A Quality Strategy for Sustainable Consumption?

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Abstract

This article discusses the opportunities and limitations in a quality strategy for sustainable consumption (SC), which implies a shift in consumer preferences towards a larger share of expensive 'quality' products. The article focuses on application of the strategy in relation to food products – that represents the most important product group when it comes to global warming in European households. The hypothesis is examined through a case study of wine and beer, and a discussion of other food products including organic versus non-organic food. The article should be seen as a tentative assessment, which can be a first step towards a more thorough comparative LCA of conventional and quality versions of different food products.

Key words: Green house gasses, food, quality, sustainable consumption, life cycle assessment (LCA)

1. Introduction

A fundamental challenge concerning sustainable development (SD), is how to create the basis for a world that can support 9-10 billion inhabitants that are pursuing the western life stile based on a nearly insatiable consumption of material goods. The IPAT equation, generally credited to Erhlich and Holdren (1971), says that the environmental impact (I) is a function of the population size (P), the affluence level (A) and the technology (T). Due to ethical reasons, it is difficult to address the P factor directly, but assumingly population growth will be stabilized through increased affluence level at some point. Proponents of a sufficiency strategy suggest addressing the affluence level (A), by reducing the consumption in the rich countries, and obtain higher life quality by other means than material goods. Finally, an efficiency strategy implies addressing the T, by technological improvements that reduce the environmental impacts per unit of product that is produced and consumed.

1.1. Efficiency through labour intensive production and consumption

While examining the potential in 'efficiency strategy' (focusing on the T in the IPAT equation), this paper propose that it is relevant to distinguish between an efficiency strategy that address 'technological' improvements as described above, and a strategy that promote 'labour intensive' production and consumption. Existing studies have shown that labour intensive products, such as services and products with high service content, represent a relatively small environmental burden, because human labour comes with no or little associated environmental burden, and because they bind a scarce production and consumption factor, human labour or time – see e.g. Weidema (2005). This is also referred to as the time rebound effect. One example of products with higher service content could be quality products which in many cases has involved more design, more knowledge, more attention to detail and other factors that often absorb labour. This strategy has an additional advantage as it binds another scarce production and consumption factor, namely money, because quality products typically are more expensive. This is referred to as the money rebound effect, and suggests that it is relevant to measure environmental burdens per product 'value' e.g. expressed as greenhouse gas (GHG) intensity, which is GHG emissions per monetary unit (Weidema 2008, Thiesen et al. 2008).

Studies exist that estimates the environmental burden as a function of increasing income level based on Input/output Life Cycle Assessment (IO LCA) (Thiesen et al. 2008, Hertwich 2005), but as the

product categories are highly aggregated, it is not possible to e.g. distinguish between 'normal' versions and more expensive 'luxury' versions of the same product. Hence, it is indirectly assumed that the environmental burden is the same per unit of value for an expensive and cheap version of the same product. Our assumption is that this provides misleading results, as it implies a linear relationship between income (or spending) and the environmental burden. It also hides the potentials in a quality strategy for sustainable consumption (SC), where we buy less - but better altogether.

Why not buy 'less and better' meat and wine, or simply just buy 'better' food products, as long as it is expensive enough and represent a significant negative money and time rebound effect that will reduce the overall consumption. There are obviously ethical and practical limitations of this strategy in relation to low-income groups especially in developing countries. It should therefore be stressed that this article therefore focus on consumer behaviour in middle and high income groups in the worlds wealthiest regions such as Europe and North America, where the largest environmental impacts per person also occurs. Globally the middle and high income groups are growing significantly in numbers.

