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Green Fingers for Climate-Resilient Cities – Connecting Processes of Landscape Planning and Designing with Co-Creation

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Abstract

Taking the transdisciplinary research study “Green fingers for a climate resilient city”, funded by the German Ministry of education and research (BMBF), as an example, this paper follows the hypothesis that processes of landscape planning and designing multifunctional green spaces and processes of co-creation need to be combined to stimulate climate resilient city transformation. The findings are that efforts to combine these processes benefit from making complex climate-resilient city planning accessible for people of different professional backgrounds. The paper showcases how storytelling (Schmidt 2019), mapping (Langner 2009) and guided walks (Schultz 2019) are means to mutually engage with, perceive and understand multifunctional green spaces, inspire ownership, and build capacity for the city’s climate-resilient transformation.

Introduction

Transdisciplinary research on climate resilience asks for two processes: One that generates, structures, and spatializes knowledge and designs spatial visions for multifunctional greenspaces and one that involves the different actors that play a potential role in transforming the city. The hypothesis of this text is that it is important to connect the two. Researchers setting up and facilitating these processes need to find means to discuss the aspects of complex climate-resilient transformation in a way that is intuitively accessible for people of different backgrounds. The question is what appropriate means of connection are.

The text starts by introducing the key terms, namely transdisciplinary research, co-creation, landscape planning, transformative resilience and Green Fingers. Then, aims, layout and methodology of the research project Green Fingers are explained. After that, the results are presented by explaining in detail how walking, storytelling and mapping helped to link the processes. Finally, the findings are reflected, and the hypothesis is discussed.

Background and Literature Review

Transdisciplinary science and co-creation

Being a complex task, tackling the challenges of climate resilient city planning demands transdisciplinary approaches that involve different disciplines as well as decision makers and stakeholders (Vigar and Healey 2002; Schneidewind and Singer-Brodowski 2014; Schneidewind 2018). Transdisciplinarity is understood as a critical and self-reflexive research approach, which integrates different interdisciplinary scientific and extra-scientific insights to co-produce new knowledge to tackle complex problems (Jahn, Bergmann, and Keil 2012, 8–9). This “research must be created through processes of co-production in which scholars and stakeholders interact to define important questions, relevant evidence, and convincing forms of argument” (Kates et al. 2001, 2).

While searching for transformative knowledge, it invests in process-designs that bring together scientists with stakeholders and decision makers at all stages of the research, from the initial construction of research question and selection of approaches all the way through to the interpretation and application of results. Knowledge is not only produced but discussed, reflected, and prioritized by stakeholders (Schneidewind and Singer-Brodowski 2014; Schneidewind et al. 2016; Schneidewind and Augenstein 2016). Learnings are directly used for adjustments in the research layout. This iterative process of producing, testing, and using knowledge is often described as co-creation. The city-partnership Leading Cities defines co-creation as the “active flow of information and ideas among five sectors of society: government, academia, business, non-profits and citizens (...) which allows for participation, engagement, and empowerment in, developing policy, creating programs, improving services, and tackling systemic change with each dimension of society represented from the beginning” (Leading Cities 2014, 3). Thus, co-creative processes reach far beyond informing people or establishing acceptance for planning proposals.

Landscape planning and transformative resilience

Landscape planning is understood according to the European Landscape Convention as an iterative process of generating, structuring and spatializing knowledge on landscape functions and designing visions for the development of sustainable landscapes. The landscape planning process follows the guiding principle of transformative resilience. According to Schmidt, Hahne, Kegler and several other authors, resilience describes the capacity and velocity of a system to cope with disturbance (Hahne and Kegler 2016; Schmidt 2020). Many authors emphasize that only analyzing bouncing back effects and aiming at restoring a landscape that had been disturbed, falls short. The notion of transformative resilience describes a process of socio-cultural change that is characterized through mutual learning and aims at „bouncing forward“ and designing new landscapes (Kegler 2014; Meerow and Stults 2016). In the context of this paper, resilience is understood not only as a set of technological improvements. In fact, the cultural dimension of transition is crucial for successful processes of change (Karow-Kluge 2010; Sieverts 2013).

Green Fingers

Especially in growing cities, Green Fingers are intensively discussed as a special type of green infrastructure (Rößler 2015; Flitner 2017; Hansen et al. 2018; Maes et al. 2019; Pauleit et al 2020) in the context of developing climate-resilient cities. Often reaching from city centre to urban fringes, they can provide space for stormwater retention, urban agriculture, biodiversity, and recreation. In addition, the Green Fingers are important cooling retreats during periods of summer heat and, with appropriate topographic conditions, corridors that provide fresh air to neighbourhoods. According to Pierer and Creutzig (2019), a star shaped city structure with Green Fingers can be seen as a prototype for climate resilient ways to settle. Cities like Helsinki and Milan work on qualifying or recreating their Green Fingers. The “Raggi Verdi”, in Milan are the guiding element for restructuring the city (Fabris, Semprebon, and Fu 2019).

