Work package 1. Framework & Governance

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Framework for "Circularity by Design"

Summary

In this report, we identify and discuss the key limitations of a "circular economy": a poor, practically non-existent, inclusion of a social dimension; a reductionist approach that undermines systemic change towards circular agri-food systems; and a focus on shallow leverage points that are not conducive to systemic change. We propose a radical approach to circularity by adopting the concept of a *circular society*, which extends to incorporate the social dimension. We root *circularity by design* on the integration of three frameworks: the doughnut economy, a food systems approach, and leverage points. The doughnut economy provides a vision for a safe operating space within planetary boundaries that places emphasis not on economic growth but rather on prosperity; while a food systems approach provides a methodology for mapping and navigating the doughnut economy by using a systemic approach and drawing from all dimensions of sustainability—economy, environmental and social. We draw attention to the need for targeting deep leverage points, which focus on design, and require institutional and value changes. Deep leverage points are in contrast with the technical and reductionists fixes (i.e., shallow points) that dominate interventions in the CE. The next report will delve on the applications of this framework on agri-food systems at the urban scale with a focus on deep leverage points around institutions and governance for the Amsterdam Metropolitan Area.

1. Introduction

The concept of circular economy (CE) represents a most recent attempt to integrate the economic and environmental dimensions of sustainability to address our societal and planetary challenges. Emerging also in response to the failures and shortcomings of linear food systems, the principles of a CE can inspire new ways of (re)designing food systems that provide a pathway to a more sustainable food future. By proposing a regenerative and restorative system of production and consumption, based on closing material and energy loops, CE aims to address issues of unsustainable natural resource use while benefiting the economy. Although CE is just catching academic attention (Merli, Preziosi, and Acampora

2018), it is not an entirely new concept; it builds on other disciplines such as industrial ecology, environmental science, and ecological economics (Lazarevic and Valve 2017). CE also lacks well-define boundaries, resulting in substantial overlap with other concepts such as Green Economy and Bio-economy (D'Amato et al. 2017). Although linked with a variety of concepts, in practice, CE is mainly associated with efficient and sustainable waste management (Merli, Preziosi, and Acampora 2018).

While CE offers a promising approach to redesigning more sustainable food systems, it has not escaped criticism for a lack of clarity in its nexus with sustainable development. On one hand, some believe that CE supersedes sustainable development because it may act as a tool to operationalize sustainable development concepts while also moving beyond the linear thinking strategies on which sustainable development is rooted (Kirchherr, Reike, and Hekkert 2017; Sauvé, Bernard, and Sloan 2016). On the other hand, CE has been criticized for being founded on a paradigm of continuous economic growth, which is at odds with a finite biosphere (Ward et al. 2016). The notion that economic growth and natural resource consumption can be decoupled is widely challenged for its arguably flawed assumption that sufficient decoupling can be achieved through increased efficiency without limiting economic production and consumption (Parrique et al. 2019). Moreover, as part of the emphasis on economic growth, individuals in the CE concept are conceptualized as consumers whose consumption patterns need not be challenged but simply satisfied via products and services produced following CE principles.

In order for CE to foster a food system transformation, key gaps in the concept of circular economy must be discussed and addressed. Here, we focus on three key gaps: lack of inclusion of the social dimension; lack of systemic approach to governance and innovation; and a lack of focus on deep leverage points, or the inflection points capable of producing the largest and most meaningful societal change. First, the lack of social dimension has been repeatedly highlighted as a critical gap in the implementation and analysis of circular economy (Kirchherr, Reike, and Hekkert 2017; Pla-Julián and Guevara 2019; Merli, Preziosi, and Acampora 2018; Hobson and Lynch 2016; Calisto Friant, Vermeulen, and Salomone 2020). We particularly focus on the concept of circular society and on aspects of cultural change, justice and equity, and governance and political considerations for incorporating a social dimension. Second, a systemic approach refers to the need to go beyond scatter and disconnected initiatives and move towards a holistic, systemic and coordinated efforts that will support systemic change. Finally, in order to engage and change the root causes of unsustainability in society in general, and food systems in particular, interventions need to target more powerful areas of change—also known as deep leverage points—in addition to technical solutions, such as the ones that dominate the circular economy (Abson et al. 2017). Addressing these gaps is fundamental to ensure that CE gains systemic validity, critical social relevance, and that its claims are achievable on a relevant scale to address the socio-ecological challenges of our times (Friant, Vermeulen, and Salomone 2020).

We focus on the three aforementioned gaps because they carry important implications on efforts to redesign circular urban agrifood systems that are better inter-connected, rooted on coherent governance, and that meet society's expectations of prosperity. Agrifood systems are socio-ecological

systems and failing to include the social dimension will lead to interventions that ignore the social issues that threaten sustainability, such as equity, fairness, and governance. A reductionist approach to redesigning agri-food systems will also deliver incomplete and myopic solutions; agrifood systems are complex systems and require a systems approach that takes into account all activities related to food production and utilization (growing, harvesting, packing, processing, transporting, marketing, consumption and waste), as well as all the actors, activities and feedback among elements (Van Berkum, Dengerink, and Ruben 2018). Finally, failing to focus on deep leverage points will leave us with interventions with limited potential to drive system wide transformation; currently, most interventions in agrifood systems are based on "shallow" leverage points, which focus on technical fixes, for example, which although important are insufficient (Dorninger et al. 2020).

In response to these shortcomings and gaps, more radical approaches are (re)emerging which argue for a circular economy rooted on "degrowth", or a direct downscaling of economic production and consumption in the wealthiest countries. Amsterdam Metropolitan Area (AMA) exemplifies this paradigm shift by betrothing the concept of circular economy with the "doughnut economy", which acknowledges that economic growth must occur within the constraints of planetary boundaries (Raworth 2017a). Circularity grounded on degrowth and planetary boundaries would complement current overemphasis on technological innovation and economic efficiency with sufficiency and social justice (Hobson and Lynch 2016). This is aligned with scholars and practitioners' call for a reconceptualization of the circular economy into what is now termed a ***circular society***. A circular society incorporates the social dimension along with issues of equity and power; extends circularity not only to material and energy flows, but also to how wealth, knowledge, technology, and power is circulated and redistributed throughout society; and reconceptualizes the role of individuals as citizens in a society rather than simply as consumers in the economy.

In this report, we discuss the gaps in the circular economy concept, Section 2 "Towards a circular society" discusses the three gaps identified: 2.1 discusses the social dimension of CE; section 2.2. requires the need for a systemic approach; and section 2.3 discusses the need for deep leverage intervention points. In section 3, we develop and adopt the concept of circular society, propose a framework for circularity by design that moves beyond the shortcomings of a circular economy, and discuss its implementation in the context of agri-food systems in an urban region, such as AMA. The purpose of this first report is to focus on the conceptual development of the circularity by design framework, while our next report will focus on the operationalization of the framework in the context of AMA and the Amsterdam living labs.

