BACKGROUND BRIEF

THE CIRCULAR ECONOMY & SYSTEMS THINKING

Green Avengers

THE CANOPY LAB

This briefing note provides a short overview of agricultural terms. It assumes that the reader is familiar with MSD. It was prepared by Clara García Parra, Principal Consultant at the Canopy Lab, for the Green Avengers Community of Practice. If you would like to join the Green Avengers, please complete this survey.

The Circular Economy & Systems Thinking

No, it's not just recycling

The simplest way to understand the Circular Economy (CE) is by contrasting it with our current economic model: a linear, "take, make, dispose" system fueled by fossil energy. This linear model, also called a "throughput economy," relies on extracting resources, producing single-use goods, driving mass consumption, and disposing of waste back into the environment. Throughput implies a one-way flow of resources, materials, and energy, which drove prosperity for high-income countries when resources were abundant (due to no small degree to the exploitation of resources in low-and-middle income countries) and people did not understand ecological systems as we do now.

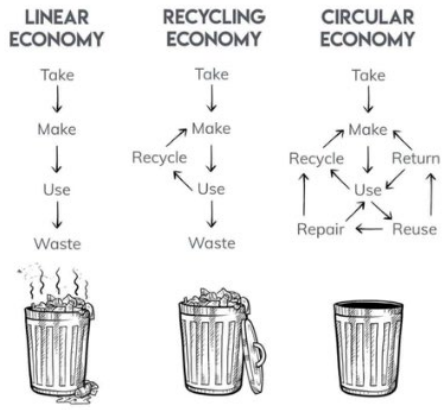

FIGURE 1: LINEAR, RECYCLING AND CIRCULAR ECONOMIES. SOURCE: THE R COLLECTIVE

But the conditions supporting linear growth are no longer sustainable—economically (credit is more expensive, the prices of virgin resources more volatile), environmentally (as evidenced by rapid environmental degradation and climate change), or socially (rising levels of inequality).

The CE challenges this throughput model, asking if we can use resources, materials, and energy more effectively instead of wasting them. It promotes decoupling economic growth from material consumption by first reducing consumption and moving to business models that minimize disposable goods. Some popular CE practices include mining waste for raw materials, extending the life of products, repurposing discarded goods across different uses or industries, and refurbishing materials and assets for continued use. Fig. 2 illustrates different solutions put forward by proponents of circularity.

Note: this is where we would usually include a definition of the CE. Unfortunately, there is not a universally accepted one. The elements shared in the briefing note will help you identify the main characteristics of CE accepted by most practitioners.

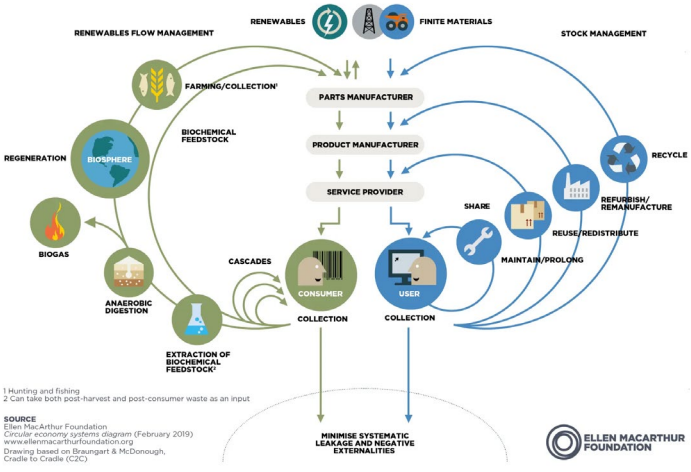

FIGURE 2: THE FAMOUS ELLEN MACARTHUR CE BUTTERFLY DIAGRAM SHOWING HOW BIOLOGICAL AND NON-BIOLOGICAL MATERIALS CAN BE CYCLED. SOURCE: ELLEN MACARTHUR FOUNDATION

Why should I care as an MSD practitioner?

Beyond the fact that circularity is a concept that makes sense in the contexts where we work, CE thinking shares a lot of characteristics with MSD thinking, with the advantage that it offers frameworks that can help us think even more systemically and identify new and exciting opportunities to promote prosperity within our planetary boundaries.

CE researchers have done a lot of work categorizing business models, exploring cross-industry synergies and thinking about how to reframe impact. Getting familiar with the CE can at the very least help us come up with new ideas for our projects, and ideally, it can help us rethink with our donors how we see results. In addition, there is growing interest and momentum from development partners and LMIC countries on topics related to the CE.