According to the mindset of the European Landscape Convention (ELC), that defines landscape as perceived by people, whose character is the result of action and interaction of natural and/or human factors (Article 1, European Landscape Convention) and in line with the notion of transformative resilience, Green Fingers can not only be considered as physical space that provides biophysical functions, but also as social space with a distinct cultural dimension (Meier, Bucher, and

Hagenbuch 2010). Other than approaches that focus mainly on the protection and conservation of cultural and natural heritage, the ELC presents landscape as a comprehensive vision combining both natural and cultural aspects of any kind of landscape with special emphasis on the social dimension. The complexity of the functional and cultural aspects contained in the Green Fingers metaphor therefore requires a planning culture with a clear emphasis on communication.

Method and Data

The research study “Green fingers for a climate resilient city, Osnabrück” is linked to a larger research community working on projects all funded by the German Ministry of education and research (BMBF). There is accompanying research carried out by a group of scientists whose findings on transdisciplinary research are beneficial in this context (Marg, Kreß-Ludwig, and Lux 2019). However, analyzing the interconnection between the processes of planning, designing and co-creation depends on deep insight and participation in the research process. Therefore, only the one project in which the authors of this paper were intensively involved was selected.

The university city of Osnabrück with its roughly 170.000 inhabitants is a prosperous, growing hub in semi-rural Osnabrücker Land. It is characterized by its universities, a strong middle class in an economically strong region both providing jobs. The manufacturing, transport and research sector benefit from the city's convenient location close to the Netherlands, the Ruhr region as well as links to Eastern Europe and the German seaports.

Osnabrück's eleven green fingers run as a star-shaped system along hills and valleys and consist of agricultural land, forest, community gardens and recreational areas. They incorporate different functions for climate-resilience. The idea dates to 1928 when the head of the municipal planning office Lehmann drew the first map of a system of interconnected green spaces. Since then, the Green Fingers played different roles in spatial planning. Nowadays, in the context of climate change, they are on top of the agenda of some political parties and several associations, again. This is also due to the fact, that Osnabrück is growing and that there are plans to build 3000-5000 new housing units, some of them in the Green Fingers.

The research questions of the project “Green fingers for a climate resilient city” are: Which existing spatial functions and landscape qualities need to be preserved or developed to coop with climate change? Which practices needs to be changed to establish a planning culture of working efficiently together on climate resilient city planning? Accordingly, the first goal of the project is to generate, structure and spatialize knowledge on the Green Fingers to maintain and develop a climate-resilient structure for the city of Osnabrück. The second aim is to successfully establish a co-creative process that helps to make this knowledge fruitful for the city's transformation and to experiment with a new planning culture. Both aims had been combined as components of the transdisciplinary research process which started while the city of Osnabrück applied together with the university's research team for the grant. After the successful application a City-University Partnership (CUPs) (Withycombe Keeler et al. 2019) was created, which means that staff of the city's administration worked together with the university's team of professors and scientific employees. Altogether the disciplines landscape architecture, agricultural science, biology, and urban planning were involved.



Fig. 1: The city of Osnabrück (Photo: Hubertus von Dressler)

Generating, structuring, spatializing knowledge and designing scenarios and spatial vision

To gain knowledge about the green finger system, the research team investigated qualities and sensitivities of spatial structures that enable adaptation to climate change. In addition to identifying and assessing the various landscape functions (von Haaren et al. 2019), the degree of conservation of landscape character (Schmidt 2022) was used to assess the biophysical (or spatial) aspects of landscape resilience. To find a spatial vision working as a guideline for the transformation of the star-shaped city with its Green Fingers the research team designed four scenarios based on the knowledge that had been generated and spatialized both by the research team and the involved actors. Scenarios are seen as ‘plausible descriptions of how the future might develop, based on a coherent and internally consistent set of assumptions (“scenario logic”) about the key relationships and driving forces’ (Nakićenović and Swart 2000; Griewald et al. 2017). After that, a spatial vision was developed, the so called green-blue network of high resilience green spaces.

Process of co-creation in Osnabrück

Based on carefully identifying relevant stakeholders, their network and influences on each other’s and the Green Fingers with the tool Net-Map (Schiffer und Hauck 2010), several working groups were formed to bring the co-creative process to life. A working group of politicians consisting of one representative of each politic party and the head of planning of the city administration met twice a year and worked on principles of climate resilience, discussed scenarios and the spatial vision. The working group “key actors” assembled farmers, members of the working group of

politicians, a formed citizens-council and of different organizations such as nature conservancy groups, hunters' representatives, citizens associations, cultural initiatives and Osnabrück's youth league. This working group was to inspire the exchange of the different perspectives and meet during walks, scenario workshops and visioning workshops (Fig.1). The members had been chosen by the research team according to their roles in policy making and involvement in organizations dealing with urban transformation. In general, the process design with the elements of walking, mapping and storytelling was in the hands of the university.