2. Towards a circular society

2.1 Socializing the Circular Economy

The social dimensions of circularity have been repeatedly identified as a critical gap in the implementation and analysis of circular economy (Kirchherr, Reike, and Hekkert 2017; Moreau et al.

2017; Pla-Julián and Guevara 2019; Merli, Preziosi, and Acampora 2018; Hobson and Lynch 2016; Friant, Vermeulen, and Salomone 2020). These social dimensions are especially important for realizing a just transition to circular agri-food systems. If sustainability is the aim of circular economy, all dimensions of sustainability – social, economic, and environmental - must be adequately considered and acted upon. As Murray, Skene, and Haynes (2017) observe

> *"The Circular Economy, however, is virtually silent on the social dimension, concentrating on the redesign of manufacturing and service systems to benefit the biosphere. While ecological renewal and survival, and reduction of finite resource use clearly benefits humankind, there is no explicit recognition of the social aspects inherent in other conceptualisations of sustainable development. It is unclear how the concept of the Circular Economy will lead to greater social equality, in terms of inter- and intra-generational equity, gender, racial and religious equality and other diversity, financial equality, or in terms of equality of social opportunity. These are important moral and ethical issues which are missing from the construct. Only if societal needs are defined and included in the basic formulation, can we hope to build on all three pillars" (p. 376).*

Numerous (missing) social dimensions with implications for circular food systems have been identified in the literature. These include the everyday practices and behaviors of consumers and citizens; the ethics, norms, and values that drive economic practices and circular economy transitions; the institutional and governance arrangements that shape CE agendas, sustainability behaviors, industry practices, and transition pathways; and broader concerns of social equity, intergenerational equity, gender, racial, and religious equity, social opportunity, social and environmental justice, human health, well-being, quality of life, and human-rights (Hobson and Lynch 2016; Murray, Skene, and Haynes 2017; Winans, Kendall, and Deng 2017; Friant, Vermeulen, and Salomone 2020). We address each of these themes below under 2.1.1 Cultural Change, 2.1.2 Justice and Equity, and 2.1.3 Governance and Political Considerations.

2.1.1 Cultural Change

> *"By overlooking social considerations, CE research is proposing a technological path to sustainability that many have criticized for being overly optimistic regarding the speed of technological transitions and the capacity of society to integrate disruptive innovations, which challenge vested interests. (...) This approach also fails to recognize the massive socio-cultural change that a CE entails by transforming consumption and production structures based on materialism, convenience, and ownership to ones based on collaborative consumption, sharing economies and use-value" (Friant et al. 2020, 11).*

Everyday social practices, norms, consumption habits, and expectations have developed around the decades long 'routine' of take, make, and throw away, as normalizing practices that work to keep our current linear economy in place. Without addressing the socio-cultural dimensions of circularity, the most advanced technical and governance innovations will fail to achieve holistic sustainability

transformations (Hobson 2015). A just transition to circular society requires cultural change at all levels of society, from everyday consumption practices that shift from buying and owning to sharing, to deep rooted cultural ideals about what it means to live "a good life" and what consumption levels are sufficient to sustain this ideal (Friant, Vermeulen, and Salomone 2020; Holmes 2018). These cultural dimensions are incredibly diverse and vary from place to place. Without considering these cultural dimensions there is considerable risk of a 're-bound' effect (e.g. increased consumption as a result of increased efficiency or lower cost) that undoes the efficiencies and sustainability gains achieved through circular economy innovations (Hobson 2015).

The social practices that underpin our economy, and circular economy, are suffused with ethical and moral concerns about what is good, right, and common sense. They are informed by broader political and ontological concerns about the relationships between humans and nature, including the ethic of care. As Pla-Julián and Guevara (2019) observe:

> *"The ethic of care helps to integrate many layers of relationships into our understanding of the environmental dimensions of human security. Through the lens of care the relationship between human beings and the biosphere (macro level) as well as households´ responsibilities (micro-level) that link care to the environment become evident" (Pla-Julián and Guevara 2019, 105).*

Bringing in cultural change into our design and analysis of circular economy therefore requires a critical attention to the social and cultural values *already* embedded in our approaches to economy and circular economy. It also requires being explicit about the cultural values we seek to further, and an evaluation of the uneven impacts of circular economy policies interventions on process of cultural change. Cultural concerns have a particular relevance to realizing a transition to more circular food systems, as a great deal depends on dietary change and the ability of consumers to shift their everyday food practices toward more circular and sustainable routines, tastes, and practices. In the realm of food waste and organic waste, cultural change is also happening: citizens and consumers are shifting their routines toward re-using food waste, sharing surplus food, and home and community composting. Cultural shifts in our relations with food and waste are critical for realizing more regenerative loops and keeping food at its highest and best social value.

2.1.2 Justice and Equity

While "equity and social justice can be said to be at the heart of the concept of sustainability" (Murray et al. 2017, 367), they remain at the periphery of circular economy practice and science. In their review, Kirchherr et al (2017) find that only 18% of circular economy definitions include social equity considerations. Social equity considerations are relevant to every aspect of circular economy, yet as Murray et al. (2017) write, "[i]t is unclear how the concept of the Circular Economy will lead to greater social equality, in terms of inter- and intra-generational equity, gender, racial and religious equality and other diversity, financial equality, or in terms of equality of social opportunity. (p. 367)"

Alongside these broader concerns about people and planet, there are also justice concerns about circular economy innovations themselves. These include critical questions about labor conditions in CE enterprises (Pla-Julián and Guevara 2019), and critical conditions about "who controls CE technologies and patents, and how economic benefits should be distributed both within and between countries" (Friant et al. 2020 p. 11). Answering these kinds of questions is necessary to determine "whether CE will lead to more meaningful jobs, closer communities, greater social equity and global solidarity or rather to increased precarity, inequality, and neocolonialism" (Friant et al. p. 11).

Social equity dimensions cannot be an afterthought in circular economy design. Kirchherr et al. (2017) advise that circular economy practitioners, scientists, and policy makers state "social equity as one of its design variables, while starting to research its social equity impacts (p. 228)." This type of research is urgently needed, especially now that the European Commission has committed to a 'just transitions' framework for circular economy transitions as part of the EU Green Deal (EU 2020). Existing research on circular economy innovations in the sharing economy for example has found that 'sharing' resources through platform capitalism has increased inequalities (Schor 2017; Frenken and Schor 2017). These findings suggest that there can be significant inequalities around who leads circular economy innovation, who owns the technology, and how (economic, environmental, and social) benefits are distributed.