1.2. Income drives the consumption

Within Life Cycle Assessment (LCA) it has been common practise to measure environmental impacts per functional unit. This can be a useful approach, but this does not mean that we generally stop buying more products when we have obtained certain functions. It seems more probable that it is the size on our salary or return on investments that set the limit of how much we buy. In this perspective, it is better to measure the environmental impacts per monetary unit (e.g. per Euro spend) – and the more money we can tie to a purchase of a car, a chair or a bottle of red wine, the better. By this yard stick, an expensive chair is 2.5 time more environmental friendly than a cheaper model, if it costs 5 times more and represents 2 times larger impacts. For food products this logic propose that organic food is more environmental friendly than conventional food, not necessarily because it represent a lower environmental burden per kg, but because it is more expensive. The consumer has less money to spend on other products, when buying organic. This is also called marginal consumption. In a comparative LCA of two cheese products, an expensive and a cheap version of yellow cheese, it was shown that the cheap version had a significant larger carbon footprint (compared to the expensive version) when marginal consumption was included (Thiesen et al. 2006).

IO LCA also measures environmental impacts per monetary unit, and shows that environmental impacts rise as a function of income level or expenditure, almost in a one-to-one relationship (Hertwich 2005, Thiesen et al 2008). This indicates that consumer habits does not change significantly as we become wealthier – at least not considering the product categories. But the existing studies have not considered that there probably is shift towards a higher percentage of luxury products within the same product categories. It is the basic hypothesis of the present article, that wealthier consumers generate smaller environmental impacts per monetary unit, not so much because they eat more at restaurants, or go more in the theatre, while travelling less – but because they eat at more expensive restaurants and select more expensive vacations. For food in particular, it is evident that rich people do not eat more in terms of energy but they eat better or more exclusive and expensive. So what happens if average consumers change their consumer patterns towards luxury/quality products – will this reduce the environmental impacts per monetary unit significantly? Is this a feasibly strategy to promote sustainable consumption (SC)?

2. Method

The hypothesis 'that quality products represent a feasible strategy for SC' is examined through a conceptual LCA of wine and beer, as well as a qualitative assessment of other food products – in particular organic versus conventional food products, when a significant price difference exists. The two cases represent extreme cases – both in terms of product types and regarding the price differences between the cheap and expensive alternatives that are analysed. The cases are therefore NOT representative for average food consumption, but are intended to be illustrative cases that can highlight the potentials and limitations in a quality strategy for SC. The assessment will focus on the contribution to global warming (or carbon footprint) and will include considerations of rebound effects.

Besides food products, there are other product categories such as transport, housing, textiles etc, which could be interesting to analyse, but this has been considered out the scope of the present article.

Hence, besides a few references to other products categories, the present article will mainly address food products. It is obvious that there are limitations to a quality strategy for SC, the purpose of this article is to identify cases within the scope of food products, that both support and contradict the hypotheses – and to discuss the opportunities and limitations of such a strategy in relation to different types of food products, but also in relation to how it could be used in a governance perspective. The attempt of the article is not to come up with a final conclusion whether a quality strategy is or isn't a feasible strategy for SC, but to identify cases where it seems likely (or unlikely) and to assess the magnitude of the improvement potentials. Also it is the objective to address the limitations of such a strategy, both regarding product groups and possibilities for implementing the strategy – seen from a governance perspective. The article should be seen as a tentative assessment, which can and a first step towards a more thorough quantitative assessment of a larger number of basic food products.

3. Case study of Wine and Beer

3.1 Expensive versus cheap wine

For wine, the focus on quality has been a natural part of the business for a long time. Wine is in itself, a luxury product, but there are easily price differences of a factor 5 between a cheap red wine that can be purchased for around 30 Dkr per litre and an relative expensive red wine (e.g. an Italien Chianti), which easily costs 150 Dkr per litre (Holtevinlager 2009). There has been made several studies of the carbon footprint from wine production and the results vary considerably. However, according to the more detailed studies the carbon footprint amounts to roughly 2 kg of CO_2 per litre of wine (red or white), which includes growing, wine making, bottle production, packaging, and transport to retail (Garnett 2007). For the cheap wine this gives a GHG intensity of 67 gram CO_2 per Dkr of wine, while it is only 13 gram CO_2 per Dkr for the expensive wine, assuming they have the same GHG emissions per litre[1].