Each of six guided walks lasted six hours and covered parts of one or two of the Green Fingers. The walks had been designed by the research team and based on the knowledge that had been generated and spatialized so far. The aim of the walks was to bodily experience the Green Fingers with all their functions. Rules were chosen to evoke the three modes characteristic for walking as a method, the discovery mode, flow mode and reflective mode (Schultz 2014; Schultz 2019), e.g. to be silent for a while or to walk very slowly or rather quickly. Short stops on the way directed the walkers to spatial constellations or traces and often inspired discussions on how people perceive the situation. Questions were collected, ideas proposed, and perspectives exchanged. An average of 20 actively engaged stakeholders took part in the walks. The scenario and visioning workshops lasted three hours. Their aim was to discuss the results from the processes of landscape planning and designing. The walks and workshops had been documented by a member of the research team. The co-creative process was systemically evaluated. Methods include participant observation, reflective expert interviews with members of the city administration, the research team and associations from civil society. According to the characteristics of transformative science the set-up of the research project was experimental and aimed at analysing the impact of process-elements and used the gained insight for the (re-)design of the research project.



Fig. 2: Walks through the Green Fingers (Photo: Svenja Busse)

According to the layout of transdisciplinary research, all stakeholders were involved at all stages of the research, from the initial construction of research questions (city's administration while writing the research proposal) and selection approach (indicators were defined with the working groups of politicians) all the way through to the interpretation and application of results (several workshops with working groups). Thus, knowledge was not only produced but tested and approved. In the last phase of the project, there were intensive discussions with political parties on how to integrate the findings in an integrated concept for the city. The input from stakeholders changed the approach of the research formulated in the research proposal significantly.

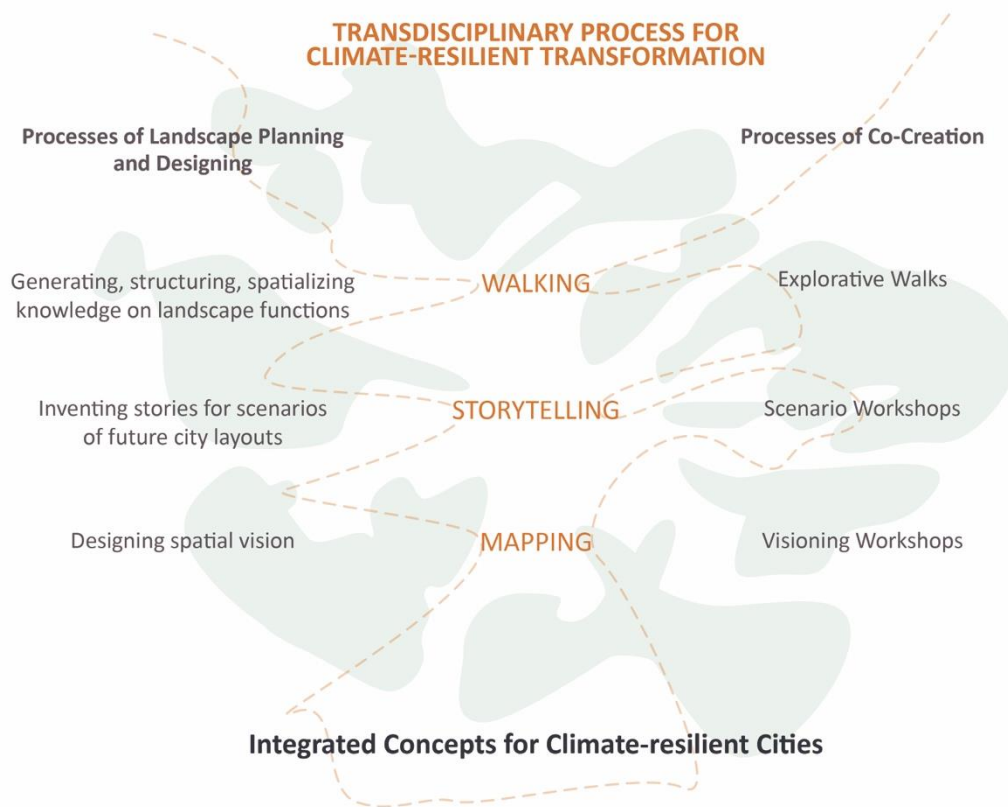


Fig. 3: Connecting processes of landscape planning and designing with co-creation (Project Green Fingers HS OS)

Results

The results in a nutshell are that walking, storytelling and mapping help to link processes of landscape planning, designing and co-creation. Fig. 1 shows the major steps of the two processes and how they are entangled. How exactly did that work?

