Tyndall°Centre
for Climate Change Research

Sustainability Meta Labelling: A Discussion of Potential Implementation Issues

Leonie Dendler

September 2010

Sustainability Meta Labelling: A Discussion of Potential Implementation Issues

The Tyndall Centre, University of Manchester

Leonie Dendler

leonie.dendler@postgrad.manchester.ac.uk

Theme: Energy

Tyndall Working Paper 145, September 2010

SUSTAINABILITY META LABELLING: A DISCUSSION OF POTENTIAL IMPLEMENTATION ISSUES

Author:

Leonie Dendler
Tyndall Centre Manchester
Pariser Building
University of Manchester
M60 1QD
leonie.dendler@postgrad.manchester.ac.uk

EXTENDED ABSTRACT

Changing consumption patterns is increasingly acknowledged as one of the key factors for sustainable development and to tackle urgent problems like climate change. To facilitate more sustainable consumption different actors have introduced various schemes over the past few decades informing about environmental, social or other product attributes. Even so, the current product information situation has been criticised for delivering insufficient information and being confusing. More and more actors are calling for the introduction of some form of meta scheme that unifies existing product information to inform about sustainability related product attributes in a more condensed way. Such an attempt could potentially increase the effectiveness of existing labelling schemes as a mean for political consumerism by individual consumers and broader society as well as a mean for businesses to modify supply chains into a more sustainable direction through making existing (or non existing) certification measures more transparent and less confusing. Based on a review of academic and grey literature within the broader theme of product information as well four case studies on the EU energy label, the EU ecolabel, the Fair Trade label and the MSC, this paper starts a discussion on a potential implementation of such a unifying sustainability meta label along the main constituent stages: product groups included, criteria setting, assessment and communication. In brief, the following main conclusions can be drawn:

- **Product groups included**: Although a labelling scheme becomes more complex the more product groups are included, a large scope in terms of included product groups is perhaps most likely to deliver a condensing of existing product information schemes in the long term. In the short term, the amount of product groups included will probably need to be restricted. One challenge is the definition of the right product group category potentially leading to conflicts between the aim of a product label to show the consumer the most sustainable consumption option and the motivation of producers to produce more sustainably.

- **Criteria development**: Given the very wide and complex concept of sustainable consumption, any labelling schemes will probably need to define and also restrict in some way what is meant by a sustainable product. Considering the difficulties in defining any absolute sustainability a relative approach seems more feasible for a labelling scheme by defining a sustainable product as a product that meets individual utilities for a justifiable price while reducing socio-ecological problems compared to conventional products. To define criteria for such products it seems necessary to take into account the whole life cycle of a product whilst restricting to the most relevant issues but also acknowledging the limitations of the LCA approach and the subjectivity of the decisions involved. Next to lifecycle related product and process criteria for particular products different authors suggest including organisational criteria and product requirements that are applicable across many different product groups. Criteria need to be sufficiently flexible for local whilst remaining sufficiently specific to ensure their verifiability. A balance needs also to be found between ambitious criteria ensuring the credibility of the schemes and the applicability of the criteria to ensure sufficient market coverage. A potential ease for this conflict could be the introduction of a graded scheme.

- **Assessment**: Considering the weaknesses of currently proposed inter product group comparisons as well as their potential conflict with the motivation of businesses to produce more sustainably, comparative assessment will probably need to be made within product groups rather than between product groups. A possible way to unify existing product information while also encouraging competition between different schemes is to base the assessment not on the product itself but on the standards that the respective product adheres to.

- **Communication**: In the case of a sustainability meta label, the high intake of information and rather large degree of aggregation seems unavoidable. Considering the complexity of the sustainable consumption concept, the huge variations between current labelling and certification schemes, the facilitation of the use of labelling and certification schemes to place societal demand for more sustainable supply chains and the needs of at least some consumers, more detailed information and a subdivision into different categories is worth considering. Yet the risk of information overload has to be kept in mind probably for the majority of consumers. Conflicts could therefore arise between the use of a meta labelling scheme to facilitate individual consumer demand for positively labelled products on the one and facilitate broader societal demand for more sustainable supply chains on the other hand. The implementation of a graded scheme, illustrated through a traffic light system, is perhaps most likely to be able to meet both aims and potentially ease this conflict.

Yet there are many problems and pitfalls related to the implementation of labelling schemes in general and a sustainability meta label in particular that need further research. This includes the subjectivity of many processes within the labelling scheme and potential legal challenges related to it, the need to organise a huge amount of dynamic data and deal with substantially different labelling and certification schemes, limitations in assuring the sustainability of a product through existing schemes as well as compliance problems and lastly the limitations of a sustainability meta label itself in supporting sustainable consumption. Regarding the last, a labelling scheme based on an intra product comparison does not address the effects of overall levels of consumption. The degree to what a sustainability labelling scheme can contribute to sustainable consumption is therefore limited and will need to be accompanied by other measures and probably more fundamentally challenges to our current societal structures.

CONTENT

1 INTRODUCTION

"The major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries, which is a matter of grave concern, aggravating poverty and imbalances" (United Nations 1992, p.19). Changing consumption patterns is increasingly acknowledged as one of the key factors for sustainable development and to tackle urgent problems like climate change.

