

Changing Global Lifestyle and Consumption Patterns: The Case of Energy and Food

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1. The Consumption Perspective in Environmental Research

For a long period, social science research on the environment was more oriented towards the production process and/or the debate on capitalist or industrialist forms of production. It was not before the emergence of a critical discourse with regard to negative environmental effects of the (global) consumer society that concept of lifestyles and the domain of consumption have attracted more and more attention—especially after the Rio summit in 1992, where the development of sustainable consumption patterns was an issue of the Agenda 21 (Chapter 4: Changing consumption patterns). With regard to both Sustainable Development issues in general and to Climate Change in particular consumption issues have become more and more important. The shift “from production to pleasure” (Schipper 1997) prolongs, especially if we take the developing world into account.

Most environmental pressure in the developed world are due to the Western (US, Western Europe) or „modern“ way of life. But: emulation effects are too simple and have to be completed by processes of re-framing and endogenous dynamics. We are observing the rise of a global consumer society, more or less heading towards Western standards of energy and resource consumption—despite remaining poverty. More or less voluntary lifestyle changes are necessary to achieve a Sustainability Transition (complementary to technological changes) and to stabilize the global climate. Again, simple ‘trickle down’ (emulation) effects of a possible Western Sustainability Transition remain important, but are to be completed by more complex (e.g. endogenous) approaches.

In recent years research on consumption and environment has found more attention and the results are stimulating (Stern et al. 1997, Princen et al. 2002). There is no doubt that consumption as a social process and consumerism as a social reality (or ideology, as some scholars prefer to put it, cf. Lodziak 2002) contribute to a substantial degree to local and global environmental problems and pose some serious constraints—if not clear obstacles—to a sustainable development of the planet.

This holds especially true with regard to the emergence of a world consumer society. In recent years the purchasing power of growing middle and upper class members has reached the total purchasing power of US consumers—and is about to grow further (Myers/Kent 2003).

2. The Lifestyle Perspective

The next step is to introduce the lifestyle concept into the debate in order to (a) contextualize consumption processes in socio-economic and cultural regards, and (b) to differentiate in modern

consumption societies between different social groups that allows (c) for differentiated accounting of the environmental impacts (cf. Reusswig 1994). This is much in line with some sociological approaches to consumption (e.g. Lutzenhiser 1997) and has been suggested by economists that try to better understand modern consumption processes (Duchin 1998).

Lifestyles are group specific forms of how individuals live and interpret their lives in a social context. Lifestyle research needs a double perspective/methodology: observer and participant. We live our lives, and others observe it (by the way: other social actors, not only scientists), but we need to make sense of our actions and frame them in a more or less personally interpreted (sub-)cultural framework. Macro-data and micro-motives should thus be monitored together.

Lifestyles link social structure to attitudes and behavior. The lifestyle perspective (mainly derived from market research and sociology) reveals the socio-cultural plurality of societies (or in one ,way of life‘). There might thus be only one ‘American Way of Life’ (as described for example by Wernick 1997), but within the United States the market research institute Claritas Corp. has detected about 60 different lifestyle groups, identified their consumption behavior and their political preferences, and is able to locate them in a fine grained ZIP-code resolution (Weiss 2001). ‘The American Way of Life’ is thus only an approximation of the US reality, and one can specify the concrete adherence (or distance) to this leading vision of Western culture.

In order to describe or re-construct a lifestyle (group) from a macro-perspective three core dimensions have to be combined: (1) social status (termed class by some authors, as by Bourdieu for example), (2) attitudes and preferences (one might term this ‘mentality’), and (3) behavior or praxis according to Bourdieu.

