Figure 1. PorTable. Design: Julia Theis, Anna Pape, Josephine Arfsten, Michel Grändorf, 2019.
Photo by Mohamed Hassan for LUH Regionales Bauen und Siedlungsplanung.

CIRCULAR DESIGN FOR THE REGENERATIVE CITY: A SPATIAL-DIGITAL PARADIGM

Jörg Schröder

This conceptual outline is based on findings from the *Creative Food Cycles* project with the specific focus to enhance innovative and creative cultural practices between food, architecture, and conviviality in a transnational and European perspective. It refers in a double perspective to the EU *Farm to Fork* strategy: to embed and extend innovation in *Food Cycles* into urban contexts and to create benefits for all citizens and actors along *Food Cycles* and and thus a main stage for circular economy, contributing to a just transition and to enhance urban transformation to sustainability and resilience. The *Regenerative City* scenario serves to evaluate findings from the creative and cultural activities of the *Creative Food Cycles* project that have been carried out as design-based research. Circular Design embodies the need of the *Regenerative City* for the effectiveness and adaptivity of strategies, tools, and processes of change. In particular, the "spatial-digital nature" of *Circular Design* and the "learning nature" of multiscalar design processes are put forward as accelerators for transformation.

urban resilience / circular economy / just transition / food Nodes / PorTable

During the Corona crisis, the fragility of supply and social divisions—both seen through the lens of food—became evident. But the role of food got also highlighted for triggering social bonds, carrying community activities and public space, and connecting to digitisation in organising our lives, expanded to every and all angle of society and economy. At the same time, the topic of food has arrived in a new perspective in European policies. The Farm to Fork strategy is a part of the agenda for the next years and is meant to contribute to Europe's sustainable transition: to reduce the environmental and climate footprint of the food system, to strengthen food security and public health, to prevent biodiversity loss, and to open up new economic opportunities (European Commission 2020).

Thus, the background from which the *Creative Food Cycles* project started two years ago has been confirmed. Its focus to enhance innovative and creative cultural practices between food, architecture, and conviviality in a transnational and European perspective can refer in to Farm to Fork in two ways: to embed and extend innovation in Food Cycles into urban contexts and urban change as well as to create benefits, social, economic, cultural, for all citizens and actors across food chains turned into Food Cycles as part of *circular economy*, contributing to a *just transition* and the liveability of Europe's cities.

FROM RESILIENCE TO THE REGENERATIVE CITY

An important result of the *Creative Food Cycles* project are detailed insights into creative mechanisms to enhance sustainability in each part of the cycle—not at least through transversality not only along the cycle, but in interdependency with urban contexts, culture, and actors. The project started from some basic figures that describe specific aspects and show also the high global relevance of the topic food, e. g. that one third of food produced globally is lost or wasted;[1] that 180 kg food waste generated per capita in Europe each year,[2] mainly in processing (39%) and in households (42%); that over half of the adult population in the EU are overweight;[3] and that 33 million people in Europe cannot afford a quality meal every second day, with food assistance essential for even larger groups.[4]

Already these figures show the societal impact and contextualisation of food issues that are deeply rooted in cultural beliefs and practices and social dynamics. Even the share of agriculture in Europe's greenhouse gas emissions of 10.3% includes the observation that 70% of it come from the animal sector,[5] clearly a cultural factor. As a major energy consumer, but also producer of renewable energies, the food sector can be seen an important field for decarbonisation. The mission

of *Creative Food Cycles* to bridge—with a material-creative approach—separated sectoral fields in order to concretise and spatialise closed loops of the food system, necessarily linked with other metabolisms, actors, and urban structures, corresponds to a holistic approach for urban resilience: defined as comprehensive adaption to climate change (Rockefeller Foundation, ARUP 2016).