Exploring and exchanging views on multifunctional green spaces through walking

Walking as method is known as means to inspire a complex cultural practice of movement, perception, and awareness (Solnit 2000; Jacks 2007; Ingold 2011; Fezer and Schmitz 2012; Schultz 2014; O'Mara 2019; Schultz 2019), stimulating the complex, iterative process that suits practices of wellbeing as well as professional exploration of large-scale landscape design and research (Schultz 2014; Schultz 2019). The walks through the green fingers with the aim to walk through a variety of green spaces, to experiences spatial interconnections and to meet people who live or work in or close to the Green Fingers or shape them by cultivating land, can be seen as a transect through the object of research (Diedrich, Lee, and Braae 2014). Walkers used all their senses to experience the traversed landscapes and bodily position themselves in the Green Fingers. This way of exploring proved to be a form of orientation and care that is needed for a deep understanding and awareness of spatial constellations and qualities (Schultz 2014). Exploring the Green Fingers

through walking helped to understand the knowledge that had been generated, structured, and spatialized in the process of planning and designing. Especially for the participants without a background in planning it was much easier to comprehend the explanations of the research team by perceiving the described spatial constellation, by feeling the breeze while standing in the cold air corridor or by talking to a local farmer. They were capable of formulating questions that came up during the walks and exchanging views while walking and talking with people from different walks of life. The explorative walks triggered arguments on conflicting objectives – all embedded in and inspired by a co-creative atmosphere of walking together (Schultz and von Dressler 2021). A representative of a politic party that postulates to use parts of the Green Fingers for housing projects for example had a revealing argument with a representative of a citizen’s association. Because the two had the chance to exchange their arguments while walking and talking together beforehand, they could build up a foundation for a very fair argument. This did not imply that the conflicting objectives can be cleared up easily, but the setting of a walk could inform, consolidate, and intensify the discourse. The evaluation at the end of the workshops showed, that the participants were not only aware of the need to work on the sustainable transformation of the Green Fingers but also highly motivated to collaborate with initiatives and associations.

Designing and testing narratives through storytelling

Narrative principles of storytelling can be used for design processes to represent and create relationships between humans, space and action (Schmidt 2019) and thus play a vital role as communicative practice in co-creative processes. According to Schmidt (2019), “narrative approaches can close a gap, in order to incorporate the actors' perspectives, to support the dialogue with various participants and to deal with complexity and process”(146). The research team in Osnabrück used storytelling in combination with scenarios, a common tool of transformative planning (Nakićenović and Swart 2000; Griewald et al. 2017). The scenarios aggregated the generated, structured, and spatialized knowledge and the contributions of the different actors collected during the first part of the research process. Through the acting of protagonists such as farmers, citizens, and politicians, the written and illustrated stories illustrated what Osnabrück’s future could look and feel like. These stories were read out loudly by a professional theatre actress during the workshops with around 15 members of the citizens council and the working group of key actors. The first scenario “Osnabrück International” creates a vision of a prosperous city that grows heavily at the cost of Green Fingers and urban agriculture. The second scenario “The productive park” showcase a prosperous future of interconnected, multifunctional Green Fingers that are mostly protected and qualified through intensive civil engagement. The third scenario “On the save side” draws of vision of rigorously protected Green Fingers in a declining economy. And the fourth scenario “The close community” draws a future where people live in their self-sufficient community gardens and withdraw from international dependencies in a worldwide declining economy. The stories can be seen as an intervention by the research team aiming at opening new horizons and inspiring to think out of the box. The written stories proved to be accessible for workshop participants without a professional background in planning because they could imagine playing a role in the scenarios. Discussing the stories and the outlined futures provoked immediate and strong reactions. Questions such as “What would your role in such a future be?” or “What would be the most important things to do in this scenario?” brought up by the moderator helped to prevent a discussion centering only around the question, what the best or worst scenario would be, or which one is more likely to happen. Instead, inspired by these questions, people started to play with the stories co-creatively and approached the professional ideas with great interest.