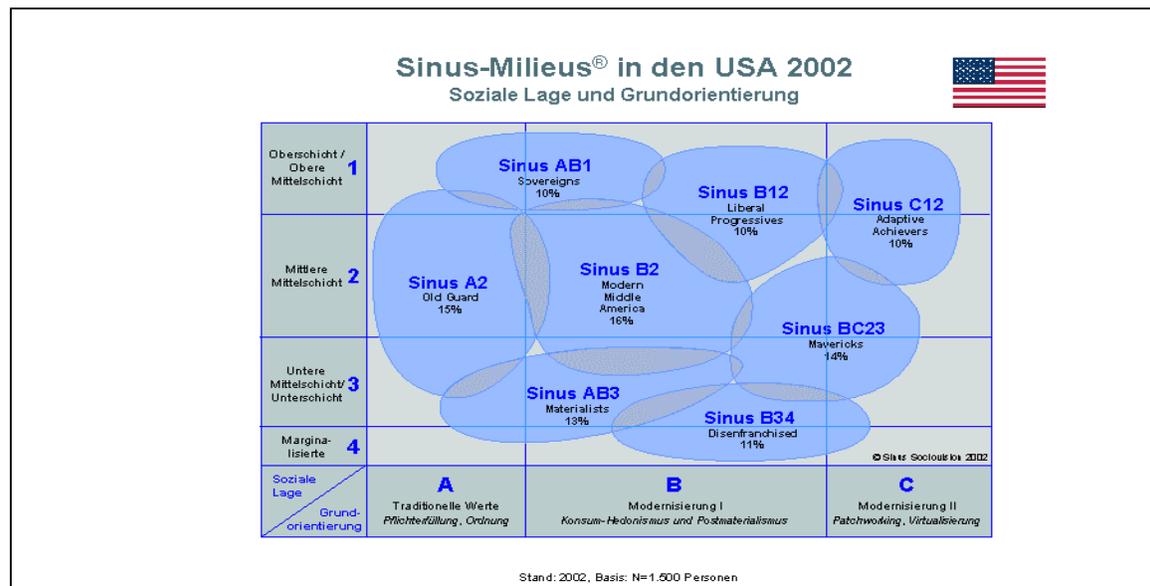


Fig. 1: US lifestyle groups according to Sinus-Sociovision

No common variable set nor methodology has yet emerged as a detailed consensus in market research and sociology. Different clustering results are thus possible (cf. Fig. 1 for the US). Nevertheless most researchers agree upon the three constitutive dimensions mentioned above.

To disaggregate consumers into lifestyle groups with different attitudes and behavior would be a sufficient reason to use the concept in consumption research. But it offers even more. Lifestyles are closely intertwined with consumption, but they encompass more than this. If we

distinguish between (1) market preferences ('I want to buy this...') from (2) reflexive preferences ('I would like to want something else...') and (3) political preferences ('I would like us/the government to do X'), lifestyles reflect all three preferences and thus extend their application field into moral and political research and the respective changes of the social system in general (cf. Fig. 2). Of course there are feedbacks too, but the important point here is to mark lifestyles and lifestyle changes as drivers of social change—something to be kept in mind with regard to the sustainability transition. People are not only consumers, they are ethical persons and political actors at the same time, and this affects—not only, but also—consumption.

