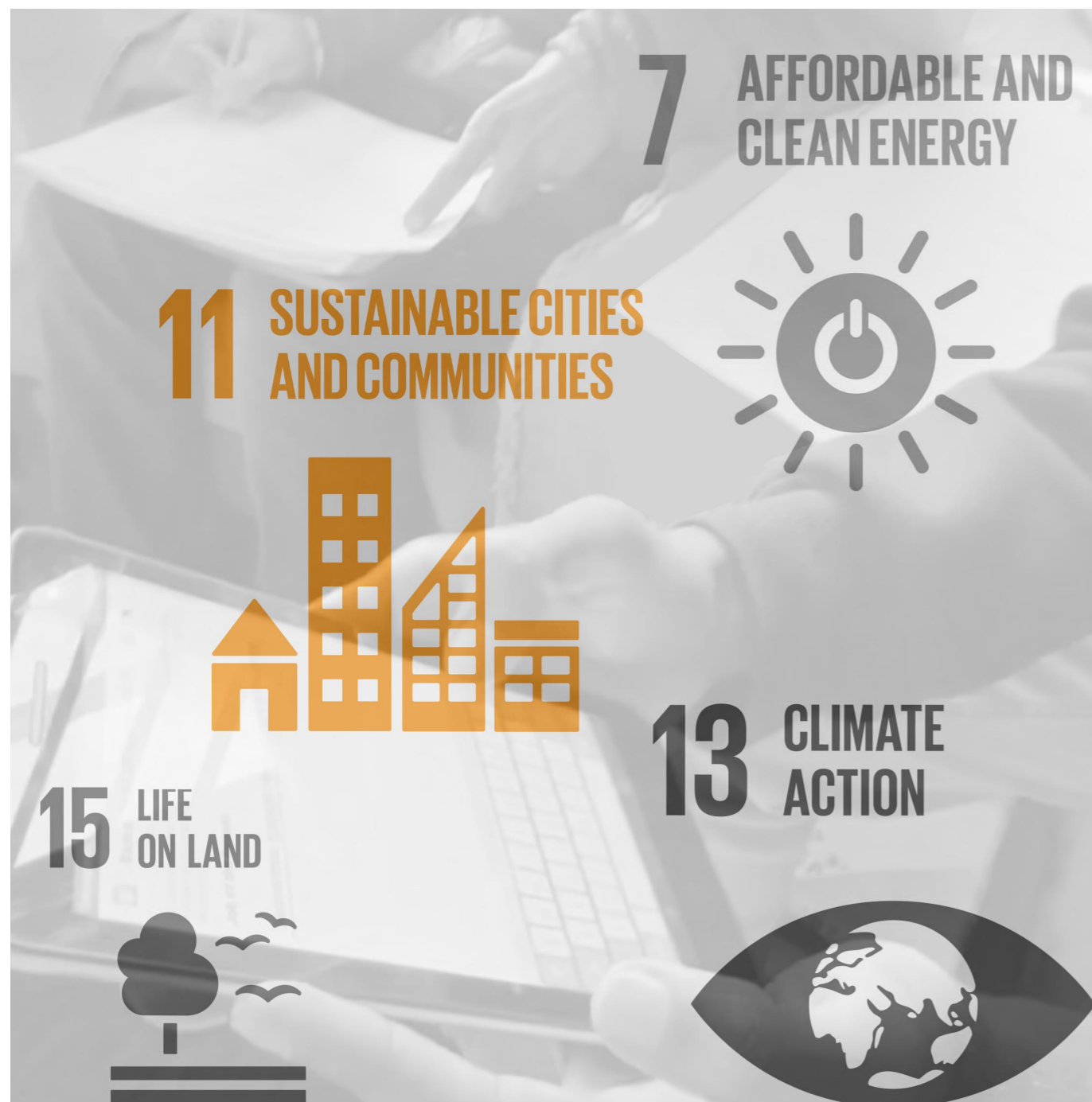
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## 2.3 Linking the SDGs with integrated development concepts (IEK) - based on IEK Münster + SDG 11: Sustainable cities and communities

Ana Patricia Ros AGULLO, Maréva BONNIER, Sofia ESCOBAR, Gary PAPKE, Emmanuella FATHALLA, Samuel KNUTELSKY, Wiebke STADTLANDER



In 2015 the ONU approved the Agenda 2030 for sustainable development with the idea in mind to transform and develop the world. It is an action plan in favour of the earth, the people and the environment that embraces political, social, economic and sustainable issues. This Agenda proposes 17 goals with 169 targets and 247 indicators. Those goals and targets are involving a compromise to end poverty, hunger and the inequalities around the world by 2030. Indicators should help to measure if countries are reaching the targets of the SDG's or not. There are actually 92 indicators that are environment related.

To understand the work, it's good to acknowledge the SDG's that are universal and apply to all countries. However, it's difficult to make SDG's work at a local level even as cities or districts. On the other hand, cities and districts can play an important role to reach SDG targets by 2030. That's why the aim of this semester is to adapt SDG targets and indicators to the local level. It is focusing on the district of Münster in Stuttgart. The district of Münster is located in the north east of the city close to the Neckar River. This district is likely to be improved over the next few years. To achieve this, a team of the "Soziale Stadt Münster" is working on a document called "Integriertes Entwicklungskonzept Münster" also "Integrated Development Concept Münster" or IEK. The integrated development or action concept is a document to help and guide a district that needs to be developed. It's based on the participation of local actors like residents of the district. This document is organized around fields of actions, targets and concrete measures.

# Methodology

The assignment for this semester was to understand and to give new approaches on how to monitor the SDG process at a local level. To explain the approach to this end this diagram (fig. 1) was created, which shows the different steps to follow and to come up with recommendations on how to break down SDG's at a local level. The first step was to create additional indicators and targets inspired by actions of the IEK Münster. After that we developed a participatory format related to those additional indicators and conducted the format on site to gather data on the chosen target, which was mobility. In the next step, we did a reflection of the outcome of the format while answering some questions. (what was positive/ negative?, how to translate participatory format into a format which is less specific to Münster? How can it be measured with less time needed?). Finally, there are recommendations for indicators which are more general and can be used in other districts, cities or countries.

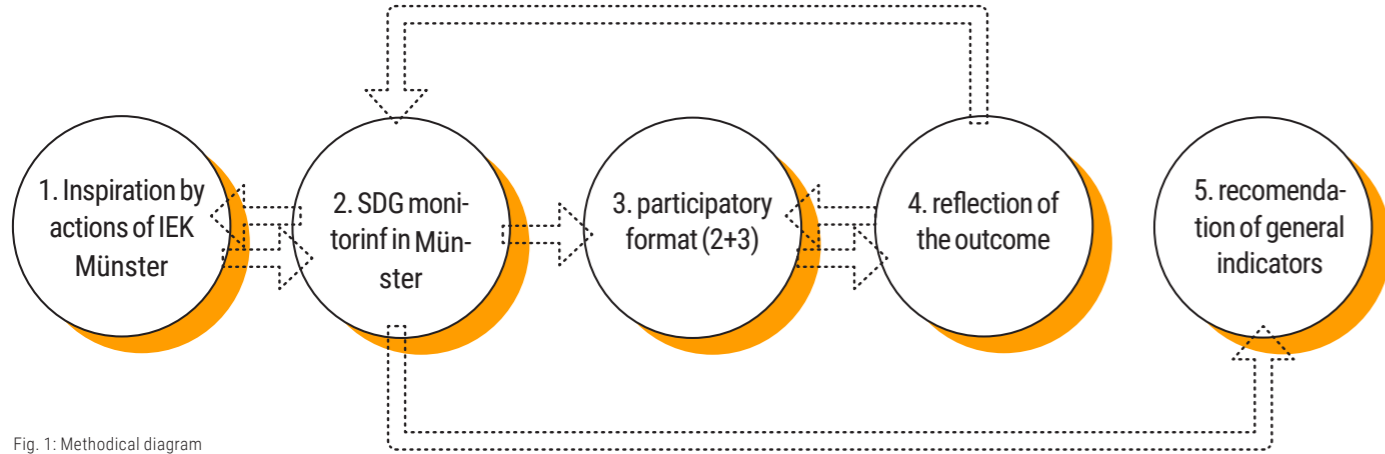


Fig. 1: Methodical diagram



Fig. 2: Cover page of Münster Blick



Fig. 3: Cover page of Münster-Rallye

# Research methods

The first stages of the seminar and research, started by getting input from experts in the topic, which was a first step to understanding what do sustainable development goals mean and how they are implemented. At a symposium Dr. Bettina Bunk and Stephanie Maier gave us of information about how is Stuttgart dealing with the global 2030 agenda at a local level, Oliver Peters, M.Sc. from German Institute of Urban Affairs presented informations about Monitoring Sustainable Development at the municipal level, and Gritta Rotter & Franziska Laue provided us with information about implementing local Agenda 2030 in city districts of Hallschlag and Münster.

One of the parts of the research was a direct visit to the city district with a team of "Soziale Stadt Münster". The next step was to get a general overview about districts history and gain deeper knowledge about the district. We carried out a desktop research concerning Münster and a study of information from the data compass (fig. 4). We also looked at other, publicly available, sources e.g a rally the "Stadtteilbüro" (fig. 3) planned during the preparatory studies of IEK or a copy of Münsterblick (fig. 2), a district magazine which invited all inhabitants of Münster to discuss the outcome of the participatory events from the preparatory studies of IEK. Furthermore, we analyzed different maps concerning land utilization and settlement development. Surprisingly for us, Münster is one of the smallest districts in Stuttgart and outstanding in a lot of the topics, which are analyzed in the data compass. While the unemployment rate is the third highest in Stuttgart, the number of inhabitants owning private cars is the lowest.

After gaining a deeper insight in the district, we started to analyze the IEK, which turned out to be the critical point for our work and study throughout the whole semester. In addition, we looked at the provided materials from the "Stadtteilbüro" Münster, which contained a summary of the most important information of the IEK, which was gathered by participatory actions in previous years with local citizens.

The main part of the research was the focus on connecting SDGs with respective points of IEK so we can come up with seizable indicators and new targets which can help set a main topic and final focus of the work. This research procedure should also led to creation of suitable participatory formats, which were then conducted on site.

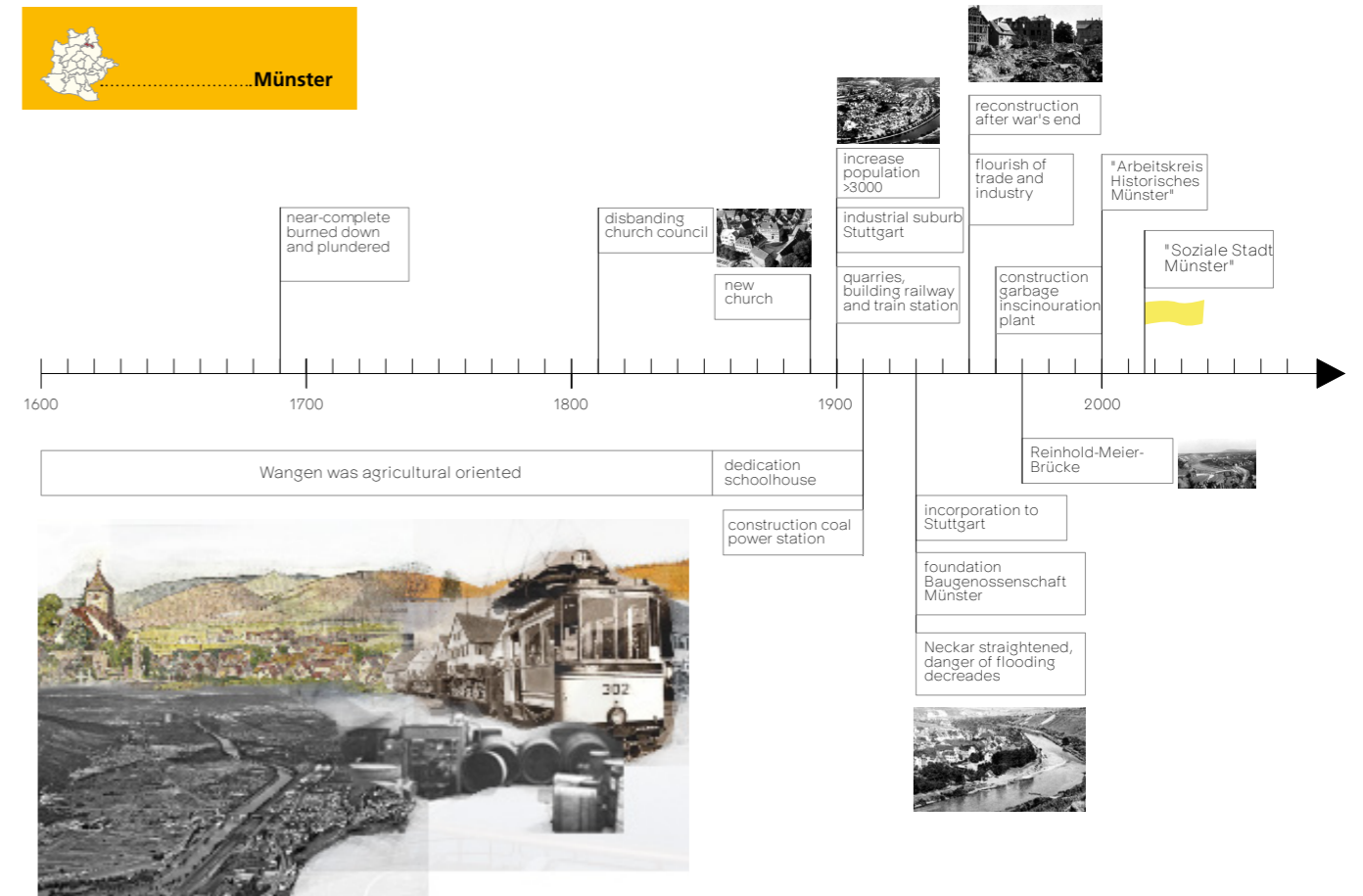


Fig. 4: Münster history and data compass

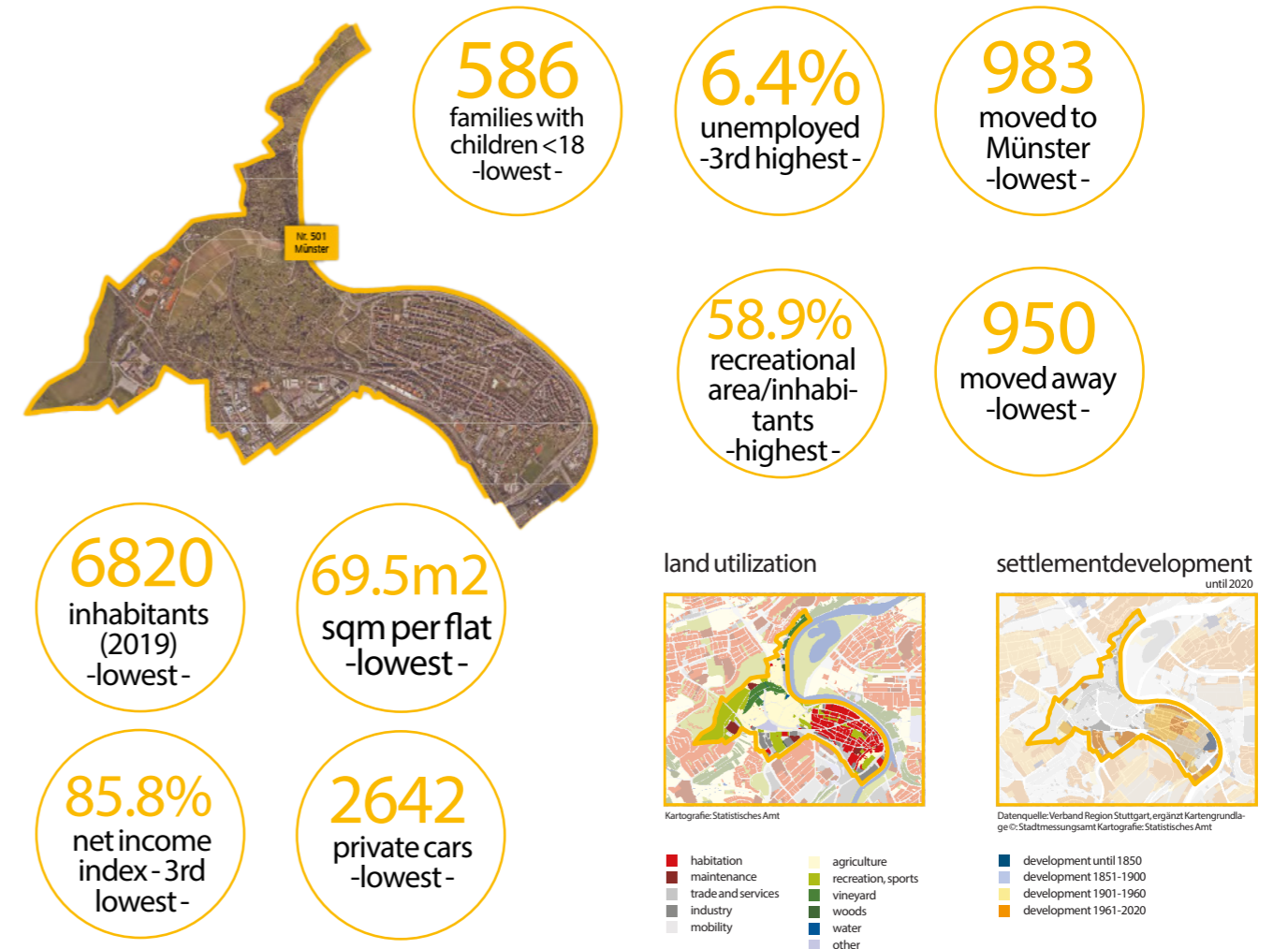


Fig. 5: data about Münster and land utilization of district

## Results of research

In order to create new indicators based on the IEK we asked ourselves some questions as a starting point, which are based on our research methods.