To facilitate sustainable consumption, many actors have introduced various schemes over the past few decades providing information about a product's environmental, social or other attributes. However, the current product information situation has been criticised by different actors for being insufficient and causing confusion. There have been various calls for and initiatives associated with the reform of product information to improve this situation. Three main trends dominate: first, expansion of existing labelling schemes in terms of product groups, area of application, lifecycle or scope; second, implementation of sustainability labels; and third, standardisation and unification of existing schemes. While some only criticise the insufficiency of existing product information along these lines others call for the implementation of new labelling schemes. No research has been conducted so far on a potential implementation of the third option: a standardising, unifying meta scheme. As a working title, such a scheme might be termed a `sustainability meta label'. This paper discusses issues that would arise along the main constituent stages of such a meta labelling scheme, that also addresses, as far as possible, the other improvement calls.

After an introductory clarification of the main terms used in this paper, an overview over existing labelling schemes and a description of the process and function of labelling schemes, the fourth section reviews the above three reform trends. The paper then focuses on a discussion of the conditions, problems and requirements for the implementation of a unifying sustainability meta labelling scheme (section 5). The following implementation stages of a labelling scheme are thereby considered: product groups included (section 5.1), criteria setting (section 5.2), assessment and monitoring (section 5.3), and communication (section 5.1). A discussion of a potential institutionalisation[1] is deliberately excluded and will be discussed in another paper. The discussion of the implementation stages is followed by highlighting main limitations and problems related to labelling schemes in general and a potential sustainability meta label in particular. The last sections include an outline of some of the main accompanying measures discussed to improve the effectiveness of labelling schemes followed by a concluding summary.

The discussions draw on a review of the academic and grey literature from different fields dealing with the broader theme of product information as well as literature reviews from four case studies on the EU energy label[2], the EU ecolabel[3], the Fair Trade label[4] and the Marine Stewardship Council (MSC)[5].

---

[1] In line with Davis and North an institutional arrangement is understood in this paper as "arrangement between economic actors that govern the ways in which these units can cooperate or compete. […] The arrangements may be formal or informal, they may involve an organization or not, and they may be temporary or long lived" (Davis & North 1970, p 133).

[2] See (Dendler In progress b).

[3] See (Dendler In progress a).

2 TERMINOLOGY AND OVERVIEW

The term 'product information scheme' is used in this paper as an umbrella term including the standardisation of certain production, management or other processes certified by a more or less independent institution as well as labelling schemes. While information about the standardisation of processes and its certification does not necessarily need to be delivered with a product, product labelling implies the communication of product information on or with the product. The focus of this paper is product labelling, but labelling schemes usually build on some form of standardisation and certification process.

The typical general steps of a certification and labelling process are: conception and institutionalisation of the scheme, criteria or standard setting, assessment of processes against these criteria or standards, certification of the results of the assessment, controlling of the continuous adherence with the standard and communication of the results. These steps can take different characteristics and involve various actors.
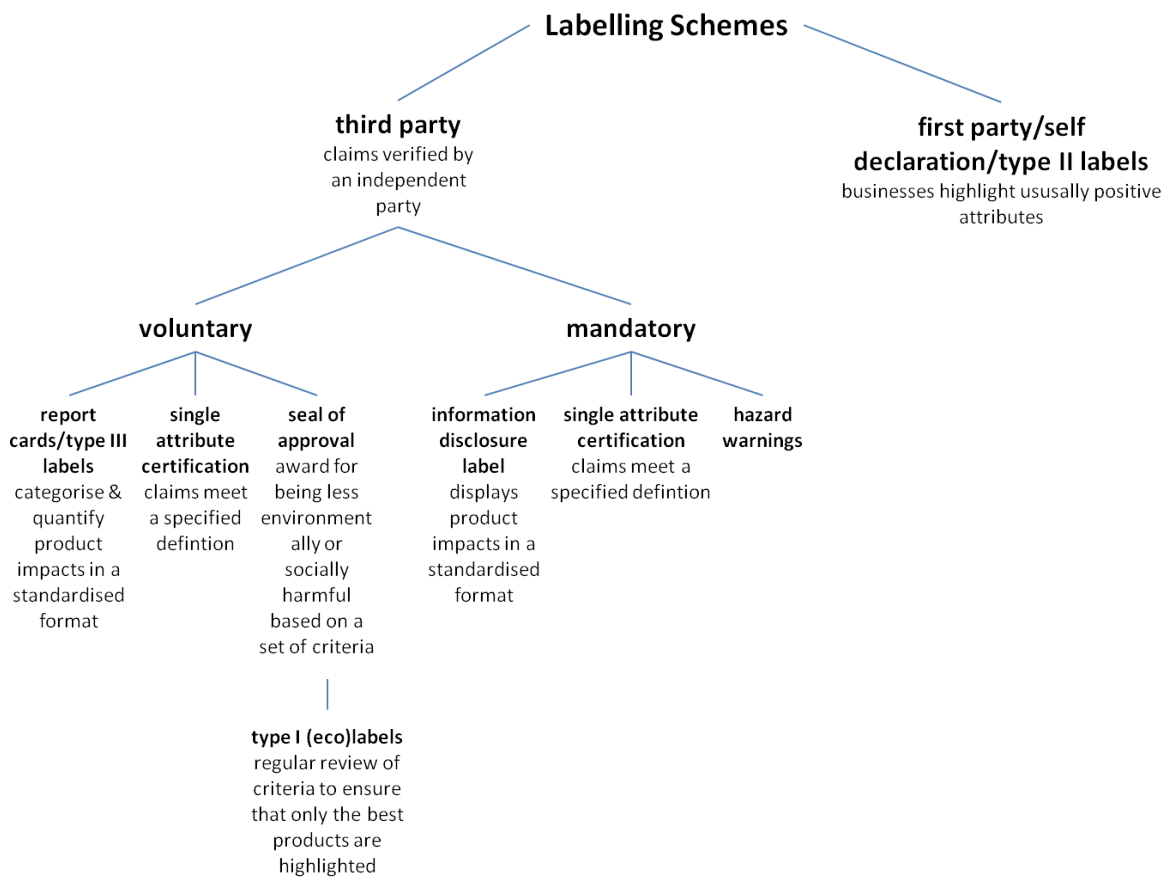

