

# Assemblages of Anthropocene Landscapes

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**Abstract:** The Anthropocene reveals itself in urban landscapes. The multidimensional effects of global change – rapid urbanization processes, heavy rain events, droughts, resource scarcity, and the acceleration of social injustice – all confront urban and natural systems and their inhabitants with increasing challenges. People are once again being forced to rethink the circumstances and components that have led to these transformations. Because of the strong interconnectivity between these urban and natural phenomena, revised approaches to Anthropocene landscapes require us to think in terms of dynamic categories, i.e. relationships and interactions between nature and culture and between human and non-human actors, and then to focus on their spatialization. Landscape architecture has the competence to link different types of disciplinary and social knowledge as well as creative design practices and spatial transformations, thus materializing knowledge about robust urban landscapes. This paper argues for an integrative approach that links assemblage and post-human theories with systems thinking, landscape design and interactive methods in order to foster innovation in changing landscape architectural theory and practice. We wish to promote an understanding of urban transformation as a process of materialized knowledge reflection, adaptation and innovation. This article outlines conceptual approaches to deciphering the assemblages (or links) of Anthropocene landscapes. They should also show how the “agencies” of landscapes can be stimulated and how more capacity for action can be achieved with regards to dealing with the challenges of the Anthropocene.

## 1. Introduction

Dealing with the multidimensional effects of global change as well as the irreversible human impact on an entire planet that is high industrialized and geo-effective means dealing with wicked problems and uncertainty in the Anthropocene epoch. This is also a historical moment – in June 2019 the international panel of scientists in the Anthropocene Working Group (AWG) formally defined a new geological slice. According to Zalasiewicz (in Subramanian, 2019) ‘The Anthropocene works as a geological unit of time, process and strata’. The Anthropocene has led to an accelerated global metabolism that has changed our environment profoundly. Furthermore, nature is no longer seen as an infinite resource. What is new is that human action has become a major factor in planetary balances and imbalances (Renn and Scherer, 2015, 13) The Anthropocene reminds us that viewpoints and times are changing. Likewise, there is an

interest in a better understanding of the deep evolutionary processes of the earth's history (deep time) and the depth of its geological strata, geomorphology (deep ground), this time linking scale with today's accelerated processes (Giseke, 2018).

We are faced with the challenge of adapting our knowledge production to these upheavals, putting our ears to the ground, as it were. Floods and droughts, as well as the immense consumption of water and food, make it clear that we are part of complex material, energy, capital and information flows (Renn and Scherer, 2015, 13). This is even more challenging because we need to learn to grasp our knowledge as the result of long-term and ad-hoc processes of development at the same time. Following Chakrabarty (2015, 158) '[...] as we learn to acknowledge our place in the depths of time, in geological and evolutionary time, we also begin to connect our localized problems with some of the broader issues, and therefore we will be in the position to intervene in these development processes'.

In addition to increasing the awareness and management of natural, social and political risks, the Anthropocene concept also allows for a deeper understanding of how nature and technology interact. Indeed, there is no single coherent narrative, but several. According to Dürbeck (2018, 2), the Anthropocene debate serves as a bridging approach and ranges from natural and social sciences to humanities and public discussions. From the perspective of cultural studies and environmental humanities, the human with its geophysical force is being questioned in a subject-object-dichotomy, titled as the interdependence-narrative. The Anthropocene debate reminds us to adjust our knowledge production as well as our knowledge systems. On the one hand, the position of the human as a critical thinking and active component is still anchored in modernism, while on the other hand in the passive nature that needs to be cultivated, adapted and transformed for social needs or in terms of ecology to be protected against human impacts. In Dürbeck's argumentation this follows the narrative of the Anthropocene as a cultural concept that aims to think about the human with a post-human approach (Dürbeck, 2018, 13). These critical theoretical approaches have been primarily developed in the humanities and social sciences as 'the non-human turn' (Grusin, 2015). This was stimulated by the work of Donna Haraway with the figure of the 'cyborg' as a hybrid of human and non-human (1990) and Bruno Latour's Actor-Network Theory (ANT) (1998 [1991]), which describes the distribution of an "agency" among a heterogenous network of human and nonhuman actants. To overcome the separated positions of nature and culture, and subject and object, it is necessary to focus on critical arguments which stimulate the assertiveness of the Anthropocene.

