

Theme 2: Social organization and risk management in a circular bio-based society

session 1-4

2s1

What kind of circular society

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A circular society has many potential benefits and is one of the most promising pathways to a more sustainable economy. But pitfalls exist as well. A careful examination of such pitfalls is required in order to take the right decisions. Without doing so, circularity may not always lead to more sustainable outcomes. In this session we aim to learn from past mistakes, so that we can gear towards sustainable forms of circularity.

Issues to be discussed may include:

- Sometimes a waste stream turns into a primary resource, once a certain production scale is achieved. Wood pallets are an example: they were once no more than the by-product of forestry, but now that they are needed to keep powerplants running, they have become the primary purpose of production. The same can be said about 1st generation biofuels: it was initially meant to be grown on 'waste land', but soon started to occupy high quality soils. We invite contributions that elaborate these and other examples of instances where the waste- or by-product became the primary product, and what that meant for sustainability.
- In some case the process of recycling waste consumes more resources than what is saved by it, especially in combination with the mechanisms that people start using more of it (the rebound effect). For example paper coffee-cups: although they are recycled, the recycling process is water- and energy consuming, a harmful product such as PFAS is used, and people no longer bother to re-use their cups since the disposed cups will be recycled anyhow. We invite contributions that elaborate these and other examples of instances where the recycling itself is very resource-consuming, and what that means for sustainability.
- It is sometimes argued that technological solutions prevent more structural solutions such as a change in consumption patterns. This is the debate between 'the wizard and the prophet'. Where does circularity stand in this debate? Could it be that circularity is a form of technological solution that is – in the end – not the best way towards a more sustainable society? We invite reflections on this question supported by examples.

Keywords: sustainability, competition, rebound effect, prioritisation, perverse triggers, biofuels, renewable energy.

2s2

Costs and risks

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The matter of unintended consequences for health, local environment, and landscapes should be carefully considered. In a circular economy, primary resources are replaced by by-products and waste streams, which are often of lower quality. This may have consequences of the quality of the end product (e.g. contamination by pathogens or chemicals), which may imply a health risk. Furthermore, unintended by-products or processing plants may harm local environments and landscapes.

Issues to be discussed may include:

- Costs come in the form of industrial activities that require space and energy, and which may pollute air, water and landscapes. Do we sacrifice valuable land (that could be used for food production) for building processing plants or producing renewable energy? We invite contributions in which the costs and benefits are discussed.
- Applicable waste streams or by-products are usually of sub-optimal quality compared to products specifically produced for the given purpose and may therefore lead to, for instance, lower crop yields or less robust products. To what extent is lower productivity or low quality of end products acceptable?
- Risks are considered within a one health approach, including risks for humans, animals and the environment. By using waste streams or by-products hazardous pathogens or chemicals (e.g. processing and environmental contaminants, pharmaceuticals) could be reintroduced in the system and they can continue to circulate or accumulate in specific compartments. By-products that are used as feed or fertiliser input are considered of the highest risk. Do we know where risks might occur? Are we able to predict this? What aspects to consider to prevent risks from occurring and what mitigation strategies are available? Yet again, a fair yet critical assessment needs to be made.

For this session we also welcome out-of-the-box solutions to mitigate costs and risks.

Keywords: Costs, benefits, risks, transmission, landscape quality, one health, chemicals, pathogens, solutions.

2s3

Food safety in the circular food system

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Current plant and animal production systems in Europe have led to the production of safe and high quality food for everyone. However, it has not become without negative effects; our current feed and food production systems have led to pollution, soil derogation, emission of greenhouse gasses, amongst other negative effects on our planet. With the establishment of the Green Deal and Farm to Fork policy, the European Commission want

to counteract these negative impacts on our planet, by making our food production systems more sustainable. An important part of the proposed way forward is to recycle the byproducts from food production, processing and consumption back into the food production system. This implies, amongst others, that we bring back byproducts, like by- and side streams from food production, that can not directly be used for human consumption, into the food production system. Closing loops to make our food production system more circular has not only advantages, but also entails disadvantages. When by- and side streams are re-used as much as possible in food production, we should prevent the accumulation of hazardous substances in our food chain. These could be, for instance, persistent chemicals or viruses that could contaminate the final food production and result into human health risks. Recycling streams can also be susceptible to fraud regarding the type of food waste. Identification and management of possible hazards should be in place, and be part of proper HACCP procedures.

2s4

Risk management and trade-offs

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This session presents ways of how to deal with the dilemma's discussed in session 1 (pitfalls of circularity) and session 2 (risks and costs). This includes technical tools and methods as well as transparent communication. This session specifically invites practitioners of circularity as well as CSOs that seek to promote circularity.