Within the literature we found few examples of circular economy innovations and frameworks that explicitly address the social equity dimensions of circularity. **Circular society** described at the start of this report is "a vision of circularity where not only resources are circulated in sustainable loops, but also wealth, knowledge, technology and power is circulated and redistributed throughout society" (Friant et al. p. 19). The social circular economy highlights the opportunity for social enterprises in the circular economy, and "aims to inspire people to rethink, redesign and pursue a positive future with the belief that coupling the principles of the circular economy with social enterprise gives the right conditions to foster innovation and creativity, for a world with local solutions to meet societal, environmental and economic needs" (Robinson 2017, 2). A related approach is the social and solidarity economy which emphasizes social equity in labor and the governance (Moreau et al. 2017), and therefore encourages business models that can better facilitate this (e.g. social enterprise, worker cooperatives, etc.). Economic actors in the social and solidarity economy are united around shared concerns and values which emphasize solidarity and mutual aid, and put people and planet before profit, thereby facilitating sustainable development. Moreau et al. (2017) argue that "the principles and values put forward in the social and solidarity economy may enable the necessary social and institutional conditions to allow for higher martial recovery, toward the desired transition (p. 498)" These social dimensions are already being pursued in the food system, through food aid (e.g. food banks, social groceries, community fridges, food not bombs) and alternative food networks (e.g. solidarity purchasing, community supported agriculture, food sharing, food cooperatives, and social enterprises in the food sector, food justice driven urban agriculture and community gardening). While many of these social food projects

have circular dimensions, around sharing and reusing surplus food, creating short food chains, composting, or reducing food waste (Davies et al. 2017), they are not often recognized as significant parts of a circular agri-food system.

2.1.3 Governance and Institutions

Political and institutional change is necessary to ensure that the above social dimensions can be met, that their benefits reach the most vulnerable, and that holistic and systemic circular transitions are possible. Merli et al. (2018) show that the majority of circular economy research has been on cleaner production practices aimed at optimizing efficiency with little attention to the social and institutional implications of circularity. They argue for "greater attention to strategies for social and institutional change, able to transform the upstream processes of production and consumption (p. 717)." Along similar lines Moreau et al. (2017, p. 498) argue that "social and institutional changes are necessary to achieve a significant level of recycling" and that "without political reform, the degree of recycling in the economy, as measured in physical terms, will remain low both at regional and global levels."

Circular economy is being pursued internationally through circular economy policy at regional (e.g., European Commission), national (e.g., the Netherlands, China), and urban (e.g. City of Amsterdam) scales. However, there is very little public discussion, citizen engagement, or debate on how circular economy should be defined and implemented, or how the benefits (and potential burdens) will be distributed to ensure a just transition to circular society. Fratini, Georg, and Jørgensen (2019) observe limited research on social identities, institutions, political transformation, or the active role that public authorities and citizens can take. Institutions are important in governing circular economy transitions because, they can "set the rules of the game, influencing expectations, values and actions, and determining the spectrum of economic activities. Understanding institutions contributes to unfolding knowledge about who bears the costs of externalities; the social (e.g. inequalities) and environmental impacts (e.g. air and water pollution). Institutional structures, and legislation in particular, delineate the costs that economic activities must be held accountable for and thus effect profitability and competitiveness" (Fratini 2019, 979). The current lack of attention to institutional conditions is "considered an important barrier to its contribution to socially just and environmentally desirable societal transitions" (Fratini, Georg, and Jørgensen 2019; Moreau et al. 2017; Korhonen, Honkasalo, and Seppälä 2018).

Cities cannot achieve circular transitions on their own, or become isolated closed loop systems removed from their global foodsheds and rural hinterlands—cities are essential actors in governing sustainability transitions because of their high consumption power, innovation capacity, and political power. Cities can also test and experiment with circular economy innovations, which may be implemented at a faster pace than changes in consumer behaviors and diets, industry practices, environmental regulations, and agricultural policies. Prendeville, Cherim, and Bocken (2018) describe a circular city as "a city that practices [circular economy] principles to close resource loops, in partnership with the city's stakeholders (citizens, community, business, and knowledge stakeholders), to realize its vision of a

future proof city" (p. 188 in Fratini 2019, p. 980). Cities have influence over infrastructure and urban design, zoning and land use, public procurement, urban food policy, waste management, and public tender requirements – all of which can contribute to guiding a just circular economy transition to shorten food chains, circular and urban farming, and reuse urban waste streams. However so far, urban policy makers have relied too much on businesses (and business incentives) to drive implementation, had difficulty involving stakeholders to co-create circular city visions, and placed too great an emphasis on major urban stakeholders and on digital and data driven approaches (Prendeville, Cherim, and Bocken 2018; Fratini, Georg, and Jørgensen 2019). There is tremendous potential in including citizens as more-than-consumers in a circular economy (Hobson and Lynch 2016), as well as involving grassroots sustainability innovations and civil society actors to co-define the aims and practices of a circular society.

Fratini et al. 2019 point to the important role of sociotechnical imaginaries as "collectively held institutionally stabilised and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science at technology" in dictating which circular economy policy "solutions" are imaginable or possible for cities. These sociotechnical imaginaries are shaped by a combination of material and social factors e.g. material infrastructures, social norms, and structures, and political institutions. One common barrier to realizing transformative circular economy policies is a deep investment in the discourse of economic growth and efficiency (Hobson and Lynch 2016; Friant, Vermeulen, and Salomone 2020; Pla-Julián and Guevara 2019). This ideology can come into tension with and undermine the social and environmental dimensions of sustainability. However, this appears to be changing, at least in Amsterdam, where Kate Raworth's "doughnut economics" has been adopted to develop circular economy vision, criteria, and indicators that aim to help the city thrive within ecological limits while addressing social needs (City of Amsterdam, Circle Economy, and Raworth 2020). We see potential in the city of Amsterdam's circular economy strategy (2020-2025) (Gemeente Amsterdam 2020), and discuss these policy ambitions to reduce food waste, shorten food chains, and increase access to healthy and sustainable food in Section 3 "A framework for designing a circular society."

2.2 Circular economy requires a systemic approach

As a transition towards a CE requires a fundamental systemic change considering the implications this would have on complex social and ecological systems. In food systems, several actors are involved and interconnected through activities and processes related to primary production, food processing, distribution, retail and consumption at multiple spatial and temporal scales (van Berkum, Dengerink, and Ruben 2018; Koppelmäki, Helenius, and Schulte, n.d.). Therefore, transformation towards a circular food system, requires a systems approach that recognizes the interlinkages between social and ecological systems and all the stakeholders involved food system activities and processes (Kirchherr, Reike, and Hekkert 2017; Pla-Julián and Guevara 2019). A reductionist approach, or merely studying the individual parts of the systems, is not sufficient for a system-wide transformation. A systemic approach requires understanding the implications of implementing a CE across different scales and how related

biophysical flows and processes are interconnected at the food system level. This also requires the participation of multiple actors at multiple spatial scales in a transition towards circular food systems (Koppelmäki, Helenius, and Schulte, under review).

A systemic approach is underrepresented in the literature and in the implementation of CE. For example, a recent review revealed that only about 40% of 114 definitions for CE had a system perspective (Kirchherr, Reike, and Hekkert 2017). In most cases, CE is focusing on the micro perspective such as single products or sub systems of a larger system such as waste management. The need for a more holistic approach to CE is acknowledged by the institutions currently promoting or implementing CE (Sitra 2016; Ellen MacArthur Foundation 2019; European Commission 2020). However, while this need is recognized, most research is still not applying a holistic framework. Thus-far the focus continues to be on the environmental or economic performance of CE without including all three dimensions of sustainability (Geissdoerfer et al. 2017), or only on specific parts of system leading to a fragmented implementation of CE without considering whole systems or including spatial and temporal scales (Geissdoerfer et al. 2017; Kirchherr, Reike, and Hekkert 2017).