However, this article is about assemblages of Anthropocene landscapes, focusing on their systemic and transformative relations and understanding them as linkages between positions and concepts that had previously been treated as dichotomies. Anthropocene discourses manifest a hybridization of separate categories such as culture and nature, city and landscape, human and non-human actors, and material and immaterial. It thus addresses both a profound material, concrete, spatial and theoretical dimension. Therefore, Klingan and Rosol (2019, 13) describe the Anthropocene as 'becoming empirical of a new influence relationships'. We argue that this empiricization can be found in landscape.

Why in landscape? Firstly, the transformation pressure on landscapes worldwide is extremely great, triggered by territorial rearrangements as a result of the many effects of the Anthropocene period such as extreme weather events, massive urbanization, overused areas, a lack of resources and the loss of species. Indirectly, the Anthropocene shows a high degree of interdependence among conflict fields, e.g. through periodic and sudden disaster or long-term changes in and of landscapes. These act locally and globally at the same time, and are dependent on a variety of very different systemic, spatial, social, cultural and natural constellations.

Secondly, as a general multidimensional concept, landscape includes both the matter and the idea, in other words it embodies the nature-culture dichotomy in itself. Seen from the Anthropocene perspective, landscape is obviously not only a geophysical surface that can be formed. Instead, 'a landscape possesses an efficacy of its own, a liveliness intermerged with human agency' (Bennett, 2011, 15). Thirdly, following the definition of human geography for landscape morphology, 'it is the material formation of the landscape, its shaping and reshaping, in which social structures and cultural world are enfold' (Oxford reference, n.d.). Similar to sociospatial perspectives on urban space, landscape morphology embeds social, cultural and economic practices. Furthermore, we also understand landscape as practice, as an object, an actor and a knowledge-archive at the same time. This approach to landscape includes socio-natural and socio-technical linkages. Combining both approaches, assemblages of Anthropocene landscapes are treated as an enhanced field of research and practice. Grasping the knowledge of these assemblages in their materiality and idea and in their morphology and practice, there is a need to focus on the mutual relationships between different systems, components, actors and processes. This theoretically and empirically includes their immediate relationship to society, nature and technology, and their capability to act and to represent knowledge at the same time (Wieck and Giseke, 2017).

## 2. Methodology

The transformations of Anthropocene landscape – as we argue from the discipline of landscape architecture – can no longer be dealt with using morphological and functional problem solutions in research and design practice. Rather, they require an interplay of systemic approaches and scenario thinking that abandons previous categories and classifications, and develops productive units and stimulates and designing links. In changing the perspectives towards human-non-human relations, it is equally clear to us that we need to adapt our knowledge to these transformation challenges. There is a growing demand for a landscape architecture that understands which knowledge systems shape our thinking and what kind of new knowledge we need to tackle the wicked transformation challenges of the Anthropocene in order to develop hybrid design solutions. Landscape architecture has to face the challenge of identifying and qualifying interfaces of this interaction, reassessing them and stimulating processes. This is not only an academic exercise but a very ontology-oriented practice of landscape architecture that stresses empirical knowledge.

Three conceptual approaches are introduced here: the actor-networktheory, assemblage theories, and systemic thinking and design. Together, they are considered to be suitable for focusing on the transformative relationships inherent in Anthropocene landscapes. The Department of Landscape Architecture and Open Space Planning at the TU Berlin uses these approaches in teaching and research in order to make them productive for landscape architectural design and new linking cultures. This also aims to contribute to the development of a fundamental theoretical and methodological position for landscape architecture in the Anthropocene period.

## 3. Assemblages of humans and nonhumans – the ANT

The increased interest in designing with an eye for natural processes and non-humans provoked by the Anthropocene discussion has led to a new perspective of the social. With the development of the ANT, Bruno Latour mentions symmetric relationships between humans and nonhumans. These hybrids foster a new understanding of nature-culture and subject-object

relations, seeing nature and society as being network-building or collective (Latour/Callon in Belliger, 2006, 38). It creates a path to re-inject things and matters of concern ‘into our understanding of the social fabrics [...] through a network-like ontology’ (Latour, 1996, 3). Non-humans therein are to be understood variously as animals, plants, affectivity, bodies, organic and geophysical systems, materiality and technologies (Grusin, 2015, vii). They are all embedded in acting programs, and they share responsibility. Sharing responsibility in a symmetric thinking of acting networks is what Latour also calls ‘the farewell to the sublime’ (Latour, 2016). There is no more acting competence of humans than the agency of nonhumans. Rather, as Grusin (2015, xv) argues interpreting Latour, that the distribution of agency is not only among non-humans, but across a heterogeneous network of human and non-human “actants”, i.e. networks of actors who take action. With this balanced perspective, ANT focuses on coevolving, coexistence and collaboration. In other words, for Latour it is a rethinking and repositioning of society as a whole, as a complex assemblage of human and non-human actors. This readjustment of thinking about society is also named as the process of building a network, as communicative action towards a balance of interests, as translation.