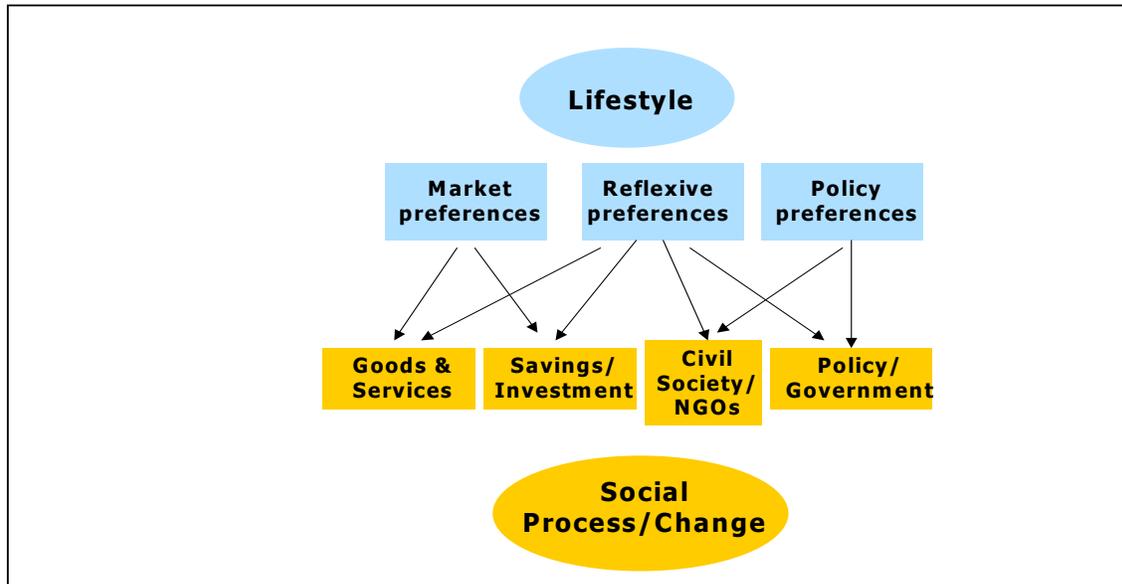


Fig. 2: Interactions between lifestyles and the social system with regard to different preference types

Up to now, the application of the lifestyle concept to environmental and sustainability issues is at the very beginning. Until recently, environmentalists talked about the necessity to change ‘our’ lifestyle, using a word in a singular manner that was introduced by marketing and social research in order to differentiate society. Today, we observe some first signs of a changed use.

We would like to discuss next some examples for differentiation of ways of life, or on a very aggregate level with regard to energy and food. Introducing the lifestyle concept would then mean to disaggregate the national average data we have been using in these sections. This endeavor is faced with some serious data constraints, as globally comparable data on lifestyles and their environmentally significant consumption is still—and we guess: for quite a time being—lacking. Research will have to zoom in countries via case studies, and to develop a toolset for lifestyle research on a global scale.

3. The clustered world of energy use

In this section we analyze the world energy system based upon some very aggregate variables of the energy economy—much in the vein of the IPAT and Kaya-identities of energy economics. But our intention was explicitly not to ‘explain’ something with these identities (which we think is impossible by definition), nor to find a common formula and weights for the factors used across the whole world (as for example Dietz/Rosa 1997 tried to do). We simply use the variables of the Kaya identity as

meaningful indicators for both the energy system and its environmental impacts (climate change). The variables are:

1. Income level (GDP p.c. in PPP \$)
2. CO₂ emissions p.c. (industrial emissions only!)
3. Carbon Intensity (CO₂ per unit primary energy used; indicating the energy mix of a given economy)
4. Energy Intensity (Primary energy per unit GDP, indicating the efficiency)

We used time series of 1990-1998 and calculated an annual average change for the 122 countries in the sample (World Bank data and Global Carbon Emissions Center). We thus had 4 state and 4 change figures or in total 8 variables for each country. After checking a factor analysis we did a cluster analysis and checked the different solutions the program (SAS) found. A six cluster solution seemed most reasonable and is presented here (cf. Fig. 3).¹