Even more, *Creative Food Cycles* aim at contributing to mitigate climate change by supporting and even enhancing the transformation of cities into a sustainable living space that has positive environmental impacts. Not only to react to stress and shock, but to transform proactively towards an adaptive city calls for the regenerative design of pathways to sustainability. *Regenerative City Design* (Schröder 2018), thus, cannot be just a destination, but needs to become a process- and capacity-oriented approach to the city that constantly renews and reinvents itself meaningfully, "in a new responsive and sensory condition, sensorized and sensitive at the same time" (Gausa 2019). Cities as a complex entity of streams, activities, influences, and beliefs—as lived space that is all about regeneration—are not only increasingly fragmented, spatially and socially, but also expanded in a view on diverse constellations between metropolis and peripheries in a broad range of different—and emerging—habitats (Schröder, Carta, Ferretti, Lino 2018). This complex urban and territorial condition demands differentiated and pro-active concepts to effectively install sustainability as evolving pathway—necessarily transcending limits of scales and systems to become sustainable, as adaptive bodies energised by people, space, ideas, and nature.

A SPATIAL-CREATIVE APPROACH:
FOOD CYCLES AS A LENS AND ACCELERATOR FOR URBAN CHANGE

The *Regenerative City* scenario serves to evaluate findings from the creative and cultural activities of the *Creative Food Cycles* project that have been carried out as design-based research (Schröder 2019A). Design, in this context, evidently addresses a range from product and communication design to architecture and urban design—a spectrum of thinking and work as a creative methodology deployed to a specific end, to shape ideas to become a practical and attractive part of life (Design Council 2015). In this sense, design can be defined as "what links creativity and innovation". Food as transversal topic in different scales and contexts in the city, and as a relevant field for sustainability, can be seen as a lens to observe social and urban conditions and at the same time as potential accelerator for change. *Creative Food Cycles* have proved their tendency for specific innovation as well as for conceptual and methodological novelty. In particular, the aim to close the cycle

Figure 2. Manifesto Market. Design: reSITE, Radka Ondrackova. Prague, Czech Republic, 2018. Cultural events in the evening at the Manifesto Market. Photo by Jakub Červenka. Layout plan of Manifesto Market. Graphic by reSITE, Elvira Islas.
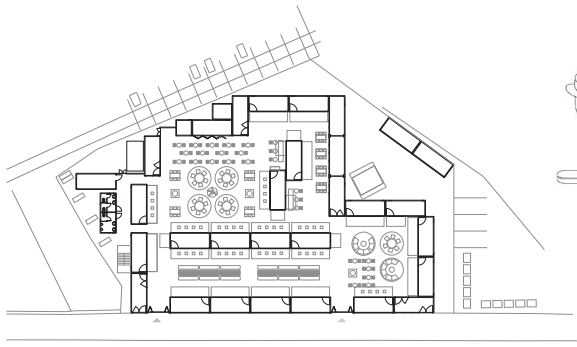

Figure 3. Firekitchen. Design: Johanna Dehio. São Paulo, Brazil, 2017. Johanna Dehio cooking during the Firekitchen workshop. Photo by David Moritz. Drawings of cooking utilities. Graphic by Johanna Dehio.

Figure 4. Fish market. Design: Eder Biesel Arkitekter. Bergen, Norway, 2012. The fish market as public space between the old town and the harbour. Photo by Norbert Miguletz. The Fish Market upgrading the historic harbour of Bergen. Graphic by Eder Biesel Arkitekter.
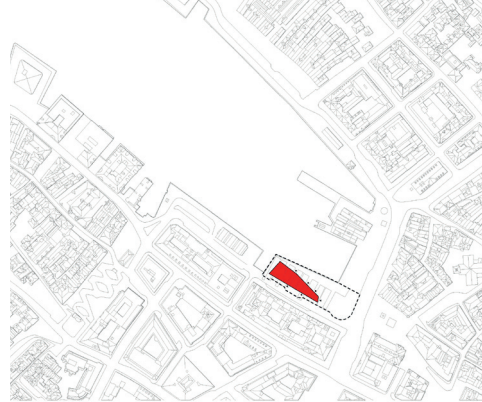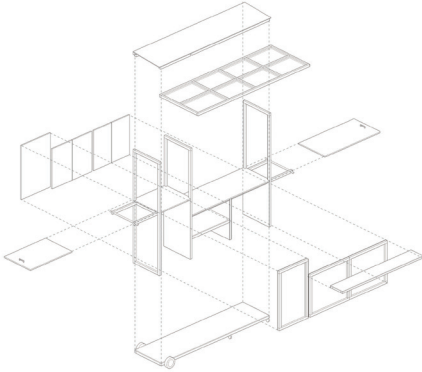