### 1. What is the difference between Integriertes "Entwicklungs-konzept" and Social development goals?

The Integriertes Entwicklungskonzept is a very district-specific tool, which works through integration of citizens to the planning process by creating participatory formats like surveys and workshops. The IEK Münster was inspired by similar concept of actions in the neighbouring city district Hallschlag. The team "Soziale Stadt Münster" from district office tries to integrate as much citizens as possible from the variety of social and economical backgrounds or different age groups. IEK Münster has more specifically 4 main fields of actions with 16 targets and 45 smaller sub-targets which they want to implement in the next years. The district office created a document with all of their goals (fig. 6) This document has most of the actions that the municipality or the district wants to implement in this programm. Those actions are based on the outcome of a preparatory study and are revised by the outcome of additional project groups. Therefore it gathers mostly **qualitative data**.

In contrast, SDGs are very general and therefore we cannot apply them directly to the smaller scale of districts and they have to be adapted to the specific size of this urban unit. Sustainable development goals relate to every country, but not to every specification. They consist of 17 goals, 169 targets and many indicators. The indicators are especially used to monitor the progress towards reaching the goal of each SDG. They are based on numeric values so they are a **quantitative tool**.

### 2. What opportunities does integrating SDGs into steering and monitoring IEK create for SDG monitoring?

SDG's indicators were created to measure the progress towards SDG targets. Integrating SDG's into the IEK could help to show us if there is any improvement through the actions taken by the IEK. We should be able to get a better overview of the current situation and measure what has changed in the last 12 months. In addition, the IEK would add qualitative data to the quantitative data of indicators which is maybe something that misses the actual indicators that are really quantitative tools. Also, integrating SDG's and using indicators to steer and monitor the IEK could help the comparison between districts and cities regarding IEK's of other districts and cities.

### 3. How do the goals and subgoals of IEK Münster relate to the SDGs?

IEK of Münster is already connected by the fact that the SDG's were considered to create the IEK. In this way, we decided to link targets and indicators of each SDG goal with the different fields of actions of the IEK (fig. 7). As there are a lot of fields of action on the IEK of Münster, we choose two of these that were for us the most important regarding the visit we've made in Münster to give an example of our research:

-Field of action 1: Housing, living environment and public space

-Field of action 3: Mobility for everyone

As the field of action number 1 is really general we connected each target and indicator to the subgoals that are developed in this field of action. The measures in each subgoals are also taken into account to connect in a right way targets and indicators. It was easy to connect because the subgoals of the IEK take into account SDG. Indeed this IEK was created based on SDG's.

At first glance subgoals number 1.3 The retail trade and gastronomy in Münster will be secured and strengthened and 1.5 The environment and infrastructure in Münster contribute to the quality of life are both connected to a lot of indicators and targets. And all the subgoals are also connected with SDG 11. But most of these indicators can not be measured at a local level (highlighted figures in fig. 8 and fig. 9). As a conclusion, we can see that a lot of indicators are not working at a local level. This means that it could be difficult to monitor the IEK with SDG's indicators.

### 4. How to fill the gap?

Creating new indicators or adapting some of those which are not working at a local level can help to fill the gap that actually exists. That's what we will show in the next step with the field of action number 3. We used the same process to link targets and related indicators to the subgoals as in the field of action 1.

Field of action 1: Habitation, residential environment, public space
Spaces in Münster are transformed for utilisation that is for the common good
The public space in Münster appeals welcoming
Retail and gastronomy in Münster is being secured and strengthened
Housing space in Münster is attractive to people whatever their situation in life
Environment and infrastructure in Münster contribute to the livability
Field of action 2: Cohabitation of generations
Münster offers cross - generational activities offer
Münster offers age group specific activities
Field of action 3: Mobility for everyone
Münster has an improved pedestrian-path-net
Münster receives safe infrastructure for motorised individual transport
Münster is well connected though public transport
Münster enables mobility by bike
Infrastructure in Münster is safe for all traffic participants
E-mobility in Münster is strengthened
Field of action 4: Education, culture, health
In Münster there are educational activities for all groups of the population
Münster offers a diverse cultural programme
Münster supports health offers

Fig. 6: Table showing "Entwicklungskonzept" or IEK with 4 fields of action and 16 targets by Team "Soziale Stadt Münster"

SDG targets	Field of action 1: Habitation, residential environment, public space
8.9/11.7	Spaces in Münster are transformed for utilisation that is for the common good of community
11.3/ 11.7/ 12.8/ 15.5/ 15.8/ 15.9	The public space in Münster appeals welcoming and invites people
2.3/2.4/2.5/8.3/8.a/ 9.3/ 11.3/ 11.7	Retail and gastronomy in Münster is being secured and strengthened
3.8/ 7.1/ 11.1/ 11.2/ 12.1/ 12.7/	Housing space in Münster is attractive to people whatever their situation in life
1.4/3.8/6.1/6.3/6.4/9.c/ 11.1/ 11.2/ 11.4/ 11.6/ 12.4/ 17.14	Environment and infrastructure in Münster contribute to the livability
Field of action 2: Cohabitation of generations	
2.2/ 4.5/ 5.c/ 8.5/ 10.3/ 10.4	Münster offers cross - generational activities offer
2.2/ 4.5/ 11.2/	Münster offers age group specific activities
Field of action 3: Mobility for everyone	
9.1/ 9.4/ 11.2/ 11.6/	Münster has an improved pedestrian-path-net
9.1/ 11.2/	Münster receives safe infrastructure for motorised individual transport
9.1/ 9.4/ 11.2/ 11.6/	Münster is well connected though public transport
9.1/ 9.4/ 11.2/	Münster enables mobility by bike
9.1/ 9.4/ 11.2/	Infrastructure in Münster is safe for all traffic participants
7.1/ 7.2/ 7.3/ 9.1/ 9.4/ 11.2	E-mobility in Münster is strengthened
Field of action 4: Education, culture, health	
8.3/ 8.6/ 8.9/ 10.2/ 12.b	In Münster there are educational activities for all groups of the population
3.7/ 2.1/ 2.2/ 2.3/ 2.4/ 4.a/ 4.6/ 4.7	Münster offers a diverse cultural programme
3.4/3.a/ 3.c/ 3.d/ 3.7/ 3.8/ 5.4/ 5.6	Münster supports health offers

Fig. 7: relation between IEK Münster and SDG targets.

SDG targets	Field of action 1: Habitation, residential environment, public space
8.9/11.7	Spaces in Münster are transformed for utilisation that is for the common good of community
11.3/ 11.7/ 12.8/ 15.5/ 15.8/ 15.9	The public space in Münster appeals welcoming and invites people
2.3/2.4/2.5/8.3/8.a/ 9.3/ 11.3/ 11.7	Retail and gastronomy in Münster is being secured and strengthened
3.8/ 7.1/ 11.1/ 11.2/ 12.1/ 12.7/	Housing space in Münster is attractive to people whatever their situation in life
1.4/3.8/3.9/6.1/6.3/6.4/9.c/ 11.1/ 11.2/ 11.4/ 11.6/ 12.4/ 17.14	Environment and infrastructure in Münster contribute to the livability

Fig. 8: relation between IEK field of action 1 and SDG targets, highlighted targets must be adapted to be measured.

TARGETS FROM FIELD OF ACTION 1	FITTING SDG TARGETS OR INDICATORS	SDG TARGETS OR INDICATORS WHICH HAVE TO BE ADAPTED
Retail and gastronomy in Münster is being secured and strengthened	8.3.1 Proportion of informal employment in total employment, by sector and sex	2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.
Housing space in Münster is attractive to people whatever their situation in life	7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.	7.3 By 2030, double the global rate of improvement in energy efficiency.
Environment and infrastructure in Münster contribute to the livability	1.2.1 Proportion of population living in households with access to basic services	3.9 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all

Fig. 9: examples of corresponding SDG targets or indicators with targets from field of action 1, which must be adapted and which do not need to be.

## Reflections and recommendations

As we can see on the diagram below (fig. 10), all the subgoals of IEK field of action 3 (Mobility for everyone) are related to target 11.2 of SDG 11 (fig. 11). That's why we decided to show examples of creating additional indicators with the example of target 11.2. Indeed, focusing on one target and one SDG helped us to get more details regarding the indicators we created intending to break SDG monitoring down to a local level.

SDG 11 worked on the access the population has to transportation and its purpose, in how to connect people to it and integrate all the population of the different areas so they all have the same level of access to it. We came up with new indicators that would also help us complete this evaluation centering more on qualitative data, to monitor the measures that are taken by the IEK, and to see if that helps to move towards fulfilling the targets of the SDGs.

To create specific indicators we decided to take into account the measures that are taken by the IEK. Here is a list of some measures (fig. 12) that we worked on to show how we connect with target 11.2 and related indicators to create new indicators.



Fig. 11: SDG 11 and its target 11.2.

Field of action 3: Mobility for everyone	
9.1/ 9.4/ 11.2/ 11.6/	Münster has an improved pedestrian-path-net
9.1/ 11.2/	Münster receives safe infrastructure for motorised individual transport
9.1/ 9.4/ 11.2/ 11.6/	Münster is well connected though public transport
9.1/ 9.4/ 11.2/	Münster enables mobility by bike
9.1/ 9.4/ 11.2/	Infrastructure in Münster is safe for all traffic participants
7.1/ 7.2/ 7.3/ 9.1/ 9.4/ 11.2	E-mobility in Münster is strengthened

Fig. 10: connection of Field of action 3: Mobility for everyone with target 11.2.

At first glance, it seems difficult to work with the IEK and SDGs together. First of all because one is providing qualitative data while the other is providing quantitative data but also because both are not working at the same scale. Nevertheless, connecting SDGs with the IEK was not as difficult as we thought it would be. Indeed, based on the actions taken by the IEK, we came up with additional indicators for SDG target 11.2. Connecting SDGs with subgoals and actions of the IEK was a way to understand how to fill the gap between these but also to combine qualitative and quantitative data to get a better overview of the actions taken. The purpose would be to check if the actions taken in Münster help the district to come closer to reaching the goal of SDG 11 which was then conducted on site.

actions	new Suggested indicators	Conclusion
Creating a new busstop within the district	<b>indicator 11.2.2:</b> "Modal split, frequency of used means of transportation used on routes connected to Münster"	If the district provides a new bus stop and in the same year the number of people using public transport increases, you can relate the data gathered by this indicator to the action.
Lowering the prices for public transport	<b>indicator 11.2.3:</b> "Number of people having a ticket for public transport"	If more people are using public transport after lowering the prices, it could be a sign that it was too expensive for them before.
improving appearance of roads/safety by lighting, make streets more accessible for people with disabilities or children,... etc	<b>indicator 11.2.4:</b> "frequency of most used routes by bike/car/foot"	If people didn't use certain roads before the action, even if it's shorter, but use it afterwards it might be a sign that the route was dangerous/don't appear nice.
strengthen economy (supermarkets, market, pharmacy)	<b>indicator 11.2.5:</b> "Proportion of people who are able to walk to shopping/work"	strengthen district, measure if action which are taken help to fulfill goal of city of short distances.
provide car-/bike sharing	<b>indicator 11.2.6:</b> "Number of provided cars/E-bikes" and "Number of rentals"	conclusion: see whether people deregister their car, relate bike rentals to health issues, link it back to city of short distances, compare how many bike rentals to car rentals

Fig. 12: examples of some actions taken by IEK, with suggested new indicator and our conclusion, all action are connected with SDG target 11.2

## Focus topic

Before we started planning the participatory event and the methods we were going to use to gain data, we had to set the focal points of our study. The questions and data we aimed to collect should be clear and more specific to get deeper insights. We wanted to make sure that we evade certain gaps which come up with participatory format execution, such as the fact that the format tends to be long, and that we need to make sure it will only take a few minutes for the residents to participate.

After that, we could implement them in our final part of the seminar by gaining qualitative data on the ground, for the citizens of Münster. As already mentioned, we focused mainly on target number two of SDG 11. The main topic of the SDG targets is **mobility and transportation** (also the topic of IEK Field of action 3: Mobility for everyone). This target was tackled frequently in the IEK and is also considered the easiest for residents' of Münster to relate to, in comparison to other targets of SDG 1. It is a recurring topic for the residents of Münster, which we identified in our field visit to the site. Besides these facts, Münster is a city district with mostly residential areas with circa 6800 citizens. Most of them move throughout the day in and out of the district, mainly for the purpose of work and education. Citizens of Münster own fewer cars in comparison to any other district in Stuttgart, therefore the topic of public transportation as well as the number of U-Bahn lines and bus lines, quality of means of transportation or access to other districts is an important topic for citizens. The same applies to the topic of mobility and the quality of public space inside the district. Other than traveling outside the district, people especially young people, families with children, and elderly people stay inside the borders of Münster for recreation, culture, socialization or to do groceries and use the pharmacy. It implies the importance of pedestrian pavements, access to public spaces and safety for vulnerable people.

After deciding on the main topic, we set also the key question we wanted an answer to: "How do residents move around the district?" This question not only implies what means of transportation they use but also where people move (e.g. which streets) and with what perception, and ease they move around the city district. We chose 3 indicators that we created for the measuring of SDGs in Münster (from the previous part: Reflections and recommendations), which directly imply this question: (fig. 14):

- indicator 11.2.2: "Modal split, frequency of used means of transportation used on routes connected to Münster,"
  - indicator 11.2.3: "Number of people having a ticket for public transport,"
  - indicator 11.2.4: "frequency of most used routes by bike/car/foot."
- These indicators were later used to make more specific questions for our participatory methods so we can measure them easier and get a deeper insight into the level of application of SDG 11 in this district. Planning and executing these events are not only for gathering data, but also for raising awareness about topic in the neighbourhood.