As a contribution to the development of a linkage theory of landscape architecture in the Anthropocene, we adapt Latour’s approach of translation to better understand how this balanced status in landscape can be achieved as a co-evolutionary process – in reflecting, describing and transforming Anthropocene landscapes. It helps us to clearly formulate collective goals for assemblages of human and non-human actors as a design for robust hybrid landscapes.

#### 4. Vibrant matters – Assemblage theories

While ANT reflects in a more socially critical way about which collectives of human and non-human actors develop in ‘coherent moves’ (Latour 1999, 194), the approaches of assemblage theories focus more on the nature of the connections between heterogeneous components as well as their materialization and spatialization. For designing Anthropocene landscapes this provides a basic understanding of the materialized nature of relations and of the interactive competence of the materiality itself.

Assemblages are defined as a multitude of linkages between actors, components and processes. They permeate all areas of life in which humans, nature and technology meet. Thus, they stimulate a reflective translation of landscape architectural work. Assemblage concepts, first developed as social theories, help us to focus on the mutual relationships of landscape components and their effects, their spatialization and their constant moves. Therefore, assemblage approaches can be seen as a theoretical instrument for decoding relationships in landscapes and their socio-materialized knowledge.

Two assemblage approaches are selected here in order to highlight the competence for assemblage thinking as concepts for describing and designing Anthropocene landscapes.

First, attention is given to the political scientist Jane Bennett, who provides a manifesto for a new materialism which decodes the capacity to act on things – a ‘vibrant matter’ – that pulse and connect again and again (Bennett, 2010). Her approach is on affective things forming assemblages or the distributive agency of things and systems. Bennett positions this vital materialism as a supplement and complement to historical materialisms that were developed as a counterposition to global capitalism (Bennett, 2015, 223). In Bennett’s understanding, the landscape itself is a vibrant matter that positions nature and culture as an agency of heterogeneous assemblages, as a locus which is always a human/non-human collective (Bennett, 2011, 23).

The interactivity of these matters is provided by both, i.e., by systems and things. This includes Bennett's positioning as things with an inherent "thing-power" (i.e. the power of interaction that things have) that aims to theorize a materiality as force and power. It further involves the agency or efficacy in dependence on 'collaboration, cooperation or interactive interference of many bodies and forces' (Bennett, 2010, 21).

The second assemblage approach introduced here is McFarlane's argumentation for the materialized production of knowledge. Taking McFarlane's learning as a translocal assemblage concept emphasizes the need for people to interact with themselves and also with the environment. McFarlane (2011, 16) argues that 'learning is a distributive process that foregrounds materiality and spatial relationships of learning'. His concept of learning as a process of translation, coordination and dwelling implies possibilities for socio-material configurations of human and non-human components. Following Latour, who said that we had started to be affected, McFarlane points out that humans learn to perceive policy through a practiced ability and thus respond to changing contexts.

The 'vibrant matters' of Bennett's assemblage approach can be used as a superordinated, materialized image of Anthropocene landscapes. They include both a materialized agency to act and to interact in assemblages. Taking this together with McFarlane's socio-materialized knowledge, the Anthropocene landscape in its relations, materialities, meaning and acting represents a resonance space for the transfer of knowledge. This reflection promotes the development of adapted categories in understanding, describing and designing active competences and agencies of hybrid and robust landscapes across multiple scales and times.

## 5. Systemic thinking and design

Systems thinking, as it developed in the 20th century, has shifted from a reductionist to a holistic approach aimed at dealing with complex features. Systems thinking in general becomes evident in many disciplines, based on an understanding that the 'whole' of a given condition is not the sum of its parts but is rather a product of interactions between the parts.

