

MFA and waste accounts in physical supply-use tables

Topic: Physical and hybrid input-output tables 2

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The paper describes a framework for MFA and waste accounts in physical supply-use tables (PSUT) making full use of all available datasets. The framework has been initially developed for the EU FP6 project FORWAST (Schmidt et al. 2010) and after a further refinement it is currently used for the construction of PSUTs incl. waste accounts within the EU FP7 project CREEA (Schmidt et al. 2012).

The MFA accounts are structured following the supply-use framework as of SEEA 2012 (United Nations Committee of Experts on Environmental-Economic Accounting 2011) with a few modifications in the terminology. Some of the major modifications include:

- the definition of products in this framework excludes secondary materials, which is included as part of the category 'materials for treatment' (see below);
- the term 'waste' is replaced by 'materials for treatment', which is not present in SEEA 2012. The new term is defined as an output flow of a human activity that remains in the technosphere and cannot directly (i.e. without further processing or emissions) displace another principal product of an activity. After processing in a waste treatment (re-processing or recycling) activity, the recovered materials for treatment may displace other products.

Furthermore, in order to accomplish a mass balance, a stock addition table is added to the Use tables in the columns of productive activities and final uses. By doing so it is possible to take into account both products and material for treatment with a lifetime longer than the accounting period, according to the destination activity.

PSUTs are created together with and in same classification as monetary supply-use tables (MSUT). The mass balance for industries is established via an iterative waste calculation procedure, which enables for the construction of detailed country specific waste accounts. The main idea behind the approach is that only a part of each type of input ends up being included in the final products. What is left out may end up either in the emissions or in stock additions or, finally, in 'materials for treatment'. The supply of 'materials for treatment' from an activity is so expressed in terms of originating flow, i.e. product, resource or 'material for treatment'. The use of the latter allows the calculation of waste with the broadest possible definition of waste, open to any desired waste definition, e.g. if it is desired to generate waste accounts according to SEEA 2012 waste definition.

In order to trace the waste pathway through the economy, the industrial production processes that involve re-processing of waste material and secondary material into new products are disaggregated into virgin and recycling production. This also involves technical disaggregation of joint production processes where secondary material is used. These activities dealing with secondary material are then considered as proper waste treatment ones. Further, a large number of different waste treatment activities are created through disaggregation of the waste industries in the original MSUT, permitting to account the pathways of different waste fractions.

The calculated 'material for treatment' is integrated in the PSUTs where these flows can be interpreted as waste flows. The principal product of waste treatment industries is the service to treat waste. When a 'material for treatment' is recycled/re-processed into new products, these are

off-diagonal by-products in the supply table. On the other side the waste generating industries and households have entries in the 'material for treatment' rows in the physical use table. This is interpreted as these activities use the service to have waste treated. Hence the final PSUTs represent an integrated account of products and waste flows service as intermediate transactions within the economy.

The presented framework and waste calculation procedures has been tested for EU27 and Denmark in the FORWAST project, and currently it is used for the creation of MFA and waste accounts for 43 countries as part of the CREEA project. Further, since the PSUTs are classified with same products and industries as the MSUTs, the approach enables for the creation of a fully balanced (economic, mass and energy) hybrid supply-use table enabling for new and better quality hybrid life cycle assessments.

References:

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Schmidt J H, Merciai S, Delahaye R, Vuik J, Heijungs R, de Koning A, Sahoo A (2012), Recommendation of terminology, classification, framework of waste accounts and MFA, and data collection guideline. Deliv. 4.1 of the EU FP7 project CREEA. <http://creea.eu/> (in press)

United Nations Committee of Experts on Environmental-Economic Accounting (2011), October draft of the handbook of the system of environmental-economic accounts (SEEA) 2012.