

## **The seeds of sustainable consumption patterns**

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### **Abstract**

We present five examples of sustainable consumption measures or campaigns: organic food, changing washing machine use, renting efficient white-goods, a sustainable lifestyles campaign, and a car-free housing development. The environmental and social impacts of consumption are largely determined through infrastructure, the goods and services available, and habits. Our examples affect habitual use behaviour, the availability of and access to sustainable solutions, or the overall organisation of life. We judge that any of these three targets is important. Sustainable consumption research should focus more on how to shape habits and how to improve the availability and acceptance of sustainable solutions.

### **Introduction**

The need to "chang[e] unsustainable patterns of consumption and production" has been firmly acknowledged by the World Summit for Sustainable Development (WSSD) in Johannesburg. The WSSD Plan for Implementation contains a description of a "10-year framework of programmes in support of regional and national initiatives to accelerate the shift towards sustainable consumption and production [...]," which world leaders resolve to implement (United Nations General Assembly 2002, §13).

As a contribution to the development and planning of this work programme, I review selected actions, initiatives, and measures that contribute to reducing the environmental pressures and social repercussions of consumption. These examples, mostly from Europe, have been identified in a research project on examples of sustainable consumption (Hertwich and Katzmayer 2003). I evaluate the contribution of the examples given a background on the debate about sustainable consumption. I investigate to what degree these examples can serve as seeds for more sustainable consumption patterns, addressing the concerns with the present patterns raised by the Rio and Johannesburg Earth Summits.

Patterns of consumption and production are not sustainable in developed or developing countries. In developed countries, the levels of pollution, especially those causing global change, are far too high and trends go in the wrong direction. In developing countries, there is too much strain on the local resource base, and this strain is increasing due to population growth, increases in wealth and urbanisation.

The need to address consumption follows from the global environment & development agenda, which emerged from the Rio Earth Summit. This agenda includes the right to develop for the global poor and aims for a convergence of affluence. The common perception, although hardly ever explicitly articulated, is that this convergence will be at the level of the middle class. What Nathan Keyfitz (1998) calls the "middle class package" includes various appliances, communication equipment, and - most clearly visible - a car. Being concerned about the environmental effects of such a policy, Keyfitz, the former head of the IIASA population project, reviews four types of measures to reduce environmental impacts:

1. 'end-of-pipe' measures, such as catalysts, sewage treatment plants and filters

2. 'increases in mechanical efficiency,' such as increased car mileage, increase insulation of houses etc.
3. 'raising use efficiency': multiple-flat houses, public instead of private transportation, car sharing etc
4. 'lifestyle change'

After reviewing the first three types of measure, Keyfitz (1998, p. 496) arrives at following conclusion: "*But even with these [ecoefficiency and use] changes, a population of 10 billion could not be accommodated in the style of life described as middle class without irreparable damage to the environment. That style would have to be more radically changed than indicated above.*"

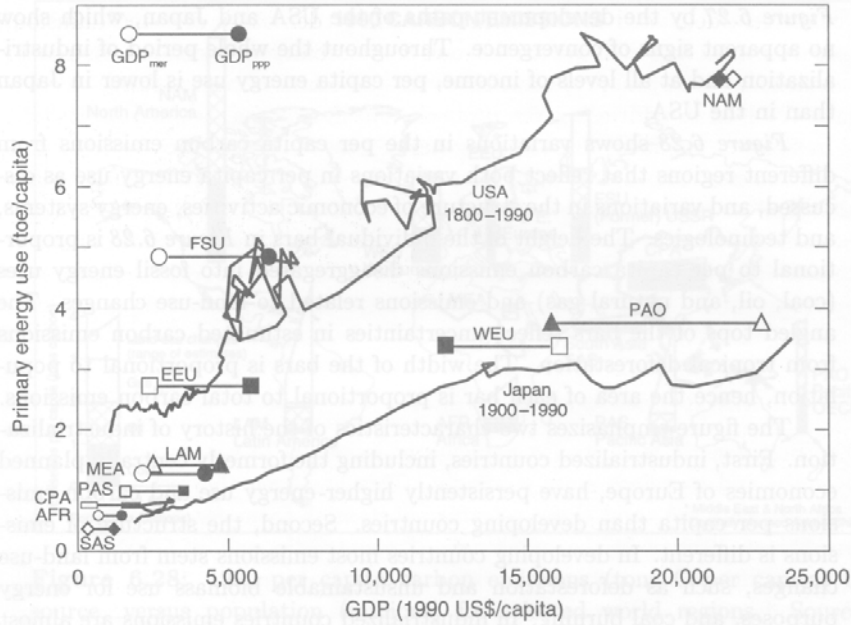
To bring about sustainable patterns of consumption and production, or a situation in which the production, distribution, use and disposal of goods consumed no longer causes undue strain on the environment or undesirable social effects, fundamental changes are required. But what needs to change, and how? There is the option to accelerate increases in eco-efficiency through improvements in production methods and the design of products. There is the option to reduce or halt the growth of consumption until autonomous eco-efficiency improvements catch up with past consumption growth. Is it possible to shift the focus of consumption to things less material, less pollution intensive? Is it possible and desirable to pursue a sufficiency approach, decoupling social well-being from a growth in consumption? I do not attempt to address all these questions here, but I raise them to indicate that, opening the Pandora's box of sustainable consumption, we arrive at a research agenda that addresses fundamental questions regarding the future course of our civilization.