Figure 5. Yatai Cart. Design: Note Architects (Ryo Kamamatsu). Fukuoka, Japan, 2018. Yatai Cart in the renovated alley. Photo by Maki Hayashida. Exploded axonometric plan of the Yatai Cart. Graphic by Note Architects

Figure 6. PorTable. Design: Julia Theis, Anna Pape, Josephine Arfsten, Michel Grändorf, 2019. Photo by Mohamed Hassan for LUH Regionales Bauen und Siedlungsplanung.

1 parking

2 move
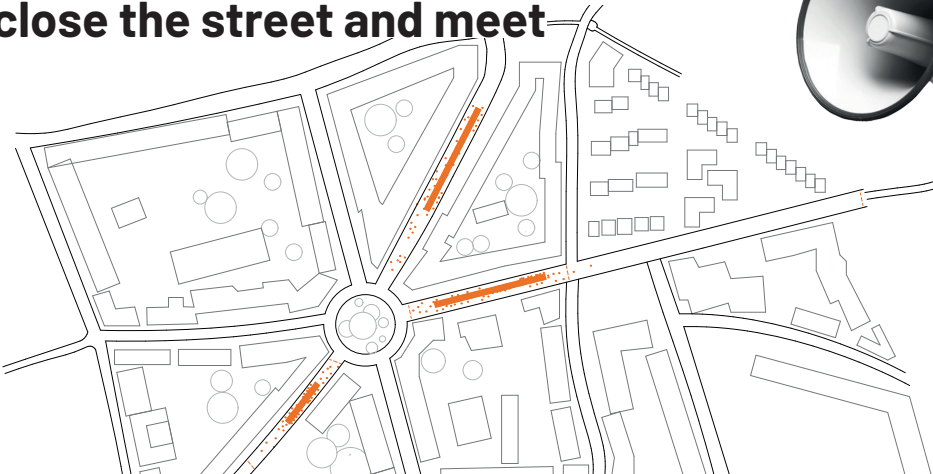
3 close the street and meet
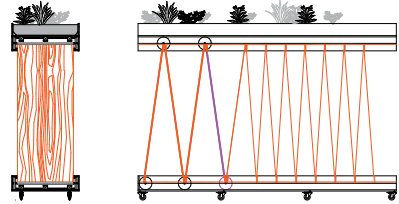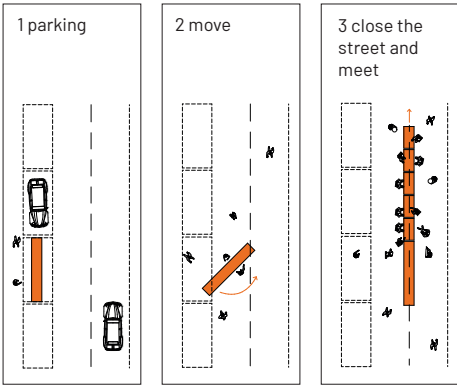
close the street and meet

Figure 7. PorTable. Design: Julia Theis, Anna Pape, Josephine Arfsten, Michel Grändorf, 2019. Photo by Mohamed Hassan for LUH Regionales Bauen und Siedlungsplanung.

