Territorial Metabolism Assessment of Advanced Agricultural Waste Technologies

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Background and context
This work will be completed as a part of the No Agricultural Waste (NoAW) project, which aims at closing the loop on agricultural waste by turning current waste products into ecological and economic assets.

Agricultural wastes, by-products and co-products (agro-waste) represent a large potential energy source, with some estimating upwards of 90 megatons of oil equivalent available for use annually. The utilization of that resource brings with it large opportunity for environmental benefits as well as the potential for monetization of a ‘waste’ product. However, while it is likely that accessing this resource for energy production or other alternative use, such as bio plastics production, would result in environmental benefits, such a result cannot be taken for granted. And, detailed study might aid the development of environmentally optimized technology and avoid the risk of environmentally sub-optimal systems and environmental impact burden shifting.

Recent study has shown that urban metabolism (UM) studies coupled with life cycle assessment (LCA), UM-LCA, can be effective as a tool for benchmarking the environmental performance of cities across a broader range of environmental impacts than previously possible with traditional UM studies. By expanding the UM framework to a territorial level, that of territorial metabolism (TM), a similar hybrid model, TM-LCA, can be developed assessing and benchmarking environmental impacts on a slightly larger scale. The potential environmental benefits created by utilizing agricultural waste as a replacement for traditional energy production methods could be well represented with modelling at the territorial scale, allowing for optimization of the system.

Main objectives
1. Develop a combined method of territorial metabolism and LCA, which will include determining issues and challenges in scaling from urban to regional or ‘territorial’ scale.
2. Create an inventory of the territory for wine making in the Languedoc-Roussillon Wine Producing Region and compare with other regions.
3. Perform a comparative TM-LCA+ (incorporating system dynamics and multi criteria decision analysis) which will provide recommendations for the implementation of agro-waste treatment technologies for the Languedoc-Roussillon Wine Producing Region.

Expected outcome
This project is intended as a piece in the puzzle of creating a future with no agricultural waste. The development of the TM-LCA, and its implementation in regional-scale assessments across the globe, should lay the groundwork for an environmentally conscious implementation of this change.