Accordingly, the Oxford English Dictionary (n.d.) defines a system as 'A set, or assemblage of things connected, associated, or interdependent, so as to form a complex unity'. Shaked and Schechter also simply define a system 'as a functionally related assemblage of interacting, interrelated, or interdependent elements forming a complex whole.' They stress that 'The variety of systems falling under such a definition is endless, encompassing natural systems such as the human body, the earth, and space; human-made systems ranging from tiny hi-tech chips to global commercial conglomerates; conceptual systems like ethics and policy; and many more. [...] systems thinking provides a means of seeing the system as an integrated, complex composition of many interconnected components that need to work together for the whole to function successfully' (Shaked and Schechter, 2017, 9).

We assume that the conceptual framework of systems thinking and design is extremely useful for creating a better understanding and shaping of Anthropocene landscapes or the urban-natural hybrids, their different subsystems, their elements and their relations, and interactions. Systems thinking offers scientific ways to approach complex features and it also becomes even more evident in many disciplines for addressing real-life-problems (Giseke et al., 2015).

Translated to the concept of Anthropocene landscapes, systems thinking not only allows us to describe them as systems, i.e. to think about them as systems, but to think about them from the standpoint of systems (Boardman and Sauser, 2008, xix) and the interrelations of different subsystems. Systems thinking thus offers a methodological approach to Anthropocene

landscapes, enabling various disciplinary, sectoral, thematic and spatial perspectives in parallel to a set, or aggregate of things, be they natural, artificial, or social, that form a contextualized, concrete, spatial whole. This might include geological formations such as mountains, rivers and the wind, as well as physical elements shaping urban form. Analog to this, they can be described as a social system or as the intake and output of certain materials and related infrastructural systems. All of this stakes out a specific territory that consists of both material components on the one hand, and immaterial components such as values on the other.

Nevertheless, systems thinking offers tools to increase our understanding (and ability to design) Anthropocene landscapes as hybrid natural, technical and social features.

## 6. Analysis/Results

This paper argues for an integrative approach linking assemblage and post-human theories with system thinking, landscape design and interactive methods in order to foster innovation in changing landscape architectural theory and practice. Three projects from research and teaching in landscape architecture are introduced here to show how the linking of theories and design practice can promote interactive approaches for designing assemblages of Anthropocene landscapes.

## 7. Isar Camp – Rethinking and designing collectives

Rethinking and transforming the Bavarian Isar as a riverine landscape in the Anthropocene is a challenging task for master's students in the current Landscape architecture design studio 'Isar – Designing Anthropocene Natures'. In the studio students are asked to design their 'own' river landscape assemblage with its relations and exchange processes as a collective, following Latour's processes of actor-network building. This task also opens a debate about a possible and more symmetric coexistence between rivers and humans in the Anthropocene (Kropp, 2015). The following questions were raised concerning the Isar landscape: Why do we see the river only as a wild, alpine one, neglecting its technical reshaping? Which multifaceted dimensions does the river represent, having a closer look at it? How does the river deal with the contracting demands of being wild, natural, controlled and productive at the same time? Which of these demands are obvious and visible, and which rather invisible? How does the collaboration and coexistence of human and non-human take place? To get answers to some of these questions, an Isar Camp was organized for 30 Students so that they could deepen their theoretical approaches and to get in touch with the river.

The Isar Camp was an experimental field. It involved walking along the Isar river, readings, discussions, posing questions, generating collectives by using found pieces, reflecting, collecting, building and linking information and actors. Using the process of actor-network building and Latour's collectives as a starting point, the students were asked to link critical theoretical approaches and field research to performative and systemic design work. To create statements from human and non-human actors and stimulate the taking of another perspective, we used the technique of asking questions. The textual work and immersion in the Isar Camp was an experimental set-up with the goal of creating new Isar narratives, including the materialized knowledge of the Isar itself in terms of geophysical forces, human impacts and technological development. Packed with findings from the Isar landscape that serve as material and symbolic, human and non-human actants in a riverine-collective, the students were asked to physically