Urban food systems are linear by default, hence implementing CE to address agri-food system impacts is challenging as the options to close loops within the urban area are limited (Papangelou, Achten, and Mathijs 2020). Understanding how the urban metabolism is interconnected across spatial scales is fundamental to designing circular processes towards more sustainable agri-food systems. Environmental impacts of food production are substantial and are a major driver of the urban ecological footprint. However, the burden of environmental impacts is often experienced in places far from the urban areas where the food is consumed (Imhoff et al. 2004; Goldstein et al. 2017). Though potential to produce food within urban areas is limited, people's dietary choices have an impact on demand and, therefore, cities can play a role in implementing policy and design interventions that have wide-reaching effects on the broader food systems (Goldstein et al. 2017). Achieving changes in food consumption practices also requires sociocultural change as described in Section 2.1.1 Cultural Change". Changing citizens values in how they engage with food systems is a *deep leverage point* (Section 2.3) with potential of wide system transformation.

More recently, a study by Desing et al. (2020) conceptualized CE using a systems approach. In their framework, a cascading top-down approach is introduced where environment is a non-negotiable layer. The second layer in this framework represents society, which is based on a normative consensus where human dignity and well-being being is a goal for any human developed systems. Economy is the last layer and is conceptualized as providing ecosystem services within planetary boundaries (Fig 1). The authors argue that a transition towards a systemic and resource based CE requires a paradigm shift because implementing CE within current institutional structures is impossible because change needs to involve all social actors.

A more holistic and systemic approach requires design. In the context of circular economy, design has mostly been confined to designing processes of individual products or business models (Lewandowski 2016) De Schoenmakere and Gillabel, 2017). The paradigm has been to meet the societal demands with new product designs that are required in the transition to CE (De Schoenmakere and Gillabel, 2017). This requires understanding the links between products, business models, societal contexts and the governance affecting the products lifecycles. However, in addition to technological innovations, which is undeniably an important part of CE, changes in citizens' competencies, practices and world views, must also be changed (Jurgilevich et al. 2016). To achieve CE, it is essential to understand the fact that available resources are finite and that this indicates a need for a paradigm shift (Desing et al. 2020).

2.3 A transition to a circular economy requires interventions at deep leverage points

The major incentives behind many studies and interventions in the circular economy are attaining economic benefits, followed by environmental benefits, whereas social and systemic implications are hardly addressed (Homrich et al. 2018; Geisendorf and Pietrulla 2018). For the circular economy to support sustainable development, interventions should be designed to also target social and systemic issues. Kirchherr et al. (2018) found that the circular economy is most frequently depicted as a combination of reduce, reuse, and recycle activities, with few explicit linkages to sustainable development and without highlighting that circular economy necessitates a systemic shift to include economic prosperity, environmental quality, social equity, as well as future generations. Furthermore, strategies for social and institutional changes to radically change consumption and production patterns are only marginally included in circular economy practices (Merli, Preziosi, and Acampora 2018). EEA (2017, p6) argued that if Europe is to achieve the EU's 2050 vision of living well within environmental limits, it must fundamentally transform its core societal systems of production and consumption, in particular those related to food, energy, mobility and the built environment. Despite a growing realization of the need for a systemic change towards circular and sustainable urban systems, it is still unclear how to achieve such transformation (i.e., the processes of understanding and negotiating trade-offs and the different worldviews and values that underpin them) (Angheloiu and Tennant 2020). In this section, we discuss "deep leverage points" to support the design of circular urban agri-food systems.

Sustainability science argues that failures to get on more sustainable trajectories are in large part due to a failure of science and politics to engage with the root causes of unsustainability. Many sustainability interventions—as is the case with interventions in the circular economy—target highly tangible but essentially weak leverage points (i.e., interventions with limited potential for transformational change). Therefore, there is a need both in sustainability science and the circular economy and any other field seeking transformative change to focus on potentially more powerful areas of intervention.

We draw from the "leverage points" framework, inspired by systems thinking and focused on transformational interventions, centered on leverage points (Meadows 1999; Abson et al. 2017; Fischer and Riechers 2019). This framework proposes that interventions for systemic change towards sustainability should target four leverage points: parameters, feedbacks, design and intent (Abson et al.

2017). Parameters are modifiable, mechanistic characteristics such as taxes, incentives and standards, or physical elements of a system, such as sizes of stocks or rates of material flows. Feedbacks are the interactions between elements within a system that drive internal dynamics (e.g., dampening or reinforcing feedback loops) or provide information regarding desired outcomes (e.g., effectiveness of a given incentive scheme). Design relates to the societal structures and institutions that manage feedbacks and parameters, such as information flows, rules, and power. Intent relates to the norms, values, goals, and world views of actors in a system of interest that shape the direction to which the system is oriented.

Parameters and feedbacks are so-called **shallow leverage points**, or places where interventions are relatively easy to implement yet bring about little change to the overall functioning of the system. Design and intent are so-called **deep leverage points**, which might be more difficult to alter but potentially result in transformational change. Interventions that only involve shallow leverage points (parameters and feedbacks) are unlikely to bring transformative change, as long as system characteristics remain unchanged (Dorninger et al. 2020). Only interventions that focus on both shallow and deep leverage points have the potential to bring about transformative change (Fischer and Riechers 2019). To initiate system wide transformative change, the goals of a system, its intent, and rules need to be addressed directly.

In the circular economy, most efforts focus on closing material and energy loops and improving efficiency and performance—examples of shallow leverage points, e.g., parameters and feedbacks. However, transformative changes in the socio-economic system of production and consumption are also needed to achieve sustainable development. This requires changes in the societal structure and institutions and norms and values of the actors involved, which are deep leverage points. To aid long-term sustainable development, circular economy must address necessary transformative changes at a systemic level through targeting deep leverage points of intent (norms, values, goals) and design (information flows, rules, power and self-organisation) in addition to the shallow leverage points that are already addressed in much studies and initiatives.

Transitioning to a circular economy for urban agri-food systems will require looking beyond technical biophysical fixes, which constitute shallow leverage points. In other words, efforts are needed that look beyond redesigning waste streams or rechanneling biophysical and energy flows. In addition, deep leverage points are needed, which encompass the design of institutions and social structures, as well as their intent (e.g., norms and values), to support a needed systemic change that encompasses all three dimensions of sustainability.

