AgroCycle H2020 Project
School of Biosystems and Food Engineering
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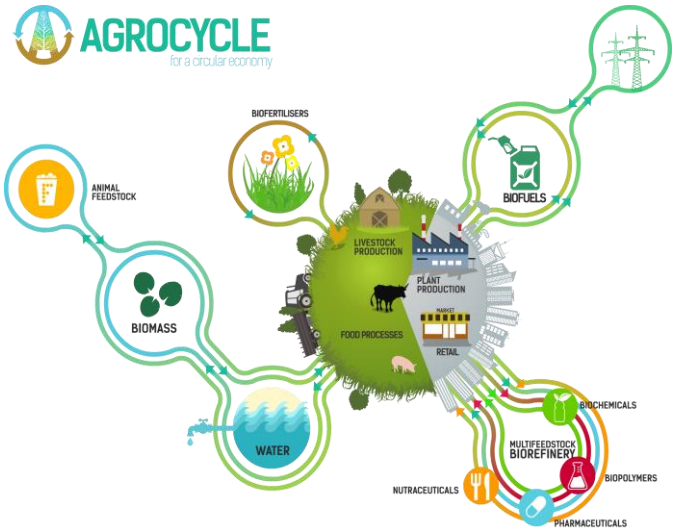

REF: Discussion document for the preparation of a National Policy Statement on the Bioeconomy

1. Does the broad definition outlined adequately encompass the opportunities presented by the bioeconomy?

This definition does encompass the opportunities that the bioeconomy offers. We would suggest that the definition be expanded to include the following point. The bioeconomy should have:

- the ambition to create a 'zero-waste' bioeconomy whereby waste is valorised to produce value-added bio-products.

2. How can a high-level policy statement on the bioeconomy assist in progressing the development of the priority value chains identified?

Any policy statement must provide both clarity and vision. One of the key areas where this is most relevant for the bioeconomy is in definitions and classifications of organic material streams perceived as waste. The classification of material streams as 'waste' or 'resource' has influenced how they are treated: 'resource' highlights its potential value, while 'waste' implies that it has little or no value. The high-level policy statement must help to clarify naming conventions (definitions).

A major part of the bioeconomy is organic wastes, co-products and by-products, generated throughout the agrifood chain (from farm to fork). Many of these material flows are perceived as 'waste' in the subjective opinion of the relevant observer, but may still be valuable resources in the agrifood system. A prime example is that of crop and other vegetable residues which can either be viewed as a potential input for valorisation or key resources to keep within the agricultural system (for soil stability and nutrients). To overcome this ambiguity, it has become important to categorize the biogenic agrifood wastes that are generated each year into 'avoidable' and 'unavoidable' wastes.

Avoidable wastes are material streams that have been mismanaged and disposed of, and are typically a mixture of different components (heterogeneous). These include wasted foods generated in processing, retail, catering and households. Avoidable agrifood waste occurs when foods are discarded because they are regarded as 'suboptimal', or when they pass their 'best-before' date, or due to product flaws. Unavoidable agrifood wastes, on the other hand, are materials arising from food production systems that

are not consumable, typically described as by-products, co-products, or residues (e.g. manures, crop residues, leaves, peels). Unavoidable agrifood wastes cannot be prevented and are typically homogeneous streams and are better described as a 'resource'.

The policy statement must differentiate between different types of material streams to avoid suboptimal utilization. The policy must clearly define between what should continue to be prevented (as per the waste hierarchy) and what should be promoted for valorisation within the bioeconomy. The overall goal should be enhanced operational efficiency along the full chain, from 'farm to table', minimising waste streams at all stages, and optimising the valorisation of the 'unavoidable' waste streams.

3. What lessons can Ireland take from the European approach, including to the Circular Economy?

European countries such as Denmark are leading the way in establishing and promoting a national bioeconomy. We can learn from how they have advanced and the challenges they have faced. For example, a clear need is the increased coordination and synergy among initiatives and projects dealing with the bioeconomy in Ireland.

The circular economy and bioeconomy are inextricably linked, hence it is essential that there is a high degree of coordination between stakeholders working in both domains, with policy taking a holistic view.

An interesting comment from a Danish bioeconomy report (A Bioeconomy for the Baltic Sea Region - Mapping of stakeholders, practices and opportunities (InnoGate), 2014) stated that there is a need to 'Make research and academic work in the fields of sustainable production and utilisation more attractive to future generations'. This will start with education and making sure the 'bioeconomy' as a concept is taught at an early age. If we are to transform our economy we need to make sure the next generation understands the bioeconomy concept from an early stage.

4. Given the cross-sector nature of the bioeconomy, how can a national policy statement best support development?

Align incentives – clear rules of the game.