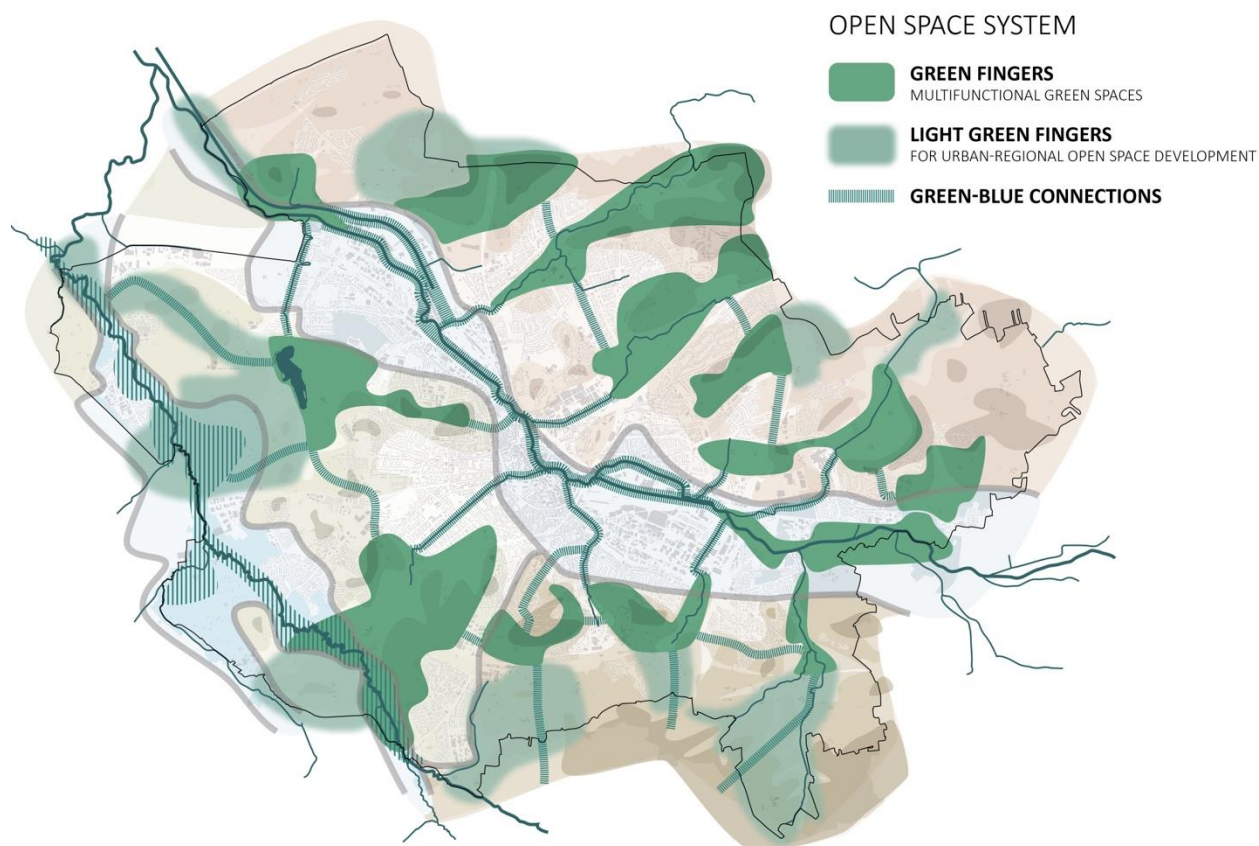


Fig. 4 Spatial vision Network of Green fingers, HS Osnabrück (Project Green Fingers HS OS)

Translating experiences and visualizing narratives through mapping

Mapping can be seen as an important tool of translating experiences and mental images into drawings and thus help designers in the dynamic, relational nexus of urban landscapes to determine their position during the design process. New relations in this fabric can be revealed (Langner 2019). Based on existing studies and assessments, cold air production areas and guideways or areas for water retention in Osnabrück's Green Fingers could be identified and complemented by areas with high potential for urban agriculture, as urban wetlands, for carbon storage, biodiversity, and recreation. This spatialization and subsequent aggregation into highly functional areas led to a better understanding of the importance of individual Green Fingers, but especially their importance as open space systems. Based on the layering of areas with high performance of landscape functions, multifunctional green spaces could be identified. It is not surprising that these areas coincide in many places with the existing eleven Green Fingers. The spatial vision complements the previous spatial delineations and depicts the connections between the identified multifunctional green spaces (Fig. 2). This robust system is the safety net for climate adaptation in Osnabrück. By highlighting discussed topics, structures, and interconnections the mappings inspired the discussions of the working groups. The spatial vision met the challenge to translate the

complex interconnections of different functions and topics into mappings that were intuitively accessible for all the stakeholders. The spatial vision was deliberately presented vague instead of exactly by plot, because this made it possible to concentrate on the vision in all its roughness and discuss the system of resilient green spaces instead of detailed plans for smaller parts of the Green Fingers. The fact that the open spaces are highlighted and foregrounded helped to change perspectives from a view on the built city that is a growing into the open spaces to a view on a city that is shaped by its Green Fingers.

