Approaches for evaluating sustainable consumption initiatives[1]

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Overview

The following selective overview investigates and discusses various approaches for evaluating sustainable consumption. This attempt to organise various research approaches is part of a larger study analysing research methods and driving forces for sustainable consumption. First investigations show that a wide variety of different approaches and methods do exist but the integration and cross-fertilisation between them has not been achieved to a satisfactory level.

1 WHAT MAKES A SUCCESSFUL INITIATIVE?

The assumption behind international declarations and policy efforts addressing sustainable consumption is that consumers have some degree of control over the environmental and social impacts of their choices.[2] The hope is that consumers will express their preferences[3] for a clean environment and fair trade through their purchase decisions if they have information about the relevant impacts of their choices. Currently, such information is not available thus contributing to market failure. Regarding sustainability both the level of consumption and the composition of the basket of goods and services matter. Through conscious choices and public policies, the composition could be altered so that the basket includes fewer items with high and more items with low impacts (Goedkoop 2003). Over the last couple of years research efforts have focussed on a wide range of questions related to these basic ideas.

This paper investigates and discusses various approaches for evaluating sustainable consumption. We used the following map based on major streams of sustainable consumption research as an organizing principle to structure our discussion of the different approaches (see figure 1). The figure shows major research areas related to the evaluation of sustainable consumption initiatives, the research questions they might ask

[1] This paper is based on research conducted for the research program "Lifecycle approaches to sustainable consumption" of the Society for Non-Traditional Technology (SNTT) and the National Institute for Applied Industrial Science and Technology (AIST) in Japan.

[2] Sustainable consumption addresses both environmental and social impacts. In this paper, we limit ourselves to the discussion of environmental effects even though some of the approaches can be applied to both categories.

[3] In practice, "preferences" depend on habits, incentives, institutional factors, influence from peers (their relevant social world) as much as personal taste. All these elements incorporated in the term preferences potential opportunities for policy makers and marketing to influence purchase decisions.

and examples of approaches applied. This figure presents a heuristic, i.e. a first organising tool of the wide variety of studies available. As our analysis proceeds the first mind map will be adjusted, new categories added or groups merged and current categories disaggregated.

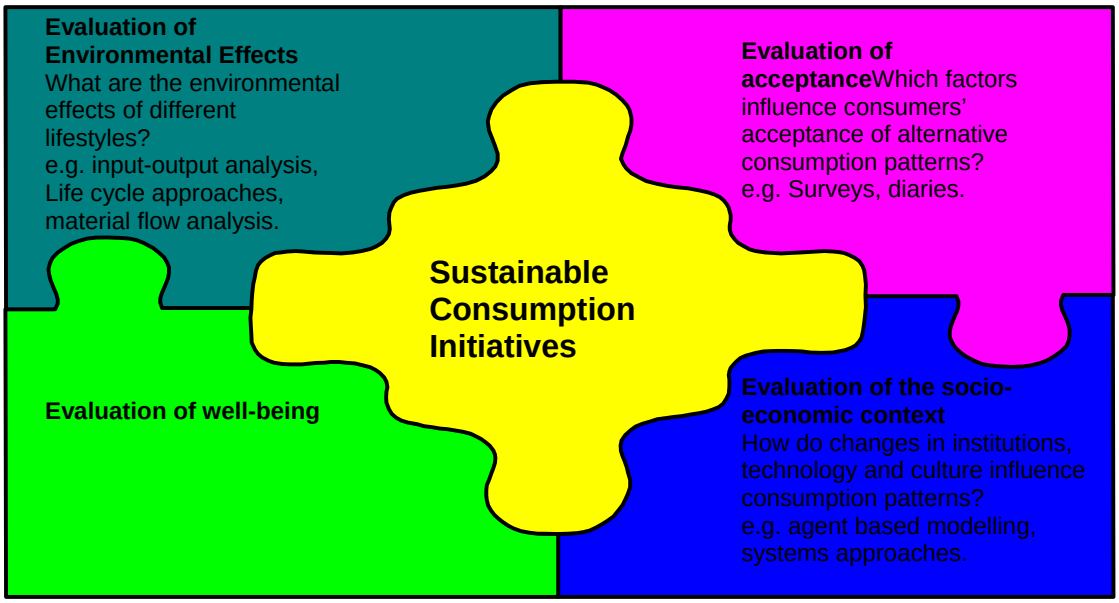

Figure 1: The sustainable consumption puzzle

1) The **evaluation of environmental effects** addresses questions such as: How can consumption patterns be determined and their environmental impacts be quantified? What activities, goods and services cause the largest impacts and have the highest impact intensities (impact per $ spent)? How do different households vary in the environmental impact of their consumption?