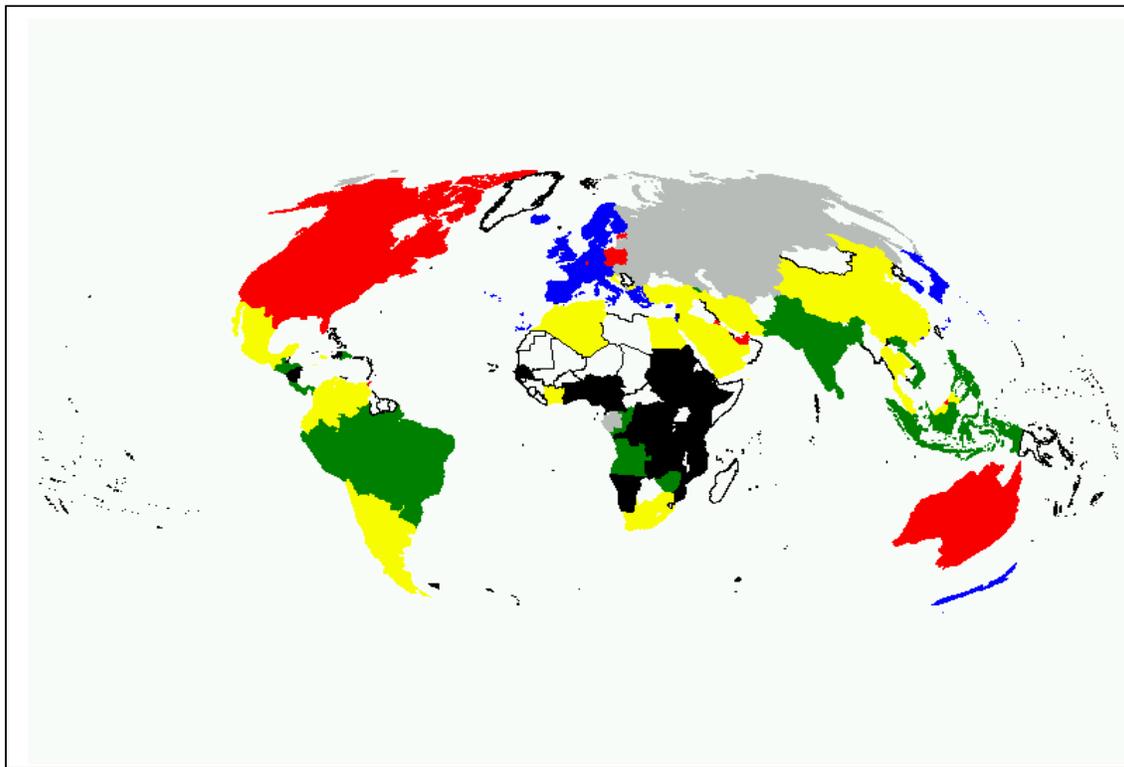


Fig. 3: The six clusters of the world energy system in the 1990s

The main important message is that a differentiation of national energy and emission systems is possible, and that it yields a clear distinction between the two main groups of the Western world (namely the US cluster (red) and the Europe/Japan cluster (blue), three distinct developing countries' clusters (yellow: China, green: India, black: Africa). The former Soviet Union (gray) is characterized by a very distinct pattern—especially with regard to ('downward') dynamics.

¹ For a more detailed discussion see Reusswig/Gerlinger/Edenhofer 2003.

We will not enter into a detailed debate about the results but just want to highlight three points:

1. *The distinction between the US and the Europe cluster.* The red cluster (termed ‘rich maximum emitters’) displays high economic performance (and still noticeable growth rates), very high per capita emissions of carbon dioxide, improving efficiency (on a rather inefficient level), and high carbon intensity (with almost no change during the 1990s). The blue cluster (termed ‘rich medium emitters’) shows significantly lower per capita emissions (on a global scale they are high of course), and a lower increase of emissions during the 1990s compared to both the US and the India and China clusters (only the African and the Russian cluster have reduced their emissions in that period). Whereas the US cluster countered its otherwise more rapidly growing emissions by efficiency gains, the Europe (and Japan) cluster countered growth- and population-effects by a combination of efficiency gains and de-carbonization efforts. These efforts can be traced back first to nuclear energy, but to some degree to the use of renewable energy sources (cf. Denmark and Germany in the wind sector).
2. *Different Environmental Kuznets Curves.* There is a widespread debate on Environmental Kuznets Curves (EKC) in the literature. One of the main findings is that this inverted n-shaped curve mapping economic performance (GDP levels) to environmental loads does not hold uniformly for all pollutants. Unfortunately the case of greenhouse gases seems no case in point: if turning points of the upward curve have been detected, they either are out of the sample—or at very high income levels (so Dietz/Rosa 1997). Our clustering approach allows for a differentiation between countries and displays different ‘routes’ of development for the clusters. E.g. the Europe cluster seems to reach a turning point at significantly lower levels of per capita emissions than the US one.
3. *The pluralized developing world.* The three developing world clusters perform very differently. The black (African) cluster for example displays reduced CO₂ emissions in the 1990s—despite remarkable population and very modest economic growth. Our data for the cluster reveal a strong de-carbonization of the economy, mostly attributable to higher usage of traditional biomass.² We thus termed this cluster ‘poor involuntary climate protectors’. This clearly indicates: There are a lot more problems related to energy than ‘over-consumption’ or ‘climate change’. Many people are facing the lack of basic energy supply and services and will have to come to significantly higher energy shares in order to live a sustainable life. At the same time, the green and especially the yellow cluster display a rapid dynamic of economic growth, growing energy consumption, and growing per capita emissions. They still have very small per capita energy consumption and emission levels compared to US and Europe/Japan (even to Russia), but of course the number of heads matters, and the dynamic of the system could lead to significantly higher per capita consumption rates in the near future.

Based on some case studies in the OECD we calculated the amount of directly lifestyle and consumption related CO₂ emissions on a rather conservative basis and differentiated again between the clusters in this case (25% of global industrial emissions), but this part of our work needs much more empirical underpinning.

² As our database accounts for industrial emissions only, the data are not telling the whole story, and they are especially masking with regard to traditional biomass. Other sources indicate a clear increase of traditional biomass use (mostly as a substitute for fossil fuels). This implies: (1) the danger of biomass overuse is high, and (2) emissions per capita have to be corrected upwards—more or less slightly, depending upon the net balance of biomass burning and sequestration.

4. The clustered world of food consumption

We now turn to a similar analysis focusing on lifestyle patterns with respect to food consumption, again based on an aggregate set of country data, taken from the World Bank's World Development Indicators and the World Resource Institute's Earth Trends database. This second domain of our analysis is still in a very preliminary state, but first results will be presented here anyway, in order to demonstrate how the approach can be applied to different thematic settings.

Food consumption and the underlying agricultural production processes are accounting to a significant degree for global environmental pressures, including land use changes, water use, biodiversity loss, and even climate change through methane emissions. The environmental impact of food consumption does depend on the total amount of food consumed, the structure of dietary intake, above all the share of animal products in overall diets, and the technology applied for producing agricultural raw materials. For example, a high share of animal products tends to imply a higher environmental impact in terms of land and water requirements. However, if meat or milk are produced with low-input technologies like extensive grazing, this might be an even environmentally friendlier way to provide a sufficient diet under certain natural conditions.

Probably the most important factor explaining food consumption patterns is the level of disposable income. Not only increases the amount of calories consumed with rising income, but the share of animal products in overall diets also tends to rise. However, if we look at a wide range of countries at various income and consumption levels, the correlation between many of these factors is not very strong and leaves room for additional explanatory factors like culture, religion or – possibly – lifestyle choices. For example, a relatively large number of countries shows the same level of calorie consumption, although at very different income levels. Moreover, the consumption structure differs widely even at the same high income level. This has to be further explored in specific country case studies.

For our aggregate analysis, similar to the energy case, we chose 4 state variables together with their growth rates over the last decade, in order to find clusters of countries which are similar with respect to their food consumption patterns. The following variables were used:

1. Income level (GDP per capita in US\$ PPP)
2. Food consumption level (calories p.c. per day)
3. Food consumption structure (% of animal products in total calorie consumption)
4. Environmental impact (kg of feed grain used for producing 1 kg of meat)

The proxy variable representing "environmental impact" here has to be further explained. We assumed that the production of animal products is the more intensive, the more input factors are used which could also be consumed directly by humans. In other words, if a cow is fed primarily with grass for producing milk and meat, this will on average have a lower environmental impact than if the feed mix contains a high proportion of grains. Admittedly, this is a rather crude measure, but as our first results show, it is not completely implausible.