Discussion and Conclusion

Coming back to the hypothesis that processes of planning, designing and co-creation need to be connected to stimulate climate resilient city transformation, the example of Osnabrück show that walking, storytelling and mapping address people of different backgrounds (and without a background in resilient planning) and thus may be proper means to inspire co-creative processes. In fact, they inspire three aspects that can be crucial in transdisciplinary processes: Understanding, Ownership and Capacity.

Understanding the complex tasks of climate-resilient city planning

The reflective interviews emphasize the emergence of a systemic understanding of the Green Fingers and their role in Osnabrück's future. This understanding derives from walking and discussion upon stories and mappings. Hille von Seggern (2019) refers to the philosopher Gadamer and translates his notion of understanding to the context of planning and design. She describes the dynamic transformation of landscape as a steadily changing multi-dimensional performative process. Researchers and the involved actors must become part of this performative process to understand, express creatively and transform it. The example of Osnabrück showed that meeting farmers on site during the explorative walks and discussing sustainable land-uses with them, discussing their roles in stories for the Osnabrück of the future and seeing their farms highlighted in mappings helped to understand the contributions, urban agriculture can make to strengthening the system of Green Fingers.

Ownership for the concepts

The evaluation of the process with its echo in the press coverage and the role the Green Fingers played in the local election campaign made clear, that Green Fingers became a major topic in the public debate in Osnabrück. The Green Party promoted the Green Fingers as their predominant campaign issue and won the election. Initiatives were founded and public events organized by a group of initiatives consisting of representatives of "Parents for Future", "Fridays for Future", and "the Climate Network" – they all put the Green Fingers on their agenda. Many of the involved actors acted as multipliers and transported the professional analysis and concepts of the Green Finger project in their communities. Participants engaged with the Green Fingers during the walks, connected emotionally with them, changed them by perceiving them differently and thus made them "their" Green Fingers. Apart from the walks, the vivid mappings and stories helped the participants to develop an ownership for the Green Fingers that is characterised by the willingness to act and thus reach beyond an awareness of the qualities. This becomes visible in a list of approximately 5600 collected signatures postulating to use the concept of the research project as the main guideline for the development of the Green Fingers and the cityscape. It is amazing and

inexplicable at the same time that people not directly participating in the transdisciplinary research process, express their trust in the (unknown) results of the project.

Capacity in co-creative processes

Apart from understanding and ownership for the concepts, walking, storytelling, and mapping enhanced the capacity of many of the involved actors to take effect. Whereas the representatives of the city's administration still struggle in finding their role in co-creative settings, representatives of organisations, farmers and some of the dispatched members of the political parties show competence and power to promote new concepts for the climate-resilient city and to work for a new culture of co-creation when transforming Osnabrück. This capacity could be acquired because the findings of the research could be made transparent to the involved people with walks, stories and mappings working as translating tools. Vice versa, everybody involved in this process – including the research team – experienced the power of co-creation. It must be said that also the challenges became obvious, for example for the city administration to work across sectoral and to partner with a university.

Formal planning instruments have been used in Germany for a long time. Walking, mapping, and storytelling are also successfully used time and again as methods of informal planning. The special feature of the approach in Osnabrück is that formal and informal instruments are consistently thought of together and developed in constant dialogue of the transdisciplinary process. Thereby, understanding, ownership, and capacity for the complex task of transforming Osnabrück towards a more climate-resilient future could be promoted.

References

Diedrich, L., Lee, G., Braae, E. 2014. “The Transect as a Method for Mapping and Narrating Water Landscapes: Humboldt's Open Works and Transareal Travelling.” *NANO* 6.

Fabris, L. M. F., Semprebon, G., Fu, F. 2019. “Greenways as a New Potential for Shrinking Cities. The Case of Milan (Italy).” *Proceedings of the Fábos Conference on Landscape and Greenway Planning* 6: 1–10. doi - 10.7275/zjxh-hp81.

Fezer, J., Schmitz, M., Eds. 2012. Lucius Burckhardt Writings. Rethinking Man-made Environments: Politics, Landscape & Design. Wien, New York: Springer-Verlag. doi - 10.1007/978-3-7091-1257-1.

Flitner, M. 2017. Grüne Infrastruktur und die Erneuerung städtischer Naturen. In *Infrastrukturen der Stadt*, edited by Flitner, M., Lossau, J., Müller, A.-L., 45–64. Wiesbaden: Springer VS. doi - 10.1007/978-3-658-10424-5_3.

Griewald, Y., Clemens, G., Kamp, J., Gladun, E., Hölzel, N., Dressler, H. von. 2017. “Developing land use scenarios for stakeholder participation in Russia.” *Land Use Policy* 68: 264–276. doi - 10.1016/j.landusepol.2017.07.049.

Haaren, C. von, Lovett, A. A., Albert, C. (2019). Landscape planning with ecosystem services. Dordrecht: Springer. doi - <https://doi.org/10.1007/978-94-024-1681-7>.