2) In addition it is unclear, how people could be encouraged to switch from one basket of goods to another one with fewer impacts. This area of research we have summarised as **evaluation of acceptance and motivation**. Leading questions are the following: What sorts of information are necessary for consumers to induce them to changes in their consumption patterns? Will these changes be for a longer period of time or do the quickly subside as soon as the project or intervention effect subsides? Are the examples acceptable and indeed popular, so that others might adopt them? What determines the acceptability of specific consumption patterns/lifestyles?

3.) Acceptance is closely linked to the next category – **evaluation of well-being**, which investigates how consumption is linked to the subjective 'happiness' of consumers. Research guiding questions are: How do bundle of attributes of certain goods influence the 'happiness' of the consumers? Does the consumer really need these products? What aspects of happiness are fulfilled through the consumption? Which factors, such as education, level of information, peer group pressure, advertisement, values and attitudes, influence these perceptions and functions of products?

4.) All of these questions have to be considered within its **socio-economic context**, a given set of institutions, infrastructure and technology, reducing effectively the scope of sustainable consumption initiatives leading to questions such as: How important are opportunities, infrastructure, and availability of services? How important are habits and habit formation? How do these factors influence consumption patters? How important are demographic and occupational factors (age, formal education, employment, family situation)?

2 THE PARTS: SOME EXAMPLES, METHODS USED AND FINDINGS

Environmental evaluation

Various methods have been used in the effort to provide insights into the creation of environmental damage caused by human activity. Material Flow Analysis (MFA) provides the information about the material requirements for certain processes in society. For example, Fritsche et al. (2003) are using a so-called substance flow analysis to evaluate the sustainability of consumption activities by examining environmental, economic and social impacts in the renovated city quarters in Freiburg and Neuruppin and compare them to average German city quarters. The data on demand in the consumption areas housing, living and transport were converted into mass flows tracked throughout the process chain, through which environmental effects (CO2, SO2, material requirements) were tracked. In addition, Fritsche et al. also analyse the potential environmental and economic effects from closing production and consumption circles (often referred to as leak plugging) by moving production into the region. For this step they used disaggregated bottom-up modelling of regional production activities to calculate additional economic turnover of a regional economy.

Another interesting study chosen for this selective overview was the input-output (IO) analysis by Goedkoop (2003); a model that assesses the worldwide environmental impacts created by consumption in the Netherlands. It has been developed to serve as an evaluation tool for the governmental policy measures on private consumption on a national level. Such environmental and economic evaluations are also necessary for the consumers as a source of information of the impact from their behaviour and about the possibilities how to change it through change in their consumption patterns (see below).

The model is based on measuring environmental loads[4] (EL) per value added (provided by the Dutch economic IO table). The data from a LCA database is combined with economic information from an IO table in order to calculate indirect environmental loads and with a consumer expenditure survey (for direct environmental load). The IO table for the Netherlands has been interlinked with three international IOTs[5] to give some rough estimate of worldwide EL for Dutch consumption. For each of these regions, 30 sectors were defined. The project has made use of DIMITRI and EDGAR for data on environmental stressors per sector and country; and the GTAP database for identifying the countries that contribute most to an industrial activity. The study did not focus on individual emissions, but aggregations have been made, mostly using the CML 2001 impact assessment method. The data on environmental loads per sector was taken from the national emission registry system. The study shows the power of using the eco—efficiency ratio (environmental load per value added) to make assessment on a societal level. The research showed the remarkable importance of the consumers' decisions through their relatively high contribution of direct environmental loads in the consumption domains food, housing & recreation (mainly through car use). It further provides a useful tool for government to selecting priority areas for environmental policies and it helps firms to focus on the most efficient products or production sites. The model can be used to extend IO datasets for other countries by providing a starting point of a worldwide LCA dataset to which each country can connect its own IO database.

Acceptance

There are numerous social science approaches to evaluate the acceptance of sustainable consumption measures. These methods include surveys, in-depth interviews, and focus groups. One such example is provided by the evaluation of the Perspectives project (Novem 1999) in the Netherlands through Gatersleben (2002). The *Perspective Project* studied of the possibility of reducing energy consumption through information induced behavioural change of consumption patterns. The environmental and economic

[4] Indirect environmental load is the load before the purchase of product/service (production, packaging, distribution), and can be calculated by IO. Direct environmental load is the load after the purchase of product/service (e.g. load coming from emissions). It can be calculated by LCA (not IO).