The relative expensive wine appears to be the more eco-friendly alternative, in this perspective. But if the expensive wine represents significantly larger GHG emission measured per litre, this may not be true. In this regard, it is unlikely that expensive wine has significantly higher emissions for the transport, bottle making and packaging (compared to cheaper wines). For comparison, it is therefore mainly interesting to focus on the growing and wine making stages, which represents less than 1 kg of CO2e per litre according to Garnett (2007). According to Garnett (2009) it is possible that the expensive wine represents higher GHG emissions during processing and storing, but it appears that we are dealing with small differences and probably not more than a factor 2 (as a worst case) in a life cycle perspective.

Buying the cheaper wine would save 120 Dkr. Assuming that the consumer uses these 120 Dkr to purchase other products, modelled as average Danish consumption[2] as suggested in Thiesen et al. (2007), the impact for marginal spending would be about 12 kg CO2e per litre of cheap wine. Adding this to the cheap wine gives 14 kg CO2e per litre (for the cheap wine), which should be compared to 2 kg CO2e per litre for the expensive version – a difference of a factor 7. Even if the GHG emission per litre of wine should be twice as big for the expensive wine (lets say 4 kg CO2e per litre), the GHG intensity would still be 3.5 times smaller! In many cases expensive wine has fewer yields due to cutting of grapes but also due to the physical condition of the soil. From a farming perspective the best wine fields are considered as extensive farming fields, often hilly and with a lot of chalks stones and very little humus.

3.2 Expensive versus cheap beer

Compared to wine, there are generally smaller but still significant price and quality differences on beer. The expensive quality beer is often brewed on micro-breweries, which according to Garnett (2009) typically have a higher environmental impact per litre of beer, compared large scale mass production. The difference can be up to a factor of 6 in energy consumption per litre brewed beer, but there are also efficient microbreweries that perform better than large scale breweries, according to Garnettt (2009). In

[1] According to Weidema et al. (2005) the GHG emissions for average Danish consumption of wine and spirit amounts to 88 gram CO2e per Dkr in basic prices. This means that it is per Dkr excl transport and trade margins and taxes on products and processes (Schmidt 2009).

[2] The GHG intensity for average Danish consumption is roughly 100 g CO2e per Dkr (Weidema et al. 2005). The 100 g CO2e per Dkr is in basic prices.

Denmark, normal pilsner can be purchased for 6-9 Dkr per litre, while the more exclusive quality beers from microbreweries costs 30-70 Dkr per litre (Olpriser 2009). This gives a price difference of approximately a factor 3 to 11. If the GHG emissions from the two types of beer are the same - the GHG intensity of the quality version would be 3-11 times smaller compared to the normal pilsner. The GHG emissions are approximately 1 kg CO2e per litre beer (bottled) in a cradle-to-gate perspective and around 1.5 kg CO2e if the use stage is included. The latter involves both transport and cooling (Garnett 2007, Kissmeyer 2009, Weidema et al 2005). If we compare a 'normal' beer that costs 7.5 Dkr per litre with a luxury beer that costs 50 Dkr per liter – this would amount to 200 gram CO2e per Dkr for the normal beer and 30 g CO2e per Dkr for the quality beer[3].

According to Garnett (2007), it is only about 15% of the GHG emission that are related to agriculture, malting and brewing in the whole life cycle of beer. The remaining 85% of the GHG emissions are related to transport, bottle production, packaging, cooling etc – where it is unlikely that large differences exists. This means that the impacts from agriculture, malting and brewing should be about 30-70 times larger for the expensive beer, if the GHG emissions per Dkr should be the same. This is probably not realistic. Based on information provided in Garnett (2008) it must be assumed that the difference in the brewing stage normally is less than a factor of 3. If we assume that the difference is a factor 3 for both agriculture, malting and brewing this would suggest that the expensive beer represent 1.95 kg CO2e per litre instead of 1.50 kg CO2 e per litre – a difference of only a factor 1.3.

However, one problem with quality beer from microbreweries is that the bottles are not reused, but only recycled in Denmark. The reason is that they have many difference shapes, sizes and colours, which makes it difficult to handle in a re-use system. A very conservative estimate would therefore be that the bottle comes with out GHG emissions for the cheap version, due to the recycling system in Denmark. This would reduce the emissions to 1 kg CO2e per litre for the cheap version, while it would still be 1.95 kg CO2e per litre for the expensive beer if we assume that it is brewed in relatively inefficient microbreweries. It seems plausible that a factor of 2 in differences is a worst-case estimate for the quality beer, just as for the wine case.