### **The environmental impacts of consumption**

Because there is a paucity of data on the social impacts of consumption, this review focuses on the few environmental indicators for which data exists. Traditionally, national levels of emissions and resource use are tracked and compared on a per-capita basis. This lumps together emissions caused by domestic production and those caused by consumption itself. This is misleading, because in an open economy, much of domestic production is not for the purpose of domestic consumption and many of the products and services consumed are imported. In a time series analysis, effects of increasing specialisation obscure the effects of changes in consumption. In a cross-sectional analysis, countries with resource-intensive exports look worse. In addition, emissions and energy use connected to international transport, i.e. shipping and air transport, are not accounted anywhere. To determine the environmental impact of consumption, including that connected to the production, delivery and disposal of the goods consumed, one uses input-output models and life-cycle assessment. Unfortunately, such analyses are not available for many countries and especially not as a time series. Most models for the environmental impacts from consumption are based only on domestic numbers. At a recent workshop on life-cycle approaches to sustainable consumption at IIASA, several attempts to account for the different environmental impacts that occur in different countries of origin were presented (Goedkoop et al. 2002; Hertwich et al. 2002; Munksgaard et al. 2002). Hertwich et al. (2002) have shown that in Norway more than 70% of greenhouse gas (GHG) emissions are associated with production for export. Counted at domestic pollution intensities, import is responsible for about 25% of the indirect household GHG emissions. The emission intensities of Norwegian industry, however, are significantly different from the emission intensities of the same sectors of key trading partners, such as China and Japan. The expected influence of these differences on the overall household emissions is appreciable but not dramatic. The potential errors are so large, however, that the domestic numbers

should not be used when comparing different households in Norway or recommending changes in consumption patterns.

In spite of these limitations of currently available figures, interesting patterns emerge. Aggregate national figures show that resource consumption and linked pollutants increase with time, although at a rate smaller than the parallel increase in economic activity as measured by the gross domestic product. Only pollutants that can easily be addressed by end-of-pipe measures show a downward trend after a peak. While much has been made of this trend and the linked hypothesis of a reduction of pollution with wealth ("Environmental Kuznets Curve"), wealth has not been proven as a causal factor and autonomous technological change with time emerges as a strong contender (De Bruyn 2000). What is interesting, however, is that there are significant national differences in emissions per capita that cannot be explained by levels of wealth. Grübler (1998) points to the existence of development trajectories, as they are displayed in Figure 1. I believe that the path-dependence of environmental impacts is something that can be seen not only on the national level, where it has been documented, but also for regions, towns, and even single individuals. This has not yet been investigated, but I will return to this theme later.



**Figure 1: Primary energy use (toe/capita) versus GDP/capita for major world regions (1990 USD at market exchange rates and purchasing power parity) and two historical trajectories for the US and Japan. Source (Grübler 1998)**

Investigations of energy use and CO<sub>2</sub> emissions per household show that, within European countries and the US, there is a strong correlation between household expenditure and direct as well as indirect emissions. While indirect emissions are proportional to expenditure, direct emissions sometimes show a less steep increase in some countries, so that the emissions per unit expenditure may be slightly lower for rich households than for poor households. Vringer and Blok (1995; 2000) showed that, in the Netherlands, additional explanatory variables are household size, car ownership, and urban/rural differences. They are responsible for about 40% of the variance among households at the same expenditure level displayed in Figure 2.