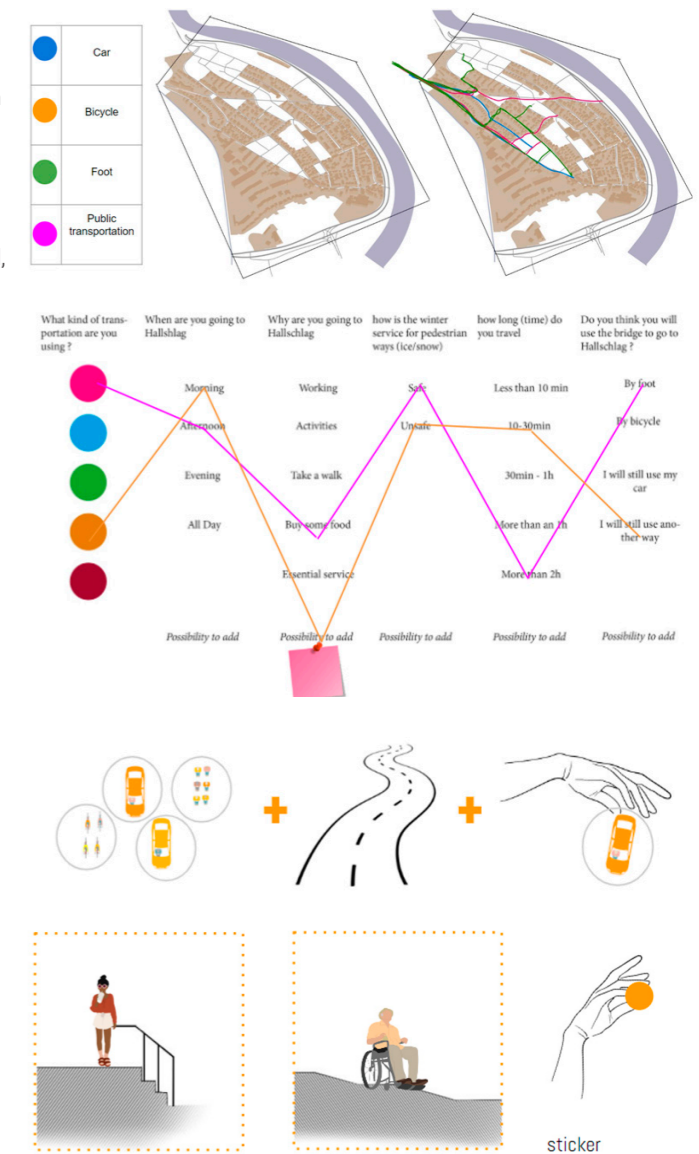


Fig. 13: Proposals for participatory events and actions

## HOW DO PEOPLE MOVE AROUND DISTRICT?

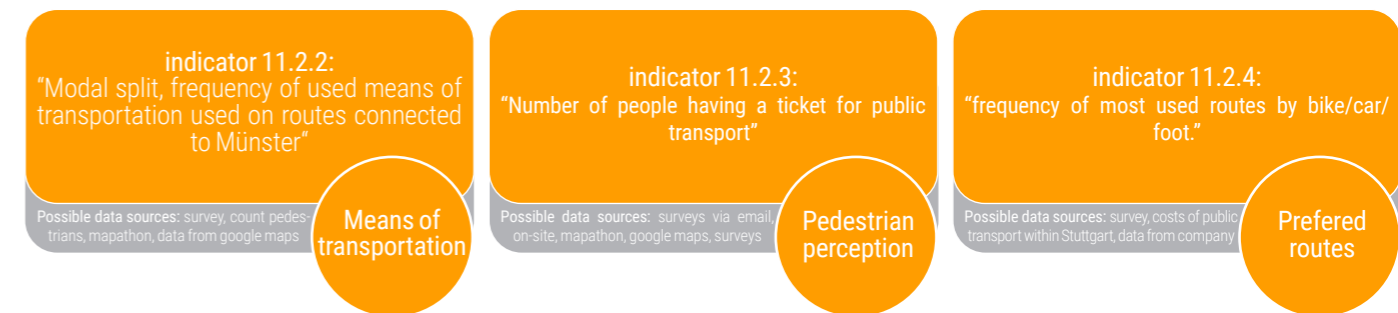


Fig. 14: Graphic depiction of our focal points + possible data sources for indicators

## Participative methods

The main objective of our next assignment was to develop interactive participatory formats, to be implemented with the residents of Münster district. Therefore, the aim of these formats was to gather qualitative data, related to SDG 11 and collect data on our chosen topic: **Mobility**, from the residents, in a simple, attractive and playful way.

For the first part of our participatory format we created a set of direct questions to answer our main topic questions which were stated in the part before (focus).

- What is your destination?
- What kind of transportation are you using?
- What time of the year do you choose this form of transport?
- How often do you travel?
- At what time of the day do you travel?
- How long does it take?
- What is the purpose of your travel?
- Is it easy to find a parking spot?

Additionally, we wanted to know their view on the "Bürgerbus project" (a project of a bus going around Münster and bringing people to the main destinations in the city district) that currently is in a test phase and is discussed to be permanently implemented and expanded by the care center. Out of these quantitative questions, we could then extract the qualitative information, much needed for our project. To collect the answers to our questions, we created a format where the citizens answered the questions with thread to create a thread picture (fig 18), connecting the different answer possibilities with different colored threads. Each color represented a different destination. Each answer was represented by a pin, where the thread would be wreathed around. Multiple tendencies of participants were shown, just by the growing wrapped number of threads. Results may be seen in the next part (Results).

For the second part, we tried to find out which ones are the most transited roads/paths in Münster (fig 15-16). Thus, we made a map of the Münster district, where with the help of, again, nails and thread, the person had to trace its most used path in Münster to also create a thread picture highlighting the main roads and main "knot points" of the movement made by citizens throughout the day.

Additionally, after carrying out these two participative formats, we tried to "break the ice" with our participants and we tried to collect as much data as possible with basic conversation. Asking questions for example: "Are you satisfied with the possibilities of moving around Münster" or, "what would you change in Münster in connection with the topics of mobility and public spaces."

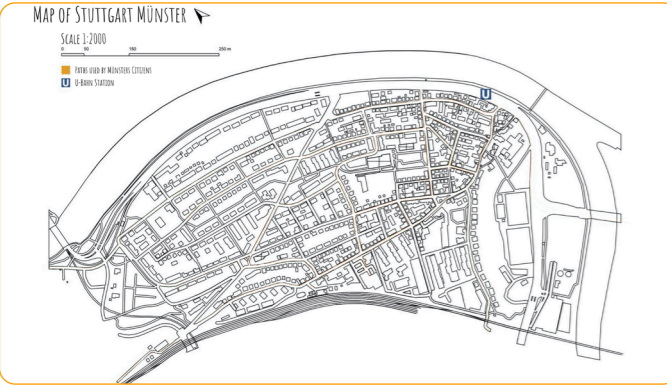


Fig. 15: base map of Münster for second participative method.

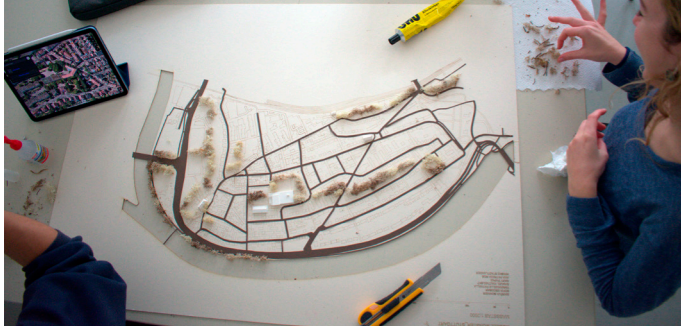


Fig. 16: preparation of map for the second participative method.

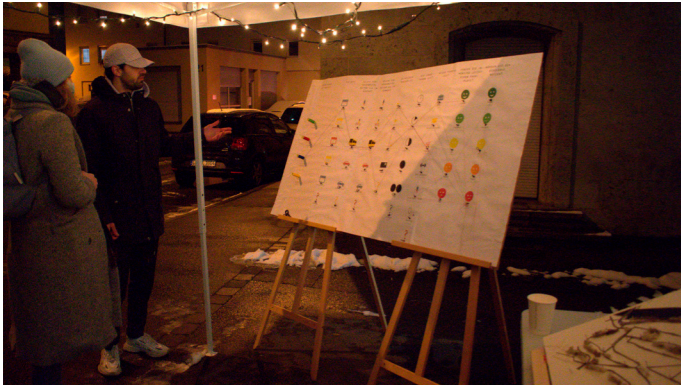


Fig. 17: picture from participatory event, first participative method.

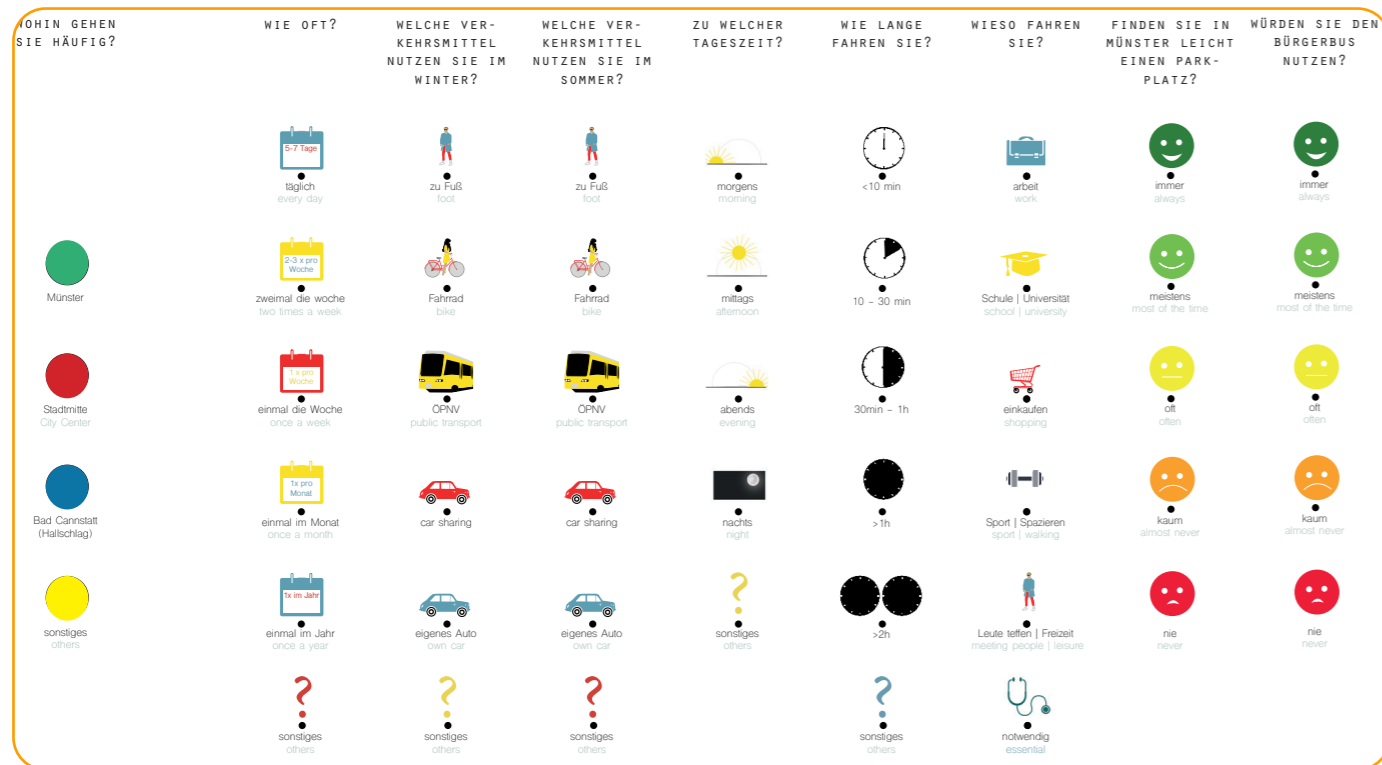


Fig. 18: first participative method called "Fadenbild".



Fig. 19: picture from participatory event.



Fig. 20: picture from participatory event.



Fig. 21: picture from participatory event.



Fig. 22: picture from participatory event.

# Results

We represented the results of the thread picture format with diagrams (fig 23-31) where each color represents the destination of the person (Münster, Bad Cannstatt, the city center, other) and each diagram shows the results of a different question that we established. Our results of the participatory format show answers from circa 25 participants who are all citizens of Münster.

From the first question, we could notice that most of the people mobilize themselves very frequently, mainly to go to the city center or Bad Cannstatt (Hallschlag) (fig. 23).

From the next question, the first thing we noticed was that people who mobilize within Münster do not change their means of transportation based on the season (fig 24-25). Within one city district, they mainly walk because public transport does not make their mobilization easier. Everything is reachable within short distances. We also noticed that in winter, public transport is the only used mean of transportation for going to the city center and is the main mean to go to Bad Cannstatt and it slightly decreases in summer, while bicycle usage slightly increases. Even though during the warmer months, it is easier to mobilize by bike to the city center or the other parts of Stuttgart, people do not use them. This may lead to the assumption that people need more impulses and motivation or maybe better infrastructure to use a bicycle. The results also show that car sharing is a weak method to move around Stuttgart for citizens of Münster. As you can see in the results of car usage, only very few people use a car because of only partial research.

Next, we found out that people are traveling throughout the whole day, they mostly need from 10 to 30 minutes to go to the places where they need to go and no one takes more than an hour for their trips (fig. 27). The most common reason why people mobilize is for going to work or shopping. And something memorable we noticed is that people don't usually meet with other people within Münster (fig. 28).

With the second last question, we found out that people mainly find it difficult to find parking lots (fig. 29). The last question was about the pilot project of the "Bürgerbus" which the care house is planning and most of the people said they would not use the "Bürgerbus", but they think it is a good idea for the elderly and people with difficulties (fig. 30).

From our second participatory format, we can see which are the most used paths by the people we interviewed. Here it is remarkable, that most of the identified roads are the ones near the U-Bahn station, which was probably somehow influenced by the location of our stand (fig. 32).

Finally, in the next graphic, you can see important qualitative data that we collected while talking with the citizens while they were answering our two participatory formats (fig. 33). We deepened on the project of the "Bürgerbus", heard about a lack of cultural offer in Münster, about the big amounts of cars people use throughout the day but on the other hand some people mentioned, if there was the possibility, they would use more car sharing.

Colors by destinations: ■ Münster ■ City center ■ Hallschlag/ Bad Canstatt ■ Other

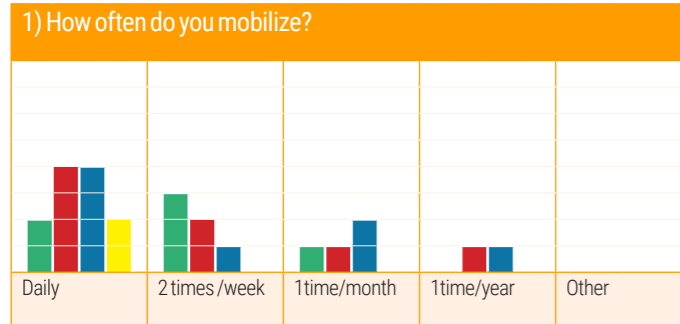


Fig. 23: answers to the question: "how often do you travel?"

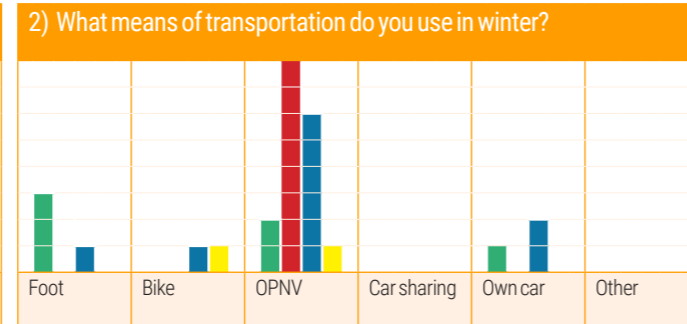


Fig. 24: answers to the question: "what means of transportation do you use in winter?"