FIGURE 1: OVERVIEW LABELLING SCHEMES
Source: on the basis of United States Environmental Protection Agency 1998

---

4 See (Dendler In progress c).

5 See (Dendler In progress d).

As shown in figure 1 the United States Environmental Protection Agency (EPA) distinguishes between first party and third party verified labels[6] (United States Environmental Protection Agency 1998). The International Standardisation Organisation (ISO) calls first party schemes type II labels[7] or self declarations. Businesses usually use them to highlight positive attributes, either of their products or of their company. First party claims may be in accordance with very high environmental or social standards at either the company or product level, or be in accordance with minimum standards, or even take the form of 'green-washing', in the sense of being deceptive. For others, these differences are generally difficult to distinguish. For this reason, products increasingly display labels that are verified by an independent third party (Upham et al. In Press, Accepted Manuscript). Such third party labels include voluntary but also mandatory labels. Voluntary third party labels are typically positive or neutral and EPA classifies them as 'report cards', 'single-attribute certification', or 'seal-of-approval programmes' (United States Environmental Protection Agency 1998). EPA defines report cards as a type of information disclosure label using a standardized format to categorize and quantify various impacts that a product has on the environment. ISO refers here to type III labels.[8] Figure 2 shows an example of a type three label.
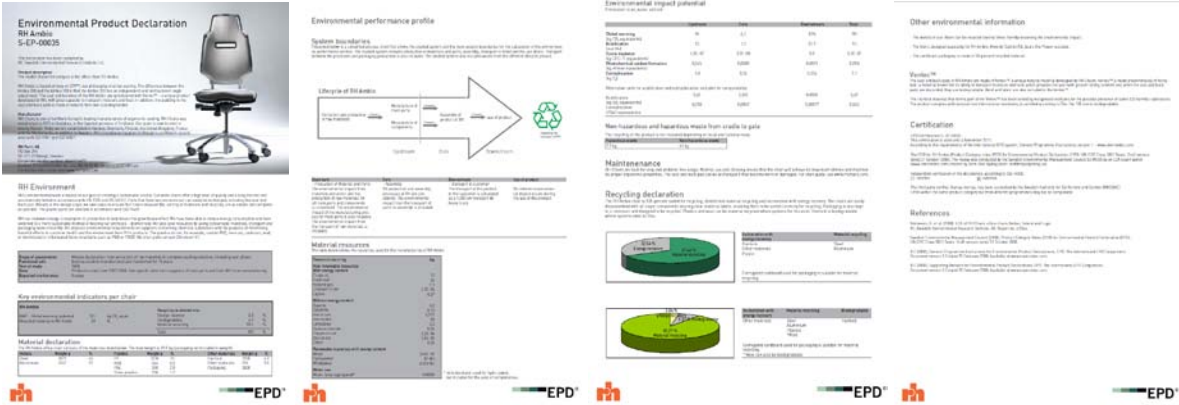
FIGURE 2: EXAMPLE OF A TYPE III LABEL
Source: Swedish Environmental Research Institute Ltd. 2009

Single-attribute certification programmes certify that the claims made for a single-attribute of a product (e.g. 'recycled' or 'biodegradable') meet the definition specified by the respective programme. Seal-of-approval programmes, like MSC or the Fair Trade label, certify and award the use of a logo to products that the labelling scheme judges to be less environmentally or socially harmful than comparable products. Decisions are based on a set of award criteria or standards.

---

6 EPA and ISO developed their classification for environmental labels, though this can also be used on a more general level to include social labels.

7 In their norm 14021, ISO gives guidelines e.g. regarding terminology, comparability and verification (ISO 2001).

8 Principles for type III labels are given in the ISO norm 14025 (ISO 2007).

The Fair Trade label assures that the labelled product meet social (mainly employment rights, fair prices, long-term relationships) but also certain environmental and economic standards mainly during the primary production stage. So far standards exist for various food, drink and cotton products but also flowers and sport balls. The labelling organisation is set up by a multi stakeholder association of producer networks and labelling initiatives. See http://www.fairtrade.net/ for further information.

The MSC has been established in 1996 by WWF and Unilever. Main aim is to label wild fish caught by fisheries that meet standards which are supposed to prevent overfishing and protect marine resources. See http://www.msc.org/ for further information.

A subcategory of seal of approval labels are ISO type I (so far only eco-) labels which review and tighten their criteria or standard on a regular basis in order to ensure that only the best products within one product group are highlighted. Prominent examples include the EU Ecolabel or the German Blue Angel.

1992 the EU Parliament passed the Council Regulation on a Community eco-label award Scheme. The objective of the EU ecolabel is to promote products that reduce various negative environmental impacts along their whole lifecycle and to condense existing national ecolabel schemes into one European system. Products that meet the environmental standards of the EU ecolabel scheme can be labelled with the EU flower. See http://ec.europa.eu/environment/ecolabel/ for further information.