portable

pass by

tell your friends

outer circles

dine togehther

grow

cooking

inner circles

take it home

facts & recipes

care the herbs

reuse your
KNOW-HOW

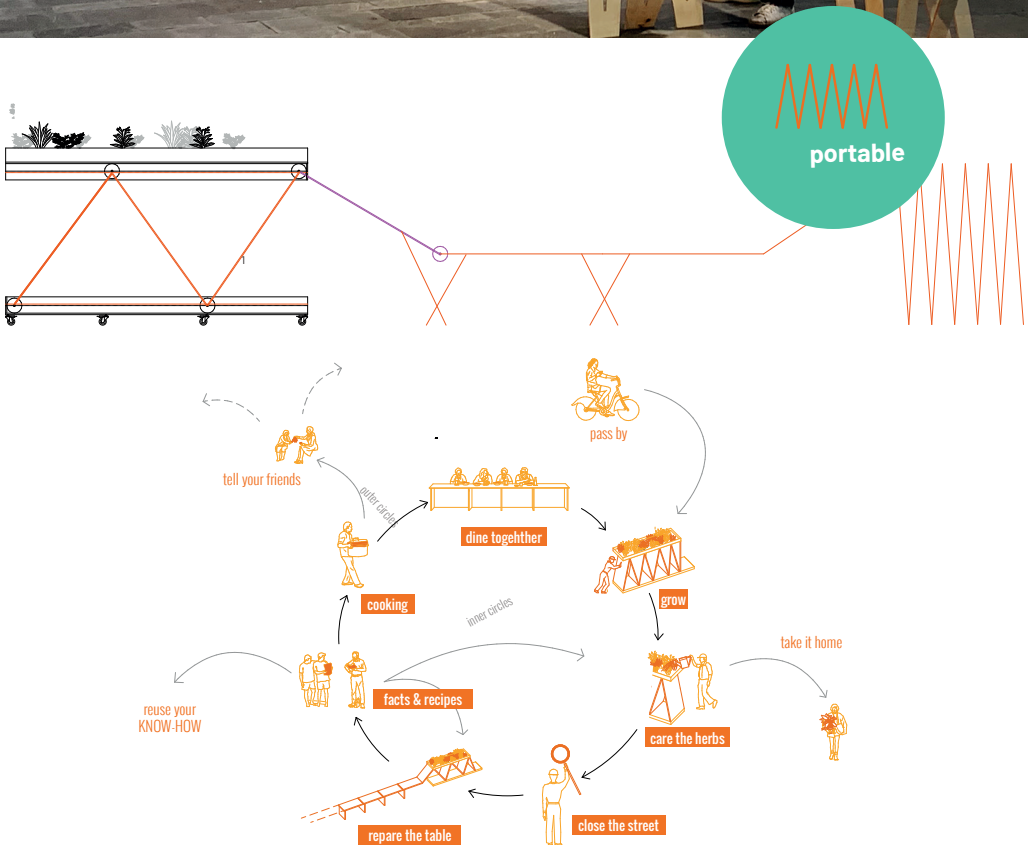repare the table

close the street

Figure 8. PorTable. Design: Julia Theis, Anna Pape, Josephine Arfsten, Michel Grändorf, 2019.

Food Nodes: typological categories	Cyclical charging / polyvalence	Digital charging / aggregation values	Spatial expression / aggregation values
A. Weekly / daily markets	Distribution + consumption, recycling, linkages to production, manufacturing	Pre-ordering, community networks, financing models	Renewed/new centralities, public space
B. Food stores / groceries	Distribution + conservation tools, without packaging, manufacturing	Pre-ordering, community networks, financing models	Neighbourhood aggregation
C. Bakeries etc.	Distribution + manufacturing, recycling	Pre-ordering, community networks,	Neighbourhood aggregation
D. Supermarkets	Distribution + fair trade, recycling, linkages to production, manufacturing	Community orientation, financing models	Renewed/new centralities, public space
E. Restaurants	Consumption + manufacturing, conviviality	Community networks, sharing / financing models	Renewed/new centralities, public space
F. Farms / mircofarms	Production + manufacturing, distribution, recycling, consumption	Deep chains, sharing / financing / co-harvesting, working models	Agricultural space aggregation
G. Shared kitchens / dining rooms / workshop rooms	Production + conviviality, consumption, centres for self-production,recycling	Sharing / community networks, link to FabLabs	Neighbourhood aggregation
H. Collection / storage points	Distribution + recycling, linkages to production, manufacturing	Sharing / community networks	Neighbourhood aggregation
I. Social kitchens / collection points	Production + distribution, recycling, self-production, conviviality	Basic digital access, new financing models	Neighbourhood aggregation
J. Mobile kitchens / streetfood stands	Consumption, linkages to manufacturing and production, conviviality	"Food ambassadors", instant communities	Renewed/new centralities, public space
K. Picnic baskets / blankets	Consumption + linkages to production, recycling, conviviality	Instant communities	Open / agricultural space aggregation
L. Mobile tables	Conviviality + production, manufacturing, recycling	Instant communities	Neighbourhood / public space aggregation