Several initiatives in Africa show leadership in CE thinking. According to Circular Economy Transitions in Africa: a policy perspective, "the African Circular Economy Alliance (ACEA), formed by South Africa, Rwanda, and Nigeria, aims to advance CE practices through policy frameworks and regulations. In November 2019, the African Ministerial Conference on Environment (AMCEN) endorsed the Durban Declaration, the first continent-wide policy explicitly incorporating the CE". The African Development Bank has a wide range of circular economy initiatives, and as it explains CE principles "play a strategic role in advancing the African Development Bank's High-5s development priorities to 'Feed Africa', 'Light-up Africa', 'Integrate Africa', 'Industrialize Africa' and 'Improve the Quality of Life for the People of Africa'".

A few months ago, USAID launched the Circle Alliance and the Circular Economy Learning Series, and elements of it are increasingly explicit in programs such as the Feed the Future Initiative which has a focus on food loss and waste reduction. The CE is also a big driver of the EU Green Deal and several donor countries are incorporating elements of it into their legal frameworks which in turn inform aid budgets.

In Asia, both China and India have taken leading roles embedding CE principles into policy initiatives. Other countries, including Vietnam, Indonesia and Thailand are spearheading policy and technology adoption. In Latin America, countries such as Chile are an example of extended producer responsibility (EPR) enforcement, showing the rest of the world how it can be done.

Getting the basics straight: where the CE comes from and what characterizes it

CE is not a new concept, but rather a synthesis of various schools of thought that have informed its conceptualization.

School of thought	First theorizers	Year	Contributions to CE
Industrial ecology	Frosch and Gallopoulos	1989	Material and energy flows, resource conservation
Biomimicry	Benyus	1997	Product and process design for regenerative purposes
Eco-efficiency	Welford	1998	Decoupling of growth from material consumption

School of thought	First theorizers	Year	Contributions to CE
Natural capitalism	Hawken et al.	1999	Increase productivity of natural resources, source inspiration from biology, reinvest in natural capital
Cradle-to-cradle	Braungart and McDonough	2002	Regenerative design, reduction in toxicity of materials
Cleaner production	Stevenson and Evans	2004	Reduction of use of natural resources
Resilience of social-ecological systems	Folke	2006	Adaptive capacity
Performance economy	Stahel	2006	Maintenance and reuse of material stock
Blue economy	Pauli	2010	Multiple income streams, social benefits, geographic proximity
Industrial symbioses	Chertow and Ehrenfeld	2012	Reverse logistics, eco-innovation, culture change
Product-service systems	Tukker	2015	Collaborative consumption, business model innovation

Despite not having a single definition, several principles underpin a CE, and they are most apparent when juxtaposed with the characteristics of our linear model shown in Fig 3 (linear) and Fig 4 (circular):

FIGURE 3: CHARACTERISTICS OF THE LINEAR ECONOMY.

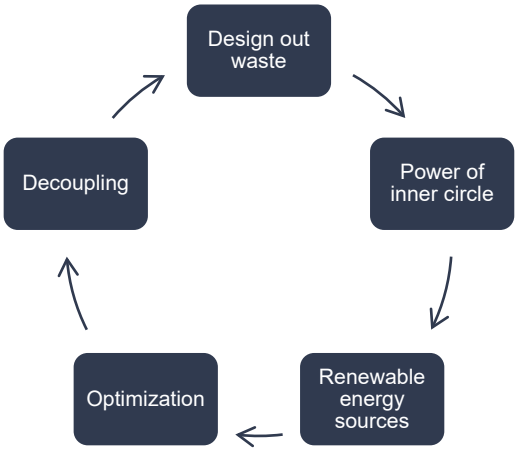

FIGURE 4: CHARACTERISTICS OF THE CE.

Design out waste

Current rates of raw material extraction and processing contribute 55% of global greenhouse gas emissions and 90% of total land use related biodiversity loss[1]. Trends are discouraging, with some estimates pointing to resource use up by 60% from 2020 levels by 2060[2]. As a consequence, our planet is grappling with a waste issue: waste generation is expected to increase at more than double the pace of population growth between now and 2050[3]. The way humans use finite resources is inefficient and leads to the generation of waste that is not only sometimes toxic but can also represent unnecessary financial losses through opportunity costs. Waste management represents a challenge for public authorities and innovative private sector initiatives such as Extended Producer Responsibility can only deal with so much of the problem. A way to address this situation is to eliminate the need to deal with waste by, where possible, designing products that do not feature it.

Renewable energy

One of the main contributors to the current climate crisis are fossil fuels (IPCC). Most fossil-fuel derived energy use is devoted to natural resource extraction for productive economic purposes. Renewable energy sources such as solar energy constitute endless stocks where inputs do not need to be replaced. Using such energies also eliminates negative externalities such as pollution. A CE must be powered by renewable energy sources.

