# Chapter 6
# Evolving Relations of Landscape, Infrastructure and Urbanization Toward Circularity

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## 6.1 Introduction

A great deal of the contemporary discourse around circularity revolves around waste—the elimination of waste (and wastelands) through recycling, renewing and reuse (3Rs). In line with industrial ecological thinking, the discourse often focuses on resource efficiency and the shift toward renewables. The reconstitution of numerous previous ecologies is at most a byproduct of the deliberate design of today's cyclic systems. Individual projects are often heralded for their innovative aspects (both high- and low-tech) and the concept has become popularly embraced in much of the Western world. Nevertheless, contemporary spatial circularity practices appear often to be detached from their particular socio-cultural and landscape ecologies. There is an emphasis on performative aspects and far too often a series of normative tools create cookie-cutter solutions that disregard locational assets—spatial as well as socio-cultural. The re-prefix is evident for developed economies and geographies, but not as obvious in the context of rapidly transforming and newly urbanizing territories. At the same time, the notion of circularity has been deeply embedded in indigenous, pre-modern and non-Western worldviews and strongly mirrored in historic constellations of urban, rural and territorial development. This contribution focuses on two contexts, Flanders in Belgium and the rural highlands, the Mekong Delta and Ho Chi Minh City in Vietnam, which reveal that in spite of the near-universal prevalence of the Western development paradigm, there are fundamentally different notions of

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circularity in history and regarding present-day urbanization. Historically, in both contexts, the city and its larger territory formed a social, economic and ecological unity. There was a focus is on the interdependent development of notions of circularity in the ever-evolving relations of landscape, infrastructure and urbanization. In the development of contemporary circularity, there are clear insights that can be drawn from the deep understandings of historic interdependencies and the particular mechanisms and typologies utilized. The research questions addressed are in line with territorial ecology's call to incorporate socio-cultural and spatial dimensions when trying to understand how territorial metabolisms function (Barles, Revue D'économie Régionale and Urbaine:819–836, 2017). They are as follows: how can case studies from two seemingly disparate regions in the world inform the present-day wave of homogenized research on circularity? How can specific socio-cultural contexts, through their historical trajectories, nuance the discourse and even give insights with regard to broadened and contextualized understandings of circularity? The case studies firstly focus on past site-specific cyclic interplays between landscape, infrastructure and urbanization and their gradual dissolution into linearity. Secondly, the case studies explicitly focus on multi-year design research projects by OSA (Research Urbanism and Architecture, KU Leuven), which underscore new relations of landscape, infrastructure and urbanization and emphasize the resourcefulness of the territory itself. The design research has been elaborated in collaboration with relevant stakeholders and experts and at the request of governmental agencies.

## 6.2 Flanders: Embracing the Circular Economy

In Flanders (the northern part of Belgium), integrated resource management, landscape, infrastructure and settlement development were strongly intertwined until industrialization and its twin urbanization radically restructured the order of things in both rural and urban areas. This included the dramatic disruption of production and consumption cycles, resulting in the massive issue of waste (to dispose of). Until the end of the nineteenth century, the Limburg region—the easternmost part of Flanders, west of the Meuse River—was a territory where rural economies were largely embedded within and anchored on the resources of the (natural) environment. By the early twentieth century, coal extraction was the primary driver of the economy and the region witnessed an overwhelming rollout of railway and canal infrastructure and development of mining settlements. This drastic induction catalyzed a generalized urbanization of the scarcely inhabited and mostly rural region. On the other hand, until the nineteenth century, in Antwerp, Flanders' largest city, water-bound transportation of urban waste provided the sandy countryside of the adjacent Campine region with nutrients which were then returned as food to the city. Introduction of modern sewage systems, treating household water as waste to dispose of, halted this cyclic mechanism. In countryside and city alike, historic cyclic mechanisms of production and consumption have been systematically disconnected. However, today circular economy transition is high on the Flemish policy agenda. Despite

thriving innovations in technology and business models, the complex interconnectedness of natural and human systems complicates the transformation of twentieth century linear infrastructural systems toward territorial circularity. Over the course of the past decade, design research by OSA (Research Urbanism and Architecture, KU Leuven) has explored strategies to revive cyclic interplays between resources in urban areas and hinterlands and ways in which they can (re-) connect Flanders' circularity transition. There was an emphasis on particular socio-cultural and landscape ecologies.