3. A framework for designing a circular society based on the “doughnut” and a “food systems approach”

We propose a framework for circularity by design that combines the “doughnut economy” (Section 3.2), a “food systems approach” (Section 3.3), and leverage points framework (Section 2.3). The doughnut

economy provides a vision for a safe operating space within planetary boundaries that places emphasis not on economic growth but rather on prosperity. A food systems approach provides a methodology for mapping and navigating the doughnut economy by using a systemic approach and drawing from all dimensions of sustainability—economy, environmental and social. This combined framework addresses key limitations of a circular economy identified in this report: lack of both a social dimension and systems approach, while providing guidelines for how to apply deep leverage points (Section 3.4).

3.2 The doughnut economy

Raworth, creator of the "doughnut economy" framework, stated that our current economy is degenerative and divisive *by default*, resulting in enormous environmental challenges and increased social inequalities (Raworth 2017b). To address these challenges, we need to move to an economy that's regenerative and distributive *by design.* For Raworth, that starts with changing the goals: from endless growth to thriving in balance, or 'meeting the needs of all within the means of the planet' (Raworth 2017a). Her image of the economy takes the shape of a doughnut, formed by an outer ring representing the ecological ceiling and an inner ring representing the social foundation. If we cross the ecological ceiling, we overshoot and degenerate the life-support system of our planet. If we break the social foundation, we fall short on meeting the needs of all, resulting in inequality and injustice. The space in-between the two rings, represents the safe and just space for humanity.

Along similar lines, Gibson-Graham, Cameron, and Healy (2013) have argued in 'Take Back the Economy' for the need to reframe 'the economy'. From "and ordered machine that governs our lives" (2013, p. 1) and "must be fueled by growth" (2013, p.3) to "*all* the things we do to ensure the material functioning and wellbeing of our households, communities and nations" (2013, p.4). The economy is thus created by our actions and made up of a wide variety practices that we engage in to ensure our social, material and environmental well-being.

To capture this diversity, Gibson-Graham, Cameron, and Healy (2013) introduce the language of 'diverse economies', represented in the image of an iceberg. Visible above the waterline are the practices that are considered to be part of 'the economy' in dominant conceptualizations: wage labor, producing for a market, in a capitalist firm. Below the waterline is the much wider range of economic practices we all engage in to ensure or material and physical wellbeing, including household labor, volunteering, sharing and bartering.

Following both Raworth's and Gibson-Graham's re-framings of the economy, also results a re-framing of ourselves as economic actors. From a narrow framing as consumers and 'rational economic man', we become diverse economic actors that participate in and shape the economy in multiple roles: we work for money, we volunteer, we care, we join organizations and start businesses, we save money and invest in our future and that of our children, and we might become politically active to make sure ours and others' needs are met through laws and regulations.

As Gibson-Graham succinctly summarized: “our economy is the outcome of the decisions we make and the actions we take” (2013: xiii). Taking back the economy to make our societies and environments thrive, involves ethical decision-making and ethical action. Gibson-Graham et al. have formulated six ethical considerations for an economy that sits within the ‘safe and just space for humanity’ of Raworth’s doughnut, and that Gibson-Grahm et al. have called ‘community economies’. These six considerations are:

- *surviving* together well and equitable
- *distributing surplus* to enrich social and environmental health
- *encountering others* in ways that support their well-being as well as ours
- *consuming* sustainably
- *caring for* -maintaining, replenishing and growing – our natural and cultural *commons*; and
- *investing our wealth in future generations* so that they can live well

In summary, a *community economy* is “a space of decision making where we recognize and negotiate our interdependence with other humans, other species and our environment” (Gibson-Graham et al. 2013, p. xix)

A first step of our Circularity by Design (CbD) framework is thus to re-orient the purpose: from endless growth *to* ‘thriving in balance’, or ‘surviving well together’. Bringing together Gibson-Graham’s community economies and Raworth’s doughnut economics has brought us a better understanding of an economy that is circular (or regenerative and distributive) *by design*—which literally means *intentionally* and refers to intent, or purpose. If we take the economy as the outcome of the decisions we make and the actions we take rather than a machine operated by the ‘natural laws’ of the market, *by design* means we put ethics (of regeneration and (re-)distribution) at the heart of our decisions and actions. The six ethical considerations of Community Economies, in combination with the UN Sustainable Development goals can well serve as starting point.

3.3 A food systems approach

A food systems approach (FSA) is a sophisticated interdisciplinary framework for research and policy-making aimed at generating sustainable solutions for the supply of healthy food within environmental limits (Hammond and Dube 2012; Ericksen et al. 2010; Ingram 2011). Such a systemic approach is useful to analyze the systemic transformation that is required to attain alternative agri-food systems that achieve nutrition and environmental outcomes. FSA looks at the outcomes of food system activities and processes in terms of food security (including nutrition), environment (e.g., biodiversity, climate), and socio-economic (e.g., income) components (Van Berkum, Dengerink, and Ruben 2018; Ericksen et al. 2010). This framework acknowledges that achieving food and nutrition security requires looking more broadly than at either agricultural production or nutrition interventions alone. Unlike a focus on value chains or farming systems, FSA looks at the interactions within the food system and its socio-economic and biophysical component (Van Berkum, Dengerink, and Ruben 2018). The framework also provides a

list of topics to consider in research, and helps map vulnerabilities of agri-food systems to external impacts, such as climate change (Van Berkum, Dengerink, and Ruben 2018; Ingram 2011).

We propose to draw from the FSA to address the need for systems thinking in CE. A FSA may elucidate how CE interventions may influence and potentially transform food systems across scales and sectors. A FSA may be used to map food systems, bringing to light all system components, interactions, and flows from the social, environmental, and economic perspectives. This would allow for an understanding of the potential and limitations of different CE interventions in driving systemic change. It would also enable key stakeholders, for example in the Amsterdam Municipality, to map policies and initiatives to support a coherent integration of efforts while identifying gaps, or neglected leverage points to support food system transformation.

3.4 Deep leverage points: strategies for systemic transition towards a circular economy

To enable a transition towards a circular economy, there is a need to target deep leverage points, which are less obvious but potentially powerful areas of intervention. What strategies can be used for this? Potential strategies for transformational change include (1) re-connecting people to nature, (2) re-structuring institutions, and (3) re-thinking how knowledge is created and used (Abson et al. 2017). For the first strategy, reconnecting people to nature, consumers active in the circular economy could buy products with a lower impact on the environment (e.g., climate, biodiversity, or water), instead of the cheapest products in which those external costs are not included in the consumer price. Consumers can also start producing part of their food or energy themselves with a lower environmental impact. An example is a group of about 100 families who want to develop a housing project in the city of Amsterdam that is as self-sufficient as possible in food and energy by supporting its own production and closing loops and is affordable for all families regardless of their income. Strengthening of direct material links between people and nature in local ecosystems could influence the design of the system and facilitate other types of human–nature connections that can influence a system's emergent intent (Abson et al., 2017). Another lever for connecting people to nature is experiential connection with nature. Careful planning and management of urban green infrastructure can assist in re-connecting urban dwellers to natural environments. A transition towards a sustainable resource-based CE goes hand in hand with a paradigm shift in the way environmental considerations are perceived by individuals, codified in different normative frameworks and dealt with by private companies (Desing et al. 2020).

