

Bioresource circularity in agriculture, forestry and aquaculture: typology of intra-sectoral and cross-sectoral solutions

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Introduction

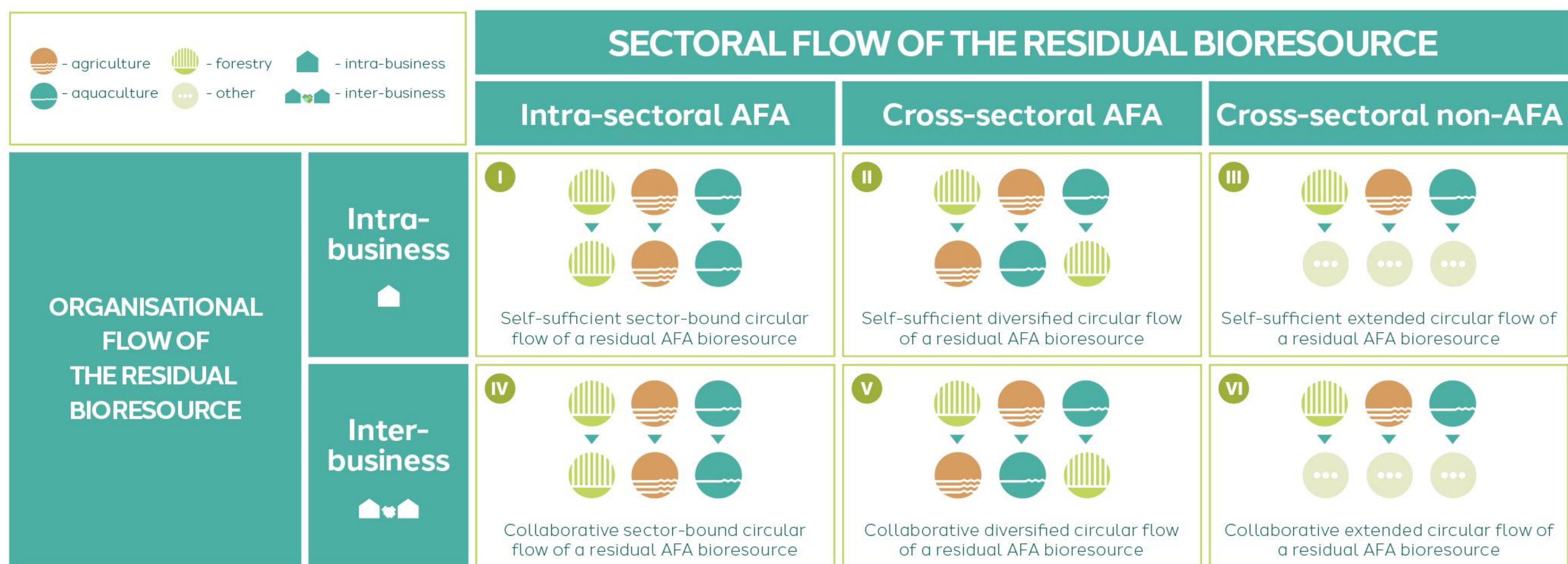
The widespread adoption of the 'reduce', 'reuse', 'recycle' and 'recover' principles inherent in the circular economy is a core aspect of future-proof development that aims to reduce waste and increase efficient use of resources. Promoting loop-closing practices and business models organised around circular resource use in value chains is of strategic importance. Unsurprisingly, food, water and nutrients are among the core foci of the Circular Economy Action Plan (EC, 2020). While the Action Plan touches upon agriculture, a broader, cross-sectoral understanding linking the bioeconomy sectors of agriculture, forestry, and aquaculture (AFA) is lacking.

Research Objective

The study has been carried out as part of a research project CIRCLE that develops an interdisciplinary perspective on circular bioeconomy in the Baltic-Nordic region and focuses on the role of collaboration in the development and implementation of circular solutions in AFA sectors. With the aim to explore and systematise the diversity of circular initiatives in the bioeconomy sector, we have built a typology that characterises circular flows of residual bioresources within and across AFA sectors and businesses. The typology is based on a collection of 120 diverse examples of circular solutions in AFA sectors in Latvia, Lithuania, Estonia and Norway.

Results & Discussion

The unit of analysis chosen for the construction of the typology was a specific residual AFA bioresource and its (1) sectoral flow (i.e., intra-sectoral, cross-sectoral AFA, cross-sectoral non-AFA), and (2) organisational flow (i.e., intra-business, inter-business). The intersection of the two dimensions results in six types of circularity initiatives that feature sector-bound, diversified, or extended flows of residual AFA bioresources managed in either a self-sufficient or collaborative way.



Example 1: Type I



Using in-house sheep manure and residuals of sheep wool as fertilisers for own grapes

Example 2: Type V



Using pine bark from log peeling for production of mulch in horticulture

Example 3: Type III



Using in-house chicken manure in a biogas plant for producing own electricity and heat

Conclusions



The proposed typology of circularity initiatives involving residual bioresources stemming from and/or finding their application in AFA sectors shows that there are notable variations in the way their flow is organised within and/or between different sectors and companies. The core categories of sectoral and organisational flow of bioresources underlying the typology offers a new way to conceptualise and systematise the rich diversity of practical arrangements in bioresource circulation, by integrating the technological and socio-economic aspects of circularity.

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