Mandatory schemes can take different forms, for example as information disclosure labels (e.g. the EU energy label), single attribute certification or hazard information or warnings.
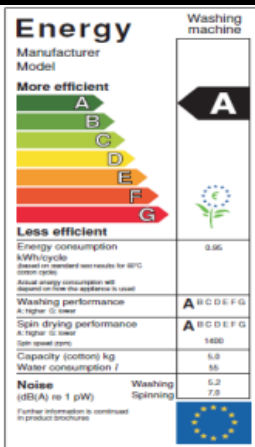
1992 the EU ratified the Council Directive 92/75/EEC on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances. The established EU label separates the products into different consumption classes usually from A for a low consumption and G for a high one. All producers and retailers have to display this classification which is illustrated with a traffic light system. Furthermore the label can ask for a declaration of other information regarding energy or other ressource consumption. See http://ec.europa.eu/energy/efficiency/labelling/energy_labelling_en.htm for further information.

3 THE LABELLING PROCESS

Labelling schemes try to shape the production and consumption systems through two main dynamics: the facilitation of political consumerist demand[9] for more sustainable products and the reaction of supply chain actors to this demand by using labelling standards to modify their processes into a more sustainable direction. Most labelling schemes and its literature has been focused on enabling political consumerism in a sense of enabling individual consumers to shape the production and consumption system through their purchase decisions. They often base on information deficit models assuming "that the main barrier between environmental [or social] concern and [purchase] action is lack of appropriate information" (Blake 1999). Taking into account concepts explaining individual consumption from a sociological and psychological perspective however, there seem to be various barriers at the micro, meso and macro level, apart from a lack of sufficient information, preventing consumers from consuming more sustainable. This is not to say that there are no individual consumers actually purchasing in a sustainable way, for which product labelling can be an aid to make informed choices, but more that it is difficult to identify a stable group of consistently sustainably purchasing consumers (Dendler 2010).

Yet next to utilising direct purchase power, political consumerist power has been also used indirectly (in a sense of individual consumers being mentally prepared to discriminate among products because of concerns related to sustainability issues) by NGOs to pressure businesses to transform their supply chains towards sustainability. One way for businesses to meet this broader societal pressure is to participate in socially legitimised labelling schemes and adjust their processes in a way that meets the respective labelling standards (Dendler 2010).

4 CURRENT PRODUCT LABELLING SCHEMES: TRENDS AND CALLS FOR REFORMS

4.1 EXPANSION TRENDS

Current labelling schemes are usually restricted to a certain area of application, part of the life cycle, product range, or scope. Accordingly there are major gaps in the labelling of sustainability related aspects. The need for more comprehensive product information has been raised by various actors including governmental actors, NGOs, businesses, and consumers. Three main expansion trends can be distinguished: expansion of current schemes towards more product groups; expansion of the area of application; expansion of the scope and/or expansion over the lifecycle. The following sections will discuss these three trends briefly.

4.1.1 EXPANSION OF CURRENT SCHEMES TOWARDS MORE PRODUCT GROUPS

---

[9] Political consumerism can be defined as "consumer choice of producers and products with the goal of changing objectionable institutional or market practices. It is based on attitudes and values regarding issues of justice, fairness, or non-economic issues that concern personal and family well-being and ethical or political assessment of business and government practice. Regardless of whether political consumers act individually of collectively, their market choices reflect an understanding of material products as embedded in a complex social and normative context which may be called the politics behind products" (Micheletti et al. 2006, pp x–xiv).

Many current schemes are getting or are discussed to get expanded towards more product groups. In the course of its current revisions, the EU Energy Labelling Directive for example has been expanded to products that influence energy consumption (e.g. windows) during their use (COMMISSION OF THE EUROPEAN COMMUNITIES 2008a). Other examples include the expansion of the EU ecolabel towards food products or the continuous inclusion of more product groups into the Fair Trade labelling scheme.

4.1.2 EXPANSION OF THE AREA OF APPLICATION

Another expansion trend is an expansion of the area of application. Even though some labels take a comparative approach and apply to all products within a certain product group (e.g. the EU energy label) most sustainability related labels only apply to some members of certain product groups (e.g. only the most environmentally friendly product). They have a limited area of application. Various scholars have argued for the implementation of more graded or comparative labelling schemes to be applied to all products within a product group either on a voluntary but most likely on a mandatory basis (e.g. Allison & Carter 2000, p II; Nilsson et al. 2004, p 525; Frankl & Pietroni 2005). France, for example, is at the time of writing considering the implementation of an "Environmental Labeling Law" that would make environmental labels mandatory on all consumer products (McLeod & Audran 2009).

4.1.3 EXPANSION OF THE SCOPE AND/OR EXPANSION OVER THE LIFECYCLE

Different authors call for information on more environmental aspects along the whole life cycle of a product (Stewen 2003; Führ 1998). Labelling schemes that show the environmental footprint of a product have been increasingly introduced. A recent example is the introduction of carbon labels to address the issue of climate change.

FIGURE 3: AN EXAMPLE OF A RECENT CARBON FOOTPRINT LABEL
Source: Carbon Trust 2010

The additional inclusion of the carbon footprint and other major environmental impacts has been also discussed for the EU energy label. On a broader level the European Association for the Co-ordination of Consumer Representation in Standardisation (ANEC) recently commissioned several reports on the expansion of existing type III declarations towards end consumers. Type three labels currently mostly provide technical information for business to business relations. The reports suggest two alternative concepts: first, the implementation of an environmental product declaration entailing the environmental footprint of a product for seven environmental parameters (e.g. biodiversity or climate change potential) illustrated via a traffic light system as well as a single score to enable inter- and intra product group comparison (Christiansen et al.