[5] There are 3 types of "regional" IOTs: OECD countries in Europe, Other OECD countries, Non-OECD countries.

evaluation is an integral part providing consumers with information on the impacts created through their behaviour and alternative behaviours (consumption patterns).
For this study twelve Dutch households were examined for two years to investigate how they use energy and possibilities to reduce their energy consumption. The goal for each household was to reduce both their direct and indirect energy consumption by 40% of their expected energy use. Within the same time period their income level was increased gradually by 20% above their previous income in order to determine whether energy-extensive lifestyles are compatible with rising disposable income. The households were recording their daily purchases into a so called "energy account" (similar to energy diaries), with categories such as country of origin, weight and price[6]. The coach assigned to each household evaluated the purchases/activities with them every week, provided feedback and additional information. The attempt to examine the rebound effect (where goes the money saved on low-energy-low-cost products) was based on the precondition that the whole financial supplement to income had to be spent (not saved). The study showed that it is indeed possible to lead a more energy efficient life style (reduced energy use by 40%) even with increased income.
In a follow-up study the possibility of long-term acceptance of changes was investigated (Gatersleben 2002). In this psychological study Gaterleben investigated households' perceptions (and awareness) of political measures for reducing energy use in the Netherlands. The findings show that if households are provided with relevant information about the effects of their lifestyles and suggestions for alternative consumption they might change their lifestyles toward more sustainable ones. Gatersleben found that the energy savings are acceptable as long as people are not asked to give up any of their utility (i.e. comfort, freedom and pleasure) they derive from consumption" (ibid). These alternatives may be based on the assumption that "people derive utility (and well-being) from the consumption of services that goods deliver and not from goods themselves, therefore one should strive to deliver the same services by using less material resource" (Gatesleben, 2002). It is also important that this lifestyle fits in with current social trends and developments and the willingness and ability of the household as such to change its behavior, lifestyle and habits. (Gatesleben, 2002).

Well-being

While data from consumer expenditure surveys and IO tables provide us with information about environmental loads from the consumption of goods and services, which consumers use to satisfy their needs, we also want to know how much these purchases contribute to well-being. On the aggregate level, well-being surveys have shown that life-satisfaction has not increased with economic growth. However, we do not know, for example, how living in different settlement types, engaging in ever more spare time activities, consuming luxury items or purchasing organic food affect well-being.
The common approach to evaluate well-being involves asking individuals about their subjective well-being (SWB). These subjective social indicators supplement measures of standard of living, which have long dominated welfare research in the social sciences. They are aimed at monitoring the subjective side of social change (Schwarz and Strack, 1991). There are established questions that have been used for a long time and across many countries. There have been many studies investigating different factors that may influence SWB, such as wealth, health, life participation, social recognition, self-esteem, national differences, and genetic make-up. However, there are serious concerns about biases and context effects in measurement of global SWB. Reports of SWB do not reflect a stable inner state of well-being (Schwarz and Strack, 1991). There are various strategies of avoiding such bias and context effects. The implications and seriousness of

6 The computer program used data on to calculate the energy intensity per guilder of certain products provided by the universities of Groningen & Utrecht and the Netherlands Energy Research Centre (Energieonderzoek Centrum Nederland).