Figure 9. Food Nodes: typological categories.

between production, distribution, consumption, and disposal led to a sharpened focus on cultural modes, from perception to performance, that connect inventions along the cycle: e. g. through the creative use of waste, collected from different points of the cycle, into new products; or through new linkages between consumption and production, e. g. in prosumer models. Along the cycle, products, not only material flows, connected to social demands and urban contexts, embody experience and capability of closed cycles. In terms of architecture and urban design innovation, urban space, its elements, networks, and strategies for its change become the stage for closing the cycle in the sense of resilience and sustainability, and at the same time enable new conviviality and social inclusiveness in the city. Based on experiences from the *Creative Food Cycles* project, innovations of interaction between food and regenerative cities can be identified in different spheres: common, private, and urban.

FOOD NODES: NEW COMMONS, NEW ROLES

As spatial manifestation of food in the city, *Food Nodes* in the form of markets have been the origin of cities. Today, on the one hand, advanced forms of Food Nodes can be described as places of exchange in the city, that re-invent existing structures and are part of a revival of community cooperation (Sennett 2012). They are energised with a new role for sustainability, also by means of an added digital dimension—not only in information, but particularly in interaction, e. g. participation in organisation of distribution, or in manufacturing and harvest. On the other hand, digitally co-created initiatives as *new commons* are observed to setting up on site spaces of material encounter.

This spatial-digital interaction, driven by civic engagement, entrepreneurial vocation, and idealistic spirit, can be seen as characteristic for the new role of food in the city, with its material value of nutrition and its sensual value charged by cultural, social, and economic meaning. As manifest and experienceable spaces, *Food Nodes* offer new forms of social encounter, education, culture, experience, delight, and draw their mission and their added values from a polyvalence of roles and functions, within the *Food Cycles* but at the same time within the *Regenerative City*. Based on the research for the *Food Interaction Catalogue* (Schröder 2019B) and the capacity building workshops and accompanying research within the *Creative Food Cycles* project, some typological categories for *Food Nodes* can be detailed: specifying the cyclical charging towards polyvalent roles and spatial-digital aggregation values (Fig. 9).

Digitally driven interactive organisation and financing models target sharing, but also in new forms of crowd-funding and part-ownership, investment, shared ownership, civic associations. A desired share of organic production, set with the objective 25% by 2030 in the *Farm to Fork* strategy, evidently is bound in many ways to questions of distribution and consumption. Even in its social criticalities, the food topic seems a lens for larger questions and trends in society and space, just to mention social fragmentation and living costs; that food can become a tool for spatial and social separation (élitist or middle-class "food zones"); or social standards and working conditions, all along the cycles.

PORTABLE: PROTOTYPE OF A MOBILE SOCIAL TABLE

The typology of the mobile table has been chosen for inventing and testing a prototype, realised and presented in a public installation within the *Creative Food Cycles project*. *PorTable*[6] (Fig. 7–10) is a prototype for street furniture on the theme of food and sustainability. It is designed as a foldable table for transformative actions in urban space, combining creativity with climate change, food production, inclusion.

The shift to sustainable forms of mobility offers the possibility to transform parking areas in the city into experimental spaces, that can host and enable a wide range of urban micro-actions. The table creates a space for eating together as cultural exchange, starting a new urban ritual. Through the initiative of residents and guests, urban space becomes a new community place, temporary and short-term, but with impact on urban space and visions for urban futures.

The mobile table is conceived as a modular system of 15 folding panels with a herb garden as roof on top. When closed (1.6 x 4.0 m), *PorTable* fits into a parking lot. The panels can be partially or fully unfolded, then the table has a maximum length of 26.0 m. If you want to be part of the table, you bring food and a chair, and contribute to create a "public dining room", a place of eating as social interaction. The table propagates the idea of public space created by the attention and commitment of citizens.

PorTable can be used in various situations and in different spatial configurations: the table becomes a multi-purpose stage for showing, sharing, distributing, and communicating creative events on food and culture that strengthen social life in neighbourhoods; it serves a material side of digital interaction, as has been experimented in the *Creative Food Cycles* installation.