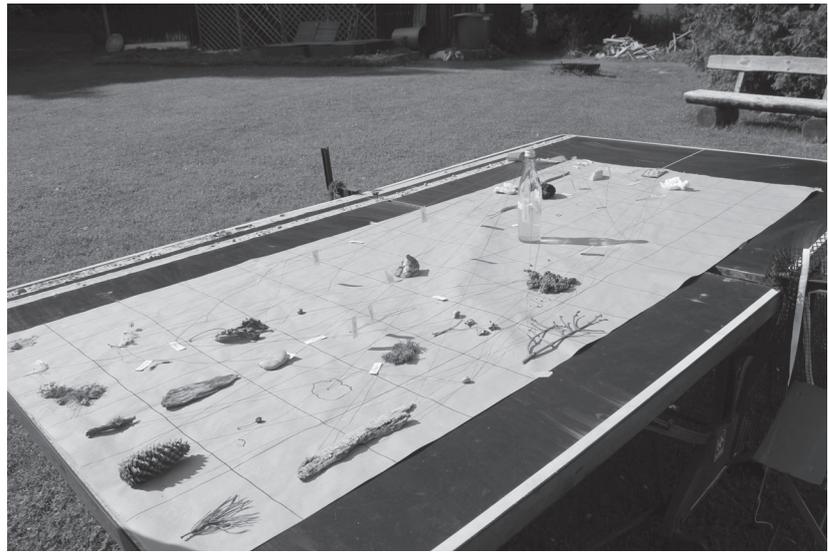


Figure 1. *Isar Camp collectives – Building networks as experimentation order for future design collectives, left: Anne Arndt, Karoline Dorothea Haerter, Cian Lorcan Hansen-Ennis, right: Kami Hattler, Joel Schreyer, 2019.*

create an experimental arrangement of possible actor-arrangements by using their findings following Latour's process of building a network; see figures 1 and 2 (Latour, 1996; Latour, 1999, 194, 195; Belliger and Krieger, 2006, 40, 41). Based on these concrete physical arrangements, the students were able to discuss the more general collective problems, sub-programs and transformation goals of the different actors, i.e. humans, birds, fish, currents, flooding, turbines, a nuclear power station, a sewage treatment plant, an airport, alluvial forests, e.g. To further develop design ideas that often dealt with ambivalent and contradictory interests, the first design questions were developed, for example, How can we make the deep time degradation processes of plastic visible, perceptible and conscious? How could we set up a new language for materialized relations between humans and non-humans? And, how can we develop agencies if birds are the main actors who are responsible for building the collective and are simultaneously involved in a network of interests, practices and regulations?

## 8. K.I.E.S – Designing of agencies

Following the assemblage approaches of McFarlane and Jane Bennett, the master's thesis of Elisabeth Stieger (2017) shows the relevance of complex knowledge structures in the Anthropocene and their challenges for landscape architecture. As a separate and innovative question, gravel was treated as an actor in the two knowledge systems of the eco- and technosphere, and the claim was formulated to develop another type of knowledge for the material in combination with both. The empirical object of the work is the Gotha gravel complex – as a geological formation with natural geological knowledge and as a deposit in buildings and infrastructure with technological-economic knowledge. The disclosure of the potential of the gravel is conducted through the discovery of the natural process transformation and storage, as well as the technical process extraction, conversion and custom storage. This analysis related to the socio-materiality and the 'vibrant matters' of assemblages has led to the synthesized design concept of the gravel plant in Gotha (see Figure 3). As a result, a new deposit was designed that is formed by terraces which inform visitors about the accumulation of gravel in the riverbed and about the various gravel mining stages in the construction industry. Furthermore, the compartments of the deposit hold information through different filling levels, showing the material in all stages and with changing granularity linked to the demand of the construction industry and resulting demolition quantities, all the stages of which belong to the eco- and the technosphere. The



Figure 2. *Isar Camp collectives – Building collectives as experimentation order with birds, water, infrastructures, plants, humans, objects, institutions and norms, Andreas Ebert, Jörn Gertenbach, Nils Belting, 2019.*

ongoing transformation processes of the Gotha landscape due to the coherent moving of gravel have also been made visible in the deposit to aid in the future processes of dismantling and recycling the concrete into its original parts by electrodynamic fragmentation.

The potential of the material as a raw material and building material, as well as its ability to combine both, are made visible and experienceable. Furthermore, the design involves the possibility of participation via an app, and also extends the perspectives of gravel as a raw material and building material, not only in its acting competences but as agencies as well.

## 9. Fostering systemic thinking: Linking food as a component of the urban infrastructure in Kigali

In 2014 the Rapid Planning research project started. Its purpose was to develop a rapid trans-sectoral urban planning methodology, specifically targeting supply and disposal infrastructure and aiming at creating synergies within the urban metabolism and its material flows. The sectors covered by the project include energy, water, waste water/sanitation, solid waste and urban agriculture/food. DaNang in Vietnam, Kigali in Ruanda and Assiut in Egypt are partner cities in this action-oriented research project.