From our data sources we were able to construct a complete data set on all eight variables for 104 countries. Below we present the results of our cluster analysis with a number of 5 clusters. Countries with no or incomplete data are shown without color (cf. Fig. 4)³.

³ It should be noted that the colors for various clusters in Figure 4 have been assigned randomly by the software, so they should not be interpreted in any way.

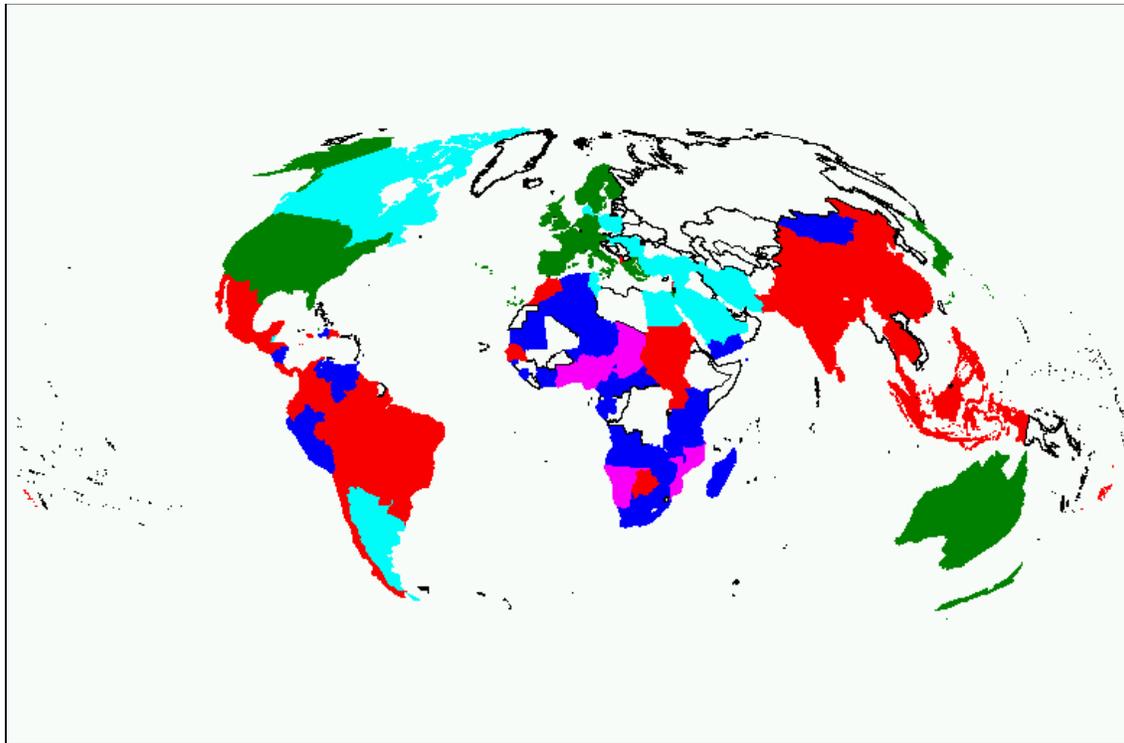


Fig. 4: The five clusters of the world food system in the 1990s

The green cluster includes only high-income countries with a high level of calorie consumption and a relatively high share of animal products in their diet (28%). Although Japan has a quite distinct dietary structure with lower total calories and lower animal share, the income effects seems to over-compensate this, so it is still in the same cluster as the USA, Western Europe, and Australia.

The light blue cluster is quite interesting. It contains countries with high to medium income levels, high consumption levels, and the highest environmental impact in terms of feed use. Not surprisingly, Denmark as a country known for its intensive pork production belongs to this group. At the same time, the share of animal products in their diet has fallen by almost 2% per year over the last decade. Why Argentina falls into this cluster, is currently unclear and will be subject to further investigations.