On the second strategy, re-structuring institutions, pro-environmental values and attitudes need to be coupled with institutional structures that make it easy for people to behave sustainably (Abson et al. 2017). There are several levers for institutional changes: 1) develop new institutions that are better suited to foster sustainability, 2) ensure institutions are designed to be open to the potentially transformational learning and adaptation opportunities invoked changing environmental or societal conditions, 3) purposeful destabilize unsustainable institutions, 4) institutionalize mechanisms of governance learning, and 5) prevent hasty or uncontrolled institutional changes. Different strains of

literature provide ideas about new institutions that aim to de-centre growth and capitalist accumulation as the main reason of society, such as the social and solidarity economy (described in section 2.1.2 Justice and Equity). Evolving institutional conditions to support more solidarity-based production and consumption systems could lead to more resource-efficient activities. Moreau et al. (2017) stated that, similar to the idea of decoupling economic growth and planetary resource use, profitability would gain to be defined in relative and absolute terms, as competitiveness compels firms to be not only profitable, but more profitable than competitors. Specifically, relative profitability means that even activities with low economic returns are ousted from the competitive environment, let alone nonprofitable ones. This important distinction between relative and absolute profitability provides one clue on how to level the playing field for activities that have goals other than profit alone, such as fair labour conditions.

On the third strategy, re-thinking how knowledge is created and used, Abson et al. (2017) argue that much of human action is path dependent, building on the way things have been done previously and relying on established, often institutionalized, knowledge. Considering path dependencies in how we perceive and produce knowledge and questioning existing perceptions of legitimate knowledge in science and politics could be key levers for sustainability transformation.

3.4.1 Two examples of deep leverage points: Public procurement and "Orchestrators"

Two concrete examples of deep leverage points that would support a systemic change towards circular agri-food systems in an urban setting are public procurement policies and "orchestrators".

Public procurement constitutes a powerful mechanism for public authorities to institute sustainability policies and exercise leadership on sustainable development. The scale of public procurement amounts to roughly between 8 and 30% of a country's GDP; for example, in the European Union it comprises 16% of the GDP, while in OECD countries it ranges between 5 and 20% (Brammer and Walker 2011; OECD 2017). Given the scale of its importance in financial systems, public procurement can help shift agri-food systems towards circularity by leveraging the purchasing power of the state to restructure production and consumption patterns.

Integrating CE principles in public procurement is one promising option to drive fundamental change (Witjes and Lozano 2016). Public procurement may drive systematic change when public organizations demand better quality products in circular terms, circular products, or the use of business concepts that support CE. This way new products and services meeting circularity criteria may emerge. A study found that public procurement can promote circular economy and related business models by, for example, setting criteria and requirements for the extension of product life spans, efficiency and intensity of use, and efficient cycling of biological or technical materials (Alhola et al. 2019). The same study found that the sectors with potential for circular procurement included construction, waste, wastewater management, transportation, food and catering, furniture and textiles. For CE in the food and catering industry, Finland offers an interesting example in the Sodankylä municipality, where public procurement

was used as a strategic tool to make catering and kitchen operations more sustainable and circular by improving food delivery logistics and processing.

Amsterdam Metropolitan Area, in Gemeente Amsterdam (2020), stated their ambition to practice circular public procurement. By 2022, the target is that 10% of the City's procurement will be circular, by 2023, all of the City's invitations to tender in the build environment will be circular, and by 2030, the City intends to implement 100% circular procurement. Amsterdam intends to support the development of new circular products and services by leveraging circular public procurement. Key sectors in which this is planned is the construction sector, where circular criteria will be used when working on building and in public spaces. One area that needs to be further developed in Amsterdam's Circularity strategy is the use of public procurement in the food and agriculture sector.

The "orchestrator" role comes from the field of industrial ecology, where the need was identified for a "matchmaker" who would act as a network orchestrator to facilitate new forms of interorganizational cooperation (Zaoual and Lecocq 2018). Network orchestrators may facilitate the occurrence of closed loops within an ecosystem of organizations, thereby overcoming companies' difficulties in seeing the potential value creation associated with this kind of cooperation. Orchestrators may be third parties—that is external to the network of companies engaging in closing loops—who get different companies engaged in value creating cooperation, in many cases, regarding waste (Zaoual and Lecocq 2018; Zucchella and Previtali 2019).

In this report, we borrow the concept of the orchestrator and expand its role beyond orchestrating firms to close waste and process loops. One limitation in the CE is a reductionist approach which is evidenced in the many disconnected and scattered CE interventions, across sectors and scales, that may be found in any city. In this case, rather than a private sector actor orchestrating activities among firms, the City of Amsterdam may play the role of orchestrator by mapping and connecting CE interventions. This way, the orchestrator role may create cohesion and increase the potential of large-scale change by connecting CE interventions to support collaboration.

Next steps

In this report, we have developed a conceptual framework for describing, explaining, and visioning transformation towards circular by design economies. The next report will map the circular economy governance landscape in the AMA region and delve on the applications of this framework on agri-food systems at the urban context. We will evaluate governance structures and instruments for change that can incentivize a transition towards a circular by design economy. We will draw on the four Urban Challenges.

Literature cited

Abson, David J, Joern Fischer, Julia Leventon, Jens Newig, Thomas Schomerus, Ulli Vilsmaier, Henrik von Wehrden, et al. 2017. "Leverage Points for Sustainability Transformation." *Ambio* 46 (1): 30–39.

https://doi.org/10.1007/s13280-016-0800-y.

Alhola, Katriina, Sven- Olof Ryding, Hanna Salmenperä, and Niels Juul Busch. 2019. “Exploiting the Potential of Public Procurement: Opportunities for Circular Economy.” *Journal of Industrial Ecology* 23 (1): 96–109. https://doi.org/10.1111/jiec.12770.

Angheloiu, Corina, and Mike Tennant. 2020. “Urban Futures: Systemic or System Changing Interventions? A Literature Review Using Meadows’ Leverage Points as Analytical Framework.” *Cities* 104 (September): 102808. https://doi.org/10.1016/j.cities.2020.102808.

Berkum, Siemen van, Just Dengerink, and Ruerd Ruben. 2018. “The Food Systems Approach: Sustainable Solutions for a Sufficient Supply of Healthy Food.” *Wageningen Economic Research* 064: 32. https://doi.org/10.18174/451505.

Berkum, Siemen Van, Just Dengerink, and Ruerd Ruben. 2018. “The Food Systems Approach: Sustainable Solutions for a Sufficient Supply of Healthy Food.” Wageningen. www.wur.eu/economic-research.

Brammer, Stephen, and Helen Walker. 2011. “Sustainable Procurement in the Public Sector: An International Comparative Study.” *International Journal of Operations & Production Management* 31 (4): 452–76. https://doi.org/10.1108/01443571111119551.

