Why is LCA

in combination with a regional context

important?

Brought to you by:

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Video one– Transcipt

In this video we aim to provide a simple overview of why we think this is important and what we mean by a regional context. We assume a basic understanding for life cycle approaches-so hopefully you can follow us...

Shot 1- Fossil to biobased systems



But first let us explain what a bioeconomy essentially is- the idea is that when we no longer use fossil derived products, like petrol or plastics or even domestic household cleaners, we will produce our different products as well as sourcing our energy from biobased sources. Biomass such as maize or even grass could be potentially used. In fact many countries around the world

have been using this biomass to create energy, like biogas for many years now.

Final shots-Closing out and credits



So after this short overview, we leave you with the key point:

Biomass is decentralized and is not so easy to process as oil and other fossil fuels-therefore the future biobased production networks will be more than likely decentralized and regional – baring this in mind- the regional contexts presented in this

video will be important if we want to effectively assess how we are managing our biomass resources and indeed our regional's natural resources too.

If you fancy some night time reading we have published a paper on it which explains all of these concepts in a bit more of a scientificy way..

Shot 2- Change of scale

But this will mean that instead of processing our raw material in

large scale centralised oil refineries, we will move towards more smaller decentralized scales— in other words biomass, like maize and grass, will be processed in smaller refineries that will be located at different locations around our local regions.

While the shift towards biobased products is seen a good thing, we still have to make sure that it really is and

so we need to check, using life cycle assessments in order to avoid any potential environmental impacts due to refining our raw materials and manufacturing different products out of them.



is an island—assessing bioenergy systems in a regional and LCA context: a review. The International Journal of Life Cycle Assessment. 2016;21(6):885-902.

O'Keeffe S. Maier S. Bezama A. Thrän D. When considering no man



region can affect the environmental impacts of biomass production across the region.

Shot 11- "Region and ROW context"



The second context that we determined was "Region and Row" with this context we still focus on a particular producing region, but this time we are not interested in the specific c locations within a region, but we are focused on the environmental burdens or benefits associated with the end use of a particular bioenergy product, such as the biofuels which we

already showed or another example is the case of electricity from biogas where we want to track the substitution effects and to see if the bioelectricity produced in our region is substituting fossil fuels sustainably.

Shot 3- Regional focus for biomass production



Therefore, for our biobased economy, with biomass being grown and processed in the regional landscapesimilar to what is currently being done for bioenergy-we need to account for how difference within the fabric of the regional landscape and how these can influence: 1) our biomass yields and hence yields of our products; and 2) the emissions produced as a result of

growing, harvesting and refining this biomass for a particular product.

Shot 12- "Regionally differentiated"

The third and final context – "Regionally differentiated", With this

context we shift our focus a little and we are more interested on how different regions are interacting with one another like the example where we want to compare different bioenergy sectors which are interacting between different regions, e.g., they are trading biomass products or biofuel products with each other. In turn,



the burdens associated with producing the biofuel or feedstock would become an upstream or downstream burden respectively for the region using these products, but a direct burden for the region producing it. However, how the burdens are attributed depends on the goal of the particular project and care must be taken to avoid double counting.

Shot 4-No man is an island

But as no man is an Island"– meaning that as all products are connected to the diversity of the world's economy. For a bioeconomy

this presents a challenge for life cycle assessments, as we need to find a balance between the increased need to focus on the environmental burdens produced in our region, but we also impacts from regional biomass production and processing, but we also need to account for those environmental burdens happening outside of our region. An example of this can be



shown with the products we use to grow our biomass in our region, as they are usually produced elsewhere but imported into our region. What this means essentially is that the biomass production in the region of focus is technically "responsible" for the environmental emissions coming from the production associated with the amount of fertiliser used in producing our biomass, even though it doesn't occur in our focus region, but it still needs to be included in our life cycle calculations.

Shot 5- Balance between Regional and Non-regional



Researchers at the Helmholtz centre for environmental research together with the DBFZ were faced with exactly this challenge of trying to produce life cycle approaches for regional biobased energy and it was our task was to figure out how we should look at a region as we needed to find an appropriate way for orientating our life cycle thinking and so to find the

balance.

Shot 6-Questions with a strong regional focus

the cars that burn it in their engines? For sure they will be sold on national or international markets and so this changes the context of our region and we now see it more as a region interacting with the rest of the world.

Shot 8- Questions regarding different trading regions

Another way to look at our region is when we want to find out how different regions are interacting with each other. For example when region A is importing biomass from region B and then exporting biomass to region C. This again gives us a different way of how we should view or region.



Shot 9-Light bulb moment



We figured out that if we can specify the regional context that's important to our questions or goals of our LCAs, this could help us to make our life cycle calculations a little easier.

We figured out three context which were rather helpful for regional bioenergy systems.

Take for example heat produced from biogas plants-this is generally locally used in local cattle sheds, houses, or hotels and so from start to finish or from "biomass-to-heating element" your production pathway is entirely held within a region. Therefore, this sets a predominant regional focus

Shot 7-Questions with both a regional and non-regional focus



However, it gets a little tricky when we want to find out more about the end use of bioenergy such as biofuel and whether the environmental consequences are better or not than the fossil fuels they are substituting. For example-it's very difficult to trace or get the information on where biofuels go after the factory get-where are they blended? and in which petrol station do they end up and where are Shot 10 - "Within regional context" The first context the within regional context focuses purely within our region and we are not really interested in what's going on outside of it, we don't ignore it, we just don't spend too much time on it-our details to be collected refer to within the region.



This is a useful context for the completely decentralised systems – like the example of heat previously given or more importantly for studies that really want to look to know how the fabric within the