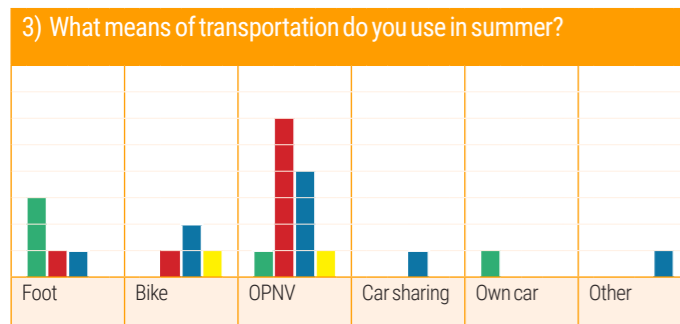


Fig. 25: answers to the question: "What means of transportation do you use in summer?"

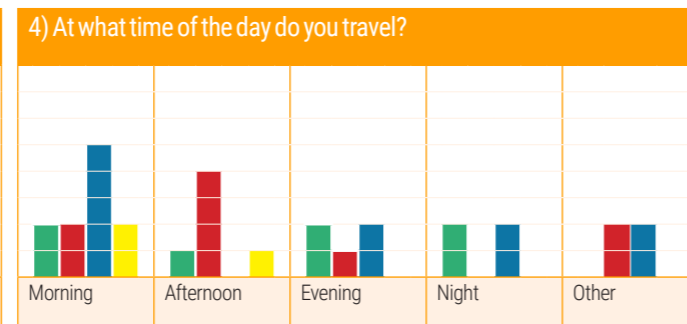


Fig. 26: answers to the question: "At what time of the day do you travel?"

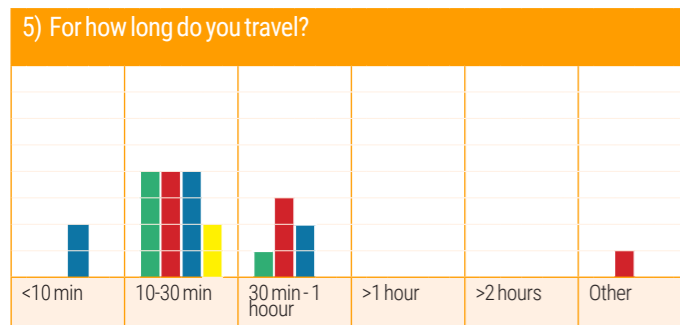


Fig. 27: answers to the question: "For how long do you travel?"

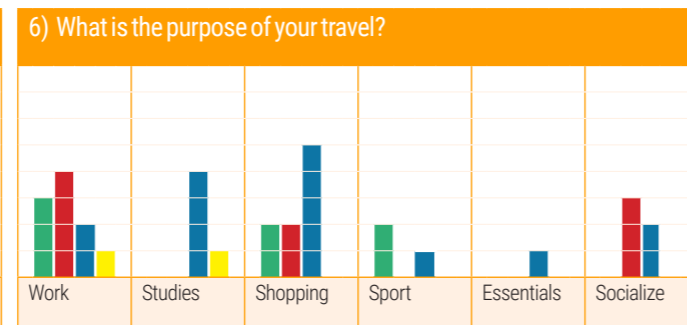


Fig. 28: answers to the question: "What is the purpose of your travel?"

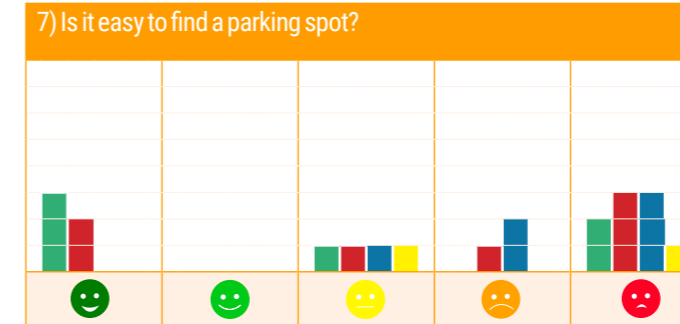


Fig. 29: answers to the question: "Is it easy to find a parking spot?"

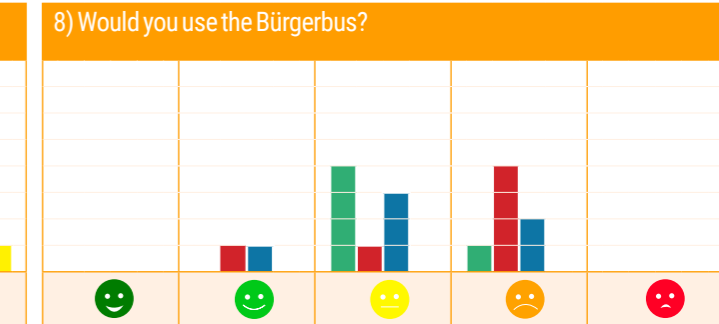


Fig. 30: answers to the question "Would you use the Bürgerbus?"

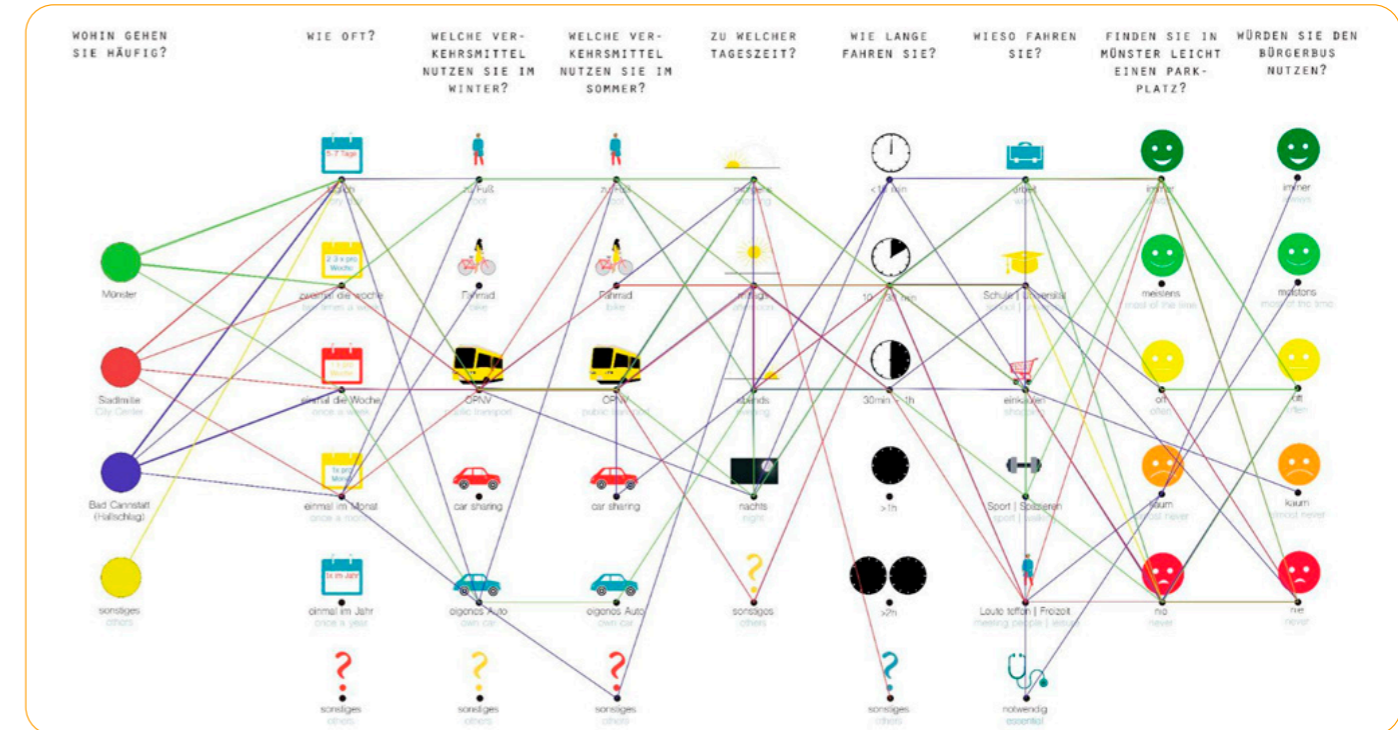


Fig. 31: graphic result of the first participatory method "Fadenbild".

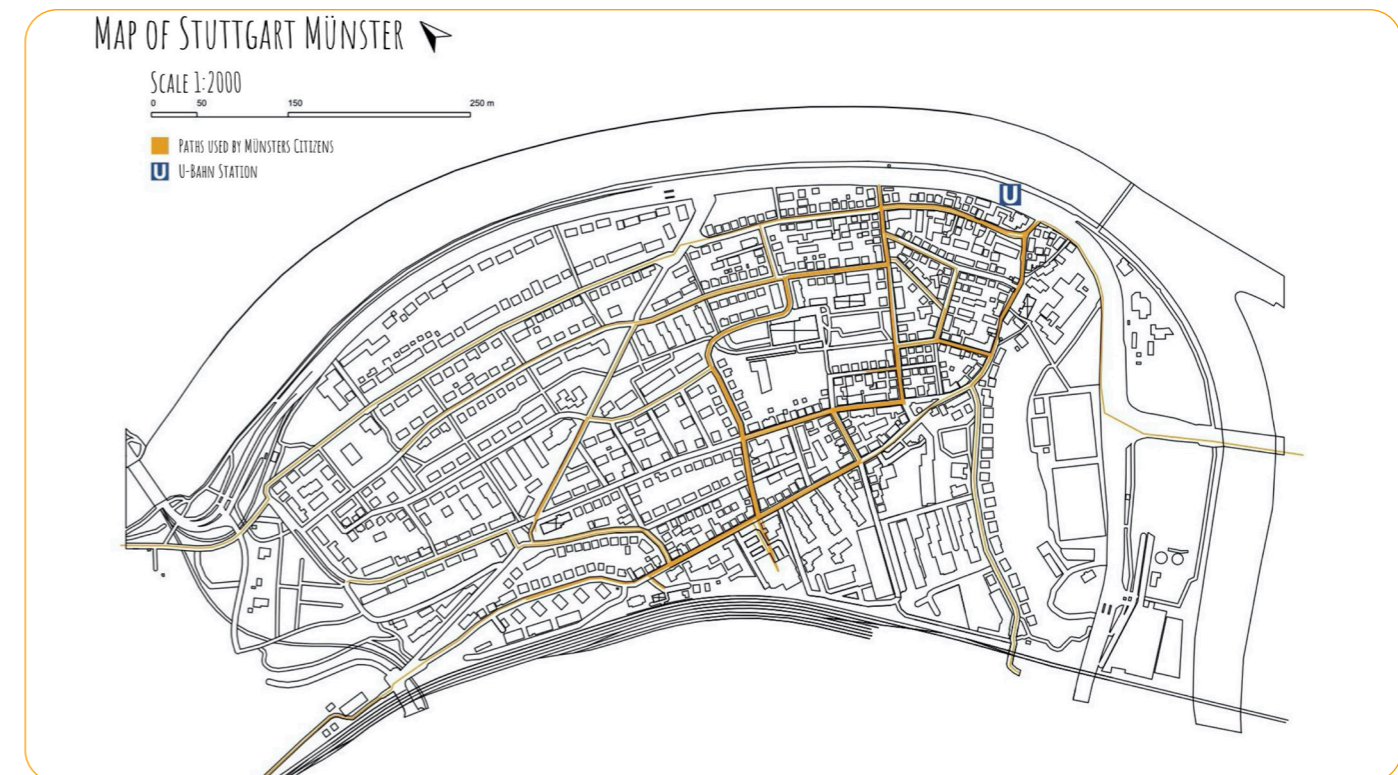


Fig. 32: graphic result of the second participatory method

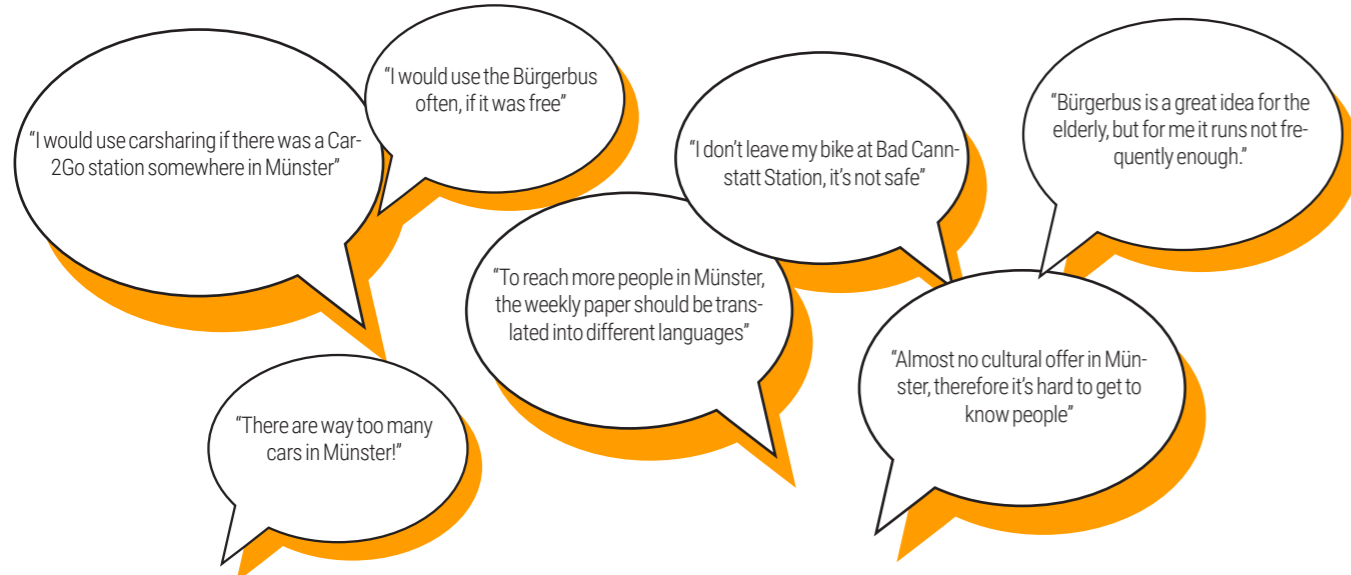


Fig. 33: Important answers from our discussion with citizens of Münster, during participatory event

## 8. Final reflection and recommendations

Carrying out an event in real life in Münster helps us to understand the strength and weaknesses of our three formats. This allows us to get critical about it and to think about developing improved formats. The implementation of our participatory format developed many problems and challenges. On the one hand, there were technical problems during the realization, which could be dealt with easily, and then there were challenges, where we need to refine the whole concept.

First of all, by these formats, we have to find ways to reach more people from different backgrounds and with different opinions. We need to repeat such surveys and events each month or more times a year to get feedback depending on the seasons (for example some people are not using their bikes during winter). When we look back at our event, it was carried out in mid-December, therefore it was quite cold, which played a significant part. Thus we did not collect as much data as may be desired. A big gap, in our participative methods, was related to our location. Since we were located on the spot close to a U-Bahn station, we ended up asking mostly people who mobilized with public transport and not with cars, bicycles or other means of transportation. Therefore it was not such a strategic location to get to many different kinds of people. Also, since we were only in one location, we got responses only from people who mostly mobilized nearby and not really from the whole district, even though the city district of Münster does not cover so much space. This also led to a result which you can see in the graphic in the previous part (fig. 32). It is then recommended to spread across the whole district to key locations as gas stations, supermarkets, parks or other bus and U-Bahn stations. These locations need to be set during the preparatory stages. Then, to reach more people, an online participatory format needs to be created, so we do not bother people who do not want to speak. With this, we can reach part of the population working from home or generally, reach more people not available during the events. It is also important to find a way to increase the qualitative part by creating group projects of different communities and new participatory formats for different groups (for example children or seniors).