## 6.3 Campine: Past and Future (Water) Cycles

Central Limburg's river and pond constellation (de Wijers) still embodies a layer of circularity that integrates landscape, infrastructure and urban development, drawing from the territory's specificity and resourcefulness. In the nineteenth century, a constructed water system turned the inhospitable heath and swamp 'wasteland' into productive land, structured by parallel swampy brook valleys (Nolf et al., 2016). Following local topographic and soil conditions, a mesh of man-made pond complexes, pond cascades, natural fens and meadows, connects to natural waterways through intricate systems of in- and outlets. Originally, pond water management was strongly synchronized with agriculture, respecting natural cycles and capacities. As such, ponds were alternatingly emptied to allow soil to rest and regenerate after productive periods, a variation of the Medieval three-field system. Similarly, in the same region, fertile topsoil 'podzol' slowly formed through the interplay of directed sheep grazing and cyclic nutrient recovery (Kaland, 2014).

Nevertheless, this territorial layer of cyclic water and landscape management and agriculture in Central Limburg was subsequently superimposed with very disruptive water manipulations, infrastructures and systems. Coal extraction in the early twentieth century introduced increasingly one-way extractive relationships between humans and natural resources. The practice of incorporating time and space for natural systems or soil to replenish or regenerate was lost. A disruptive economic era of 'resource extraction urbanism' (Correa, 2016) began with the introduction of extraction sites at the edge of the sandy Campine Plateau. The coal mines were complemented with mining cities as well as railway and canal infrastructure to efficiently transport it to industrial centers in Antwerp and Liege. Urban and infrastructural development—and particularly its morphology form—was explicitly organized for the purpose of efficient and large-scale resource exploitation. However, coal extraction caused significant land subsidence, associated water table disturbances and pollution as a result of coal washing, as well as the generation of gigantic amounts of mining waste, piled up in now largely overgrown (and often flattened) slag heaps. At the same time, what is left of the region's pre-industrial river and pond network is now widely acknowledged as a vital structure to develop a resilient and adaptive territory in the wake of climate change (including droughts that are expected to increase). There is a regional water platform gathering different local, regional,

public and private stakeholders managing, monitoring and maintaining pieces of this regional natural and man-made water systems. The platform coordinates their actions, initiates synergies across administrative silos and more importantly rethinks water management in line with the natural water cycles (Stuurgroep De Wijers, 2019).

Today, some of the ponds still function as water buffers draining swamps, or as fish farms, simultaneously supporting biodiversity, recreation and soft mobility networks. Pilot projects have been initiated to recover biomass and waste flows related to the ponds: sludge from pond maintenance becomes agriculture fertilizer. Old water mills have been reactivated and there is a pilot project which generates energy from cultivated reed root ends which border the ponds. A quantitative study mapped water stocks and reserves to support a provincial strategy to prepare for extreme situations of drought as a result of climate change (Bodemkundige Dienst van België et al., 2020). OSA produced a comprehensive 'water atlas' to support the water platform's ambitions to reinforce regional cyclic and integrated water management (OSA KU Leuven, 2019) (Fig. 6.1). The atlas built on previously developed design research supporting a shift from 'planning' to 'profiling' in this water-bound territory, through urban landscape design strategies such as inverting valleys, collecting water in gardens and flood chambers (Nolf, 2013). Other design research (Marin et al., 2020) proposed to connect biomass recovery from landscape maintenance to educational and employment programs, as well as the planned restoration of an ecological corridor.