Waste is food

The CE identifies two main types of product components: biological and technical. Biological components should trickle back to the biosphere in imitation of the behavior of ecosystems. Technical components cannot be returned to their original state, but they can be cycled back into the system in as pure a state as possible, becoming “food” for other processes. This pillar of the CE is best represented by the “Re-” principles, each representing a loop that links end-of-first use with the options materials have for being cycled back into the system. Figure 5 below shows circular options ranked horizontally (to the left are the most circular solutions) as well as vertically, with the top “re-“ being more circular than the ones at the bottom of each arrow.

[1] United Nations Environment Programme (2024): Global Resources Outlook 2024: Bend the Trend – Pathways to a liveable planet as resource use spikes. International Resource Panel. Nairobi. https://wedocs.unep.org/20.500.11822/44901
[2] Ibid
[3] World Bank, WHAT A WASTE 2.0 A Global Snapshot of Solid Waste Management to 2050. https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

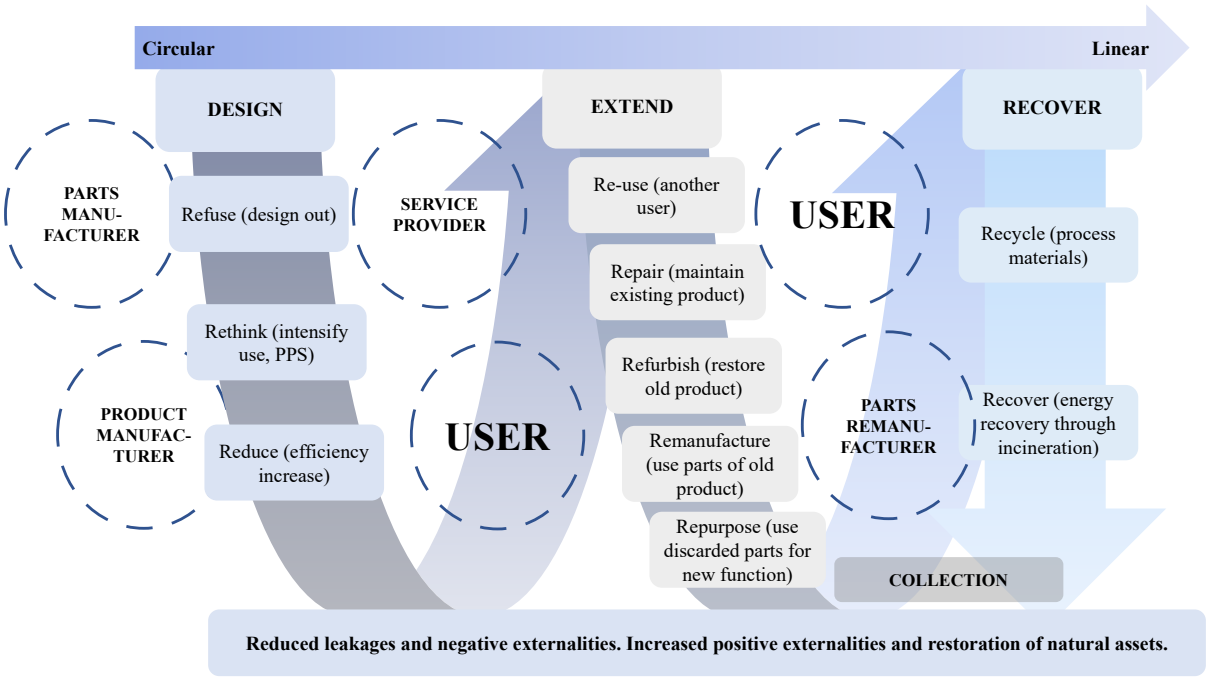

FIGURE 5: KEEPING TECHNICAL MATERIALS IN USE FOR AS LONG AS POSSIBLE THROUGH LOOPS.

The power of the inner loop

Not all energy recovery loops contribute in the same way towards circularity. Different players such as product manufacturers, parts (re)manufacturers, service providers and most importantly users (as opposed to consumers) play a key role in maintaining the purity of materials and avoiding leakages. The less geographic distance and the less intermediaries there are between stages of material cycling, the more circular the system is.

Optimization versus maximization (or efficiency versus effectiveness)

Finally, the current paradigm of endless growth pushes businesses to increase productivity and reduce costs at the expense of trespassing our planet's boundaries. A functional CE will rely on the **effectiveness** of processes and materials, rather than on their **efficiency** – and the goal will not be to do less harm, but rather to actively do good. Achieving an equilibrium might be complicated in an era where just-in-time global supply chains dominate, and lifecycle assessments of manufactured goods show how complex and interconnected their production processes are.

