Carbon footprint of human settlements in Spain

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The role of towns and their inhabitants in fighting climate change is becoming increasingly important (Shi et al., 2016). In this context, the aim of this paper is to apply a multi-regional input-output model to study the evolution of the carbon footprint for Spanish households as determined by the different type of settlement. This study analyses the household carbon footprint as a function of the municipalityâ€™s population size, whether it is located in a rural or urban environment, and its relation to population density. By using a multi-regional model we are able to calculate the share of that carbon footprint that is generated within the settlement and the share that is produced around the world along global value chains. This methodology has been widely applied to study carbon footprints for households in terms of different characteristics: income levels (Duarte, Mainar & SÃ¡nchez-ChÃ³liz, 2012), age (Shigetomi, Nansai, Kagawa & Tohno, 2014), consumption of agriculture products (LÃ³pez, Cadarso, GÃ³mez & Tobarra, 2015), or tourism consumption (Cadarso, GÃ³mez, LÃ³pez & Tobarra, 2015).
The structure of household consumption as a function of the type of settlement will be used to analyse whether socio-economic features are the greatest influence in the level of carbon footprint, or by the contrary, structural, institutional or geographical factors of the settlement are more relevant. Previous literature has addressed this link in other countries, for instance Fan, Guo, Marinova, Wu & Zhao (2012), Jan et al. (2013), Baiocchi, Creutzig, Minx & Pichler (2015) or Ahmad, Baiocchi & Creutzig (2015), but not for the Spanish case.
Regarding data sources, we propose combining the World Input-Output Database (WIOD) and the Household Budget Survey for the Spanish economy, in order to analyse the carbon footprint from household consumption for the period 2006-2014.
In terms of carbon footprint from goodsâ€™ purchasing, our analysis leads us to conclude that the geographical, structural or institutional factors have a moderate impact, as the carbon footprint increases slightly with population size and density. Higher income levels in bigger and densely populated municipalities explains this growth, as it overcomes the lower emissions per euro as the emissions intensity is lower than in rural areas. Consumption of electricity and gas has the largest share in this carbon footprint, either directly by households or indirectly by means of the required electricity to produce goods and services. Nevertheless, when we compare our results to previous findings, we can conclude that socioeconomic features (income distribution, age of the head of the household, household size) have more importance on total carbon footprint.