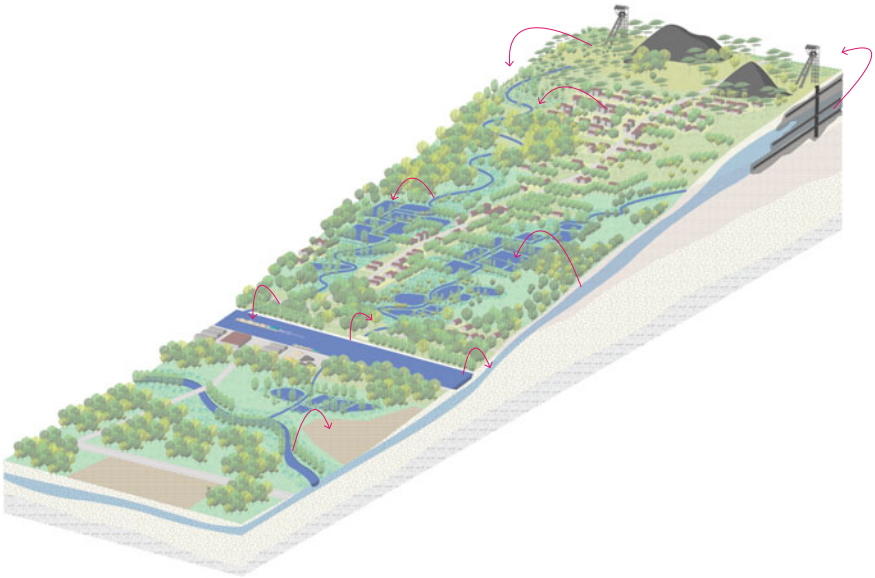

**Fig. 6.1** Wijers, Limburg, Belgium. Integrated water management is sequenced from the sandy Campine plateau (with its cascade of artificial fish ponds and natural water pools fedby water seapage) to the Demer River Valley and interrupted by the Albert Canal (Antwerp-Liege)

Also in Limburg, Atelier Track Design, developed by WIT Architecten in collaboration with OSA, Lateral Thinking Factory and Technum in 2016, proposed a gradual redevelopment of an abandoned Ford car manufacturing site in Genk as a circular economy hub. Evolving soft and hard infrastructures were developed to strengthen cyclic interplays between the industrial site and the natural environment. In addition to the reinforcing of existing rail and water infrastructures as the most suitable mobility means in a circular economy, planted areas were proposed as reserve space for water and the extension of an existing poplar landscape could slowly clean historical groundwater pollution through phytoremediation. In all the OSA design research, there was an objective to embed the circular economy agenda within broader place-specific social and ecological questions and structures.

## 6.4 Antwerp: Waste and Wastelands

In Flemish urban areas, historic development also offers insights for the contemporary transition to circularity. In Antwerp, wastelands throughout history reveal how (largely) circular pre-industrial circular 'nutrient' flows gradually dissolved into linear flows of waste. This change introduced, nor the least because of scale increases, previously non-existing spatial and infrastructural demands for waste. As French professor of urban planning and development Sabine Barles notes, the first European industrial revolution from the eighteenth century onwards motivated the reuse of urban byproducts partially feeding industrialization, but chemistry innovations such as artificial fertilizers gradually made urban byproducts obsolete and 'invented waste' (Barles, 2005; Landsberger, 2019). In the eighteenth century Antwerp, urban waste and manure was collected in urban places such as the *Mestkaai* (manure quai) and transported over water or rail to the countryside where it served as fertilizer. One argument to construct a new canal to Antwerp in 1748 and to improve an existing canal (*Herentalse Vaart*) was the possibility to ship up to 4000 waste loads to the countryside (Poulussen, 1987). The same countryside produced food for the city, supporting circular nutrient flows between city and hinterland (Beyers & Van Damme, 2016). The implementation of centralized sewage before the First World War made a return to the previous cyclic system almost impossible without major infrastructural adjustments and a systemic shift. Before the creation of the Flemish Waste Agency (OVAM) in 1981, waste management in Flanders was organized at the municipal level. As in the rest of Flanders, in Antwerp (that is today the fusion of a multitude of previously independent small municipalities), this resulted in a dispersed constellation of waste disposal sites and landfills across the city's periphery (Feys, 2011). Many of those sites were located in the *Groot Schijn* riverbed, historically the limit between municipalities and at that time considered as unproductive 'wasteland' in the sense that architecture historian Vittoria Di Palma has investigated (Di Palma, 2014). However, in line with mid-twentieth century globally increasing environmental awareness following works such as Rachel Carson's *Silent Spring* (1968) and the Club of Rome's report, *The Limits to Growth* (1975) causalities between waste