To summarise, the environmental and social impacts of consumption are known at best on the aggregate level. A number of important impacts remain to be quantified, and the connection between specific consumption patterns and the resulting impacts remains to be determined. The currently available data shows a strong connection between levels of wealth and energy use, but also interesting differences both among nations and among different households within a nation. These differences remain to be explained, but they point at the potential for less impacting consumption patterns at comparable levels of wealth.

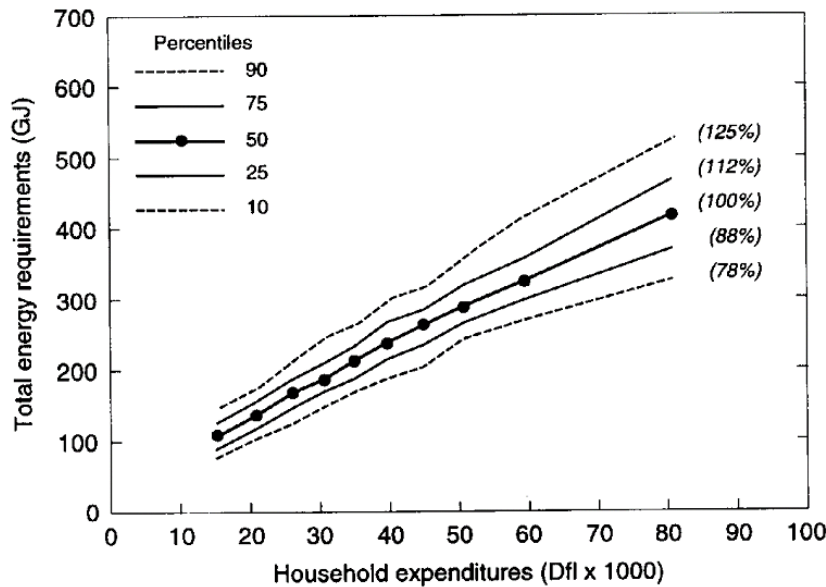


Figure 2: Total energy requirement per household versus household expenditure for the Netherlands. Source: (Vringer and Blok 1995).

### Addressing Sustainable Consumption

UNEP has recently suggested using the life 'functions' nutrition, mobility, housing, clothing, health and education as a way to organize its work on sustainable consumption and production (UNEP 2002). Functions can be seen as components of lifestyles. Functions are fulfilled by different products and services. This is a useful manner of organizing the analysis of sustainable consumption issues. It is important, however, to also address the entire consumption pattern of a population, the lifestyle. Otherwise sustainable consumption would stop at what Keyfitz calls use efficiency. A total reduction of impacts could not be guaranteed, because the time and income rebound effects could lead to increases in emissions

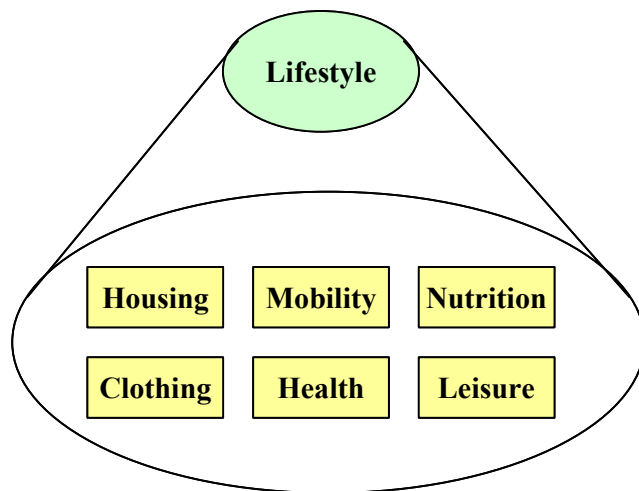


Figure 3: Functions as components of lifestyle.

related to other functions. We have used functions to organise the analysis of sustainable consumption measures, but we have also used lifestyle as a separate, overarching category (Figure 3). Hertwich and Katzmayer (2003) have described 34 campaigns, policy measures, individual or corporate actions that could be described as examples of sustainable consumption. These were selected from a larger group of examples identified in the electronic appendix of the report. These measures address the functions of mobility (8), housing (6), clothing (8) and nutrition (4), as well as the cross-cutting areas of appliances (4) and lifestyles (4). In this paper, I describe only five examples and discuss their general features.