2006); second, the implementation of an environmental data sheet focusing on the most relevant environmental information illustrated through a traffic light system to enable inter-product group comparison including information on the accordance of a product with criteria used in existing ecolabels, its impact on indoor air, and content of chemicals (Schmidt & Brunn Poulsen 2007). Also labelling schemes addressing social issues have been increasingly implemented in the last few years. An example for a socially oriented labelling scheme is the Fair Trade labelling scheme which has been not only expanded to include more and more product groups but some have also called to expand the current focus from primary and resource production to later stages of the life cycle. Additionally, some scholars have asked for more with product information on companies CSR performances (Schoenheit 2001).

The expansion trends of some of these schemes are illustrated in the following figure:
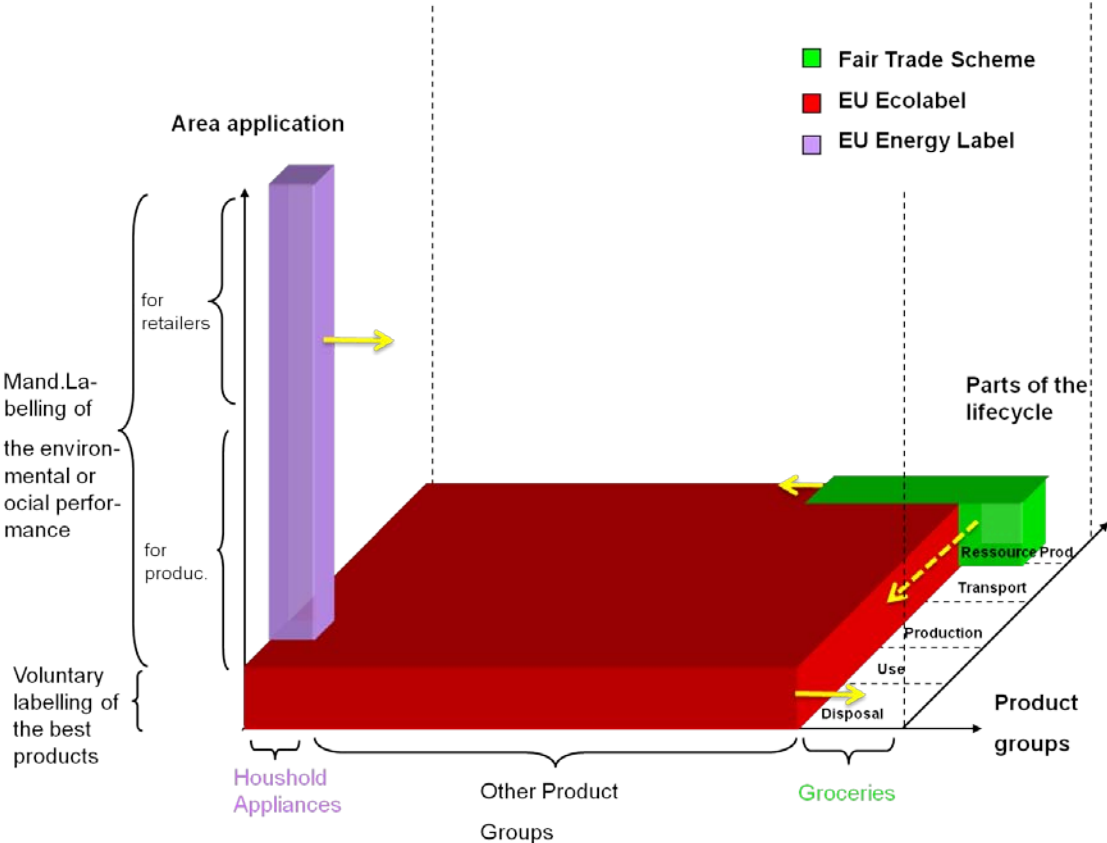
FIGURE 4: ILLUSTRATION OF EXPANSION TRENDS

The X axis shows the product groups that are affected by the labelling scheme. The y axis illustrates the area of application which means the reach within the respective product groups. Voluntary schemes usually have a much lower area of application than mandatory schemes and are therefore located on the ground level. On the z axis the parts of the lifecycle that are addressed by the label are shown. This includes production of raw materials, transport, production, usage and disposal. Expansion trends are illustrated through yellow arrows. To keep the figure comprehensible it does not illustrate expansions in terms of the environmental and/or social issues addressed (e.g. introduction of carbon labels) as well as its target group (for example targeting individual consumers in addition to businesses like in the case of type III labels).

EU eco label (red): The EU ecolabel includes a huge array of product group and addresses most parts of the lifecycle. However it is a voluntary label for the most environmental friendly

products. It therefore has a limited area of application. Officially it aims to cover 20-30 percent of each product group. Current expansion trends focus on the inclusion of more product groups (mainly groceries).

The Fair Trade scheme (green): The Fair Trade scheme currently focuses on primary and resource production. During the last years more and more product groups have been included (bold yellow arrow). The scheme now not only applies to groceries like orange juice and chocolate but also non food products like sport balls or flowers. Additionally some have called to expand the focus towards later stages of the life cycle (dotted yellow arrow).

EU energy label of household appliances (purple): Due to its mandatory character the energy label has a very large area of application though is limited to household appliances and only covers the use phase of the product. During its last revision however the scheme has been expanded towards products that influence energy consumption (e.g. windows) during their use (COMMISSION OF THE EUROPEAN COMMUNITIES 2008a).