disposal and environmental problems such as soil, water and air pollution became very obvious. Growing incidents around waste and pollution led to the first Belgian toxic waste law in 1974. From the 1980s, the Flemish Waste Agency rationalized the scattered Flemish wasteland, cleaning sites and upscaling waste processing facilities (to intermunicipal and even regional level). This technocratic waste management centralization remained problematic and increased the burden of increased waste handling by fewer communities. The construction of an intermunicipal waste incinerator *ISVAG*, 5 km south of Antwerp in 1975 immediately incited protest by inhabitants. The increase of health issues led to a temporarily shutdown in 1994.

After about a century of breaking cyclic mechanisms intertwining Antwerp's landscape, infrastructure and urbanism, today the city demonstrates a renewed interest in closing resource flow loops by a multitude of initiatives. A water plan proposes integrated reuse, infiltration, buffering and making room for water within urban fabrics, replacing radically the former policy of evacuating water out of the city as quickly as possible (Stad Antwerpen, 2019). The recent urban development on 'Nieuw-Zuid' employs digital technologies to minimize materials, water and energy losses (Stad Antwerpen, 2018). Bluegate aims to reconvert a brownfield into a climate neutral industry park for circular economies, employing industrial symbiosis (Blue Gate Antwerp, 2020). The 'urban metabolism Antwerp' study (Fabrications et al., 2018) provides insight into how (material) flows in the city could be better aligned to guarantee a sustainable urban future while exploring spatial and landscape integration of circular flows and infrastructural carriers (Bergers & Van Acker, 2018). Additionally, as in many European cities, an increasing amount of small-scale waste recovery practices such as flea markets, repair cafés and gift cupboards give second and third lives to clothes, electronics and food in circular, social, local sharing economies. Vanmaercke and Rosso (MaUSP/EMU2015) explored alternative infrastructural constellations supporting circular economies building onto these community practices. Breaking with centralized sewage and other waste handling systems, they proposed overlapping closed materials loops while restructuring space and connecting to locational assets.

After decades of centralist waste handling outside the collective urban realm and consciousness, the circular economy transition in Flanders has begun to reconnect waste flows to daily urban lives, economies and urban forms—instigating synergies between varying social, economic and environmental public agendas. The challenge is now, after at least half a century of awareness of unsustainable waste production, to fully grasp the opportunity of this transition in order to radically re-envision infrastructural networks supporting material flows toward truly cyclic relations between landscape, infrastructure and urbanization. Besides technological innovations and political capacity for sustained and radical change, the heart of this challenge undoubtedly is about acknowledging the earth and its natural resources as the fundamental framework for a 'balanced co-existence between humans and nature' (Escobar, 2008) and to stop pretending nature is a machine with man at its levers (Klein, 2014).

## 6.5 Rural Vietnam: Culture, Economy and Ecology Tied to Locational Assets

On the other side of the world, in Vietnam, most early settlements were, by necessity, intimately tied to the rhythms and opportunities of the natural environment. Human life was primarily a response to geography and a cosmological view deeply rooted in Buddhist-Taoist-Confucianist ideology. There was an undeniable interconnectivity, reciprocity and synchronization of settlement and nature. Two-thirds of Vietnam is mountainous and inhabited by a minority of the population; 53 ethnic groups have historically clustered in the highlands of north and central Vietnam. They lived by foraging, hunting and fresh-water fishing or by dry-farming agricultural techniques on labor-intensive terraces and developed profound relationships to self-renewing (and in that sense circular) forest and mountain ecologies. Although the State viewed the mountainous territories as wastelands (with the exception of the few mining areas), they were invaluable for various local highland ethnic groups not only for their productivity, but also for the site of spirits and shrines. Additionally, many families strategically developed settlements and productivity on lands at different altitudes (different ecological floors) (Biggs, 2018).