Hahne, U., Kegler, H., Eds. 2016. Resilienz: Stadt und Region – Reallabore der resilienzorientierten Transformation. Frankfurt am Main, Berlin, Bern, Bruxelles, New York, Oxford, Wien: Peter Lang international academic publishers. doi - 10.3726/978-3-653-06657-9.

Hansen, R., Born, D., Lindschulte, K., Rolf, W., Bartz, R., Schröder, A., Becker, C.W., Kowarik, I., Pauleit, S. 2018. Grüne Infrastruktur im urbanen Raum: Grundlagen, Planung und Umsetzung in der integrierten Stadtentwicklung. Bonn - Bad Godesberg: Bundesamt für Naturschutz. doi - 10.19217/skr503.

Ingold, T. 2011. *Being Alive: Essays on Movement, Knowledge and Description*. London: Routledge. doi - 10.4324/9780203818336.

Jacks, B. 2007. "Walking and Reading in Landscape." *Landscape Journal* 26: 270–286. doi - 10.3368/lj.26.2.270.

Jahn, T., Bergmann, M., Keil, F. 2012. "Transdisciplinarity: between mainstreaming and marginalization." *Ecol Econ* 79:1–10. doi - <https://doi.org/10.1016/j.ecolecon.2012.04.017>.

Karow-Kluge, D. 2010. *Experimentelle Planung im öffentlichen Raum*. Berlin: Reimer Verlag.

Kates, R. W., Clark, W. C., Corell, R., Hall, J. M., Jaeger, C. C., Lowe, I., McCarthy, J. J. 2001. "Sustainability science". *Science* 292, 5517: 641-642. doi - <http://doi.org/10.1126/science.1059386>.

Kegler, H. 2014. *Resilienz: Strategien & Perspektiven für die widerstandsfähige und lernende Stadt*. Basel, Gütersloh, Berlin: Birkhäuser; Bauverlag. doi - 10.1515/9783038212690.

Langner, S. 2009. Navigating in Urban Landscapes: Design-oriented Cartography as a Navigation Instrument for Large-scale Landscape Design. In *Urbanism & Urbanization: Transcending the Discipline. Urbanism & Urbanization as receptors of multiple practices, discourses and realities*, edited by De Meulder, B., Ryckewaert, M., Shannon, K., 243–254.

Langner, S. 2019. Navigating in urban landscapes – mapping as a navigational strategy in designing landscapes. In *Design Research for Urban Landscapes: Theories and Methods*, edited by Prominski, M., Seggern, H. von, 50-69. London, New York: Routledge. doi - 10.4324/9781351104241-4.

Leading Cities 2014. *Co-Creating Cities. Defining Co-Creation as a Means of Citizen Engagement*. Accessed on January 31, 2021. <https://leadingcities2014.files.wordpress.com/2014/02/co-creation-formatted-draft-6.pdf>.

Maes, J., Zulian, G., Günther, S., Thijssen, M., Raynal, J. 2019. *Enhancing Resilience Of Urban Ecosystems through Green Infrastructure (EnRoute): Final Report*. Luxembourg: Publications Office of the European Union. doi - 10.2760/689989.

Marg, O., Kreß-Ludwig, M., Lux, A. 2019. *Wirkungen transdisziplinärer Stadtforschung in den Projekten der Förderlinien „Leitinitiative Zukunftsstadt“ und „Nachhaltige Transformation urbaner Räume“: Wirkungskategorien, Projektprofile und Handreichung zur Selbstreflexion; Werkstattbericht des Verbundvorhabens „Synthese- und Vernetzungsprojekt Zukunftsstadt (SynVer*Z)“*. Frankfurt am Main, Berlin.

Meerow, S., Stults, M. 2016. "Comparing Conceptualizations of Urban Climate Resilience in Theory and Practice." *Sustainability* 8, 701. doi - 10.3390/su8070701.

Meier, C., Bucher, A., Hagenbuch, R. 2010. "Landscape, Landscape Awareness, and Landscape Identity as Potentials for Regional Development - An Empirical Case Study in Southern Glarus, Switzerland." *GAIA - Ecological Perspectives for Science and Society* 19: 213–222.