4.2 INTEGRATION TRENDS

So far no labelling scheme exists that integrates all dimensions of sustainability. Indeed, existing product information addressing different dimension of sustainability may contradict each other (e.g. clashes between social labels trying to support developing country producers through trade and environmental labels aiming to reduce climate impacts from transport). Various scholars (e.g. Hayn & Eberle 2006; Eberle 2001; Eckert, Karg & Zängler 2007, Frankl et al. 2005) as well as governmental actors have discussed the implementation of a uniformed sustainability label on national (e.g. in Germany, Belgium and the UK) and EU level. But there has not been an extensive academic discussion on the concept of sustainability label and only Eberle discusses potential implementations that allow continuous development of criteria corresponding to the sustainability process[10] (Eberle 2001). On governmental side the author is aware of two countries having started investigations on this topic. Firstly, in a study for the Belgian government, Mazijn et al. suggest the implementation of a voluntary label issued by the government, that applies to all kinds of products (including food and non food) and integrates economic, social and environmental aspects along the whole production chain in a transparent way (Mazijn et al. 2004). In Germany a study on "analysis of existing concepts of measuring sustainable consumption in Germany and main features of a development concept" by the Wuppertal Institute for the Ministry of Consumer Protection, Food and Agriculture included a brief discussion of the implementation of a sustainability meta label (Baedeker et al. 2005). In a follow up project from 2009 on "Untersuchung zur möglichen Ausgestaltung und Marktimplementierung eines Nachhaltigkeitslabels zur Verbraucherinformation (Study on potential definitions and market implementations of a sustainability label for consumer information)" the eco-institute suggests the implementation of informal sustainability criteria by the German government. Existing labelling schemes could use such criteria as the basis of a sustainability scheme. The study notes that only a few businesses are willing to adhere to very extensive sustainability criteria and suggest dynamic criteria based on current feasibilities (Teufel et al. 2009). However, this begs the question about how effective such a highly voluntary standard based on non ambitious criteria can be?

4.3 STANDARDISATION TRENDS

---

[10] Eberle term such a label sustainability process label (Eberle 2001).

Currently a plethora of product information schemes already exists including various product and management standards not communicated through products or labelling systems. The latter range from schemes independently monitored, over governmental disclosure regulations to uncontrolled self declarations. An online index administered by the Canadian company Big Room currently lists 328 ecolabels worldwide (Big Room Inc. 2010). Experts from government (see e.g.Committee on Employment and Social Affairs 2006), retail (see e.g. Eurocommerce 2009), manufacturing (see e.g. Gruner et al. 2009), consumer organisation (e.g. Steedmann 2005, p 16) and academia (see e.g. Kreeb 2003; Rubik & Weskamp 1996; Gallastegui & Spain 2002; Proto et al. 2007; Karl & Orwat 1999; Banerjee & Solomon 2003) highlight that this huge array of different schemes has evolved into a barrier for more sustainable consumption in itself. Such statements have been mirrored in diverse consumer studies (e.g. Ipsos Mori 2008; National Consumer Council & Better Regulation Executive 2007; European Commission 2008a). Several meta information tools have already evolved aiming to give an overview about different product information schemes. This includes for example online databases (e.g. http://www.ecolabelindex.com/, http://www.label-online.de/) or printed brochures (e.g. http://www.nachhaltigkeitsrat.de/uploads/media/Broschuere_Nachhaltiger_Warenkorb_Februar_2010.pdf). Some websites also offer overall ratings of the sustainability of products. The internet platform GoodChoice for example has developed various criteria to measure products against their environmental, health and social performance and offer consumers an overall rating of products. Data is gained from company self-reported information and data published by regulatory agencies and other sources, including media and NGO reports. Part of the data also builds on already existing certifications (GoodGuide). A more environmentally focused approach can be found on the GreenerOne platform. They follow a very innovative approach by involving individual consumers in gathering the information about products to develop their overall ratings based on questions and resources provided by greener one (Greener One 2008-2009) . Klemisch concludes (translated): due to a lack of normative or voluntary rules a plethora of diverse labelling schemes has been established that are difficult to evaluate in terms of their content and transparency. In many cases this situation has resulted in a failure to assist consumers in their purchase decision. For this reason endeavours to develop standardised means of communication remain on the agenda (Klemisch 2004).

The chief editor of the Retailing Today for example highlights that facing problems of greenwash on the one hand and conscious consumers on the other hand, "for the sake of the future of the green movement at retail, which at its current pace runs the risk of losing credibility at a perilous rate, it's time to advocate for a system of standards" (Graig 2007). The world largest retailer Walmart announced on 16th July 2009 plans to develop a worldwide universal sustainable product index to establish "a single source of data for evaluating the sustainability of products"(Walmart 2010). The company is introducing the initiative in three phases:

- First phase is a survey of its more than 100,000 suppliers including 15 very general questions on four areas: energy and climate; material efficiency; natural resources, and; people and community (Walmart 2010). Data partly builds on labelling and certification schemes suppliers already adhere to.
- As a second step, the company initiated a Sustainability Consortium consisting of various retailers (e.g. Wal Mart, Safeway, Marks and Spencer), producers and branders (e.g. Ulnilever, Kellogs, Loreal, Monsanto), governmental agencies (e.g. United States Environmental Protection agency), consultancies (e.g. KPMG), certification organisations and two NGOs (WWF, BSR)[11] (The Sustainability Consortium 2009-2010). They are currently working on sustainability and reporting standards developed by sector working groups (The Sustainability Consortium 2010).