Meanwhile, the Kinh ethnic majority initially settled in the Red River Delta and coastal plains. More than a thousand years of human occupation obliterated the natural landscape. Abundant, warm rains brought by summer monsoons supported a cultural landscape of what has been termed a rice or vegetable (Gourou, 1972) or hydraulic civilization (Wittfogel, 1956). The population was localized as 'swarms on the plains' (Gourou, 1975, p. 29) and villages formed as densely clustered and bamboo girdled agglomerations within productive paddy fields. A Chinese-influenced administration was capable of requisitioning enormous masses of labor for collective irrigation works, primarily without mechanical assistance. In the Red River Delta, ever-stronger and higher dykes protected settlements from seasonal flooding. Deltaic and coastal village boundaries most often coincided with irregularities of the ground, river courses, lanes, bushes (or delimited by markers in the absence of natural landmarks) and were often founded upon the land cushions left by strongly flowing river vegetation (Nguyen, 1993). Village sizes and distances from one another had a direct correlation to the productivity of nearby wet-rice cultivation and ecological footprints. Like many parts of the Far East (also including China, Korea and Japan), density and proximity were determined by a self-sustaining relation of consumptive and productive landscapes (Gourou, 1975). Historically, the Red River Delta has supported one of the world's largest (predominantly rural) population densities and in 2018 there were 1014 persons/km2 (GSO, 2020).

The dense rural populations occupied the territory intensely and simultaneously supported urban centers of power and privilege. Countryside and city formed a coherent whole. With the expanding size and might of Hanoi, there were ever-more elaborate and intimate linkages to the countryside. The city and its larger territory formed a social, economic and ecological unity. The entirety of the Red River Delta was dotted with small-scale, highly specialized villages with traders and artisans

organized into guilds and heavily taxed. In many instances, the handicrafts provided seasonal occupation for farmers in the flooding and fallow periods; it also prevailed in villages where land was scarce (Fanchette & Stedman, 2016, p. 21). They were primarily located along navigable waterways helping with the import of raw materials and export of goods. Systems emerged with geographical groupings of villages specializing in the same sector with businesses interconnected and within which there was a high degree of labor division (Fanchette & Stedman, 2016). The productive landscape corresponded to various agro-ecological regions and micro-topography and specific village crafts were directly tied to natural resources and locational assets: ceramics, brick and tile production near rivers and clay soils; pottery and earthenware on the banks of the Red River; ironwork and bronze products in the mountains; flower and silk villages in relation to specific soil types; paper near lakes since it required large amounts of water; woodcarving and shipyards near forests and rivers, etc. Since the seventeenth century, handicrafts were networks connected to the capital, Hanoi and its so-called '36 Streets' (in fact roughly one hundred streets), each named after the goods it sold: Tin Street, Drum Street, Cotton Street, etc. The crafts fed the city, but also brought off-farm wealth to the countryside.

In the so-called 'March to the South,' the step-by-step occupation of the coast, marked by citadel cities nested in subsequent deltas (Thanh Hoa/Ma River, Hue/Perfume River, Saigon/Saigon River) culminated in the Mekong River Delta, where a vast network canals and irrigation ditches drained the quagmire and settlement adapted to and lived-with monsoon rhythms. In each of these stops along the 'march', the interdependency city-countryside was reproduced. This was literally done in the case of Hue, when its citadel became the capital of the Nguyen Dynasty in 1805, and centrally marked the ever-progressing Vietnamese nation-building. As in the Red River Delta and coasts, humanity was omnipresent in the rural landscape. At the same time, the more southwards the inner colonization progressed, the less strict the Kinh traditional domestication of territory through dike building prevailed, until the point of the Mekong, where living with and within the seasonal flood was the norm. Since in the Mekong Delta the land is gradients of wetness—with the land saturated with water and the water full of land, variations of water urbanism prevailed. Constellations of dispersed, yet linear, settlements were not only tied to the ecological footprints of wet-rice cultivation, but also to cities' interdependency through tidal regimes of waterways. In fact, the distance between Mekong Delta cities was consistently 60 km, corresponding to tidal rhythms and boat speeds. For centuries, the primary economy in the Mekong Delta was low-land wet-rice farming and alluvial high-banks of waterways that are appropriated intensively for orchard cultivation and settlement. However, Vietnam's period of collectivization severely affected the delta and led to a series of dramatic socio-economic crises. Nonetheless, the southern delta, similar to the one in the north, was always densely occupied. Yet, very peculiar for the Mekong Delta is the absence of a real socio-economic center and its interdependence with Ho Chi Minh City (HCMC, formerly Saigon)—which operates as the dislocated center for the delta. In a certain sense, the deltas of the Mekong and the Dong Nai Rivers merge in one vast alluvial plain that was easy to unify by canals, which explains the central role of the external, and older Saigon