Our goal was also to see if the IEK could help monitor SDG, but after doing this and rethinking the assignments, we would not advise using IEK as a tool to monitor. In our opinion actions are measured by indicators that are provided by SDGs, however, combining IEK & SDG can help to raise awareness of SDGs. But at a local level SDGs are way too general to be always understood by citizens

There are also recommendations based on the outcome connected with SDG indicators, targets and IEK. The first recommendation would be to divide targets of SDGs into smaller targets so that more of the actions taken by the IEK can be related to it. We have for you an example based on our case study

on the field of action number 3: Mobility for everyone (fig. 34-36). The actions of the IEK do not relate to the whole target 11.2 because this one includes a lot of topics. The idea is then to split target 11.2 into 3 targets, which can be reached more easily on the district level. For example "improving road safety" can be linked to almost all sub-goals of the IEK (fig. 34), but "provide access to safe, affordable, accessible and sustainable transport systems for all" is only related to three of these (fig. 35), and finally, the last part of this target is "improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons" is related to another three of these IEK targets (fig. 36). With this example, we can see that dividing the targets and linking the different parts with the subgoals of the IEK can also be implemented in order to adapt SDGs at a local level.

We also reviewed our previous indicators to try to make some of them more general so that they can be monitored in other districts, even other cities in Germany (fig. 37). For example, indicator 11.2.3 "Number of people having a ticket for public transport" could become "Number of people having a ticket for public transport compared to salary and age." Then there is an example for indicator number 11.2.6 "Number of provided rental bikes" and "Number of rentals related to deregistration of cars" could be "Number of provided rental bikes and cars" and "Number of rentals related to deregistration of cars." This means that we could have additional information to measure and monitor these indicators in different cities to allow comparison between them to see which measures of an IEK are working or not.

Last but not least, it is needed to create and include more qualitative indicators as well. Indeed, we captured a lot of information thanks to the perception of pedestrians in Münster while we were asking questions during the event.

Devised target 11.2	Field of action 3: Mobility for everyone
<b>target 11.2</b> "By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, <b>improving road safety</b> , notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons"	<b>3.1</b> Münster has an improved pedestrian-path-net <b>3.2</b> Münster receives safe infrastructure for motorised individual transport <b>3.3</b> Münster is well connected though public transport <b>3.4</b> Münster enables mobility by bike <b>3.5</b> Infrastructure in Münster is safe for all traffic participants <b>3.6</b> E-mobility in Münster is strengthened

Fig. 34: highlighted part of divided SDG target 11.2 corresponds to highlighted IEK targets

Devised target 11.2	Field of action 3: Mobility for everyone
<b>target 11.2</b> "By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons"	<b>3.1</b> Münster has an improved pedestrian-path-net <b>3.2</b> Münster receives safe infrastructure for motorised individual transport <b>3.3</b> Münster is well connected though public transport <b>3.4</b> Münster enables mobility by bike <b>3.5</b> Infrastructure in Münster is safe for all traffic participants <b>3.6</b> E-mobility in Münster is strengthened
actions from IEK: public transport call-a-bike station, SSB-flex, Bürgerbus, missing: cargo bike	

Fig. 35: highlighted part of divided SDG target 11.2 corresponds to highlighted IEK targets

Devised target 11.2	Field of action 3: Mobility for everyone
<b>target 11.2</b> "By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, <b>improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons</b> "	<b>3.1</b> Münster has an improved pedestrian-path-net <b>3.2</b> Münster receives safe infrastructure for motorised individual transport <b>3.3</b> Münster is well connected though public transport <b>3.4</b> Münster enables mobility by bike <b>3.5</b> Infrastructure in Münster is safe for all traffic participants <b>3.6</b> E-mobility in Münster is strengthened
example actions from IEK: accessible, Bürgerbus, SSB-Flex,	

Fig. 36: highlighted part of divided SDG target 11.2 corresponds to highlighted IEK targets

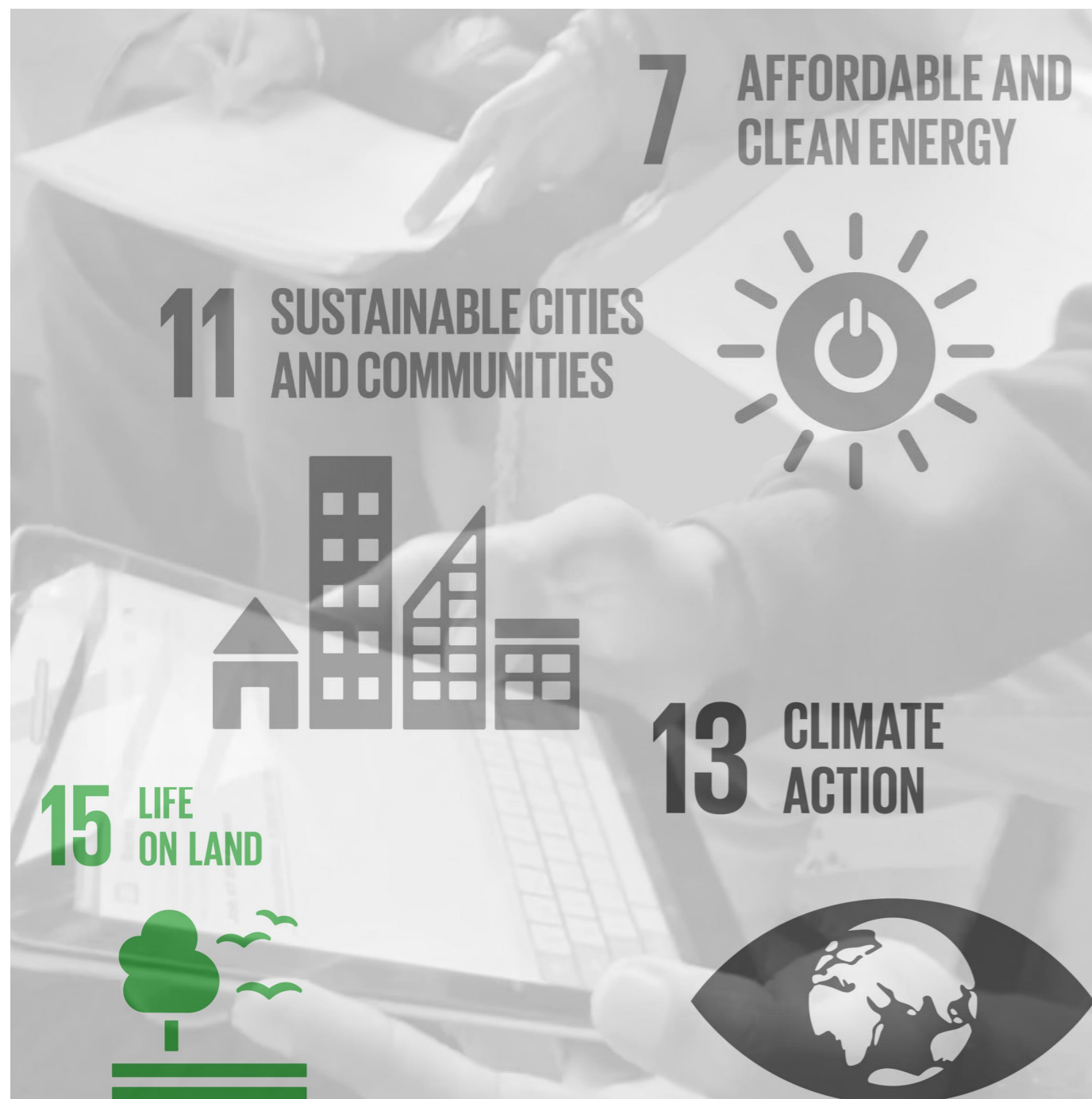
New indicator for Münster	Possible data sources	Possible general indicator	Possible data sources
<b>indicator 11.2.2:</b> "Modal split, frequency of used means of transportation used on routes connected to Münster"	survey, count pedestrians, mapathon	<b>indicator 11.2.2:</b> "Modal split, frequency of used means of transport used on routes connected to city/city district"	mapathon, count pedestrians, data from google maps, survey from city for all districts
<b>indicator 11.2.3:</b> "Number of people having a ticket for public transport"	survey, costs of public transport within Stuttgart	<b>indicator 11.2.3:</b> "Number of people having a ticket for public transport compared to salary and age"	costs of public transport within city, salary from data compass, data from company
<b>indicator 11.2.4:</b> "frequency of most used routes by bike/car/foot"	surveys via email, on-site, mapathon, google maps, surveys	<b>indicator 11.2.4:</b> "frequency of most used routes by bike/car/foot"	surveys via email, on-site, mapathon, google maps, surveys
<b>indicator 11.2.5:</b> "Proportion of people who are able to walk to shopping/work"	surveys via email, on-site, mapathon, google maps, surveys	<b>indicator 11.2.5:</b> "Proportion of people who are able to walk to shopping/work"	surveys via email, on-site, mapathon, google maps, surveys
<b>indicator 11.2.6:</b> "Number of provided cars/E-bikes" and "Number of rentals"	car sharing/bike sharing, registration office	<b>indicator 11.2.6:</b> "Number of provided rental bikes and cars" and "Number of rentals related to deregistration of cars"	car sharing/bike sharing, registration office

Fig. 37: difference between new indicators on local and indicators general level, highlighted field does not correspond to original indicators or data sources on a local level



## 2.4 Linking the SDGs with integrated development concepts (IEK) - based on IEK Hallschlag + SDG 15: Life on land (Biodiversity)

Lucie AUGISTROU, Valentina FERRARI, Bassant ISMAIL, Dina EL GHARIB, Luis STROBEL, Şevval BATTAL, Yuxuan JIANG



The agenda 2030 for the Sustainable Development Goal is a program of action for the people, the world, and the future, which was launched in 2015 by the 193 governments of the country members of the UNO. Sustainable development has to satisfy the needs of the current world without compromising the capacity of the new generations to reach the same goals. It has 17 Sustainable Development Goals and 169 targets that have the purpose of ending poverty, hunger, and inequalities in the future world of 2030. To reach this aim there is need to work on three elements: economic growth, social inclusion, and environment protection. For the goals of the 2030 Agenda, the city of Stuttgart is committed to a broad alliance at the level of the city as a whole and in the various districts at the local level. The municipal council signed the corresponding model declaration of the German Association of Cities in 2018. With this, Stuttgart declares its willingness to implement the agreements of the global Agenda 2030 at the local level with concrete measures, and thanks to this in October 2018 Stuttgart became one of the first municipalities in Germany to test the “municipal level version” of the SDG indicators.

The main purpose of our work was to transform to a more local district scale the aim of SDG 15, called “Life on land” and its targets. This goal has the objective of: “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss”. First of all, we analyzed the 12 targets of SDG 15, understanding which of those could become a municipality task. Most of them were too general and we decided to focus more on the ones that already have the potential to support sustainable development at a smaller scale. A great help for this task was connecting the SDG’s 15 targets to the Integrated Development Concept of the Social City Project, based on the district of Hallschlag.

The Social City project is a federal-state program, decided in 1999, that has the purpose of increasing the development of some districts which are considered “Soziale Brennpunkte” (in English “social problematic point”) places where the social development is hindered because of some situation in the district. The district of Hallschlag was classified as this; it has 7.000 inhabitants - 72.9% with migration background (the highest in Stuttgart), 10.4% of unemployed people (the highest in Bad Cannstatt) and 71.7% of the families need the state’s support.

Throughout its history, Hallschlag has undergone a lot of changes. In the 19th century it was just a satellite around the more important brick factory of the near district Münster. Since 1921 the building of social housing started, that until now, defines the main character to the district; Hallschlag wanted to give homes to people who needed residential buildings, realized in a cost-saving and standardized way. From all these changes, the district became, as already said, a socially problematic point, but with a very big potential to transform and enhance its best characteristics.

Because of this, since 2007 the Social City program has started with many urban development and social initiatives to upgrade the district. The Integrated Development Concept of this Social City program (IEK) is divided into three fields of action:

- Housing, living environment, and public space: with the aim of upgrading the residential environment, maintaining safety and cleaning the spaces, improving recreation facilities, especially for children and young people, and with the development of the local economy
  - Social and cultural coexistence: integrating transport into the public spaces and improving the city and the district's image
  - Education and health: providing educational opportunities for children, youth, and adults, creating opportunities for qualification and spaces for education, considering health, nutrition, and sport.
- Moreover, the responsible office for urban planning and urban renewal wanted the Social City program to have an interdisciplinary project group (IPE) to reach every field that was just mentioned. This IPG consists of experts from various areas of the city of Stuttgart.

## Research Methods & Results of Research

The Hallschlag IEK provides an overview of the city district's most significant values as well as the measures that have been taken and are still being taken. We were able to determine which issues and initiatives should be prioritized for implementation in the city district after examining this paper and connecting each field to an SDG target.

Field of action	Sub-field of action	SDG goals
Housing, living environment and public space	Upgrading the residential area	11.7.1 / 15.9.1 / 15.a.1
	Attractive living	11.3.1 / 11.3.2
	Improve meeting facilities, play and leisure time situation for children for children and young people/recreate	11.7.1
	Urban upgrading	11.3.1
	Safety and cleanliness	10.3.1 / 11.7.2
	Development of perspectives for the local economy, better marketing of the shopping location	8.3.1
	Urban-friendly integration of transport into the public space and improvement of the framework conditions for public transport	11.2.1 / 13.2.2
Social and cultural coexistence	Improve the coexistence of people of all generations and cultures / Create opportunities for encounters / Support in everyday life	10.2.1 / 10.3.1 / 10.7.2 / 11.1.1 / 16.1 / 16.2 / 16.6 / 16.b / 5.1.1 / 5.2 / 5.4.1 / 5.5 / 5.c.1 / 8.5
	Improve city district image	11.3.2 / 11.7.1 / 11.7.2 /
Education and health	Education of children and youth, adult education	4.5.1 / 4.7.1 / 10.7.4
	Creating opportunities for qualification and spaces for education	4.a.1
	Health, nutrition, sport	3.8.1

Fig 2: Each subfield of action linked with SDG goals and targets

The table shows what goals the Hallschlag district works on by connecting each field and subfield of action to SDG goals and targets. The district managers initiatives are mostly focused on SDG 10's "reduced inequalities" and SDG 11's "sustainable cities and communities".

### SDG 11: make cities and human settlements inclusive and sustainable

The world's population is constantly increasing. To accommodate everyone, we need to build modern, sustainable cities. For all of us to survive and prosper, we need new, intelligent urban planning that creates safe, affordable, and resilient cities with green and culturally inspiring living conditions.

### SDG 10: Reduce inequality within and among countries

Too much of the world's wealth is held by a very small group of people. This often leads to financial and social discrimination. For nations to flourish, equality and prosperity must be available to everyone – regardless of gender, race, religious beliefs, or economic status. When every individual is self-sufficient, the entire world prospers.

In light of the social context of the district that we have just described, this conclusion seems reasonable. The IEK measures are connected to other SDG targets, as seen on the graph, however, they only constitute a tiny portion. SDG 13 on climate action and SDG 3 on good health and well-being are underrepresented. SDGs 8 (Decent Work and Economic Growth) and 15 (Life on land) are also present. Prior to SDGs 10 and 11, SDGs 5 and 16—which promote gender equality and robust institutions for justice—are given greater weight.



Fig 3: SDG goal represented in the IEK Hallschlag

Field of action	Sub-field of action	SDG 15 targets
Housing, living environment, and public space	Upgrading the residential area	15.a.1 / 15.9
	Attractive living	15.5
	Improve meeting facilities, play, and leisure time situations for children and young people/recreate	15.5
	Urban upgrading	15.9
	Safety and cleanliness	15.5
	Development of perspectives for the local economy, better marketing of the shopping location	(15. a)
	Urban-friendly integration of transport into the public space and improvement of the framework conditions for public transport	(15.5)
Social and cultural coexistence	Improve the coexistence of people of all generations and cultures / Create opportunities for encounters / Support in everyday life	(15.9)
	Improve city district image	(15.9)
Education and health	Education of children and youth, adult education	(15.9)
	Creating opportunities for qualification and spaces for education	(15.9)
	Health, nutrition, sport	(15.9)

Fig 4: Each subfield of action linked with SDG 15 goal and targets associated with it

We attempted to relate each subject to SDG 15 aims since our work focuses on the SDG 15: Living on Land. For some of the initiatives, the "Housing, living environment, and public space" field of action is somewhat connected to SDG 15. Table two also includes some recommendations as the two other fields of action were not, or at least could not be linked with the problem we are studying. For example, even though it may be related to SDG 15.a, which states "mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems", the subfield of action "Development of perspectives for the local economy, better marketing of the shopping location" doesn't take into account any target of SDG 15. We may presume that the situation is the same for every other subfield of the "Education and health" and "Social and cultural cohabitation" field of action. Two SDG targets seem ultimately to stand out, SDG 15.5 and SDG 15.9.