---

[11] The steering committee is supposed to have at least 10% NGO participation. (The Sustainability Consortium 2009-2010).

- The final step in developing the index for Wal Mart will be to: "translate the information into a simple rating for consumers about the sustainability of products" (Walmart 2010). "How that information is delivered to consumers is still undetermined, but could take the form of a numeric score, color code or some other type of label" (Duke 2009).

On the producer side, the food sector, for example, recently set up a European Food Sustainable Consumption and Production Table (SCP). One of their objectives is to establish scientifically reliable and uniform environmental assessment methodologies for food and drink products and to identify suitable means of voluntary communication to consumers' (Gruner et al. 2009).

Supportive of this, in a study for the European Commission Allison and Carter suggest establishing "a formal mechanism to develop the linkages between different forms of product environmental information, in order to optimise synergies, avoid antagonisms and increase cost-effectiveness" (Allison & Carter 2000, p X). In relation to this the European Commission recently stated that it "intends to explore the scope for further dialogue, co-operation and, where appropriate, convergence between different private labelling schemes to promote possible synergies and enhance clarity for the consumer" (The Commission of the European Communities 2009, p 11) "while avoiding entering into defining what are the appropriate sustainability standards to be followed by these private schemes" (The Commission of the European Communities 2009, p 10). Considerations regarding the implementation of an integrated framework for the communication of environmental and/or social product attributes can be also found in many European member states. The main Swedish organic and the eco-labelling organisation for example have decided to cooperate on implementing a new climate label. To gain the right to use the label, companies not only need to take measures to reduce the climate impact of a product but also need to prove that the respective company has third-party certification which places fundamental demands in the areas of environmental protection, animal welfare and social welfare (Climate Labelling for Food 2009). Engelund et al. called in a study commissioned by the Danish Environmental Protection Agency for the implementation of "an integrated environmental and health communication system", including a "common framework for verification of environmental and health information systems" (Engelund et al. 2005). The Belgian government stated in their Federal Plan for Sustainable Development that they are aiming (on EU level) "for the integration of existing labels and the development of one single label with regard to the entire life cycle (social, ecological, economic)". Furthermore they are planning on taking measures "aimed at defining a clear, understandable, and transparent framework for the use of labels, logos and pictograms in advertising or on products and services" (Council of Ministers 2004, pp 55–56). In the UK the House of Common Environmental Audit Committee recently stated that the government should be prepared to enforce the "simplification, unification and verification of environmental labelling, preferably into a single sector-based universal scheme incorporating different key elements as in emerging food labelling schemes" (House of Commons Environmental Audit Committee 2009, p 8). They argue that it would be ideal for manufacturers and retailers themselves to introduce a scheme and support the adoption of robust, auditable certification schemes to underpin the simple presentation of information to consumers but that "the Government should
be prepared to enforce such a labelling scheme by statute although we accept that the ideal would be for manufacturers and retailers themselves to introduce a clear and robust scheme without the need for government enforcement" (House of Commons Environmental Audit Committee 2009, p 8). In Germany a report for the German Ministry of Consumer Protection, Food and Agriculture by the Wuppertal Institute suggests the implementation of a sustainability meta label at the point of sale highlighting the most sustainable products per product group based on a summary of existing labelling schemes (Baedeker et al. 2005). The implementation is suggested in two phases: in the short term a summary of existing third party verified sustainability related labelling schemes as well as processes like GRI reports or ISO certifications would be conducted to develop a sustainability portfolio that shows per sector to what extent

these schemes are able to contribute to sustainable consumption. Sustainability criteria would then be developed along the whole life cycle including all dimensions of sustainability and based on current consumption trends and a multi stakeholder dialogue. In a second step they suggest the conception of a sustainability meta label designed as a process label (as also suggested by Eberle) that identifies the most sustainable products (i.e. similar to existing eco labels). In terms of design they suggest following the approach of the EU energy label (Baedeker et al. 2005). In a follow up project conducted by the eco-institute, this concept by Baedeker et al (2005), namely of a sustainability meta label, is only discussed very briefly. In fact, the eco institute argues that agreement between the various labelling schemes on such a label seems very unlikely. A complete merger of existing schemes, they argue, does not seem politically or legally enforceable (Teufel et al. 2009).

In addition to such governmentally commissioned studies some academics have suggested the implementation of a standardising and independently verifying institution. Proto et al. or example conclude, based on a study of European eco- and energy labels, that a standardisation of the methodologies that energy and eco-labelling programs are founded on, in the form of a multi-level framework, "would help in the implementation of more efficient standards and practices" (Proto et al. 2007, p 682). Karl and Orwat suggest that institutions like research and test institutes should monitor, observe, compare, and evaluate existing activities, procedures, decisions and requirements of co-existing ecolabelling schemes (Karl & Orwat 1999, p 219). Morris from the Institute of Economic Affairs critiques current labelling practices like ecolabels in general and calls for third party verification of business claims instead (Morris 1997, p 60). However, none of these authors further specify a potential implementation of such a scheme.