for the Mekong Delta. The granaries of Cholon, its Chinese settlement and market adjacent to Saigon were stocked with rice from the delta, transported via extensive canals systems. The waterways were expanded and complemented by a road network during the French conquest. To this day, as if it demonstrates a paragon of path-dependent development, HCMC (now Vietnam's largest city) operates as the absent presence/present absence of the delta.

## 6.6 Urbanizing Vietnam: Torn Between Two Worlds

In 1986, *doi moi* (renovation) reforms were instituted and Vietnam shifted from a centrally planned system to a 'socialist-oriented market economy.' Subsequently, as the country modernized during the past few decades, through the interlinked processes of mechanization, industrialization, there has been significant rural–urban migration and massive urbanization. The result is an extremely unequal dependence between its ever-expanding urban cores and vast rural areas. At the same time, there has been an increased pressure for settlements and territories to become ever-more productive. The mountainous areas have been aggressively internally colonized by the dominant Kinh population and mature tropical forests have given way to monoculture plantations (either acacia, pine or rubber trees) with associated biodiversity loss. Taking Ho Chi Minh's remark that 'forests are gold' to heart led to a generic tinsel of monocultural forests, with a short rotation of crops (*Acacia* mainly for the world paper market) (McElwee, 2016). In the Red River Delta, the handicraft villages, which suffered gravely during the nation's period of collectivization, remerged with an increasing export demand and an accompanying depletion of raw materials, soil degradation, forest degradation, increasing levels of air and noise pollution, contamination of water supplies (Konstadakopulos, 2008).

During the 1990s in the Mekong Delta, the government developed numerous policies to increase productivity and increase livelihoods. As the natural fish catch in rivers and sea decreased due to dramatically manipulated water regimes of the Mekong and overfishing in the East Sea, aquaculture was aggressively pursued. At the same time, policies pushed for 'VAC farming'—the diversification and nutrient linkages among V (orchard), A (pond) and C (animal pens) components. The waste from one component becomes inputs to another, increases production and short-circuits the need for chemical fertilizers and pesticides. Homesteads are included in the system and it is called VACR if fish is stocked in the rice fields connected to the pond (Dang et al., 2005). Clearly, for the delta's immense productive landscape such models, that originate from times when large-scale import of fertilizers or its own production was out of reach, can be non-nostalgically upscaled, along with updates that the introduction of new technologies allows. A reduction of footprints of settlements (that always consume irreplaceable productive land, decrease replenishing of water tables and increase pollution) is thereby a major concern. It can be achieved primarily through the development of new housing typologies and increased densities.