**Target 15.5:** Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity, and, by 2020, protect and prevent the extinction of threatened species

**Target 15.9:** Integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies, and accounts.

## Reflection & Recommendations

following the theoretical part, we could conduct the following reflections and recommendations for our participatory SDG 15 monitoring event. First, we concluded that we could introduce SDG 15 through tangible projects. IEK Hallschlag was conceived before the SDG targets were launched, and in our work, we have been trying to link IEK Hallschlag to SDG targets, and it turns out that there is a very close relationship between them. IEK Hallschlag has been well implemented and provides us with an excellent model of an executable target. Secondly, the projects could be allocated in Münster; such as the green axe. Hallschlag and Münster are next to each other, they have some common situations and problems. Many projects in IEK Hallschlag have been successful and can be referenced. Thirdly, we could use SDG 15 to support the IEK projects. The SDG targets and their indicators are a global monitoring system that is widely recognized and has been accepted and adopted in different regions. Through SDG targets we can find theoretical support for the IEK and help IEK projects to be better.

Even if the SDG 15 subject isn't fully included in the IEK Hallschlag paper or the district municipality's actions, certain initiatives aren't emphasized by the document. Take the green belt project, for instance, which was executed in the Hallschlag district to connect several biodiversity regions by constructing public parks. We conclude that while the IEK Hallschlag places a strong emphasis on the social field, it also works to positively influence the environment by putting into practice several policies that are not mentioned in this document. To give the locals a say in the decisions made in their community, like in Münster, a participatory method should be used. In order to prepare for our interactive event, we will learn about a district like Münster via this Hallschlag IEK research. Based on their intentions, particularly the Green Belt project, Münster may learn from Hallschlag. Yet, we will need more specific targets and indicators that are pertinent to the process for Hallschlag as well as Münster. We learnt how to connect the measures to broad indicators from this SDG goal research. It also showed us how important SDG goals, targets, and indicators can be at the national level and how they may serve as a solid foundation for work at the local level.

Finally, our participatory event even be designed to attract as diverse participants as possible. In Münster, there are many people of different ages and from different places. In the IEK Münster it is necessary to think about how to bring all kinds of people together and achieve equality among different people.

The other part is that in the IEK Hallschlag we find something we can learn from Münster which is relevant to SDG15. The first point is that in Hallschlag biodiversity protection is integrated into their general planning, the Green Axle System. For example, taking traffic and functional area planning into account makes the planning more practical and feasible. The second point is that in the planning biodiversity is always connected to public space that serves the residents. This makes people more involved in the event, and the planning of public spaces needs to meet the real needs of people. Through our following project, setting up open-ended questions and quantity surveys, we can better understand people's needs and set targets and indicators for future planning.

## Focus: SDG 15

The main novelty of SDG 15 is that policymakers will see it as a goal to integrate it with other SDGs, although this risks being undermined by short-term priorities and a business-as-usual approach. We look at these opportunities and barriers, what drives them, and how they might evolve over the next decade. Due to the competition for land, there will be conflicting goals between SDG 15 and other SDGs, but opportunities and synergies must also be recognized. To ensure that SDG 15 is a top priority in all processes related to the SDGs, we invited conservation and development specialists to work with those responsible for all Agenda 2030 goals. We identify the goals and targets of the SDGs that are to be processed in each field of action and sub-field of action in the Hallschlag district. The district managers initiatives mainly focus on SDG 11 Sustainable Cities and Communities and SDG 10 Reducing Inequalities As for the neighborhood social setting we just described, it makes sense. The measures are related to SDG 15, but only make up a small part of the targets. Based on the field of action, we tried to combine housing, the built environment, and public space with a specific SDG 15 target, but quickly realized that the implementation of these measures by the district community did not fully address this topic. We tried to find a goal at this stage of the process that was as closely related to the sub-field issue as possible, but some were not linked to SDG 15 goals. In addition to sustainable forest management, preventing desertification, halting and reversing land degradation, and preserving biodiversity, SDG 15 calls for the conservation, restoration, and sustainable use of terrestrial ecosystems. The targets 5.1-15.9 of SDG 15 on life on land, broken down into 12 indicators, cover a variety of issues arising from the scale and complexity of the tasks required to make life on land relative to obtaining limited resources available.

Participatory monitoring in Münster based on SDG 15 "Protect biodiversity and natural lifestyles" includes transferring targets from the global to the local level by making the goal more tangible for residents, involving more people, driving engagement, raising awareness of biodiversity and its important role in the environment will as well as teaching methods for the care of ecosystems. To achieve this, the targets 15.5 and 15.9. were selected based on their suitability for the district of Münster.

The target 15.5 "take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species" is currently measured by the Red List Index. Species classified as Vulnerable or Critically Endangered (i.e. species at high, very high, or extremely high risk of extinction in the wild in the medium term) on the IUCN Red List of Threatened Species are considered to be threatened species. Since the only indicator of this sub-goal is the Red List Index (15.5.1), the monitoring scope is therefore insufficient on a municipal scale. For this reason, our team created a new indicator based on local development:

*Area of green spaces, forests, and/or public parks as a proportion of total city space [%]*

The target 15.9 aims to "integrate the values of ecosystems and biodiversity into planning, development processes, poverty reduction strategies, and national and local accounts". The existing indicator (15.9.1) counts the number of countries that do so in accordance with the Aichi Biodiversity Targets and is therefore based on national change. An indicator for local-scale implementation of this target is missing. At the local level an additional indicator with a rather qualitative approach may be useful to monitor how residents feel like biodiversity is being taken care of by the respective municipality. Therefore our team proposes the following indicator:

*Average satisfaction of residents regarding the state of biodiversity and nature-related governmental efforts*

Methods to gather data for these indicators will be tested in the participatory formats which are described in the following sections.

## Participative Methods

In order to monitor the new indicators, we had to guarantee that we will get a diverse sample to get as accurate results as possible. Moreover, we had to tailor our methods to the context of Münster specifically, and to all age groups in general. As a result, the first step was to design a participative method to address our target participants. Secondly, we've designed multiple participatory methods to collect data. Accordingly, the data collection phase was distributed among three steps, starting with the most substantial data and ending with the optional less important recommendations and inquiries.

### Phase one: attracting participants

Button badges and flower bulbs were given away as incentives to grab the attention of the passersby. The flower bulbs were Münster native species: such as the red and white tulips. While the button badges carried slogans designed specifically for this event and to achieve the goal of raising awareness of Münster's biodiversity and encouraging biodiversity protection. Consequently, the slogans were as follows: "protect biodiversity", "save the bees", and "know the source", as shown in Figure 5.

### Phase two: collecting data

#### Step one: survey

As previously mentioned, to collect data to monitor our new indicators, the data collection phases were categorized into three steps. The first step was conducting the survey. Through structured interviews, we have adopted a quantitative approach to measure the participants' connection with nature in Münster and their actions to protect it. The survey questions were conducted as follows:

How would you describe your Connection with nature

- 1) *Most of my activities take place indoors.*
- 2) *I walk past Münster's green spaces from time to time.*
- 3) *I like to go to the park in Münster when the weather is nice*
- 4) *I love outdoor activities in Münster's park. (Picnics, barbecues, outdoor parties, get-togethers with friends/family, etc.)*
- 5) *I have participated in some events of the Social Office (e.g. Let it bloom).*

*I am interested in the biodiversity initiatives by the Social Office.*

Protection of biodiversity in Münster

- 1) *I don't think Münster's biodiversity needs protection.*
- 2) *Yes, biodiversity in Münster must be protected, but I have not yet taken any individual measures.*
- 3) *I try not to step on flowers and plants, disturb species, or damage habitats.*
- 4) *I like to take care of my plants. Some of my plants are native.*
- 5) *I plant habitat-friendly plants from Münster.*

### Step 2 coming up with new ideas

This step was carried out by asking participants about possible measures or ideas they might be doing to protect Münster's biodiversity. Also, this step included some of the problems regarding biodiversity that the participants often observe.

### Step 3 getting into a discussion

In this step, we carried out a qualitative analysis through discussions with the participants. In this part, we took notes of the participants' ideas and recommendations for developing Münster. Some of the participants' recommendations and ideas were specifically directed to ongoing projects in Münster. While other recommendations aimed at enhancing their own of society's lifestyle, as shown in Figure 6.

### Step 4 Sharing knowledge and distributing information leaflets

Lastly, we have distributed information leaflets with general information about the biodiversity in Münster to raise the participants' awareness. Additionally, The information leaflets contained tips on how to plant and take care of the flower bulbs.



Fig 5: Button badges and flower bulbs as gifts



Fig6: The participatory board containing the participants' answers and recommendations



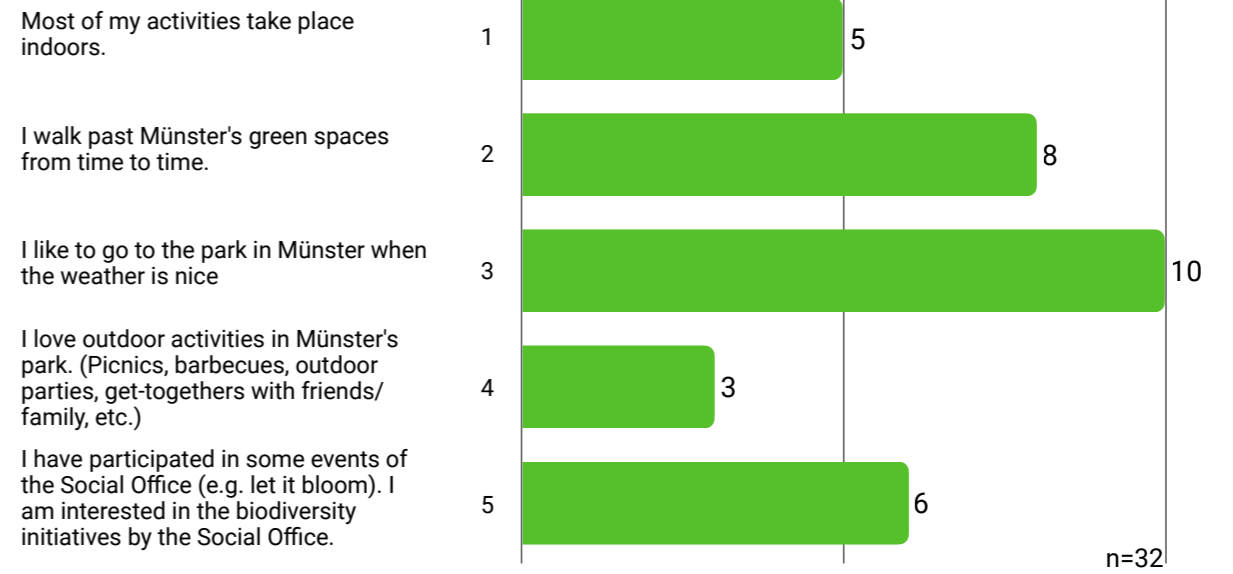
Fig 7: The participatory event



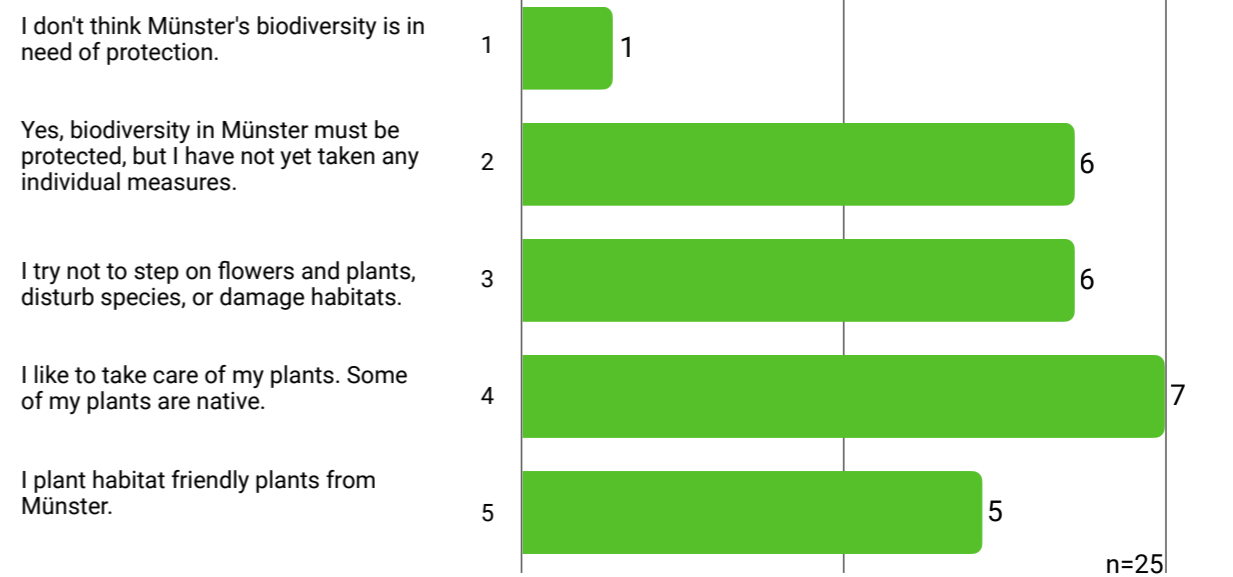
Fig 8: The participatory event

## Results of Participative Activity

### [A] Connection with nature



### [B] Protection of biodiversity in Münster



### [C] Proposed measures ("Mind-Map")

#### Quality/quantity of green spaces

- Perennial beds
- Flower meadows
- More plants
- More green spaces
- Protect soil
- More shrubs
- No tree felling
- Keep existing green spaces
- Bird nest boxes

#### Connection residents <-> nature

- More playgrounds for children
- More (cigarette) bins
- Make nature tangible
- More nature-related events
- More engagement by residents
- Use unexploited potential

#### Policies

- No pesticides
- Protection of insects
- Protected areas
- Less traffic/public transportation
- Noise levels/less industry

Fig 9: The results of events

## Results of the participatory event

In the quantitative phase of the event, residents were asked about their connection with local nature [A] and the necessity of biodiversity protection [B]. Some participants stated that most of their activities happen indoors, but the majority of residents spend a large amount of their time in Münster's public green spaces. Only some participated in nature-related events organized by the district office. As for the degree of biodiversity protection, most people advocated for further personal and district-wide measures in order to take care of the local habitat.

In the second part [C], residents were asked about measures to improve the state of local biodiversity. The list of answers can be categorized into three groups: green spaces, policies, and the tangibility of nature. As for the first category, according to many residents, public parks in Münster need improvement and upgrading. This can be done by adding elements to existing green spaces or by designating further areas for the local fauna and flora. The second category is policies that can be implemented to protect the local biodiversity from a legal standpoint. Measures include noise pollution levels, protected areas, a prohibition of pesticides, and a reformed transportation system in Münster.

Lastly, as nature and the quality of living are intertwined goals, measures aiming for an improved connection between residents and nature are of high importance. For children to have a better experience of local nature, the construction of more playgrounds was suggested.

## Interpretation of the data

Even though the residents' levels of knowledge about biodiversity and the SDGs are very diverse, most people were optimistic about the future of Münster and came up with creative proposals. In general, the interest in nature-related topics is high. The data that was collected during the participatory event can be interpreted in three conclusions.