How can possible synergies between various material flows that are necessary to supply

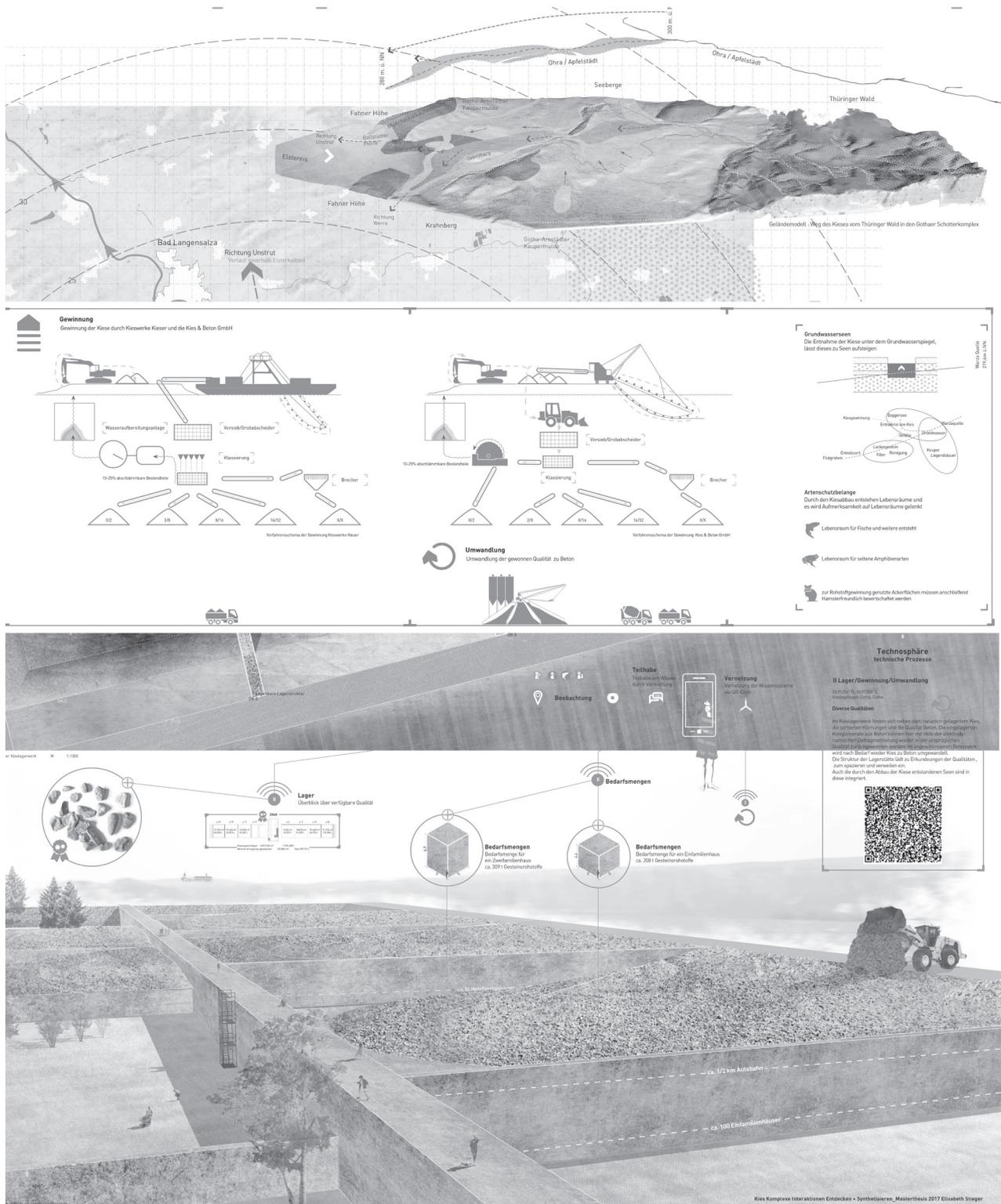


Figure 3. K.I.E.S. – Discovering, extracting, distributing and synthesizing interactions of gravel in gravel complex of Gotha, Elisabeth Stieger, 2017.

cities be generated? Which trans-sectoral infrastructure systems are required? Which new assemblages have to be generated to do so? These questions have been raised by a broadly interdisciplinary team. For the first time, the food system has been systematically included here in the canon of urban infrastructure and was considered as a central material flow in addition to water, energy and waste.

