

# 1S3 The contribution of biodiversity to productivity in circular agriculture

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Widespread “linear” agricultural systems are increasingly dependent on artificial inputs and ignore the essential contribution of biodiversity and natural processes to food production. Biodiversity in this context is generally considered a nuisance, for example biodiversity may compete with primary crops and livestock, reduce quality of the crop, and is considered a burden or at least redundant. While these “linear” systems tend to have higher yields at the short term, they are also associated with major global challenges such as pollution and biodiversity loss. Circular agriculture has recently emerged as a concept to reshape agriculture and is gaining ground. Circular agriculture does not aim to maximize singular yields, but to optimize the system as a whole. That includes preventing wastes, re-utilization of waste streams for food production or using these streams efficiently. Diversity can play a central role in circular agriculture if we consider its contribution to soil quality, nutrient cycling and nutrient- and water use efficiency. Moreover, (associated) biodiversity can enhance productivity, for example through pollination or natural pest control. In fact, in natural ecosystems, productivity and robustness are often higher when biodiversity increases, because nutrients and water are used more efficiently and nutrients are being more recycled within a (bio)diverse systems. Practices aiming for diversity of crops and welcoming on-farm biodiversity, might mimic these biodiverse systems. The concept of circular agriculture is just emerging. Hence, there is not much knowledge about the role of biodiversity in circular agricultural systems, for example whether circular agriculture actually benefits biodiversity; how (bio)diversity can contribute to circularity; what could be the role of circular agriculture in avoiding further biodiversity loss? Increasing our knowledge on these questions gives scope for circular agricultural systems that benefit from and contribute to biodiversity.

## Session topic

We ask for contributions that show recent research on the link between biodiversity and food production or that shed light on how biodiversity can contribute to circular agricultural systems. Research may include theoretical, observational, experimental and model studies.

These contributions address questions like:

- How to use diversity to maintain or improve productivity within circular agricultural systems? For example: what is the impact of diversity within crops or breeds, crop diversity, on-farm wild biodiversity, or landscape diversity on production and circularity?

- How can biodiversity contribute to circular food production?
- What can agriculture learn from circular natural processes, that are key for maintaining biodiversity?
- To what extent can circular agriculture help restore biodiversity?