The red cluster (no. 1) is clearly characterized by the strongest GDP growth rate of 6.3 % per year in the 1990s. Highly-populated countries like China, India, Indonesia and Brazil belong to this group. It is interesting to note that this is the only cluster where the share of animal products in consumption has actually increased during the 1990s, and actually quite strongly by 3.4 % per year.

Most of the poor developing countries fall into clusters 3 (dark blue) and 5 (purple). Their distinction is mainly that cluster 5 shows a strong increase in calorie consumption over the last decade, while cluster 3 reveals even falling calorie consumption together with the lowest GDP growth of all.

Some preliminary conclusions can be drawn from this part of our analysis:

- While income is an important factor in explaining food consumption levels across countries, the remaining divergence within different income groups calls for additional explanations. Especially the position of Japan in the USA/Europe/Australia cluster remains questionable.

- In the last decade the share of animal products has only increased in fast growing, middle-income countries, but has fallen elsewhere. Given the data uncertainties in the very poor countries, this may be an indication for existing Environmental Kuznets Curves in the food case, similar to the energy case.
- However, the "environmental impact" of food consumption has been inadequately captured so far. Especially cluster 4 is difficult to interpret with the variables used in our analysis.

5. Some remarks on lifestyle changes

The two case studies presented so far have addressed high aggregation data sets and thus need a further step of 'zooming in' in order to fulfill our own claims with regard to introducing the lifestyle concept to environmentally relevant consumption research. Still, they take changes into account and display some rather daunting, but also (at least at the horizons) some more hopeful results.

Reinforcing the latter results we would like to state that the 'Sustainability Transition' (Bill Clark et al.) is a real process, not only a vision any more. Some illustrative evidence:

- Renewable energy sources have reached a share of 13,5% in global primary energy supply (15 % in electricity). It is a dynamic field, not only with regard to some European countries, but also with regard e.g. to the US (and especially on a state level).
- While the level of calorie consumption still tends to rise with income, the share of animal products in overall diets tends to stagnate or slightly fall in many rich countries.
- Organic food market share in Europe is about 2.5%; share of production in some countries 5-6%.
- We have some indicators for a 'greening of industry'
- Natural Marketing Institute (NMI) identifies 32.3% of US adults as 'LOHA'-Consumers (*Lifestyles of Health and Sustainability*).
- One should keep in mind all forms of 'involuntary sustainability', i.e. people that behave in a more or less sustainable manner without sticking to the idea (but do so for traditional or post-modern reasons).

We need to take these more or less voluntary changes into account—otherwise we neglect social reality and, may be, the modest results of the sustainability discourse where research is a part of.

6. Some concluding remarks on future research

We would like to conclude with some remarks on future research, based on our own experience in the field of consumption and lifestyle research. It seems necessary to us to

1. Strengthen the link between 'micro-motives and macro-behavior' (Thomas Schelling), e.g. between lifestyle segmentation and macro-economic data (or macro-tools such as I-O-Tables).
2. Extend our interest and data coverage on ongoing sustainability lifestyle changes (both voluntary and unintended).
3. Do some in-depth analysis of the emergence of a global consumer culture as a mixture of emulation, re-framing and endogenous changes (case studies, comparative studies).
4. Examine the emergence of sustainable lifestyles (even if only expressed in reflexive/political preferences) across the globe; taking (3.) into account.

5. Strengthen interdisciplinary co-operation (Earth System Analysis) in order to assess ‚real‘ impacts, their possible consequences and trade-offs. Reflect our role (conflicts) as scientists and actors.
6. Look for policies and incentives for lifestyle changes; policy impact assessments.
7. Bridge the gap between data & theory efforts on the one hand and modeling on the other one. Let’s start to model lifestyle changes, their drivers and environmental consequences!

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