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3s3 Supply chain transition: managing tools and sustainability assessment of innovations

WASTE MANAGEMENT AND CIRCULAR ECONOMY: BUILDING A CGE FRAMEWORK

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Growing population and per capita consumption is expected to generate about 3.4 billion tons of waste by 2050. A large part of this waste stream could be reused or recycled, however without intervention most of this waste will end up dumped or in landfill or incineration sites. The reuse, recycling and use of waste for materials, chemicals, energy and animal feed can contribute to a more sustainable, efficient and integrated bio-based economy.

This paper focuses on developing a methodology to include waste management in CGE modelling framework. The implementation of waste systems in CGE models is not yet a common practice. Work focusing on small fractions of the puzzle does exist - residues from agriculture and forest, food waste reduction - however exploring the possibilities of a truly circular system remains unfulfilled. In this paper we provide details on methodology and database required to implement waste streams in the CGE model MAGNET. Finally we show some simulation examples and results.

We modelled 5 different types of municipal solid waste (food, garden, glass, paper and other) generated by households, 3 waste collection services (green waste collection, glass and paper collection, grey waste collection) demanded by households to dispose the waste generated, and various options of dealing with the waste collected by including new sectors for waste treatment. The output of treatment sectors is used as a substitute for virgin materials in the economy, providing a direct link between waste and bio-economic sectors in the model. The system also tracks emissions as a result of using different waste treatment alternatives.

By including the explicit relationship between consumption, waste and waste treatment within the model, it becomes possible to look at relevant policy suggestions in context of a circular economy.

Keywords: CGE modelling; circular economy; municipal solid waste streams