- Nakićenović, N., Swart, R., Eds. 2000. Special Report on Emissions Scenarios: A Special Report of Working Group III of the Intergovernmental Panel on Climate Change. Cambridge.
- O'Mara, S. 2019. In Praise of Walking: The new science of how we walk and why it's good for us. London: The Bodley Head.
- Pauleit, S., Hansen, R., Rall, E.L., Rolf, W., Lierop, M. van. 2020. Green Infrastructure for the city of the future. Perspectives from Europe. In *Working papers. Rivista online di Urban@it: le città protagoniste dello sviluppo sostenibile*. Urban@it.
- Pierer, C., Creutzig, F. 2019. "Star-shaped cities alleviate trade-off between climate change mitigation and adaptation." *Environ. Res. Lett.* 14, 085011. doi - 10.1088/1748-9326/ab2081.
- Rößler, S. 2015. "Klimawandelgerechte Stadtentwicklung durch grüne Infrastruktur: Urban Development under Climate Change by Green Infrastructure." *Raumforschung und Raumordnung / Spatial Research and Planning*, 73: 123–132. doi - 10.1007/s13147-014-0310-y.
- Schiffer, E., Hauck, J. 2010. "Net-Map: Collecting Social Network Data and Facilitating Network Learning through Participatory Influence Network Mapping." *Field Methods* 22, 3: 231-249. doi - 10.1177/1525822X10374798.
- Schmidt, A. 2019. Urban landscape stories – narratives as a design research tool. In *Design Research for Urban Landscapes: Theories and Methods*, edited by Prominski, M., Seggern, H. von, 144–165. London, New York: Routledge. doi - 10.4324/9781351104241-9.
- Schmidt, C. 2020. Landschaftliche Resilienz: Grundlagen, Fallbeispiele, Praxisempfehlungen. Berlin: Springer Spektrum. doi - 10.1007/978-3-662-61029-9.
- Schmidt, C. 2022. Landscape Resilience. Basics, Case Studies, Practical Recommendations. Springer Nature. Berlin, Heidelberg: Springer-Verlag GmbH Germany. doi - <https://doi.org/10.1007/978-3-662-63998-6>.
- Schneidewind, U. 2018. Die große Transformation: Eine Einführung in die Kunst gesellschaftlichen Wandels. Frankfurt am Main: Fischer Taschenbuch.
- Schneidewind, U., Augenstein, K. 2016. "Three schools of transformation thinking: the impact of ideas, institutions, and technological innovation on transformation processes." *GAIA Ecol Perspect SciSoc* 25, 2: 88–93. doi - <https://doi.org/10.14512/gaia.25.2.7>.
- Schneidewind, U., Singer-Brodowski, M. 2014. Transformative Wissenschaft: Klimawandel im deutschen Wissenschafts- und Hochschulsystem. 2nd ed. Marburg: Metropolis Verlag.
- Schneidewind, U., Singer-Brodowski, M., Augenstein, K., Stelzer, F. 2016. Pledge for a transformative science: a conceptual framework (Wuppertal Paper No. 191). Wuppertal.
- Schultz, H. 2014. "Designing large-scale landscapes through walking." *JoLA* 9: 6–15. doi - 10.1080/18626033.2014.931694.
- Schultz, H. 2019. Walk with me! How walking inspires designing. In *Design Research for Urban Landscapes: Theories and Methods*, edited by Prominski, M., Seggern, H. von, 70–85. London, New York: Routledge. DOI: 10.4324/9781351104241-5.
- Schultz, H., Dressler, H. von. 2021. Transformative Wissenschaft in der Praxis. In *Wege transformativer Forschung: Zielorientierung und Indikatoren: Dokumentation des tF-Symposiums am 7. Oktober 2020*, edited by Gemeinhardt, A., Lehmann, K., 64–73. Darmstadt:

Schader-Stiftung.

Seggern, H. von. 2019. Crossing fields: designing and researching Raumeschehen. In *Design Research for Urban Landscapes: Theories and Methods*, edited by Prominski, M., Seggern, H. von, 8–32. London, New York: Routledge. doi - 10.4324/9781351104241-2.

Sieverts, T. 2013. Am Beginn einer Stadtentwicklungsepoche der Resilienz? Folgen für Architektur, Städtebau und Politik. In *Resilienz: Informationen zur Raumentwicklung*, edited by Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR), 315–323. Stuttgart.

Solnit, R. 2000. *Wanderlust: A History of Walking*. New York: Viking.

SynVer*Z 2021. *Forschen für die Zukunftsstadt*. Accessed on June 9, 2021. <https://www.nachhaltige-zukunftsstadt.de/synver/zukunftsstadt-forschung/>.

Vigar, G., Healey, P. 2002. “Developing Environmentally Respectful Policy Programmes: Five Key Principles.” *Journal of Environmental Planning and Management* 45: 517–532. doi - 10.1080/09640560220143530.

Withycombe Keeler, L., Beaudoin, F., Wiek, A., John, B., Lerner, A. M., Beecroft, R., Tamm, K., Seebacher, A., Lang, D. J., Kay, B., Forrest, N. 2019. “Building actor-centric transformative capacity through city-university partnerships.” *Ambio* 48: 529–538. doi - 10.1007/s13280-018-1117-9.