Compared to traditional supply and disposal infrastructures, food supply is quite complex, and with its five components of production, processing, distribution, consumption and left-overs it may be called a hybrid or an assemblage in itself, as it brings together very heterogeneous components. There is, however, a range of direct interfaces with urban planning to which attention first has to be given.

Within the project, a so-called entry project – i.e., a small-scale project stimulating change – has brought together different actors for the first time, thus starting a process of linking different material flows of infrastructural systems in the informal settlement of Agatare. The settlement extends over steep slopes directly down to the wetlands, which are used primarily for agricultural purposes, among other things, by a cooperative of around thirty farmers, who produce vegetables and supply the local markets. We had workshops with the wetland farmers as well as with residents who live nearby. One result was a micro-concept for linking different infrastructure systems such as waste water disposal, organic waste and food production through a local improvement of the different systems. The concept includes, among other things, the test implementation of cleaning boxes for the gray water of private households, the development of the rainwater storage capacity at the neighboring school, the creation of purchase points for garbage collected separately, the erection of sales points for agricultural products and a project to produce more fertilizer for the Wetland Farmer Cooperative through composting. Thus, new linkages between the informal settlement's different subsystems such as waste water, organic waste and food production have been created as a micro-scale showcase (see Figure 4).

## 10. Discussion/Conclusion

This paper argues for an integrative approach that links assemblage and post-human theories with system thinking, landscape design and interactive methods in order to foster innovation in changing landscape architecture theory and practice. It promotes an understanding of landscape transformation as a process of materialized knowledge reflection, adaptation and innovation. Furthermore, it presents conceptual approaches for deciphering assemblages of Anthropocene landscapes, and for stimulating their systems, collectives and agencies to interact in order to attain more acting ability in dealing with the Anthropocene challenges. In tackling this, we have to do two things in parallel: Develop a deeper understanding of the materialized knowledge of landscape and adapt our landscape architectural research and practice in favor of the future development of landscape assemblages. The three projects presented here stress this need for a deeper reflection of knowledge spatialization and the need for designing co-evolutionary transformation processes for the creation of robust and hybrid landscapes.

Anthropocene landscapes as assemblages can be addressed through translating. According to Latour (in Belliger, 2006), Haraway (1990) and McFarlane (2011), translating means linking different actors, their roles and processes to increase knowledge from different knowledge archives, to rearrange it and to reintroduce it into theory and space. Represented through these projects and argumentation, we make the translation work productive for landscape architecture theory and practice. Translating is also the active process of network building and linking heterogeneous actors – systems, things, knowledge, humans and non-humans. This translation work of building collectives was actively called upon at the Isar Camp and used to develop different design strategies for Anthropocene riverine landscapes. Based on the experimental arrangement, various actors – like plastics, fish, birds, treatment plants, European laws, phosphorus, farmers, language, water reservoirs, meadows – their diverging roles and functions as