Through OSA's extensive work in the Mekong Delta over a time span of more than two decades, a number of projects have developed strategies for urbanization which is guided by accentuating specific locational assets and strengthening ecological structures. Strategies were developed as site-specific approaches to circularity, regenerating the territory. Until today, the Mekong Delta has a low degree of industrial development and remains predominantly an agri- and aqua-cultural economy. The question is then if the inevitable urbanization and desirable development in the already very densely occupied (and exploited) region can be steered by an endogenous development strategy to capitalize on its natural (and renewable) assets and resist the incessant calls for generic economic industrialization. Can it leapfrog such 'progress' and thrive toward its own form, anchored on its assets and fueled by the IT/AI revolution of the twenty-first century—an e-endogenous strategy? It is, in this respect, noteworthy that many of the twenty-first century technological advances (IT and other) reverse the necessity of hierarchy and centrality that was so typical of the of nineteenth and twentieth-century infrastructures. Indeed, the new goal is the development of decentralized and heterarchical systems (energy, water, mobility, etc.). It is evident that such an e-endogenous strategy for the Mekong Delta would at the same time acknowledge the mutually complementary and (absent) central role of HCMC. The *Revision of the Mekong Delta Regional Plan 2030 and Vision 2050* (developed with the Southern Institute of Strategic Planning [SISP], 2014–2018) accentuated the region's underlying geography of six broad agro-ecological subregions to develop both unique competitive advantages and complementarity as productive systems. In that plan, as well as the Revised Cantho Masterplan 2020 (also co-produced with SISP, 2010–2013), specific degrees of upscaling of VAC farming (ranging in degrees of intensity/extensity of orchards and aquaculture input levels in relation to agro-ecological environments, geographical locations, household contexts and size of animal husbandry) (Dang et al., 2005) are fundamental to build economic and ecologic resiliency in the vulnerable territory. The hybridization of programs can as well be extended to include 'agricultural solar sharing' a Japanese-invented method of generating electricity on farmland using solar panels mounted to a raised framework with crops growing underneath (Sekiyama & Nagashima, 2019) and must consider projected flooding. This is evidently only one hint of how an e-endogenous development strategy can be implemented—inverting old hierarchical systems while shifting from industrially designed monofunctional land-uses to layered (and rotating) systems of multiplicity that are expected to evolve into more resilient ecosystems of production. Supported by the AI revolution, this e-endogenous strategy recalibrates the balance between quantity/quality and the distribution of mass/specialized production.

As rural areas are anyhow forced to increase productivity, urban areas are faced with unprecedented expansion. In Vietnam, it has been stated that people living in urban areas use 2–3 times more natural resources than rural inhabitants (Schneider et al., 2017, p. 1) in addition to producing significantly more pollution, waste—and landfills. In order to meet rising consumer demands, particularly in its larger cities, increased resource extraction occurs from more remote hinterlands. Urban growth amplifies the vulnerability of land in both the city and countryside. Vietnam's inherent

circular interdependence loop has been broken. The urban system necessitates a radical new development model. In 2019, HCMC held an invited competition, which sought to develop the city's expansion across the Saigon River (in Districts 2, 9 and Thu Duc), essentially doubling both its surface area and the city's population. It sought a concentrated development, reversing the ongoing process of ever further and further consumption of the productive countryside.

The project of OSA and the Vietnamese Institute of Architecture and Planning (VIAP), *Smart Swarms in the Swamp*, developed flexible and adaptable constellations of economies and ecologies which follow various rhythms—natural, man-made and demand-driven. It built on the logics developed in recent plans for the Mekong Delta and HCMC Regions, both of which sought to re-establish a balance between economic exploitation of natural resources and ecological integrity. The project specifically tackles climate change challenges by radically rethinking the three most carbon-emitting sectors: electric power, construction and oil. Energy transitions are developed toward renewables and cyclic models, rethinking waste to resources. Construction and materiality transitions are addressed through a shift from concrete and steel toward wood (cross-laminated timber [CLT]). Hence, building the city goes hand-in-hand with a massive (urban) forestation program, that simultaneously improves the micro-climate, mitigates pollution, prevents water evaporation and, simply generates a healthy and pleasant environment, in which building materials are by definition part of cyclic system of recuperation and renewal. In short, e-cyclic building is necessarily part of and inscribes itself in an economy of multiplicity. Post-oil transitions are reached through an emphasis on renewable and water- and electric-based and app-supported transportation. The envisioned e-water-transport—a 'wetro' complements the under-construction metro and is completely demand- instead of offer-driven, with flexible trajectories instead of fixed lines and heterarchical instead of hierarchical organization. It capitalizes on the enormously extended net of natural and man-made waterways existing on the development site, which it uses (rather than overrunning it with extremely expensive asphalt road systems that are incompatible with the load-bearing capacity of the water sick soil), even extends it (to increase economically the mobility infrastructure, while simultaneously increasing the dearly needed water retention capacity) and enlarges the self-regenerating biological capacity water system, etc (Fig. 6.2). The multiplicity of spaces and their uses is fundamental to the new socio-ecological environment in the making, weaving the built and constructed nature. The approach capitalizes, in general terms, on locational assets, natural ones in the first place, and works with the forces of nature (rather than, for example, following the ongoing, unholy and, extremely expensive megalomaniac and doomed to fail dyke building program that supposedly one day will protect HCMC from flooding).