Calisto Friant, Martin, Walter J.V. Vermeulen, and Roberta Salomone. 2020. “A Typology of Circular Economy Discourses: Navigating the Diverse Visions of a Contested Paradigm.” *Resources, Conservation and Recycling*. Elsevier B.V. https://doi.org/10.1016/j.resconrec.2020.104917.

City of Amsterdam, Circle Economy, and Kate Raworth. 2020. “Building Blocks for the New Strategy AMSTERDAM CIRCULAR 2020-2025,” 1–56. www.circle-economy.com.

D’Amato, D., N. Droste, B. Allen, M. Kettunen, K. Lähtinen, J. Korhonen, P. Leskinen, B. D. Matthies, and A. Toppinen. 2017. “Green, Circular, Bio Economy: A Comparative Analysis of Sustainability Avenues.” *Journal of Cleaner Production* 168 (December): 716–34. https://doi.org/10.1016/j.jclepro.2017.09.053.

Davies, Anna R., Ferne Edwards, Brigida Marovelli, Oona Morrow, Monika Rut, and Marion Weymes. 2017. “Making Visible: Interrogating the Performance of Food Sharing across 100 Urban Areas.” *Geoforum* 86 (November): 136–49. https://doi.org/10.1016/j.geoforum.2017.09.007.

Desing, Harald, Dunia Brunner, Fabian Takacs, Stéphane Nahrath, Karolin Frankenberger, and Roland Hischier. 2020. “A Circular Economy within the Planetary Boundaries: Towards a Resource-Based, Systemic Approach.” *Resources, Conservation and Recycling* 155 (April). https://doi.org/10.1016/j.resconrec.2019.104673.

Dorninger, Christian, David J. Abson, Cristina I. Apetrei, Pim Derwort, Christopher D. Ives, Kathleen Klaniecki, David P.M. Lam, et al. 2020. “Leverage Points for Sustainability Transformation: A Review on Interventions in Food and Energy Systems.” *Ecological Economics*. Elsevier B.V. https://doi.org/10.1016/j.ecolecon.2019.106570.

Ellen MacArthur Foundation. 2019. “Cities and Circular Economy for Food.” https://www.ellenmacarthurfoundation.org/assets/downloads/Cities-and-Circular-Economy-for-Food_280119.pdf%0Ahttps://www.ellenmacarthurfoundation.org/assets/downloads/Cities-and-Circular-Economy-for-Food_EMF.pdf.

Ericksen, Polly J, Jane Dixon, Barling David, and Philip A Loring. 2010. “The Value of a Food System

Approach." In . London: Earthscan.

EU. 2020. "A European Green Deal." *European Commission - European Commission*, no. December 2019. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

European Commission. 2020. "A New Circular Economy Action Plan For a Cleaner and More Competitive Europe. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions."

Fischer, Joern, and Maraja Riechers. 2019. "A Leverage Points Perspective on Sustainability." *People and Nature* 1 (1): 115–20. https://doi.org/10.1002/pan3.13.

Fratini, Chiara Farné, Susse Georg, and Michael Søgaard Jørgensen. 2019. "Exploring Circular Economy Imaginaries in European Cities: A Research Agenda for the Governance of Urban Sustainability Transitions." *Journal of Cleaner Production* 228: 974–89. https://doi.org/10.1016/j.jclepro.2019.04.193.

Frenken, Koen, and Juliet Schor. 2017. "Putting the Sharing Economy into Perspective." *Environmental Innovation and Societal Transitions* 23 (June): 3–10. https://doi.org/10.1016/j.eist.2017.01.003.

Friant, Martin Calisto, Walter Vermeulen, and Roberta Salomone. 2020. "A Typology of Circular Economy Discourses : Navigating the Diverse Visions of a Contested PFriant, M. C., Vermeulen, W., & Salomone, R. (2020). A Typology of Circular Economy Discourses : Navigating the Diverse Visions of a Contested Paradigm. Resources, ." *Resources, Conservation and Recycling*, no. May.

Geisendorf, Sylvie, and Felicitas Pietrulla. 2018. "The Circular Economy and Circular Economic Concepts—a Literature Analysis and Redefinition." *Thunderbird International Business Review* 60 (5): 771–82. https://doi.org/10.1002/tie.21924.

Geissdoerfer, Martin, Paulo Savaget, Nancy M.P. Bocken, and Erik Jan Hultink. 2017. "The Circular Economy – A New Sustainability Paradigm?" *Journal of Cleaner Production*. Elsevier Ltd. https://doi.org/10.1016/j.jclepro.2016.12.048.

Gemeente Amsterdam. 2020. "Amsterdam Circular 2020-2025 Strategy," 1–30. https://www.amsterdam.nl/bestuur-organisatie/volg-beleid/ambities/gezonde-duurzame-stad/amsterdam-circulair-2020-2025/.

Gibson-Graham, J K, Jenny Cameron, and Stephen Healy. 2013. *An Ethical Guide for Transforming Our Communities*. University of Minnesota Press. www.jstor.org/stable/10.5749/j.ctt32bcgj.

Goldstein, Benjamin, Morten Birkved, John Fernández, and Michael Hauschild. 2017. "Surveying the Environmental Footprint of Urban Food Consumption." *Journal of Industrial Ecology* 21 (1): 151–65. https://doi.org/10.1111/jiec.12384.

Hammond, Ross A, and L. Dube. 2012. "A Systems Science Perspective and Transdisciplinary Models for Food and Nutrition Security." *Proceedings of the National Academy of Sciences* 109 (31): 12356–63. https://doi.org/10.1073/pnas.0913003109.

Hobson, Kersty. 2015. "Closing the Loop or Squaring the Circle? Locating Generative Spaces for the Circular Economy." *Progress in Human Geography* 40 (1): 0309132514566342-. https://doi.org/10.1177/0309132514566342.

Hobson, Kersty, and Nicholas Lynch. 2016. "Diversifying and De-Growing the Circular Economy: Radical

Social Transformation in a Resource-Scarce World." *Futures* 82: 15–25. https://doi.org/10.1016/j.futures.2016.05.012.

Holmes, Helen. 2018. "New Spaces, Ordinary Practices: Circulating and Sharing within Diverse Economies of Provisioning." *Geoforum* 88 (January): 138–47. https://doi.org/10.1016/j.geoforum.2017.11.022.

Homrich, Aline Sacchi, Graziela Galvão, Lorena Gamboa Abadia, and Marly M. Carvalho. 2018. "The Circular Economy Umbrella: Trends and Gaps on Integrating Pathways." *Journal of Cleaner Production* 175: 525–43. https://doi.org/10.1016/j.jclepro.2017.11.064.

Imhoff, Marc L., Lahouari Bounoua, Taylor Ricketts, Colby Loucks, Robert Harriss, and William T. Lawrence. 2004. "Global Patterns in Human Consumption of Net Primary Production." *Nature* 429 (6994): 870–73. https://doi.org/10.1038/nature02619.

Ingram, John. 2011. "A Food Systems Approach to Researching Food Security and Its Interactions with Global Environmental Change." *Food Security* 3 (4): 417–31. https://doi.org/10.1007/s12571-011-0149-9.