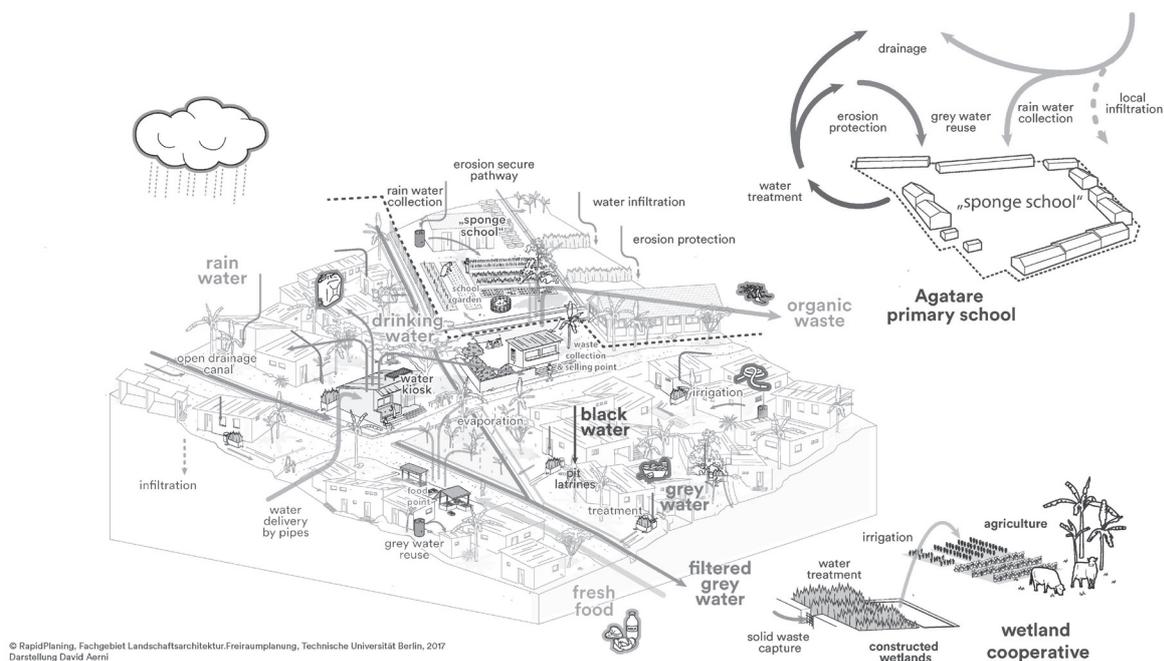


Figure 4. *Metabolic linkages between Agatare settlement and the wetlands, Rapid Planning Project, 2017.*

well as their contradictory sub-programs have been made visible and activated in the preliminary work of designing new collectives. The approach of Latour's collectives and their communicative actions make it possible to anticipate different systems, actors, needs and impacts, and to formulate their collective goals as a stimulating design strategy that balances or permits contradictory interests.

The spatialization of post-dualistic knowledge in landscapes is one of the main competences of spatial design disciplines. Through thinking, designing and constructing we bring our knowledge and interpretations about landscape morphologies and practice into being. Furthermore, through describing and designing we add norms, standards and rules of perception, use and appropriations in the landscapes. We also stimulate metabolic processes, cultural activities and social encounters. Simultaneously with this expert knowledge, there is also a knowledge inherent and represented in landscapes that is stored in its materiality, geophysical processes and infrastructural impacts. The translation work landscape architects have to do is decoding knowledge from other disciplines as well as from the existing Anthropocene landscape, bringing it together and recoding it into space and form. Designing and design thinking will thus play a key role in integrated and systemic knowledge production from different human actors, academic disciplines, administrations and communities, as well as from landscape in itself.

Furthermore, with this knowledge that is primarily focused on assemblages we are able to address different questions to the landscape and more hybrid design. The transformation challenges of the Anthropocene require a practice of landscape architecture that adapts, anticipates and develops systems, relations and actors of landscape assemblages in a spatial and material sense. This aspiration combined with Latour's sense of sharing responsibility invokes landscape architecture practice to become involved in the design of co-evolutionary processes and developing landscapes that can react more robustly to transformation challenges, and to help shape

them. The Rapid Planning project has tested how more interactive, small-scale infrastructure can be connected to livelihoods, stimulating metabolic exchange processes locally and linking them with social, economic and political issues on the regional scale as well. In the case of the urban food system, it was possible to show how fertilizer could be generated from organic waste and directly linked to local food production.

Another issue for designing assemblages of Anthropocene landscapes is the mirroring and training of human perception, experience, awareness and participation. When urbanization and climate change provide the metadata, it must be broken down into manageable information. That means we have to do “digestive work” (Marres, 2016, 269)! A possible consequence for the practice of design is to connect people to the relations of natural processes with urban metabolism, infrastructural services or changing urban aesthetics, cultures and economies in order to bring them closer together. As presented in the K.I.E.S. project, the gravel with its agencies combining knowledge and competences from both eco- and technospheres is made visible. With the design of a new gravel deposit, people can experience the transformation processes of gravel connected to their own use of the material in the construction sector. As Stieger (2017, 109) mentioned, ‘...here, people can watch the construction and reconstruction of their own geological layer’. Assemblage approaches make it possible to describe the properties of gravel and activate its knowledge in its natural and economic processes, to visualize its potential for transformation and to create new syntheses of these properties in order to increase the agency of the material.

If landscape architecture creates more of these successful closer links between systems, knowledge, things, relations and actors, robust and liveable landscapes will arise where – from time to time, during heavy rainfall events – one can get his or her feet wet. We learn to swim in the river only when it is not contaminated by pollutants. In such an intimate introduction to complex interrelations, there is a chance to overcome our supposed comfort, and to create a more robust everyday aesthetic. This would enable us to share and experience the beauty, power and liveliness of the Anthropocene landscape and raise more awareness about the related, and sometimes planetary, processes. So, get out of your comfort zone!

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