We invite contributions on topics like:

- Guidelines such as priority ladders, in order to handle situations in which alternative uses for waste streams exist. How to ensure that it is used in the best way and not simply by the party with the highest purchasing power?
- Trade-off frameworks for weighing costs and risks against benefits, as decision-support for promote circularity or not?
- How to win and maintain the intended users' trust: clear communication tools such as life cycle assessment (LCA), labelling, and other communication strategies.
- The importance of using the rights benchmarks in order to make a fair comparison.
- The involvement of stakeholders in the development of and communication about new techniques.

Keywords: Communication strategy, stakeholder involvement, labelling, Life Cycle Assessments, Cost Benefit Assessments, priority ladders

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masterclass 1-2

2m1

Behavioural aspects

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This lecture addresses the behavioural aspects of human decision making. Elements such as trust, risk-aversion, prospect theory and path entrenchment are discussed and it is explained how they play a role in the (non-)adoption of circular practices.

2m2

Welfare and welfare distribution

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This other lecture is about the effects of welfare and welfare distribution of a transition to a circular society. Where does the recycling take place and on which primary resources do we economize? In other words: who gains a livelihood and who loses it?

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workshop 1-3

2w1

Risk management and trade-offs

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In this workshop we interactively reflect on the tools, guidelines and strategies presented in session 3. We will discuss strong and weak points of each method, and reflect on how their performance depends on the cultural setting. For example, how to use social cost benefit analyses in a risk-averse society; what is the effectiveness of priority ladders in a liberal economy; how to communicate in a low-trust society?

2w2

How to transition towards circular animal feed

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An important principle in the transition towards a circular bi-economy is the animal production system as mediator to return biomass into the human food system. Envisioning the 2050 horizon, all current waste flows from the food system are either prevented or upcycled into the human food system via animal feed.

This will require a transition, overcoming many barriers from a legal, technical, safety, business model and sustainability point of view. Also, there growing demands from the biobased economy and the replacement of fossil-based resources for materials and energy will continue to put pressure on the use of side streams for human food production.

A substantial portion of current side-flows from food production and processing are already being directed to animal feed. However, earlier research (e.g. REFRESH 2019) shows that approx. 7 Million tons of suitable biomass side flows from the European food system is considered off limits due to food safety considerations. This amounts to almost 10% from all food loss and waste across the EU that could find its way back into the food system if the context allowed.

The speed of transition in solving these barriers varies and leads to the identification of transition paths towards the 2050 horizon. Insects and pet feed can serve as interesting

mediators, in-between steps to contribute to the building of scientific evidence for the safe, acceptable and attractive application of side-streams for animal feed.

Spanning over these barriers and transition pathways, four Public Private Partnership (PPP) projects from Wageningen Research and the Foundation Food Waste Free United aim to build both the scientific evidence as well as experience in practice to support the societal and policy case for safe and sustainable use of side streams for animal proteins.

During this workshop, several transition pathway will be illustrated by original case-work from the projects and considerations will be discussed following several angled questions:

- Is it legally allowed?
- Is it technologically possible (process technology & nutritional value as feed)
- Is it safe (food & feed perspective)
- Is it attractive for business (positive business model)
- Is it acceptable by consumers?
- Is it more sustainable than the current system?

The interactive discussion will seek to outline prerequisites for implementation, possible scenarios and conditions for chain and consumer acceptance. It will zoom in on the role of science, and how stakeholders such as industry, politics and the civil society can jointly move towards 2050

2w3

Visualisations of circular agriculture: your ideas about spatial quality of circular agriculture scenarios

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Since WWII farmers have adopted intensive agricultural practices to increase crop and animal production. This type of agriculture causes a number of environmental problems, including a loss of biodiversity, degradation of soil quality, water and air pollution, and depletion of fossil fuels. Adopting new circular agriculture types may help to reduce the environmental impact of agriculture. Circular agriculture may take various forms, including extensive livestock farming, agroforestry, small scale mixed farming, precision cropping, precision dairy farming, and agroparks. The adoption of these circular agriculture types may impact the quality of the landscape. To support societal acceptance and eventual implementation, these circular agriculture types should make a positive contribution to spatial quality of the landscape. To test spatial quality experience we generated 3D visualisations that simulate the new circular agriculture landscapes. We would also like to test the 'spatial quality' with the attendants of the Circular@WUR

conference. In the workshop we will present these visuals of the different circular agriculture types, and then ask participants to evaluate the 'spatial quality' of these circular agriculture types based on a framework of 17 criteria selected from the literature (in prep). Subsequently we invite the participants to discuss the strengths and weaknesses of each type of circular agriculture. The workshop aims to contribute to the design of circular agriculture types improve quality of the landscape and support eventual implementation. This corresponds with the mission of the Circular@WUR conference: to promote the transition towards a circular bio-based and climate- smart society. More specifically, our workshop links the biosphere category (types of circular agriculture) with the society category (the desired quality of these types of agriculture) of the programme.