

Circularity Efficiency in EU Agriculture: Evidence from a Nonradial Network DEA with Waste Linking

Jing Peng

Department of Resource Economics, the Institute of Economics and Rural Development,
Lithuanian Centre for Social Sciences, Lithuania

April 22nd, 2026. Wednesday at MS Teams

08.00 – 09.00 AM (Amsterdam Time), 09.00 – 10.00 AM (Lithuania time), 14.00 - 15.00 PM (Beijing Time)

Abstract

Improving the circular use of energy, nutrients, and biomass has become increasingly important in European agriculture. However, existing research still provides limited cross-country evidence on how efficiently agricultural systems combine conventional production with biomass recirculation while containing environmental burdens. This study evaluates circularity efficiency in EU agriculture using a two-stage non-radial network directional distance function model. The model distinguishes production and circularity stages. A pooled variable-returns-to-scale frontier is established using 322 country-year observations from 2010 to 2023. The results show mean (non-oriented) efficiency scores of 0.904 for the production stage, 0.770 for the circularity stage, and 0.831 for the overall system, indicating that production-stage efficiency is generally higher, while circularity-stage efficiency is lower and more heterogeneous. The results suggest that cross-country differences in overall circularity efficiency are more closely associated with the circularity stage than with the production stage.

Nonradial decomposition identifies renewable energy generation, crop-residue use, nutrient surplus, and manure application as the main sources of inefficiency.

About the Presenter



Jing Peng is a PhD student in the Department of Resource Economics at the Institute of Economics and Rural Development, Lithuanian Centre for Social Sciences.

He holds an MSc in agriculture from South China Agricultural University. His research interests include agricultural economics, rural development, circular economy, and data envelopment analysis. His recent work focuses on circular economy in agriculture.

SuReFood

Interdisciplinary workshop

SuReFood interdisciplinary workshop is an online platform for (junior) researchers from different but related disciplines to exchange their academic thoughts and foster cross-domain collaborations between social and natural scientists. The focus of the workshop is on sustainable resources and environment management and safe and adequate food provision.

About SuReFood

The SuReFood is an alliance of Chinese and international scientists carrying out interdisciplinary research on sustainable natural resource use and food systems in China and other parts of the world. By joining forces, the alliance aims at increasing the visibility and societal impact of research in this field and at stimulating the exchange of knowledge. For more future event, you could follow us on Wechat or visit our website at <https://surefood.org/>

To join the workshop

To join the online seminars, you can click [here](#) to MS Teams, or join us with MS Teams: Meeting ID: **349 209 551 833 09**
Passcode: **tm7Co3Xk**