Firstly, many people aren't aware of the complexities of biodiversity and environmental efforts in Münster. One participant said that they care about nature but their knowledge about biodiversity and biology is very limited. Generally, the topics of biodiversity, nature protection, and climate change are perceived as one entity. Creating consciousness and teaching about personal actions that one could implement in their lifestyle may have beneficial effects on biodiversity on a small scale. During the discussions, our team noticed that almost no residents have heard of the Sustainable Development Goals implemented by the United Nations, including SDG15 - Life on land. The SDGs are a comprehensible tool to make international agreements and their respective aims more tangible. Using this as a basis, events about SDGs can be conducted to raise awareness about biodiversity and inform the population about exemplary initiatives around the world as a source of inspiration for local urban planning.

Secondly, many people aren't reached by nature-related events organized by the Social City Office. The Soziale Stadt Münster district management is a publicly funded local platform to inform citizens of current developments and to allow for discourse and participation in urban planning projects. In the frame of the qualitative part of the survey, participants were asked about their engagement with this local institution and only some of them took part in events organized by the district management. The biodiversity-related project "Münster blüht" ("Münster is blooming") was mentioned by some residents. The overall participation of residents is relatively low as one resident complained that there is a lack of engagement within the community. The Social City Office, as well as its events, must therefore have more visibility within the community in order to increase engagement and participation.

Thirdly, most people believe that more measures need to be implemented, especially regarding green spaces, impervious surfaces, and the tangibility of the surrounding nature. The proposed initiatives range from small-scale measures like adding more trash bins, bird nest boxes, and plant-cultivating beds in existing green spaces to large-scale projects like opening more parks in Münster. Some residents stated that there are potentials in Münster that have not yet been exploited, for example, the proximity to the Neckar or the vineyards on the other riverbank. Currently, the U-Bahn line U14 and the four-lane Neckartalstraße are perceived as a barrier that practically prevents the recreational use of the Neckar riverbank. Some residents suggested the potential solution is to improve the public transportation system and reduce car traffic. This would result in a decrease in noise and air pollution which negatively affects the local flora and fauna, and, as a side effect, make nature more tangible for residents. One interviewed person stated that they have not experienced much urban change in Münster during their lifetime. Another participant of the survey went as far as saying that Münster is a "catastrophe" and that too much area is plastered with concrete. The magnitude of future projects must therefore

be increased to make a significant change that is also perceived positively by residents.

## Review of methodology

In the timeframe of approximately two hours, 32 persons participated in the survey which was conducted on 21 December 2022 in front of the Stadteilbüro near the U-Bahn station Münster Rathaus.

Overall, the residents of Münster were eager to share their opinions in the participatory event. A lot of insights were acquired in the quantitative and qualitative phases of the interviews resulting in a broad array of different perspectives. The polling methods were uncomplicated and comprehensive. As for the negative aspects, some participants didn't have much time to profoundly talk about the topic in more detail. Since the event was held in the evening, not many children were interviewed.

## Localized indicators and monitoring on a city-scale

The collected data was used to create new indicators for the targets we focused on, namely SDG15.5 and SDG15.9, translating them from the global to the municipal layer. The following paragraphs explain why it is vital to do so for the SDGs to be implemented in future urban planning processes.

SDG15.5 aims for "action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species". Since the only indicator of this target is the Red List Index (15.5.1), the monitoring scope is therefore insufficient on a municipal scale. For this reason, our team created a new indicator based on local development:

*Area of green spaces, forests, and/or public parks as a proportion of total city space [%]*

This indicator can be used to monitor urban planning initiatives concerning the creation of new green spaces that have a positive effect on the local biosphere. For SDG15.5, a municipality could pursue the goal of increasing the percentage of green spaces by a few percent each year, which in turn, can be measured using this indicator. Vertical green spaces, such as "green façades" can also be added to the calculation. Designated green spaces may be categorized according to their use (i.e. playgrounds, vacant lots, rooftop gardens, etc.) or their ecological value (i.e. meadows, forests, swamps, etc.). The quantifying process can be conducted using digital technologies like drone and satellite imagery, and computer algorithms that analyze the areal growth. Additionally, the quality or health of existing and new green spaces can be assessed and summarised in a map of the district. The result of this monitoring process would be a comprehensible ratio that tracks accomplishments of biodiversity goals and makes initiatives in different municipalities or even countries comparable. The inversion of this indicator would be useful to track the areal decrease of sealed surfaces, the so-called "depaving" (i.e. parking lots, roads, etc.). The conversion of unused lots to new green spaces with permeable soil and vegetation is beneficial for the local biodiversity.

*Area of impervious surfaces as a proportion of total city space [%]*

SDG15.9 aims for the integration of "ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies, and accounts". The existing indicator (15.9.1) counts the number of countries that do so in accordance with the Aichi Biodiversity Targets and is therefore based on national change. An indicator for local-scale implementation of this target is missing. In our survey, we found that some residents wished for policies like designated protected areas, the prohibition of pesticides, or maximum levels of noise. In this case, not only the implementation of legislature but also the practical execution of such policies play an important role to assess the state of nature. A rather qualitative indicator may be useful to monitor how residents feel like biodiversity is being taken care of by the respective municipality. Polls could include several questions covering various aspects of biosphere protection.

*Average satisfaction of residents regarding the state of biodiversity and nature-related governmental efforts [Scale 0 to 10]*

# Final Reflection & Recommendations

Within the scope of this study, in line with the data obtained, the application of Sustainable Development Goals to Urban planning processes, their compatibility with the IEK concept, and their compatibility with small-scale plans were examined.

## Implementation of SDGs in The Urban Planning Processes

Sustainable Development Goals (SDGs) can be implemented in urban planning. Urban planning is crucial in creating sustainable, livable, and inclusive cities that promote sustainable development. Integrating the SDGs into urban planning processes can help align planning decisions with the goals of sustainable development and ensure that the impacts of urbanization are positive for all.

## IEK Concept and SDGs

The Sustainable Development Goals (SDGs) can be linked with the IEK concept. The IEK concept is an approach to sustainable development that emphasizes the interconnections between economic, ecological, and social aspects. This concept aligns well with the SDGs, which aim to promote sustainable development that is economically, socially, and environmentally sustainable. The IEK concept can be used as a framework for linking the SDGs with urban planning processes.

## SDGs in Small Scales Planning & Monitoring

The SDGs can be localized in small-scale planning and monitoring. This involves adapting the global SDG targets and indicators to the specific context and needs of a local community and integrating them into regional planning and decision-making processes. This can help ensure that the goals are relevant and achievable at the local level and that the impacts of local development initiatives on sustainable development can be tracked and monitored effectively.

Within the scope of this study, three indicators were developed in line with two different targets for the efficient implementation of SDG 15 on small scales. While developing these indicators, 15.5: Protect biodiversity and natural habitats and Target 15.9: Integrate ecosystem and biodiversity in governmental planning targets were found suitable for local plans. The developed indicators are as follows.

- Area of green spaces, forests and/or public parks as a proportion of total district space [%]*
- Area of impervious/sealed surfaces as a proportion of total district space [%]*
- Average satisfaction of residents regarding the state of biodiversity and nature-related governmental efforts*

It is possible to be successful in local planning by using localized indicators developed within the scope of 15.5 and 15.9 indicators.

## Assessment of the work process

These studies and the event have brought new perspectives in many respects.

Increased knowledge:  
Learning about SDG 15 and the role of IEK in achieving its goals has led to a better understanding of the importance of biodiversity and ecosystem services.

Understanding of local priorities and challenges:  
Researching local residents gave insight into their priorities and the challenges they face in achieving the SDGs.

Identification of strengths and weaknesses:  
The survey results showed the strengths and weaknesses of the local area in terms of achieving SDG targets.

Increased awareness of the SDGs:  
The survey process increased local residents' awareness and understanding of the SDGs.

Data for informed decision-making:  
Data collected through the survey informed decision-making at the local level and can be used to monitor progress toward the SDGs over time.  
Finally, Data collected through the survey informed decision-making at the local level and can be used to monitor progress toward the SDGs over time.

### 3 Discussion of key findings, recommendations and outlook

Franziska Laue, 2022



As part of the low-threshold participatory events, which were held in December 2022 in the Münster district, the students were able to gather relevant knowledge about local needs and problems related to SDG 7 (Affordable and clean energy), SDG 11 (Sustainable cities and communities), SDG 13 (Climate action) and SDG 15 (Life on land (Biodiversity)). Based on these results, the students, together with the team from the Department of International Urbanism and the cooperating partners from the city of Stuttgart, developed suggestions for the further development of the SDG monitoring system at the district and neighborhood level, taking into account qualitative aspects.

With regard to the urban planning instruments that were part of the investigation in phase 1, one of the main results is that the instruments used as part of the "Social City" urban renewal program are suitable for promoting the implementation of the global sustainable development goals. In particular, the instrument of the preparatory study, which stands at the beginning of every district development within the framework of the "Social City" program, can make a significant contribution to supporting the SDGs on the local level.

In phase 2, the development and implementation of the participatory formats, the students were restricted due to the short course of the semester and the few interaction periods with the residents. This must be taken into account with regard to the representativeness of the results, which was also critically reflected by the groups during assessment of the results. Nevertheless, they managed to collect a significant amount of information in a playful way, which proves that there is potential for participative formats to collect qualitative information on the SDG on site and which might be expanded in the future.

However, an essential result of this second phase was, above all, the communication of basic information about the (selected) SDGs to the local population and thus increasing the awareness of the SDGs. Here it became clear that enhanced communication and information about the SDGs is necessary to convey the content and relevance of the SDGs to broad sections of the population.

In conclusion, the transdisciplinary seminar "Participatory SDG monitoring at the local level" raised the question of whether and how the previous practice of municipal SDG monitoring can be expanded to other small-scale areas (district and neighborhood level). Based on the first findings of this exploratory teaching project, seven suggestions for the methodological further development of SDG monitoring practice can be derived:

## 1\_Inclusion of other spatial levels in the process of SDG monitoring

The previous, successful practice of SDG monitoring at the city-wide level has shown a variety of successes - and also options for action - for the sustainable development of urban areas. In particular, by supplementing the Voluntary Local Report (VLR) with practical examples, the spectrum of quantitative data could be supplemented with qualitative information that provides inspiration for the implementation of the global sustainability goals. The description of these practical examples highlights that activities to implement the SDGs often take place in a project or district-related manner and thus have an impact at the level of individual sub-areas; However, this operational level of the sub-areas - the districts and neighborhoods - has not yet been explicitly dealt with in the previous practice of municipal SDG monitoring. As a result, the opportunity to depict the city in its heterogeneity and to show positive developments, but also deficits in individual sub-areas, is not used. In perspective, the inclusion of further small-scale spatial levels into the practice of SDG monitoring - in the sense of an extended multi-level monitoring - could make an important contribution to the implementation of the global sustainable development goals. Methodologically, however, this inclusion of districts and quarters raises further questions, for which the following additional suggestions appear to be useful:

## 2\_Adaptation of the city-wide indicator system to the district and district scale

Similar to the transfer of the target and indicator system from the level of the monitoring system of entire states to the level of the cities and municipalities, which implies an ambitious process of filtering according to relevance and data availability, an adaptation and transfer of the indicator system to the small-scale level of the districts and neighborhoods is needed. In this context, the development of modified, context-specific indicators is required

## 3\_Inclusion of other indicator types in local SDG monitoring

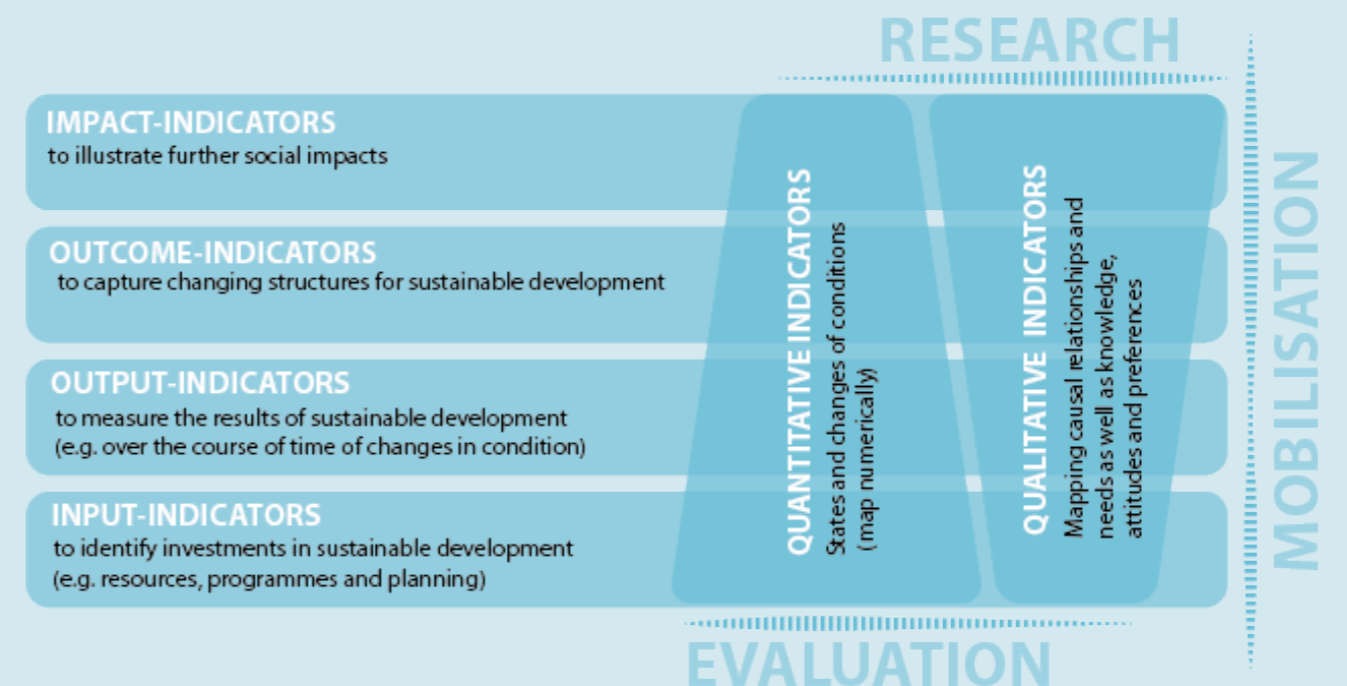
In its current form, the SDG monitoring indicator system already explicitly consists of different types of indicators (Jossin and Peters 2022). A distinction is made here based on the function of the indicators in the monitoring process and the type of information that is mapped with the indicators (see excursus).

### Excursus: Indicators - types and function

While the range of possible indicators in the context of monitoring the SDGs can be very diverse, categories can still be formed with regard to the function of indicators that are based on theories of impact analysis (Balthasar and Fässler 2017): So-called (1) input-indicators depict measures and resources that are used to create or change a situation, while (2) output-indicators traditionally measure the situation itself. Furthermore, (3) outcome-indicators aim to show changes in processes that lead to status changes, while (4) impact-indicators also collect further (social) effects of the change that go beyond the actual object of consideration.

Irrespective of the function of the indicators, a distinction can be made between the type of information represented by the indicators. While quantitative indicators depict numerically measurable information such as statistical data, qualitative indicators assess facts that can only be inadequately represented with numerical information. This includes, for example, assessments and evaluations of people with regard to the condition of (spatial) situations, as well as information on causal relationships.

Both quantitative and qualitative indicators can measure information on the levels described above (input, output, outcome and impact). They can therefore be used on different levels, depending on the underlying objective and question.





In an analysis of the current recommendations for SDG indicators at the municipal level, Jossin and Peters show that so-called output indicators are clearly predominant while impact indicators are underrepresented. In addition, so-called input indicators are integrated, which make it possible to collect resources and measures that are used to achieve (partial) goals. With both types of indicators, only quantitative data is currently collected, which enables a statistically measurable picture of the most relevant developments in the sustainable transformation of urban areas. For the level of local urban and district planning, however, further impact indicators and qualitative information are also relevant, which could provide valuable suggestions for operative approaches towards the implementation of sustainable development goals. An expansion of the range of indicators, especially at the local level, could enable the collection of information on causal relationships and thus significantly support the implementation of the SDGs.