## **Examples of sustainable consumption**

### *The "WashRight" campaign*

The International Association for Soaps, Detergents and Maintenance Products (AISE) conducts a campaign that attempts, among other things, to reduce the washing temperature (to 30 and 40 °C) and encourage a fully loaded laundry machine ([www.washright.com](http://www.washright.com)). The campaign also attempts to reduce the detergent consumption and the packaging material. The campaign uses TV advertisements and leaflets. WashRight is a voluntary industry initiative based on a code of conduct. In some way, it only strengthens an ongoing trend. Average wash temperatures in Europe have dropped from 65 to 48 °C over the last decade (Uitdenbogerd 2001). This trend has been enabled by better detergents and by easy-care fabrics such as new synthetics. The lower temperature leads to substantial energy savings. For a 1996 reference washing machine, electricity use was 2.32 kWh/cycle for 90 °C, 1.45 for 60 °C, 0.76 for 40 °C and 0.44 for 30°C. A continuation of the trend towards lower temperatures, together with an increase in laundry machine efficiency, can bring a substantial reduction of electricity used for washing.

### *FUNSERVE – Functional Service Contracts for White Goods*

This project started in 1999 and has the aim to develop and field-test in the EU member states Austria, Germany, Sweden and the UK the approach to offer customers the services that they need instead of the products that provide these services. Three electric utilities in Germany and Austria and the appliances manufacturer Electrolux cooperate in leasing highly efficient appliances to the customer. The leasing scheme includes free delivery and installation with instructions on the optimal use, free repairs and a service hotline, and the removal of the appliance after the agreed period. The targets of this project are, among others, to assess the benefits and the costs for the participants and the environmental and market potential, and to test the market acceptance. The customer surveys have provided promising perspectives; also the retail trade has shown a high interest in participating. Concerning the environmental effects, a 10% market share of the appliances would reduce the energy consumption by at about 7TWh, which corresponds to a saving of CO<sub>2</sub> emissions of at about 3 million tons per year. Moreover, 50 million m<sup>3</sup> water and 26.000 tons of detergents could be saved each year (Dudda et al. 2001).

### *Organic food lines of supermarket chains*

Organic labels transmit information about the conditions of production to the consumer and thus allow the consumer to make decisions that are in accordance with the consumers' values and preferences. Organic products are usually also more expensive. An example for sustainable consumption with respect to organic food is the British supermarket chain Iceland. It converted its entire frozen vegetable line to

organics, at no extra cost to consumers. Its initiative, which removed at a stroke the principal consumer objection to organic food, that it costs a lot more, put the rest of Britain's supermarket chains, many of which sell organics at very high mark-ups, on the defensive and under pressure to follow suit. Nonetheless, 6 months later the company abandoned the six-month-old plan to sell only organic "own-brand" frozen products, after an unexpected slump of 1.5 per cent in sales. Another attempt, the "Ja Natuerlich" line of Billa in Austria, focused on produce, bulk and dairy products. It was highly successful in giving the Billa high-quality image and attracting wealthy customers. The number of products and the market share has steadily increased.

### *Action at Home*

"Action at Home" is a so-called social marketing campaign operated by the Global Action Plan in the United Kingdom.<sup>1</sup> Participants receive a questionnaire to establish a baseline of household environmental impact called Greenscore, which is measured again at the end of the programme. A monthly information pack provides step-by-step suggestions for making small changes to their practices. Packs cover waste, water, transport, shopping and energy, as well as 'next steps.' Over 30000 households have taken part in Action at Home. Unfortunately, the return of questionnaires has been low, so that the Global Action Plan cannot judge the impact of the campaign (Hobson 2002). For the "Sustainable Lifestyle Campaign" in the United States, the Global Action Plan claims savings of 9-17% of the household energy use, 16-20% of transportation fuel, and even larger amounts of water and garbage. This results in savings of USD 200-400 per year in utility costs. It is not clear, however, how representative and reproducible these number are. Hobson (2002) reports that only half of the UK participants that she interviewed have changed their behaviour, and that most changes were minor and could be done with no cost and little effort, such as turning off the tap when brushing teeth. She criticizes the focus of Action at Home on "rationalizing lifestyles" and instead suggests a focus on social action and fairness.

### *Car-free housing project Vienna-Floridsdorf*

This apartment complex includes 244 flats of different sizes (50-130 m<sup>2</sup>) and was opened in the year 1999 as a demonstration project for car-free housing on the periphery of Vienna (GEWOG 2000). The apartment complex includes garages only for bikes and for car-sharing. The money saved from not providing one parking space per flat was invested in common areas, such as social rooms and a playground. The project includes an office for teleworkers and free-lancers, a fitness room, and a distribution/storage room for organic food. Solar energy is used for hot water heating. The apartment building is located near the old and the new Danube has therefore easy access to recreational areas. Access to the city is available through a nearby subway station. Only 5% of the trips of residents are with cars, 58% are with public transport and the remainder is walking and biking.