Working with the forces of nature often implies embedding within nature. The urbanity in the making is hence one in which conventional role divisions are reversed and landscapes become the primary infrastructure. Overall, the project focuses on transformation of the territory with increased urban density, diversity (particularly in terms of programs, footprints and scales) and increased open space (water and green systems). It fixes what is necessary to fix, gives direction to what has to be directed


**Fig. 6.2** Highly Interactive Innovation District (HIID) Vision, Vietnam. The existing, fine-mazed water system is the basis for the creation of a water transport mesh and an app, on-demand basedsystem of transport that combines WETRO, METRO and personal mobility mechanisms (image RUA 2019)

and leaves open what is unnecessary to fix or at the moment uncertain. It sought to move from linear systems toward constellations in order to achieve 'grab' on demand mobility systems, mixity (of size, program and density), high floor-area-ratio (FAR), the highest provision of open space per capital in SE Asia (now the lowest), climate change resilient networks and innovation ecosystems.

## 6.7 Toward a Twenty-First Century Circularity

To date, the circularity discourse focuses on the elimination of waste (and wastelands) through the 3Rs—recycling, renewing and reuse. However, there inescapably remains another underlying set of economically driven 3Rs—risk, return and reward. The classic contestation of ecology and economy is surely at work in the shift to circularity and it will only become normalized when both its associated technologies become more affordable and there is a fundamental value shift where the environment trumps economy. Integrated resource management and twenty-first-century circularity is a consensually-driven objective, but far from being achieved, regardless of context, east or west, north or south. At best, it is 'in the making' and has been initiated through a diversity of initiatives, projects, programs, plans and policy changes exploring new balances between different circularity agendas. Technological innovation and optimization play a key role; nevertheless, political shifts (necessarily

emancipation oriented) and, last but not least, contextualization are indispensable (Marin & De Meulder, 2018).

What is clear from the emerging practices in Flanders and Vietnam is that a starting point for any transition to circular practices is the context, the space itself: its recognition as a non-renewable reserve and acknowledgment of the resourcefulness of space use (Loeckx & Shannon, 2004). It is clear that the geography, climate and history of land occupation and practices vary greatly in the two contexts. It therefore follows that the new modes of circularity must remain nuanced. There are abundant lessons from history which underscore the interdependencies of the city and its larger territory which formed a social, economic and ecological unity. Evidently, in the contemporary world, space is a receptacle of uncountable flows of materials, people and data. Circularity and cyclic thinking are an invitation to transform function as well as the meaning and value of space. The shift from a resource-based linear economy (cradle-to-grave system) toward a resource-cycling circular economy (cradle-to-cradle system) implies the capacity of space to accommodate a multitude of uses and power of natural ecologies to regenerate. It is imperative though, that technocratic and performance-based solutions do not indiscriminately blanket territories. The richly layered 'landscape as palimpsest' (Corboz, 1983) instills particularity to places. The socio-cultural practices of the past and future must necessarily inform the tools and types of circularity. Not surprisingly landscape urbanism traditions, which consider landscape as an infrastructure, match seamlessly with circularity. Clearly, such 'infrastructure' is an enduring element (as all structure is by definition) that while spatially structuring practices and uses, adapts itself to changing circumstances of seasons and epochs, interacting with the cycles of natural processes and waves of development. It is also not unexpected that the reversal from linear to circular practices goes hand-in-hand with an exchange of old nineteenth and twentieth century (industry-initiated or inspired, unfortunately wasteful) hierarchies and centralities toward heterarchical and decentralized systems, flexibly adapting themselves to circumstances, sites and cultures.

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