Jurgilevich, Alexandra, Traci Birge, Johanna Kentala-Lehtonen, Kaisa Korhonen-Kurki, Janna Pietikäinen, Laura Saikku, and Hanna Schösler. 2016. "Transition towards Circular Economy in the Food System." *Sustainability* 8 (1): 1–14. https://doi.org/10.3390/su8010069.

Kirchherr, Julian, Denise Reike, and Marko Hekkert. 2017. "Conceptualizing the Circular Economy: An Analysis of 114 Definitions." *Resources, Conservation and Recycling* 127 (April): 221–32. https://doi.org/10.1016/j.resconrec.2017.09.005.

Koppelmäki, K., J. Helenius, and R.P.O. Schulte. n.d. "Nested Circularity in Food Systems: A Nordic Case Study on Connecting Biomass, Nutrient and Energy Flows from Field Scale to Continent." *Resources, Conservation & Recycling*.

Korhonen, Jouni, Antero Honkasalo, and Jyri Seppälä. 2018. "Circular Economy: The Concept and Its Limitations." *Ecological Economics* 143: 37–46. https://doi.org/10.1016/j.ecolecon.2017.06.041.

Lazarevic, David, and Helena Valve. 2017. "Narrating Expectations for the Circular Economy: Towards a Common and Contested European Transition." *Energy Research and Social Science* 31 (September): 60–69. https://doi.org/10.1016/j.erss.2017.05.006.

Lewandowski, Mateusz. 2016. "Designing the Business Models for Circular Economy-towards the Conceptual Framework." *Sustainability (Switzerland)* 8 (1): 1–28. https://doi.org/10.3390/su8010043.

Meadows, Donella. 1999. *Leverage Points: Places to Intervene in a System*. *Hartland: The Sustainability Institute*. https://doi.org/10.1080/02604020600912897.

Merli, Roberto, Michele Preziosi, and Alessia Acampora. 2018. "How Do Scholars Approach the Circular Economy? A Systematic Literature Review." *Journal of Cleaner Production* 178: 703–22. https://doi.org/10.1016/j.jclepro.2017.12.112.

Moreau, Vincent, Marlyne Sahakian, Pascal van Griethuysen, and François Vuille. 2017. "Coming Full Circle: Why Social and Institutional Dimensions Matter for the Circular Economy." *Journal of Industrial Ecology* 21 (3): 497–506. https://doi.org/10.1111/jiec.12598.

Murray, Alan, Keith Skene, and Kathryn Haynes. 2017. “The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context.” *Journal of Business Ethics* 140 (3): 369–80. https://doi.org/10.1007/s10551-015-2693-2.

OECD. 2017. “Size of Public Procurement.” In *Government at a Glance 2017*. Paris. https://doi.org/10.1787/888933533131.

Papangelou, A., W.M.J. Achten, and E. Mathijs. 2020. “Phosphorus and Energy Flows through the Food System of Brussels Capital Region.” *Resources, Conservation and Recycling* 156. https://doi.org/10.1016/j.resconrec.2020.104687.

Parrique, Timothée, Jonathan Barth, F.C. Briens, Christian Kerschner, Alejo Kraus-Polk, Anna Kuokkanen, and Joachim H Spangenberg. 2019. “Decoupling Debunked - Evidence and Argument against Green Growth as Sole Strategy for Sustainability.” *European Environmental Bureau*. Brusse. https://www.tercerainformacion.es/sites/default/files/archivos/decoupling-debunked-full-for-online.pdf%0Awww.eeb.org%0Awww.eeb.org.

Pla-Julián, Isabel, and Sandra Guevara. 2019. “Is Circular Economy the Key to Transitioning towards Sustainable Development? Challenges from the Perspective of Care Ethics.” *Futures* 105 (January): 67–77. https://doi.org/10.1016/j.futures.2018.09.001.

Prendeville, Sharon, Emma Cherim, and Nancy Bocken. 2018. “Circular Cities: Mapping Six Cities in Transition.” *Environmental Innovation and Societal Transitions* 26 (March): 171–94. https://doi.org/10.1016/j.eist.2017.03.002.

Raworth, Kate. 2017a. “A Doughnut for the Anthropocene: Humanity’s Compass in the 21st Century.” *Lancet Planet Health*. Vol. 1. https://doi.org/10.1016/S2542-5196(17)30028-1.

———. 2017b. “Why It’s Time for Doughnut Economics.” *IPPR Progressive Review* 24 (3): 217–22. https://doi.org/10.1111/newe.12058.

Robinson, Seigo. 2017. “Social Circular Economy: Opportunities for People, Planet and Profit.” https://www.socialcirculareconomy.com/uploads/7/3/5/2/73522419/social_circular_economy.pdf .

Sauvé, Sébastien, Sophie Bernard, and Pamela Sloan. 2016. “Environmental Sciences, Sustainable Development and Circular Economy: Alternative Concepts for Trans-Disciplinary Research.” *Environmental Development* 17 (January): 48–56. https://doi.org/10.1016/j.envdev.2015.09.002.

Schor, Juliet. 2017. “Does the Sharing Economy Increase Inequality within the Eighty Percent?: Findings from a Qualitative Study of Platform Providers.” *Cambridge Journal of Regions, Economy and Society, Cambridge Political Economy Society* 10 (2): 263–79. https://ideas.repec.org/a/oup/cjrecs/v10y2017i2p263-279..html.

Sitra. 2016. “Leading the Cycle.” www.sitra.fi.

Ward, Shane M, Nicholas M Holden, Eoin P White, and Thomas L Oldfield. 2016. “The ‘circular Economy’ Applied to the Agriculture (Livestock Production) Sector – Discussion Paper.” *Workshop on the Sustainability of the EU’s Livestock Production Systems*, no. October 2018: 1–11. http://www.agrocycle.eu.

Winans, K., A. Kendall, and H. Deng. 2017. “The History and Current Applications of the Circular Economy Concept.” *Renewable and Sustainable Energy Reviews*.

https://doi.org/10.1016/j.rser.2016.09.123.

Witjes, Sjors, and Rodrigo Lozano. 2016. “Towards a More Circular Economy: Proposing a Framework Linking Sustainable Public Procurement and Sustainable Business Models.” *Resources, Conservation and Recycling* 112 (January): 37–44. https://doi.org/10.1016/j.resconrec.2016.04.015.

Zaoual, Anne-Ryslène, and Xavier Lecocq. 2018. “Orchestrating Circularity within Industrial Ecosystems : LESSONS FROM ICONIC CASES IN THREE DIFFERENT COUNTRIES.” *California Management Review* 60 (3): 133–56. https://doi.org/10.1177/0008125617752693.

Zucchella, Antonella, and Pietro Previtali. 2019. “Circular Business Models for Sustainable Development: A ‘Waste Is Food’ Restorative Ecosystem.” *Business Strategy and the Environment* 28 (2): 274–85. https://doi.org/10.1002/bse.2216.