Buying the cheaper beer would save 42.5 Dkr. Assuming that the consumer uses these 42.5 Dkr to purchase other products, modelled as average Danish consumption, the impact for marginal spending would be about 4.3 kg CO2e per litre of cheap beer. Adding this to the cheap beer gives 5.75 kg CO2e per litre cheap beer, which should be compared to 1.5 kg CO2e per litre for the expensive beer – a difference of almost a factor of 4. And if the GHG emission per litre of cheap beer were 1 kg CO2e per litre while the expensive beer represented 2 kg CO2e per litre – as suggested above, the difference would still be more than a factor 2.5 when marginal consumption is included!

3.3 Discussion of limitations

It must be acknowledged that the selected cases are extreme case as they reflect price difference of several factors. But there are also other limitations. First of all wineries do 'not' have a quality adjustment system that can be varied independently of external factors such as weather and soil quality. Hence, it could be argued that there are certain production constrains for high quality wine (at least for certain types of quality wine). Secondly, even though it seems plausible, it has not been documented that the expensive wine involves more labour, service or knowledge etc. Thirdly Garnett mentions that wine growing yields vary considerably (a factor 5 to 10), and that the best wine sometimes (but not always) come from areas with low yields, suggesting more land use (including GHG emission from landuse) for expensive wine. In many exclusive wine areas as Burgundy, Priorat Bordeaux, Pimonte etc the soil is considered as very poor farming soil. In the world of wine the 'terroir' determine the characteristics of the wine and the consumer pay a high price due to low yields and 'taste' of the soil. More land use could be a problem, but it should also be considered that other crops would have similar low yields on this type of soil. Another aspects worth considering is that significant amounts of bulk wine is used for fermentation in Europe – suggesting that there is a over production of wine.

As it appears there are many things to consider, and it must be concluded that more knowledge is needed before it is possible to confirm or falsify the hypothesis for wine. In the case of beer, it appears that the tentative assessment confirms our hypothesis. And if it is assumed that the quality beer is

[3] According to Weidema et al. (2005) the GHG emissions from average Danish consumption of beer amounts to 75 gram CO2e per Dkr in basic prices.

produced by microbreweries, it is also reasonable to assume that more human labour (and 'know-how') is involved per litre of beer. Due to the screening nature of the case study, the hypothesis cannot be confirmed as such, but it does seems plausible that the GHG emission per Euro beer are 'considerably' smaller for exclusive speciality beers compared to a 'normal' discount pilsner.

4. Other food products

Significant price and quality differences exists for other food products as well, but it has been difficult to identify LCA studies of discount and quality variants of the same food products for e.g. bread, potatoes, rice etc. However, there has been made several studies of organic versus non-organic food products – where there are often price differences of between 10 and 50%. Concerning the contribution to global warming, the literature suggests that it is not possible to make any clear cut conclusion about what is best; organic or conventional growing practises. It depends on many factors, such as the type of food product, the farm, the country etc, and there can be larger differences between farm types than between organic and conventional versions of the same product (Garnett 2007, Florén, Flysjö and Lorentzon 2006, Nilsson 2006). But none of these studies consider price differences. If it is assumed that the contribution to global warming is roughly the same per kg of milk, meat, flour etc. the GHG emissions per monetary unit would be significantly smaller for the organic products. Acknowledging that is very difficult to make a fair comparison, especially considering the difference in functional units and other environmental impact categories, it seems to be a case that supports the hypothesis that environmental impacts can be reduced by purchasing more expensive 'quality' food. The same conclusion would probably be obtained comparing Max Havelaar labelled food products with conventional products, or seafood products from the Marine Stewardship council with non-labelled seafood products. For Max Havelaar it is plausible that some of the extra profit goes to salaries and better working conditions for people in developing countries – thus confirming that more expensive products tend to bind labour. More labour is also related to developing and implementing the eco-labelling schemes, and it could be argued that the products have a higher service content in this perspective as well.