FOOD STAGES: PRIVATE-COMMON INTERFACES

In private space, critical viewpoints on current trends, such as that one fifth of British households no longer features a dining table,[7] in the Corona crisis have been turned into the discovery that four fifth do have the table. Everywhere dining and kitchen tables were entertained as stage for "self-production" not only of meals, but of a whole material culture in manufacturing and recycling connected with food raw materials. A long-running trend of shifting cultural borders between private and public (Castells 1996, Madanipour 2003), further accelerated by diversified household constellations and by digitisation, is leading to new interaction between private kitchens and dining tables and public or common spaces of production, distribution, consumption, and disposal of food.

Today, the rediscovery of cooking and food manufacturing as self-production and of cooking and dining as social practice is mirrored in direct broadcasting, showcasing, instagramming, networking, and digital interaction: practices that are shaping a new vision of spatial programming for private living space and its connectivity. Disengaged from modernist paradigms—of the minimum and of industrial standards—the concept of the "kitchen for cooking" as stage of a new living culture and community spirit, as Aicher (1982) put it, provokes a deep change not of its dimension or technical tools, but of the spatial and conceptual design of its material-digital interaction.

FOOD STRUCTURES: URBAN SPACES, NETWORKS, STRATEGIES

As part of ongoing strategies and projects for urban resilience and sustainability, food issues are shown to be able to play a role of avantgarde (Schröder, Haid 2015). Still, challenges are remarkable towards a substantial transition, not so much in managing flows, but in changing their substance and dynamic, depending from immaterial, cultural, and behavioural patterns. The two most interesting fields for an impact of innovations in *Food Cycles* on urban change and its governance can be seen as bound to all phases along the cycle, production, distribution, consumption, disposal.

First, in terms of networks: to modify a modernist understanding of heavy and hierarchical networks towards more flexible and adaptive networks driven by new forms of platforms, hubs, abilities, and cultural spirit; recognising the influence of points of spatial and programmatic densification of networks in Food Nodes to sustain several levels of connection; and not at least, valorising micro-networks

and alternative forms of transport and its organisation, bound to new sustainable mobility and its expression in space. Second, in terms of manifest space: the possible role of Food Nodes for the revival of public and community space and for the future of centralities, not only in the sense of supply (to prevent food deserts), but also in a cultural and social sense, and in a sustainable recycling approach for existing town, neighbourhood, and village centres; in the new role of production in the city in terms of functional mix, increased autonomy, and a broader set-up of economic bases; and in extension to a new awareness for city-countryside co-operation (Schröder 2015), *regional foodsheds* (Schröder, Hartmann 2017), agriculture in relation to the city (Sommariva 2015), and *Agro-Cities* as a territorial vision (Gausa, Canessa 2018).

CIRCULAR DESIGN

The contribution of the *Creative Food Cycles* project to evolve a paradigm of *Circular Design* (Schröder 2019C) is based on the understanding of food as cross-cutting field of innovation for circularity—crucial for transition (Marin, de Meulder 2018)—and for the *Regenerative City*: to design out waste and pollution, to make products, architecture, and cities regenerative by design, and to enhance natural capital (MacArthur Foundation 2019); as well as to support a renewal of community aggregation and new economic opportunities, triggering creativity, technologies, knowledge, and abilities towards a "performance economy" (Stahel 2006).

