Sustainability, consumption, resource productivity: regional material flow accounts

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M. Carme Saborit, Jordi Galter, Cristina Rovira

The Statistical Institute of Catalonia (Idescat), Barcelone, Spain

# Introduction

# The United Nations defines sustainable development as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’. Sustainable development necessarily entails decoupling the consumption of resources from economic growth.

# Material flow accounts (MFA) shows the physical inputs of materials which enter the economic system and the outputs generated in terms of physical units. These accounts enable us to obtain a set of aggregate indicators on the use of natural resources, from which productivity indicators can be derived.

# The Statistical Institute of Catalonia, is conducting a statistical project on the material flow accounts with the aim of facilitating a detailed description of the interactions between the economy and the environment, providing information on the sustainability of our economic model in accordance with the harmonized methodology defined by Eurostat, adapted to the regional scope (NUTS 2). This project is also justified by the need for data and indicators derived from the circular economy policies for which the MFA is a fundamental pillar. The Regional Government’s 2017 approval of the drawing up of the National Plan for the implementation of the 2030 Agenda for sustainable development and the National Pact for Industry, which has an axis devoted to sustainability and the circular economy, have helped to promote the project. The Statistical Institute of Catalonia also forms part of the working group of the CITE (Interterritorial Statistics Committee) on indicators of the 2030 Agenda for sustainable development, with the purpose of exchanging methodological experiences on the preparation of the SDGs, and is establishing synergies with a technology centre in relation to the UrbanWINS project and promoting the integration of these results into an articulated information system, in cooperation with entities linked to the management of environmental and sustainability policies.

# This paper addresses the methodological adaptations which have been necessary and the limitations currently detected. It also outlines the guidelines for the future development of this module for environmental accounting in official regional statistics.

# Methods

# The methodology used is an adaptation to the sub-state scope (NUTS 2) of the methodology defined by Eurostat for member States (national economies), as there is no comparable standardized, harmonized and generalized methodology at a regional level.

# The main innovation with respect to the methodology defined by Eurostat consists of the inclusion of interregional trade (see figure 1), which constitutes a methodological challenge owing to the difficulty of comprehensively quantifying the inputs and outputs of materials without having a systematic register of physical exchanges.

**Figure 1.** Conceptual framework of the MFA adapted to the regional scope



# Source: Adapted from Eurostat.

# To quantify interregional trade, the methodological option adopted has consisted of taking into account different sources of statistical information according to the means of transport: road, rail, ship (cabotage), plane and pipeline. The use of new data sources (according to the means of transport) has meant standardizing the classifications of products and goods from each of these sources (which have their own product classifications), in order to integrate them and make them compatible with those for international trade and domestic extraction. As a result, an analytical classification has been created with two components, one related to the degree of production and the other to the type of product/material, and only the transformation of the ad hoc classification of rail transport into the analytical categories is still to be completed.

# Similarly, the methodological work continues in the case of the interregional transport of goods by plane (in our case, of little importance) and the interregional trade of fossil fuels by pipeline, currently calculated as the balance between production, consumption and international exchanges.

# Results

A retrospective series starting in 2000 has been drawn up, the results of which, in physical terms, complement the monetary information available in the economic accounts.

The results that are included in this paper focus on the most relevant indicators useful for evaluating the political objectives of sustainable development, namely resource productivity and domestic material consumption and its components. They reflect the close link between the increase in material consumption and the domestic extraction of non-metallic minerals and cement consumption, in other words, the construction sector. The indicators in the data for the region reflect the considerable effect of the real estate boom which lasted until 2007 (and, therefore, the construction sector, highly intensive in terms of material consumption) and the subsequent economic crisis in the 2008-2013 period. The start of the recovery of the sector, which took place in 2014, is also reflected in the rebound of consumption and the domestic extraction of non-metallic minerals.

 

 

# These results show the effects of the evolution of the sectoral economic structure on the development of the MFA indicators. In order to draw conclusions, it appears necessary to separate the effects or the contribution of an improvement in the resource productivity or the changes in consumption habits from the effects caused by differences or changes in the sectoral structure of an economy with respect to a greater/lesser influence of intensive sectors on the use of materials.

# Conclusions

# In this project it has been necessary to make adaptations to the methodology developed by Eurostat for national economies, given that there is no comparable standardized, harmonized and generalized methodology at a regional level (NUTS2).

# The main adaptations have consisted of the inclusion of interregional trade according to the means of transport, which has generated the need to converge the different classifications of products/materials available in each source in a common classification, in order to make them compatible with those for international trade. To do so, an analytical classification has been created which includes two components, one related to the degree of production and the other to the type of product/material.

# As the MFA is a statistical synthesis project, it has also served to detect statistical limitations and shortcomings, which must be addressed in order to complete the physical account balance of the economy. The results obtained until now have enabled us to detect the effects of the sectoral economic structure on the MFA indicators and to show that it is necessary to separate the contribution of these effects with respect to the improvement in the material productivity of the resources and the changes in consumption habits.

# The most immediate steps will consist of establishing the mechanisms permitting progress in the conceptual and interpretative basis of the MFA, as well as the detection of the sectors with key contributions to the improvement of the sustainability of the regional economy. It is also necessary to think about the suitability of the territorial comparability between state and regional data and on which magnitudes and indicators permit the establishment of rankings.

# The MFA is undoubtedly a useful tool for enhancing a debate on the productive model of the region, and its regular calculation will be crucial for evaluating economic policies and decision-making related to the efficient use of natural resources and waste prevention.

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