Other examples of more expensive quality products would be quality ripe cheese, which may involve more maturing time and labour than 'conventional' cheese. The same applies to meet – e.g. comparing a matured air dried Parma ham, with a discount version of ordinary ham. In both cases the price difference can be anything from some percent to several factors – and in both cases there are probably not great differences in the environmental impacts from the primary production, which causes the largest environmental impact from most food products. To the extend that expensive quality products are purchased in local speciality stores compared to large supermarkets outside the city, additional benefits can be obtained regarding binding labour and possibly transport.

5. Discussion and Conclusion

Acknowledging that more research is needed, it appears that significant reductions in environmental impacts can be obtained by purchasing more expensive food products. As illustrated by the two cases of wine and beer, it appears that improvements of several factors can be achieved by chosen expensive alternatives. Considering the strong focus on eco-labels, and sustainable consumptions in recent years, it is strange that so little attention has been paid to a 'quality strategy' for sustainable consumption. It appears to be one (of many) paths to dematerialisation, because more money will be tied to the same amount of products that we buy. In some cases the expensive food products are most likely already more environmentally friendly (measured per kg of functional unit) – e.g. organic or Max Havallar labelled food products. And when the price difference is included in the assessment – it becomes a win win strategy. This also applies to noon-foods – e.g. for textiles, where the cheapest textiles are more likely to originate from areas with child labour and bad occupational health and safety conditions.

The tentative assessment in this article also points towards potential limitations in the merits of a quality strategy. As illustrated by the case studies, an expensive wine might represent a larger land use (measured in hectares per litre wine produced), and the beer case showed that expensive beer from microbreweries may represent a significantly higher energy use at the processing stage. There are many other examples of food products, where the expensive version probably represents a larger environmental burden per kg. This could be due to slower processes involving more employees, for storing

of e.g. wine, cheese and meat, and selecting only the best fruit and vegetables. However, taking price differences into accounts this is not likely to be the case, as illustrated by the two cases. But when the economical aspects are taken into account, it also means that assumptions are made about the average consumers alternative purchases e.g. that they reflect average consumption. If the consumers (or a specific consumer), however, use the saved money (from buying the cheap products) on investments in green technologies, rainforest conservation and carbon credits, the results change radically. In this case, a quality strategy for SC would be counterproductive and irrelevant. The question is if it is faire to base consumer advice (e.g. to quality products) on assumptions about the consumers behaviour in other purchase decisions (e.g. that the consumer will act as an average consumer). From a governance perspective another problem would be that a qualitative strategy would be unethical in developing countries where 'consumers' are struggling to get enough food. The ethical dilemma also exist in relation to the low income groups in developed countries where it could result in less money available for investments in the children's education, leisure activities and other things that are important for the families mental and social health. It would be possible to target the strategy to the wealthier parts of society, but the problem is that wealthy consumers 'maybe' already buys quality products – leaving little room for leverage. Another problem, seem from a governance perspective is that it could be viewed as too much interference with the market sphere, or the free market.

Finally, there is the possibility that the extra money spend on the expensive products will drive '2nd order' consumption due to a higher profit margin at the producers. By a certain switch towards more expensive food products this could certainly be the case – at least for a period. However, it must also be assumed that profit margins in a longer time perspective will return to 'normal' due to competition and market forces. But this stresses the importance of a quality strategy for DC that does not encourage consumers to blindly choose more expensive products, but still consider the relationship between price and quality in their purchases.

Acknowledging the limitation of the quality strategy for SC, it is believed that it holds a potential to contributing to the necessary change. The purpose of this article has not been to come up with a clear-cut conclusion, but it has been illustrated that there are interesting potentials in a quality strategy for SC - a strategy that can contribute to a movement. It is important, however, that more research is directed to this area and that more comparative LCAs are performed on 'conventional' and 'quality' versions of the same type of product. towards a more dematerialised service society. Considering the importance of price differences in environmental assessment of products (see Thiesen et al. 2008), it must also be recommended that price differences in traditional environmental impacts assessments are addressed more often than it is the case today.

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