

From Vineyard to Point of Sale: Allocation of Energy Use and CO₂-Emission to entire Supply Chains of Wine

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The German wine market in total amounts to 20,000,000 hectoliter per year. This is equivalent to an average consumption of 24 liter per capita. Almost 67 % of that volume is imported, mainly from France, Italy and Spain. Imports from overseas – countries of provenance are the Americas, South Africa, Australia and New Zealand - are becoming more important for the German market.

In that context the public is complaining about “food miles” and the assumed waste of energy and associated release of CO₂ by global transportation. People believe that the marketing distance proportionally determinates the ecological burden. Our scientific hypothesis published as theory of “Ecology of Scale” claims just the contrary: The ecological impact allocated to the functional unit is definitely decreasing if the business size increases, and is more or less independent of the transportation distance [Schlich 2004, Schlich 2005].

Our hypothesis has been proved by wine as case study. We researched supply chains of wine bottled at the places of origin in Germany, in Europe, and in South-Africa as global provenance. Actually we were looking at the energy use of each step. The investigated supply chains include primary production of grapes, transportation of grapes and must, wine cellar and bottling facility, and finally shipping to the Point of Sale in Germany. Balance time is one legal year. Finally the results are allocated to the functional unit, in the present case to one bottle of wine (0.75 l each).

The results significantly verify our theory of Ecology of Scale. Increasing business size of the winery is causing lower ecological impact of the entire supply chain because of higher efficiency of production and transportation units. This has been proved for energy use and for CO₂ release (Carbon Footprint). The data are definitely not proportional to the distance between place of origin and PoS [Schröder 2007, Schlich 2008].

German regions turn out to be successful and competitive in terms of energy use and CO₂ release if the local vineyards produce more than 100,000 bottles of wine per year. Many German wineries outreach this “break even”- business size. In that case the supply chains cause a specific energy use of less than 3.6 kJ per bottle.

Obviously, the data clearly demonstrate that global import from overseas to Germany of wine bottled at the place of origin has not to be blamed for supposed high ecological impact. In some cases the extraordinary efficiency of global container logistics can even induce lower ecological impact allocated to one bottle of wine regarding energy use and CO₂-release compared to small German local supply chains of wine.

Further investigation is focussing on the ecological impact of the ultimate consumer which is mainly caused on account of shopping by car.

References

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