Theme 3: Economy: Economic perspectives in the circular bio-based society

Masterclasses 1-3

3M1

Circular packaging; biobased polymers for circular packages

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The current plastic packages have been developed to offer superior performance at minimal packaging weights and costs. The majority has, however, not been developed with carbon neutrality and recycling as end-of-life-option in mind. The mis-management of plastic waste is causing ever growing quantities of plastics to enter our natural environment, with major ramifications for most life forms on our planet. Simultaneously, climate change forces us to reduce our greenhouse gas emissions, to which also plastic packages have to contribute. This masterclass will explore an alternative option for 2050. In this scenario all packaging plastics are produced from natural resources, have superior protective properties, are kept in the loop with advanced recycling technologies and they will biodegrade when they unintendedly enter nature. Together with experts from industries and contract research institutes we will explore the essential requirements for such an intrinsically circular biobased (food) packaging system. What type of polymers do we need for 2050 to satisfy our needs for (food) packages? What are their critical performance indicators? What type of recycling technologies (mechanical, chemical or enzymatical) do we require to keep this material in the loop? How are we going to produce these polymers from natural resources? How should the transition towards from the current fossil-based to the future biobased system be executed and how can we avoid system contamination? The masterclass will try to answer these questions and pave the road for an alternative food packaging system.

3M2

My fossil-free wardrobe

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Our society today relies on large amounts of fossil feedstock, for energy as well as for materials. The use of fossil feedstock is one of the main contributors to the climate change we are presently facing. To stay below the 1,5 °C temperature rise compared to pre-industrial time, as is laid down in the Paris Agreement, the use of fossil feedstock needs to be phased out as quickly as possible. Fossil oil is the main feedstock for our energy supply, transportation fuels and chemicals and materials produced by the (petro)chemical industry. The current textile industry is one of the markets that uses large amounts of fossil oil and applies hazardous substances and polluting processes. The textile industry has been growing steadily due to the growing world population and the increase in living standard. On top of this, the ever-spreading trend of fast fashion has led to fast fashion retailers selling clothing that is expected to be disposed of after being worn only a few times. Hence, new solutions to reduce the resource use (both non-renewable as well as renewable) of the textile industry need to be developed and implemented. This masterclass will highligh circularity strategies to reduce the consumption of natural resources and explore option for replacing non-renewable feedstock by using more biomass feedstock and recycled content.

3M3

Economics of a sustainable circular bioeconomy

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The circular economy is a concept with a long history in economics. It can be dated back to the Physiocrats of eighteenth-century France. The economic table of Francois Quesnay shows the circularity within the economy where households supply labour to firms that in return pay salaries which are used to buy the goods produced by firms. These tables have substantially improved over time and developed into today's national accounting systems and the related input-output tables. They are important inputs for applied general equilibrium models. The shortcoming of these models are economic values and the quantities not being directly visible. The advantage is results can be compared as they are all expressed in monetary units. An accounting system on its own ensures that neither all issues that are of relevance are covered nor accounting results in improvements. Nevertheless, proper accounting is important for informing policymakers and as an input for policy modelling. This Master Class will illustrate the accounting methods used, how they have become an important input for assessing sustainability and how they are applied for assessing circulariy and its contribution towards sustainability in our economies. The importance of structural and technological change will be highlighted.

Illustrative examples will be chosen from the bioeconomy and linked with the sustainable development goals. Important policy trade-offs and how to identify them will be discussed. After the Master Class participants will be able to better judge the implications of circular bioeconomy policies and their potential implications for sustainable development. The Master Class will be followed by the BioMonitor Project Session that provides addtional insights into economic modelling of the circualr bioeconomy and will allow to deepen the knowledge gained.