## **Classification and Analysis of Examples**

We have classified the examples of sustainable consumption according to function, type of change (going back to Keyfitz' categorization) and mechanism of action. Most of the examples identified fall into the mechanical or use efficiency category. We even put organic food there, because it works through changed production methods which reduce pollution; it is like purchasing any other clean

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<sup>1</sup> <http://www.globalactionplan.org.uk/aboutus/athome.htm>. The Global Action Plan and its "Sustainable Lifestyle Campaign" started in the United States (<http://www.globalactionplan.org>). Similar activities also exist in Canada (<http://www.toolsofchange.com>).

product. In terms of mechanisms of action, the WashRight campaign works through convincing people to change their habits and lower the wash temperatures. Funserve increases the access to high-efficiency white goods by removing the initial cost barrier and spreading the costs out over the use phase, where they are compensated by lower electricity costs. Organic food lines work like eco-labels, providing information about the production of a product, and it makes organic food available or more easily accessible to customers. The "Action at home" lifestyle campaign aims mainly at changing habits and routines which increase the use efficiency of various household functions. In some way, it may also be seen as affecting the lifestyle by introducing environmental considerations into day-to-day decision making. The car-free building in Vienna puts inhabitants into a more sustainable set-up. The building is a micro-infrastructure offering access to playgrounds, socializing opportunities, ready access to car sharing. There are also shared values among the inhabitants, so that inhabitants encourage each other by example and through social pressure to reduce car use, separate the garbage, and buy organic food.

<b>Example</b>	<b>Function</b>	<b>Type of change</b>	<b>Mechanism of action</b>
WashRight Campaign	Clothing	Use $\eta$	changing habits and routines
FUNSERVE white good rental	Nutrition, clothing	Mechanical $\eta$	Improved availability through changed incentives
Organic food line at supermarket	Nutrition	Mechanical $\eta$ lifestyle?	availability & information on sustainable product
Action at Home	various, lifestyle	Use & mechanical $\eta$	changing habits and routines
Car-free housing Vienna	Mobility, housing, lifestyle	Use $\eta$ lifestyle?	more sustainable set-up

The discussion about sustainable consumption focuses naturally on the choices household make and possibilities to reduce environmental and social impacts through improving day-to-day decision making. Through changing daily, consciously made choices, however, we are able to affect only small fraction of the direct and indirect impacts caused by households. The level of impact is largely predetermined either through factors the consumer has very little influence over, such as the available infrastructure, the nature of the energy system and the properties of products and services available, or through habits, social expectations, and long-term decisions e.g. about where to live. In our opinion, we should focus more on these factors, which shape the long-term development of our society:

- Infrastructure: Change the infrastructure so sustainable lifestyles become more attractive, transport is reduced, and public transport, biking and walking are made easier and more popular.
- Habit formation: Investigate and influence the formation of habits and routines. A better understanding of the processes of culturalization and socialization (Wilk 2002) is required. As Faye Duchin pointed out at the workshop at IIASA, we need to understand the human life-cycle and attempt to influence decision making at stages of change, e.g. when one person establishes her first own household.
- Availability and access to products and services that reduce the impact of household consumption. Sustainable solutions, even if they do not achieve universal market penetration, are important because they indicate a development alternative, influence the development of conventional products, and may be adopted in situations of crisis. For appliances, market transformation programs have increased the efficiency of the entire product spectrum.

## Conclusions

The examples of sustainable consumption reviewed range from targeting specific, small changes in behaviour, such as reducing the clothes washing temperature (100s MJ/person/year) to fundamental changes of how individuals organise their life through car-sharing and more local activities (10,000s of MJ/person/year). They may target many million individuals (WashRight) or only a small, self-selected group (car-free housing). Further research on these examples is recommended, combining life-cycle assessment type studies with social research. This research should investigate the effectiveness and acceptance of different measures by different groups/in different cultures. It should help develop measures that target individuals when they are susceptible to changes, either when they make big decisions (where to live, whether to buy a car) or when they form habits and routines. Research should not only focus on individuals and their socialization, but also on regions, regional planning, and infrastructure development.

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