

## Harmonious or Harmful? The Circular Economy and Biodiversity

By: Paul Dewick and Joseph Sarkis

The circular economy has wind in its sails. Exponentially increasing academic attention; interest among policy makers, industry and financiers; and [increased trade in primary and secondary circular materials](#).

Momentum and a bandwagon effect are propelling the implementation of circular economy principles and practices—going well beyond the Industrialized Global North. Is this transition too fast and is it [environmentally sustainable](#)? The wider second order consequences of circular practice adoption and growth needs careful study.

We—and others—have noted concern over the extent to which environmental and social sustainability factors are being integrated into circular thinking. In a series of publications and blogs [[1,2,3,4](#)], we considered the relationship between the circular economy and the [informal economy](#). We discussed and debated formalization of the informal circular economy across circular agro-forestry and fishing in the Amazon, waste picking in South Africa, and ocean plastics in the Philippines scenarios. We opened the lid on what we do and what we do not know about processes of formalization.

Opportunities and challenges for the circular economy are contingent—context, geography, and history each matter. These contingencies are especially important in biodiverse environments. Biodiversity is inextricably linked to [economic systems](#) and especially [production and consumption systems](#).

The relationship between circular economy strategies and biodiversity protection is poorly understood. Biodiversity refers to the diversity and abundance of life on Earth; it includes genetic diversity within species, diversity between species, and diversity of ecosystems.

Conventional wisdom suggests that the relationship between circular practices and biodiversity must be synergistic. The circular economy is “based on the principles of designing out waste and pollution, keeping products and materials in use, and *regenerating natural systems*” [our emphasis]. And yet, there is considerable uncertainty and the relationship is contested in the extant literature.

For example, [Buchmann-Duck and Beazley](#) point to strategies of biomimicry, eco-system services, bioeconomy and renewables, that – under certain circumstances – not only do not contribute to protecting biodiversity but can actually harm biodiversity.

[Korhonen et al.](#) conclude that “every circular economy-type process or project should be carefully analyzed for its (global) net environmental sustainability contribution”, drawing attention to the violation of ecosystem biodiversity.

To support our understanding of when circular economy practice contexts and circumstances can protect or harm biodiversity, we organized an online workshop on *(Bio-) Diversifying Circular Economy Research and Innovation*. This workshop was part of the Future Earth Systems of Sustainable Consumption and Production conference on 8th November 2022. You can watch a recording of the full workshop [here](#).

Experts shared their insights on the challenges of fostering circular economy projects while enhancing biodiversity. [Tim Forslund](#) from the Finnish Innovation Fund – [SITRA](#) – shared insights from a recent report that modeled circular changes to sectors that provide the largest potential for halting biodiversity loss and regional biodiversity improvements. The [report](#) showed how interventions using circular principles of narrowing, slowing, closing and regenerating can “halt and partly reverse” biodiversity loss by 2035. These findings are especially pertinent to the Global South—even when the circular initiatives are in the North.

[Henrique Pacini](#), who leads the United Nations Conference on Trade and Development’s (UNCTAD) [Sustainable Manufacturing and Environmental Pollution](#) program discussed unintended consequences of circular economy practices on biodiversity. Henrique introduced the SMEP’s [trade and pollution dashboard](#) that evidences environmental impacts of export products from some African and South Asian countries, including data on eco-toxicities that are damaging to biodiversity. The dashboard illustrates the complex - and often contradictory - environmental impacts associated with the production and distribution of goods.

[Enni Ruokamo](#) from the [Finnish Environment Institute](#) shared some reflections from a recent project that took a deep dive into the built environment sector in Finland. The presentation was based on a [recent working paper](#) which identified circular actions that reduce raw material extraction, relieve land use pressures and promote biodiversity. The study also identified other actions that increase the use of forest resources and can impair biodiversity in the absence of biodiversity-enhancing forestry management practices.

Finally, [Jose Pineda](#) from Universidad Privada San Juan Bautista shared some early insights into a British Academy sponsored project that is exploring circular economy practices in developing contexts. The study aims to shed light on the capability of the

circular economy to bridge environmental sustainability and economic development in biodiverse ecosystems in the Peruvian Amazon Rainforest.

Many important questions were raised. The implications for biodiversity of circular changes in production and consumption and about the unintended and second order consequences of change were addressed. Major points made across the systems of sustainable production and consumption included:

- On the production side, questions arose on whether actions to reduce the uptake of virgin raw materials, decrease land use pressures, and safeguard biodiversity can be facilitated by government and other key actors? Can we design standards that offset biodiversity losses by introduction of replacement species & microorganisms—*in a safe way*—just like forestry systems have been doing to offset emissions through reforestation? How can we promote regenerative practices such as diversifying bio-feedstocks or by scaling-up anaerobic digestion?
- On the consumption side, circular economy actions will only be successful in tackling biodiversity loss if we measure the right things. One important measure is the extraction rate of natural resources—with an ultimate goal of reduction measures. What additional policy targets and instruments are needed to ensure that we reduce our resource consumption? Changing consumption patterns can also have an impact. Climate change implications of shifting diets, away from meat to more plant-based alternatives are an example. Relying on animal protein squeezes the space available for biodiversity to maintain ecosystems capacities, health and stability. But what do we know about the land use and crop diversity implications of scaling up alternative diets?
- What about unintended consequences? How can we be sure that circular economy actions work as a solution to biodiversity loss? How do we avoid creating further environmental problems at other parts of the consumption and production system—especially in another place, at another time? How can we better anticipate the potential conflicts of interest that could emerge, and plan for how these could be overcome?

These are complex questions—but they are only some of the many that exist and continue to emerge. Each question requires much more investigation. The investigations will rely on strong partnerships between academics and researchers on the one hand, and industrial and societal stakeholders on the other.

In the [Circular Economy Working Group of Future Earth's Knowledge Action Network on Systems of Sustainable Consumption and Production](#) we are committed to bringing these actors together to explore the harmonious and harmful aspects of the relationship between circular economy and biodiversity. The Working Group is open to new members. If you are interested in and working on topics related to the circular economy (including

the relationship with biodiversity), and can contribute actively to the group, we would love to hear from you. We seek collaborative knowledge, expertise, and insight. We need action and co-creation of solutions. Please get in touch with any of the co-chairs of the Working Group. You can find our contact details in the link above.