An Extended Input-Output Table for Organic Farming

Topic: Land-use change and agriculture
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The agricultural sector plays a key role in the context of Sustainable Development. On the one hand, it has a significant impact on the natural environment, for instance through greenhouse gas (GHG) emissions or the use of pesticides. On the other hand, agriculture will have to adapt to global warming, changes in precipitation and further challenges. Moreover, when consumers try to adopt more sustainable lifestyles, many of their decisions involve the use of agricultural products. They would like to know, for instance, the ecological footprint associated with a vegetarian or vegan diet, different types of farming (conventional or organic), and preferring regional products to imported products that may have travelled thousands of kilometers (â€œfood milesâ€•).
In principle, input-output analysis (IOA) can be a useful tool for studying the environmental impacts associated with food consumption and agricultural production. However, there are severe restrictions in terms of data availability. In the case of Germany, the official input-output tables represent agriculture in a rather crude form as only one industry (i.e. one column) and agricultural products are represented as one aggregated commodity (i.e. one row). The same is true for many other countries. These data limitations make it virtually impossible to distinguish between different types of food and different farming practices.
The goal of the present project is to explore how an extended input-output table could enhance our understanding of the links between nutritional choices, agricultural production, and the associated environmental impacts. We focus on the difference between organic farming on the one hand and conventional farming on the other hand. The project involves a literature survey, conceptual work on the input-output table, fieldwork in the form of interviews, and the construction of an extended model for the German economy with a disaggregated agricultural sector.
Previous research on different types of farming has identified significant differences between organic and conventional farming. One stream of literature focusses on the relative efficiency or profitability of the two different approaches (Breustedt et al., 2011, BrÃ¼mmer, 2001, BrÃ¼mmer et al., 2002, Kumbhakar et al., 2009, Oude Lansink et al., 2007, Tzouvelekas et al., 2001). Another stream is concerned with the environmental impacts resulting from food production and agriculture. These studies are often based on life-cycle assessment (LCA), focusing on individual products (Andersson et al., 1998, Berlin, 2002, Cederberg & Mattsson, 2000). Although LCA is conceptually similar to IOA; it has different advantages and disadvantages. Therefore, some authors have applied a combined IOA-LCA approach to the analysis of agriculture (EngstrÃ¶m et al., 2007).
The present project contributes to the literature with a case study of German agriculture. Its goal is to develop an extended input-output table, where the agricultural sector from the official table is split into â€œorganic farmingâ€• on the one hand and â€œconventional farmingâ€• on the other hand. We hope that the extended table will be useful for a variety of applications. For example, it can be used to study the difference between households consuming products of organic farming and products of conventional farming, including the environmental impact (e.g. greenhouse gas emissions) as well as the direct and indirect employment effects.
We have contacted a number of farmers who have agreed to participate in semi-structured interviews. Three interviews have already taken place, further interviews will be conducted in February of 2018. Our goal is to have preliminary results by the end of February. Final results of the project will be presented at the international input-output conference in June.