How to get there

To bring about the systemic change that a switch toward a new economic model requires, advocates of the CE must consider enablers as well as barriers.

Systemic enablers and barriers: finding leverage points and managing resistance

Our MSD beneficiaries and partners can be 1) producers of goods and services; 2) policy makers; or 3) consumer-user-citizens – and often are a combination of several of these three categories. The section below gives you some ideas about what may keep your target groups and partners from adopting CE practices, and what may be drivers of behavior change.

	Drivers	Barriers
Producers	• Resource scarcity, price volatility = unpredictable business environment • Technological solutions	• No business performance metrics • Practical difficulties around decoupling • Lack of long-term vision • Not proven viability of business models • No proven consumer demand

TABLE 1: DRIVERS AND BARRIERS TO THE ADOPTION OF CE BUSINESS MODELS FOR PRODUCERS.

It is in farmers' and business owners' interest to eliminate uncertainty in the production process to better control costs and be profitable – and if they see the commercial viability of doing so by increasing the circulation and recovery rates of raw materials, they are likely to adopt it as a solution. Scaling proven solutions such as the usage of organic manure, establishment of reverse logistic networks and introduction of innovations such as Pay Per Service (PPS) where consumers become lifetime users constitute enablers. But there are considerable barriers, considering difficulties faced by SMEs in developing contexts where the default is operating on survival mode without room for increasing resource efficiency.

	Drivers	Barriers
Policymakers	• National level: climate activism, social inequality, infrastructure costs of climate change • Municipal level: waste management costs	• Political cycle unconducive to long-term vision • Unwillingness of the political establishment to introduce radical change to tax or subsidy schemes • Corporate takeover of politics

TABLE 2: DRIVERS AND BARRIERS TO THE ADOPTION OF CE BUSINESS MODELS FOR POLICYMAKERS.

Policy makers can positively influence the switch to circularity by establishing policies that level the playing field for companies: it is unfair to expect circular businesses to compete with linear ones, considering the unfair subsidization of certain sectors. There are encouraging initiatives that could be scaled around the removal of subsidies and support for polluting industries, replacing them with procurement or fiscal measures that promote circular solutions. However, it is important to keep in mind that change takes time, and many political systems are co-opted by corporate interests.

	Drivers	Barriers
Consumer-user-citizens	• Direct effects of climate change on livelihoods • Change in behavior towards ownership (developed economies) • Technology adoption	• Consumerism which could offset benefits of switching to CE • Middle class aspirations to ownership in developing economies

TABLE 3: DRIVERS AND BARRIERS TO THE ADOPTION OF CE BUSINESS MODELS FOR CONSUMER-USER-CITIZENS.

Across the globe there is an increased awareness of direct, adverse effects of climate change and biodiversity loss on our lives. In high-income countries (HIC) this translates into the adoption of sharing economy models and increasing willingness to become users rather than owners or consumers through the adoption of PSS models. However, in many low and middle

income countries (LMICs), ownership is still linked with status. Population growth also means that initiatives to decouple growth from material consumption might face the barrier of increased demand. If production processes lower the costs of cycled materials, this may result in a rebound effect where more demand is created, undoing the benefits of the first initiative.

Additional reading and resources: some of our top picks

If you want to browse the Web for the latest thinking on CE, here are some good resources to check out:

- Ellen MacArthur Foundation, one of the most prominent organizations advocating for the CE. Their site offers a variety of resources, including reports, case studies, toolkits, and courses that explore the principles, benefits, and applications of the circular economy across industries and geographies. If you prefer visual learning, they also have a YouTube channel.
- Circle Economy provides insights into circular business models and practical applications. They offer resources like reports, research findings, and interactive tools, such as the Circularity Gap Report, which measures circular economy progress globally and by country.
- Doughnut Economics Action Lab is a community of practice for people keen to use Kate Raworth's doughnut in their work.

If you have a bit longer, here are some great longer videos/ reads:

- Doughnut Economics by Raworth, K. (2017). We love this book because it helps us reframe the way we understand human activity with the planetary boundaries – and promotes a viable, user-friendly alternative to our traditional M4P doughnut.
- The Macroscope: A New World Scientific System by De Rosnay, J. (1979) New York: Harper and Row. This is a really interesting introduction to systems thinking that helps us shift away from our overly analytical, siloed approach to a much more all-encompassing one.

TEDxLoodusele - Ken Webster - Circular economy.