these effects are subject of controversy (Kahneman 1999; Schwarz and Strack 1999; van Praag and Frijters 1999).
Measuring objective well-being (OWB) has been proposed by Kahneman.[7] This involves the measurement of psycho-sociological variables and the development of statistical models that relate these variables to external measures, situations, and SWB. Kahneman's own research in the field addresses experiences of pain (Redelmeier et al. 2003). OWB could be derived from a record of instant utility over the relevant period (p. 5). Such a record is obtained from asking subjects repeatedly at random times about their well-being, using electronic devices to measure their reactions.
A different approach was chosen by Van Praag and Freijters (1998), the so-called Leyden approach. They attempted to estimate utility functions and shadow prices for amenities like climate and environmental variables. The Leyden approach takes as its starting point the concept of cardinal utility from classical economics.
The Leyden approach is interesting in relation to the notion of "the hedonic treadmill" (introduced first by Brickman and Campbel (1971; in Kahneman et al., 1999), who defined it as: "if people adapt to improving circumstances to the point of affective neutrality the improvements yield no real benefits". This concept may also provide explanation why there is no increase in reported SWB despite an increase in income in the wealthiest nations (which was observed by Diener and Suh, 1999). Related to this is also the notion of the "satisfaction treadmill", which is used to explain a mechanism that could produce treadmill like effects without any change in hedonic experience. The hypothesis is that "improved circumstances could cause people to require ever more frequent and more intense pleasures to maintain the same level of satisfaction with their hedonic life. The "satisfaction treadmill causes subjective happiness to remain constant even when objective happiness improves" (Kahneman, 1999, p. 14). In general terms, the better living conditions we have (objective happiness), the less we perceive the improvements and thus the less happy/satisfied we are (subjective happiness). While adaptation level is about adjusting to improvements, which is becoming usual, the aspiration level is about our ever-higher expectations of our achievements and thus no chance to satisfy all the needs.) The recognition that aspiration levels adjust and that people will never be fully satisfied does not mean that they cannot be made more (objectively) happier (Kahneman, 1999, p. 15).
The basic difference between SWB and OWB is that SWB is influenced by comparing the experiences (memories) in one's life. The objective WB aims at avoiding this bias by measuring the instinct perception of happiness (or pain). Besides these, there are efforts to find a common framework for research on quality of life, which has been dealt so far separately in various fields (van Kamp et al., 2003).

Evaluation of the socio-economic and institutional context

Consumption decisions are ultimately a matter of individual, group or organisational choice, but consumption patterns and levels are embedded into the current spider web of economic, social and cultural norms and institutions (Charkiewicz 1998 quoted after Mont 2003). Approaches within this category are based on the understanding that environmental problems we are facing now originate from activities and norms that are deeply rooted in our society. Many attempts to address the unsustainable patterns of consumption often work against existing institutions and thus require a systems approach (Mont 2003, p. 3).
Within institutional economics and evolutionary approaches the concepts of path dependencies and lock-in effects have been used to describe the seemingly paradox situation that there are products on the market available that seem to be (technically)

[7] Kahneman recently received the Nobel prize in economics for introducing experimental research methods to economics. He and his collaborator Amos Tversky showed that humans are not rational decision makers.

superior to existing products. Yet, these products often do not obtain a significant market share. The most popular example is the QWERTY keyboard (David, 1985). Even though it might be more ergonomically efficient to switch to another type of keyboard, there are high costs involved in getting used to a new keyboard. Further increasing returns to scale and thus lower costs per unit of production make the product affordable for more people, which in turn accelerates the market penetration of the product. More recent examples of such lock-in effects are the software products MS office and word.

Recent research building on these concepts have been focussing on the question how certain aspects in the decision making process of consumers and firms affect the diffusion dynamics of green products. For example, Jansen and Jager (2002) used simulation experiments based on multi-agent modelling, where consumers and firms are simulated as populations of agents who differ in their behavioural characteristics. Jansen and Jager's stylised experiments provide some insights into the co-evolvement of firm and consumer behaviour which can be used as basis for empirical studies.

A much wider angle was used by Haas (2003). He was using material flow analysis as a tool for observing a town community and its metabolism over different stages in economic development (transition from agricultural to industrial society). He was able to show how over a period of some 170 years production and consumption coevolved with new technologies and institutions and how these changes are manifested in the village's metabolism.

3. FROM SPECIFIC QUESTIONS TO AN INTEGRATED APPROACH

If sustainable consumption policy builds on examples of sustainable consumption, which it aims to replicate and make common, it needs to address environmental impacts, acceptability, well-being and socio-economic context. A study of examples of sustainable consumption should therefore address all these four elements. For a specific example, such as a car-free housing project we have proposed to study, the reduction in environmental impact (including the rebound effect) should be evaluated through a comparative (case-control) study which compares the environmental impacts on tenants of this housing project with those of a conventional, otherwise similar project. Factors shaping the acceptance of such a project and its main features (no cars, common areas, solar energy) should be evaluated using interviews. A survey can give important information as to who would be likely to accept such a lifestyle, what the advantages and disadvantages are, and how to make this more popular. A subjective well-being evaluation can be used to select between different examples (which ones should be promoted by policy) and to argue in favour of a specific measure. A mapping of the socio-economic context can identify obstacles to a more sustainable consumption patterns and thus indicate required change in infrastructure and institutions. Or it can highlight opportunities for sustainable consumption and indicate which changes can help specific sustainable consumption measures.

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