## 4\_Integration of qualitative information collection at the local level

With the transfer of the SDG monitoring system to the local level, there are new opportunities to increasingly include qualitative aspects. The smaller the scale of observation, the easier it is to collect and assess qualitative information that is sufficiently representative. This applies in particular to the scale of the district and to neighborhood levels: While the question of representativeness is a methodologically critical point at the level of the entire city, reliable samples of residents and those affected can be formed at the small-scale level even with limited resources.

## 5\_Increased integration of participatory elements in the local SDG monitoring process

The quantitative data of municipal SDG monitoring is currently mainly generated from existing databases and only explicitly collected in exceptional cases. This in turn means that a centrally controlled top-down approach prevails in which residents and affected stakeholders are not actively involved. However, the recommendation described above to increase the inclusion of qualitative data collection in SDG monitoring is based in principle on the involvement of local residents and affected stakeholders into the process of data generation. This principle could be used to integrate bottom-up approaches to data collection into the monitoring process to promote a more participatory understanding of sustainable urban and neighborhood development and to actively involve the respective urban society. A wide variety of participation formats could and should be used, to aim at addressing as many different population groups as possible. In this context, events at different places and times in the district and neighborhoods are necessary, which are supplemented by time-independent online offers for participation. This approach could be used to increase the general knowledge of SDG-related issues in the local population and to create acceptance, recognition and support for measures and projects that contribute to the implementation of the global sustainability goals at the local level.

In this context, instruments that compile and visualize SDG measures and projects with a local reference could have a supportive effect. Particular potential lies in the digital and interactive mapping for the spatialization of these measures and projects in (selected) districts and quarters, for example through the creation of easy-to-understand digital information portals (dashboards).

## 6\_Integration of existing urban and district development instruments into local SDG monitoring processes

The translation of SDG monitoring to the local level requires additional resources that can only be raised through a meaningful integration of the monitoring process into existing activities and programs of urban planning, development and renewal. The aim should be to create the greatest possible synergies

between the monitoring process and municipal practice, and to use existing data sets and participatory activities for SDG monitoring.

In addition, municipal SDG monitoring is already helping to further strengthen networking within the existing offices and departments. Since the SDGs with their holistic orientation are a cross-cutting issue of sustainable urban and district development, they create an ideal level of reflection on existing problems and structures and can thus be used to further qualify existing practice in an interdisciplinary and cooperative manner.

With regard to the existing urban renewal instruments, there is particular potential for integrating the SDGs into the instrument "preparatory study". This instrument is used to collect far-reaching foundations for future urban renewal areas and thus set the course for the future development of the districts involved. So far, however, there are neither binding standards for these preparatory studies nor an examination of whether relevant sustainable development goals are adequately mapped. In this context, it would be favorable to have a binding framework that ensures that the SDGs are taken into account in a balanced manner in this instrument - and other instruments of sustainable urban redevelopment - right from the start.

## 7\_Consolidation of the SDG goals into thematic fields in local SDG monitoring

Since the subject areas of the sustainability goals often overlap in practice, these overlaps should be taken into account, especially at the local level, in order to reduce complexity and enable synergies. In this context, the development of thematic fields from those SDGs that are particularly relevant for the local level is advised. The development of these subject areas is a methodologically demanding project, for which there is a need for further research and discussion with the participation of experts from a wide variety of disciplines and spatial levels. Similar to the recommendations for municipal SDG monitoring, the aim should be not to create a rigid but a flexible framework that allows for context-related interpretation and adjustment.

## 8\_Concluding remarks

The way in which sustainable development processes are captured and interpreted has a major impact on the perception of problems and their resolution (Mair et al., 2018). In this sense, it is important to approach the monitoring of the global sustainable development goals at the local level with particular care and to actively participate in the further development of this monitoring system. The cooperation of municipal and academic partners can help to combine the critical view of experienced planners with experimental approaches from applied research and teaching formats in order to provide impetus for the further development of the indicator system. With this project and the student work contained in this documentation, we hope to have made a first contribution to the demanding but valuable task of supporting the monitoring and implementation of the SDGs at all relevant spatial levels.



Sigrid Busch, 2022



Sigrid Busch, 2022

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Figures:

- Fig.1 Indicators, Sigrid Busch 2023

## 5 Participants and credits

### Participants: Team SDG 7



Angie Carolina CAMACHO GUTIÉRREZ

Angie Carolina ( Bogotá, Colombia) obtained her bachelor's in Architecture and urbanism with an emphasis on urban projects and research at the National University of Colombia. She is a current MSc Integrated Urbanism candidate at the University of Stuttgart. During her Bachelor studies, she coordinated the research group of territorial architecture at the National University of Colombia, an academic group that sought to explore different forms of inhabitation around the riparian areas. Her graduation thesis investigated and proposed the reinterpretation of the 'la Conejera' wetland in Bogota as structuring elements of planning and as potential providers of ecosystem services and not only as protected areas. She has worked in the urban realm in sustainable mobility and urban design projects, and she has been involved in public projects within the Secretary of the Habitat of the mayor's office of Bogota. Her interests and motivation lie in the implementation of sustainable practices in the so-called global south countries to reach environmentally sustainable, and socially just cities.



Adriana HAUKE

Adriana Hauke (Jeseník, Czech Republic) is currently studying for a Bachelor in Architecture and Urban Planning at Brno University of Technology, Faculty of Architecture. At the moment, she is doing her Erasmus+ exchange semester at the University of Stuttgart. She is interested especially in Urban Planning and loves exploring cities to learn how to make the places we live in better.



Lucia CHOCANO VASQUEZ

Lucia Chocano ( Lima, Perú) graduated high school in Peru and is currently studying for a bachelor's in Architecture and Urban Planning at the University of Stuttgart. Completed a one-month internship with the architect Claudia Ramirez in Sao Paulo in February/March 2020 and she is going to do an exchange semester at the Polytechnic University of Catalonia (ETSAV) from February to June 2023.



Olli JÄRVELÄINEN

Olli Järveläinen (Turku, Finland) graduated with a Bachelor of Architecture from Tampere University. His Bachelor's thesis focused on flexible housing design and increasing the life cycle of buildings. He has work experience from an architectural office specializing in residential construction and in the Built Environment Unit of The Provincial Centre for Economic Development, Transport and the Environment in Tampere, Finland where he gained experience from zoning and building conservation-related projects.



Mateo EICHHORN GIANELLA

Mateo Eichhorn ( Lima, Perú) graduated from the Alexander von Humboldt German School in Lima. The following year he moved to Germany to start his bachelor's in architecture and Urban Planning at the University of Stuttgart, currently in his 7th semester. He complements his studies with a job at the architectural firm Studio SF. He is interested in the technical and constructive aspects of architecture as well as the impact it has on its social and environmental context.



Theresa MERK

Theresa Maria Merk ( Eichstätt, Germany) graduated high school, has done a federal voluntary service in the hospital after, and is currently a bachelor's student in the 5th Semester of Architecture and Urban planning at the University of Stuttgart. She did various internships at construction companies as she is very interested in the technical aspects of architecture. At the moment she works on broadening her horizons about urban planning and is looking forward to doing more projects in that field.

## Participants: Team SDG 13



Kacper Raikowski

Kacper is a visiting master's student in Architecture and Urban Planning at Universität Stuttgart. His alma mater is Politechnika Gdańska. During his studies, Kacper developed a strong interest in the concept of sustainability, with particular attention towards low-tech solutions and vision of a compact city. He is also an advocate for the ideas of resilient cities and transit-oriented development. As part of his self-study interest, he attempts to identify sustainable urban and architectural solutions, and distinguish it from greenwashing. Presently, Kacper is working on his master thesis in the subject of flash flood preventions.



Katharina Petrovskiy

After finishing high school, Katharina decided to pursue a study in Architecture and Urban Planning at Universität Stuttgart, where she is currently completing her fifth semester. Interested in the implementation of sustainable practices in the process of urban planning, Katharina enrolled in the SDG seminar to join discussions about participatory monitoring at a local level, and learn, through theory and practice, about different approaches that shape the future urban city into an ecologically friendly, innovative and habitable place. Diving into the topic of SDGs gave her a deeper insight into various possibilities of assessing and analysing data, which she hopes to reproduce for future projects that she can be a part of.



Lucie Van Zyl

Lucie is a fifth semester Architecture and Urban Planning student at Universität Stuttgart. Besides her studies in architecture, she has adopted an interest in the field of urban planning. During the SDG seminar, she had an immersive learning in the theoretical and participatory aspects of urban planning, and the importance of engaging inhabitants to gather their knowledge, pain-points and desires. This would help build a contextual, rational plan for the district and its community. Participatory events, in particular, provided an opportunity to gain substantial qualitative and quantitative insights in a fun and friendly way.



Marcelo Candia

Marcelo is a Peruvian architecture student, currently studying on an exchange semester in Universität Stuttgart. He is currently pursuing a bachelor's in Architecture and Urbanism at Pontifical Catholic University of Peru. By taking this seminar, Marcelo had the intention of broadening his understanding of urban planning and participatory methods that could help in the building of better and sustainable cities. He was also interested in engaging with locals of the city of Stuttgart, since one of his passions is intercultural exchange collaborative learning. Now, with this knowledge, he will return to his country to finish his bachelor's, and share his expertise to build sustainable cities in Peru.



Mina Davidović

Mina is a visiting master's student from the Faculty of Architecture in Serbia, Belgrade. As an Erasmus+ student, she arrived in Stuttgart to complete her third semester. The field of architecture that she dealt with was urban planning. The experience of being an exchange student helped her engage in interdisciplinary methods of knowledge and skill exchange, where she could bring her expertise, and gain from new insights on familiar topics. The SDG seminar instilled additional knowledge, which she hopes to utilise in future projects, both academic and professional. The participatory event provided her with a unique opportunity to communicate with people from various backgrounds.



Saksham Rai

Born in a small town called Palwal, Haryana state in India, Saksham holds a bachelor's degree in architecture from Chitkara University, India. He has previously worked at an international office in Rotterdam, The Netherlands, where his focus involved sustainability and 'cradle-to-cradle' approach in design solutions. His Bachelor thesis project tackled the issue of climate change, and showcased how architecture and urbanism can slow down its negative impacts with a circular approach. Through IUSD, he focused on community upgrading, and was also part of the GoGlocal Project to localize SDGs in the informal settlements of Windhoek, Namibia in 2022. He actively took part in various volunteer works - including ArchiKidz in the Netherlands, and WorkOUT Initiative at TU Delft, Netherlands.



Shalini Rao

Shalini is an IUSD master's student at Universität Stuttgart. Born in Chennai and raised in Bahrain, she completed her bachelor's in Architecture in Bengaluru, where she gained a fundamental interest in research-based design and documentation. Her academic thesis on ethnography revived the economic and socio-cultural heritage of the Siddi community of Karnataka. Since 2014, she has worked within the National and Local Planning Policy Framework (NPPF) and the London Plan in the U.K., and explored boundaries of the RIBA Plan of Work Stages (0-7). Her focus on 'implementing and challenging planning policies for sustainable design solutions' reaffirmed that this discourse ensures credibility across platforms. Through IUSD and the SDG seminar, she brought her experience in process-oriented design by moulding it for local response. She learnt the importance of patience, iterations and life cycles in participatory approaches, and found parallels between global SDGs and planning frameworks. Shalini is currently working on her master thesis in displacement processes of a marginalised tribe in Bengaluru, and hopes to explore their identity and stake in the larger urban structure.

## Participants: Team SDG 11



Ana Patricia Ros Agulló

Architecture student in Polytechnic of Valencia currently doing the Erasmus program of master in architecture and urban planning in the University of Stuttgart.



Emmanuelle Fathalla

Masters' student in the IUSD program, currently doing an Erasmus+ exchange program at the University of Stuttgart. She received her Bachelor Degree of Science in Architecture Engineering from the Faculty of Engineering, Ain Shams University, Egypt.



Maréva Bonnier

Architecture student in France doing an Erasmus program in the University of Stuttgart in 2022-2023.



Samuel Knutelský

Bachelor student of architecture and urban planning on Faculty of architecture in Brno, Czech republic, born in Slovakia and currently participating on program Erasmus + on Faculty of Architecture and Urban planning at University of Stuttgart.



Sofia Escobar

Colombian Architecture and Urban Planning bachelor's student at the University of Stuttgart.



Wiebke Stadlander

Bachelor's student of Architecture and Urban Planning at the University of Stuttgart.



Gary Papke

Master's student of Architecture and Urban Planning at the University of Stuttgart.

## Participants: Team SDG 15



Lucie Augistrou is an architecture student local from Nancy, France. She completed her bachelor's in Architecture from ENSA Nancy. Lucie studies now at the faculty of architecture and urban planning in Stuttgart for two semesters as an Erasmus student. Her studies and professional experiences defined her interests and she decided to focus her Master's studies on urban planning topics, as well as the landscape field. She is also interested in the natural species at the landscape and urban levels. After her Erasmus experience, she would like to continue traveling to discover new practices and learn new design meds around the world.



Valentina completed the Science of Architecture's bachelor in University of RomaTre with the thesis "Architecture and pandemics". Now she's studying for the Architectural project's master in University of RomaTre. She's very interested in architecture and design and how these two have changed over time. During the Erasmus that she will finish in the end of February 2023 she found out new ways to study and live architecture more near to a citizens scale but with a more global aims. Experiences that she will bring back to Rome and to her academic life to improve it and make it more global and international.



Bassant is an IUSD Master's student who graduated from Ain Shams University with a major in urban planning and design. Afterward, she managed to work briefly as an intern in the heritage conservation sector. Currently, she is a T.A. in the department of urban planning, at ASU. During her studies, she participated in multiple programs; such as 'Manifesto for a just city' -by TU Delft-, 'Environmental pioneers program' -by UN volunteer-, and "Climate ambassadors" training program -by the ministry of planning and economic development, and UNIDO-. It is during those events, she was inspired to observe the socio-spatial dynamics in her surrounding urban context, historic Cairo. And through the IUSD program, she is aiming at understanding her context and investigating its dynamic ties to tailor context-specific development programs.



Dina is an IUSD Master's student, and she is enrolled as a one-year exchange student at the Universität Stuttgart. She is holding a Bachelor of Science (BSc.) in Architectural Engineering from Future University in Egypt affiliated with the University of Cincinnati, USA. In 2020 and after her undergraduate study, she achieve her goal of carving a place for herself in academia and she is Teaching Assistant at the Future University in Egypt. Currently, as a German resident, she is interested in one of the most important research topics in Germany: studying Arab inhabitants' perception, vulnerability, and adaptation to heat stress and thermal discomfort in Stuttgart, Germany.



Luis is studying Architecture and Urban Planning in the fifth Bachelor semester at the University of Stuttgart. At school, he developed an interest for architecture as an expression of art. Besides his studies, his passion is graphic design, short films and computer animations. In his projects, he emphasises on the use of digital media as a comprehensible tool to create tangibility especially regarding complex architectural tasks. He focuses on measures, initiatives and frameworks concerning global and local action fighting climate change and similar geo-political challenges.



Şevval Battal (Istanbul, Turkey) is continuing her undergraduate education in Urban and Regional Planning at Istanbul Technical University, Faculty of Architecture. She worked in the urban renewal department of a municipality in Turkey. Moreover, she analyzed the urban renewal plan designed in a region and researched the process. She is presently doing her Erasmus+ exchange period at the University of Stuttgart. She is interested in studying urban planning concepts in different countries.



Yuxuan Jiang from China, is a master's student in architecture at Uni Stuttgart. She finished her bachelor of architecture at Beijing Jiaotong University. Her architectural projects are mostly based on city content and the behavior of the people. She is interested in the connection between architecture and the city environment, also in urban planning and how they can affect the development of the city.

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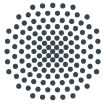
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