Thus, *Circular Design* embodies the need of the *Regenerative City* for effectiveness and adaptivity of strategies, tools, and processes of change. Linked with the understanding of design as mode of research and of research as part of design, *Circular Design* can lead to promote design itself, not is products, as culture in being for the age of climate change. Through methodological innovation, it responds to the need to bridge between the traditional fields of product and communication design, architecture, and urban design, to connect between scales, and to offer a new setup for cooperation with other disciplines. Planning, strategy, governance, and communication—essential for transition to resilience (Rockefeller Foundation, ARUP 2019)—are increasingly caught between the challenge to sustain and extend bottom-up initiatives and to produce visible and experienceable change in the city with the aim to set-up long-term perspectives. Designerly methods oriented in a circular approach can respond to the need for creative innovation, for narratives, and new forms to organise co-creative processes that lead to enabling frameworks for upscaling and to earlier impact and more adaptive setups of urban strategies.
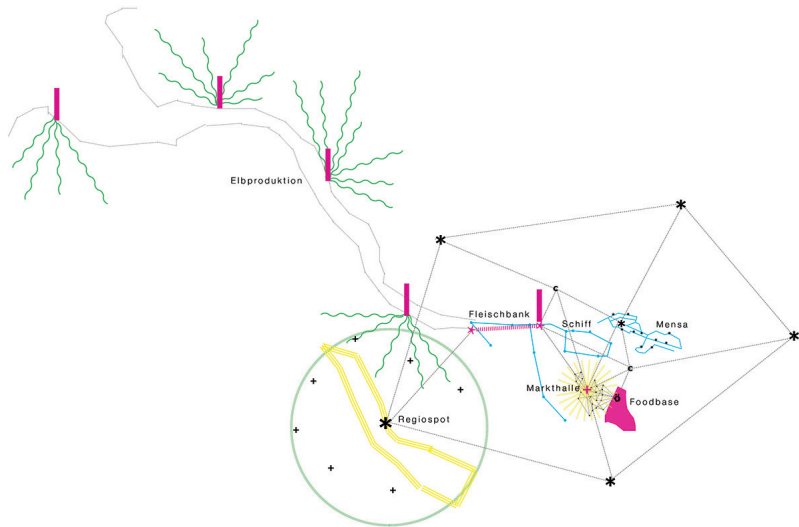
Figure 10. Foodscape Map for the metropolis Hamburg. Graphic by Jörg Schröder, 2017.

The "spatial-digital nature", at the very core of *Circular Design*, enables this new mission and role of design—and contributes to the *Augmented City* as "an expansion of urban space" (Carta 2017). A "learning nature" of multiscalar design processes, from the city to products, is shown in the three main ingredients for the *Creative Food Cycles*' menu: a creative interpretation of urban contexts and spatial potential in order to change spatial structures, actors networks, and urban mechanisms; co-production and co-creation to involve and extend to society and to dig social capital and local knowledge for transition; the understanding of digital technologies as multidimensional tools: for design, production, interaction, and for new spatial-digital qualities in the city.

FOOTNOTES

1   FAO (2011) *Global food losses and food waste*. Online at: http://www.fao.org/3/mb060e/mb060e00.pdf (01.08.2020). Following UNSDG's differentiation in food loss (during refinement and distribution) and food waste (occurs from retail to final consumption/demand), FAO developed a more precise measurement processes, leading to a FLI Food Loss Index and a FWI Food Waste Index for different food types, regions, and supply chain stages. FAO (2019) The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. Online at: http://www.fao.org/3/ca6030en/ca6030en.pdf (01.08.2020).

2   European Commission (2011) *Preparatory study on food waste across EU27*. Online at: http://ec.europa.eu/environment/eussd/pdf/bio_foodwaste_report.pdf (01.08.2020).

3   Eurostat (2017) "Obesity rate by body mass index". Online at: http://ec.europa.eu/eurostat/databrowser/view/sdg_02_10/default/table?lang=en (01.08.2020).

4   Eurostat (2018) "EU SILC survey". Online at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_mdes03&lang=en. (01.08.2020).

5   EEA (2020) *Annual European Union greenhouse gas inventory 1990–2018 and inventory report 2020*. Online at: https://www.eea.europa.eu/publications/european-union-greenhouse-gas-inventory-2020 (01.08.2020).

6   *PorTable* was designed in 2019 by Julia Theis, Anna Pape, Josephine Arfsten, and Michel Grändorf and prototyped with a group of students and with support of the digital labs and workshops of the Faculty of Architecture and Landscape of Leibniz University Hannover, as part of the *Creative Food Cycles* project; supervised by Jörg Schröder, Emanuele Sommariva, and Sabrina Sposito.

7   http://www.express.co.uk/news/uk/907364/dinner-table-sofa-Social-Issues-Research-Centre-family-eating-research-Co-op (01.08.2020).

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