The statement needs to be crosscutting and sector agnostic, it should encourage stakeholders from all sectors to consider adopting elements of the bioeconomy in their sector. The bioeconomy must not just be related to the agrifood sector. There is enough research now that shows how bio-based products can be used in all kinds of disciplines. For example, we are now seeing a move towards bio-based materials in the cosmetic industry. The policy statement should be broad enough so that it cuts across all sectors.

The policy statement should be bold and ambitious and give a target for the use of bio-based products over fossil-based. As such an ambitious target that states, for example - 10% of all fossil based materials replaced by bio-based by 2027.

5. Can we identify a common set of principles, including in particular the application of the cascading principle, which will assist in the development of both the bioeconomy and circular economy?

Life cycle thinking and in particular life cycle assessment has been used throughout Europe in order to assess waste management and to influence waste policy, e.g. the waste hierarchy. As such, and as commented on in point 7 of the report, 'sustainability cannot be assumed'. Therefore a framework, such as the one developed by the EU H2020 project AgroCycle (www.agrocycle.eu) should be adopted to give evidence based analysis of bioeconomy and waste valorisation pathways. The expertise does exist in Ireland to establish life cycle based principles for the bioeconomy.

The result of such an evidence based analysis could be something similar to the waste hierarchy, which enshrines the role of preventing and reducing the amount of waste generation as the top priority. A 'valorisation hierarchy' should be considered for organic material streams. Any policy statement should clearly define between what should continue to be prevented (as per the waste hierarchy) and what should be promoted for valorisation.

The bioeconomy is defined as those parts of the economy that use renewable biological resources (such as agricultural wastes and residues) to produce food, materials and energy, may not necessarily close resource loops in, for example agricultural production systems. Pathways that extend the 'linear chain' through utilising agricultural material streams but not feeding the resulting product back into agricultural production, such as creating bioplastic, should be viewed differently than circularisation within production systems.

Resources such as crop residues and manures can remain within the agricultural system but may also be valorised to produce energy/chemicals for the wider bioeconomy, thereby not being 'circularised'. Determining which pathways (closed loop agriculture vs. wider bioeconomy utilisation) are most effective for creating sustainable agricultural systems remains a priority for researchers and policy makers.

Clarifying the principles on what sustainable bioeconomy loops are is therefore crucial to implementing any effective bioeconomy policy.

6. How can a national policy statement support local and regional cooperation around the use of renewable biological resources?

A national policy statement should give a certain amount of autonomy to local and regional establishments. A main barrier with the establishment of a bioeconomy in Ireland is that organic feedstock (typically waste) has many inherent limitations, e.g. spatial and temporal distribution, cost of logistics, etc. Therefore, there needs to be flexibility to enable the establishment of very dissimilar regional bio-economy hubs in Ireland. In addition, priority should be given to the use of Ireland's natural resources in the bioeconomy in a local context; the document refers to "Ireland's ambition to be a global leader for the bioeconomy", however the sustainability of biomass and biomaterials for import/ export should be addressed.

7. *How can waste policy, including an examination of the definition of waste, best support developments in the bio and wider circular economy?*

The EUs definition of waste would have us think that many biomaterials found in agriculture are 'waste' if someone does not have a use for it. This would be wrong, as there is few biomaterials that are actually waste and have no use whatsoever. Therefore there needs to be a clearer definition of different bio-materials that could be perceived as waste.

We have published a paper that gave recommendations in this area. We suggest using: (i) "waste" strictly to describe those materials that are not utilisable and are disposed of in the biosphere sink, (ii) "residue" to describe those materials that are unavoidable, but not consumable for their primary purpose, and (iii) "wasted food" or "wasted product" for material that has been mismanaged and should never end up in a secondary processing technology, and should continue to be reduced.

8. *How can we stimulate market demand for bioeconomy products? What is in it for the consumer?*

Clear labelling and material passports; Awareness campaigns of the significance; Carbon tax on fossil based products; Incentives for bio-based product producers.

9. What is the most appropriate mechanism to coordinate development and monitor progress?

UCD is in the process of establishing a bioeconomy centre funded by SFI. It would seem appropriate that part of this organisations remit be the collection of data under three pillars of sustainability – environment; economic and social with well-defined KPIs. Furthermore, the AgroCycle H2020 Platform (see: www.agrocycle.eu) provides a pan-European and global perspective and network that should be utilised.

10. Are there any other issues to be addressed through a national policy statement?

Many biomaterials are produced consuming non-renewable materials. So the products may be 'bio' but their supply chain consists of many non-renewable biomaterials. Hence, there is a need to address how to make sure that policy acknowledges this, and does not create a 'sub-system' bioeconomy.