5 DISCUSSION OF ONE POTENTIAL IMPLEMENTATION FORM OF A SUSTAINABILITY META LABELLING SCHEME

The following sections further investigate the call for standardisation and integration of existing sustainability related labelling schemes into a unifying meta scheme to address the increasing confusion on the part of consumers, producers and other stakeholders. The main aim of an integrated meta label is considered to be the implementation of an instrument that condenses existing product information schemes and communicates the sustainability of a product in a simplified form. Such an attempt could potentially increase the effectiveness of existing labelling schemes on the demand as well as the supply side. On the demand side a more transparent and less confusing information situation could facilitate political consumerist demand from individual consumers as well as broader society. On the supply side such increased demand could then trigger respective modifications of the production system in order to meet the demand. A less confusing situation in terms of possible standards to assist in doing so could facilitate this modification. So far, standardisation and integration calls lack detailed discussions on potential forms of such a scheme. This paper is a first attempt to deliver this discussion. The next sections discuss alternative forms of implementation in terms of: the range of product groups included (section 5.1), criteria setting (section 5.2), assessment and monitoring (section 5.3) and communication (section 5.4).

5.1 PRODUCT GROUPS INCLUDED

In the course of its conception and institutionalisation any labelling scheme will need to decide which products groups it is aiming to apply to. The following sections discuss how many and which product groups to include (section 5.1.1 and 5.1.2) as well as the difficulties in drawing the boundaries around the selected product groups (section 5.1.3).

5.1.1   NUMBER OF PRODUCT GROUPS INCLUDED

Labels may either apply to certain product groups (e.g. fish in the case of the MSC or household appliances for the EU energy label) or include many different product groups and services (e.g. EU ecolabel).

On the one hand it can be argued that the more product groups are included in a labelling scheme the less confusing the situation becomes (Hansen & Kull 1995). According to consumer surveys conducted by Jensen et al. on labelling of electronic products in Denmark the majority of the consumers are interested in comparability between different product groups (Jensen et al. 2003). On the other hand, the social and environmental issues that need to be addressed in a labelling scheme differ across product groups. In addition, every group is different in terms of its market structure and essential actors forming the market. While for some products retailers can have high market power other markets have a high concentration of power on the producer side. Also for some groups the pressure on businesses by societal actors like governments and NGOs is much higher than in others. Accordingly key actors for the facilitation of a scheme depend essentially on the respective product group. The implementation of a labelling scheme therefore becomes much more complex the more product groups are included. For such reasons authors like Hansen and Kull state (for the case of ecolabelling) that the informational value and ecological credibility and competence decreases the more heterogenic the product attributes are that are included and compared within one labelling scheme (Hansen & Kull 1995).

To achieve one of the main aims of a sustainability meta label (reduce the confusion of the various labelling schemes), a wide scope of included product groups seems unavoidable. If a label only covers some product groups this will necessarily lead to either the implementation of many different schemes or leave major information gaps. Despite the previously described difficulties related to the inclusion of many product groups a meta label can hardly be restricted to only a few products. Yet as the number of product groups is vast, it seems highly difficult (or probably practically impossible) to develop a labelling scheme that immediately applies to all existing products. An alternative is for a meta labelling institution to start with a few product groups and then gradually expand. This conclusion was arrived at by Eberle (2001) and Teufel et al. (2009) in their studies on a potential implementation of a sustainability label as well as Baedeker et al.'s study on sustainability meta labelling (Baedeker et al. 2005).

5.1.2   PRODUCT GROUP SELECTION

If we are to start with a few products, then it makes sense to start with the most important ones. But, which product groups are most important in terms of sustainable consumption? Most academic studies take an impact approach at this point by looking for the product groups with the highest negative sustainability impacts (so called "hot spots") (Baedeker et al. 2005, p 94), usually based on life cycle assessments.[12]

Alternatively, the selection of product groups can be based on the prospects for success. Frankl et al. suggest that the selection of product groups for ecolabels starts with products for which it is easy to develop criteria, where stakeholders have a positive attitude, and where labelled products can find their way into the shops easily, in order to create snowball effects (Frankl et al.

---

[12] The German Eco Institute for example conducted life cycle assessments for various sectors to identify areas with high environmental impacts for the project "Eco Top Ten". They found that nutrition, mobility, and housing have a particularly high environmental impact (Grießhammer 2001, pp 104–105). Similar results were found in expert interviews conducted by Baedeker et al. on a broader sustainability level (Baedeker et al. 2005, p 94). The German project "Nachhaltiger Warenkorb" (sustainable shopping basket) adds to this list tourism, textile, and the finance sector as having a high sustainability impact (Schoenheit et al. 2002, p 21).

2005). Frankl and Piertoni developed a framework of product group specific factors influencing the success of environmental product information schemes including main environmental impacts along the life cycle, quality and price on the market, industry structure, role and importance of stakeholders, awareness of consumers, integrated approach with other policies existing, and criteria and format of the scheme for the particular product (Frankl & Pietroni 2005). Depending on the interplay of these factors product information schemes are more likely to be successful in some product groups than in others. For example, the market structure within a product group influences the motivation and strategy with respect to voluntary product information schemes. Agreements are more likely in highly concentrated markets with fewer actors involved. Also, for some product groups the pressure on businesses by societal actors like governments and NGOs might be much higher than in others.

A similar but more cost benefit oriented impact approach is taken by Banerjee and Solomon. They suggest selecting product groups for which there is large room for improvement in product standards and where these improvements can be achieved with relatively little effort (Banerjee & Solomon 2003).

A more consumer focused approach is to either look for areas where purchase decisions and consumer behaviour have a relatively high influence on the supply of products or to look for product groups with the highest probability of being actually used by consumers. Regarding the latter, BjØrner et al. suggest, based on a study of Danish consumer use of the Scandinavian ecolabel, that ecolabelling is more influential with frequently bought products since consumers have the impression that they can make a difference by changing their purchase behaviour (BjØrner et al. 2004). A similar argument is made by Erskine and Collins (Erskine & Collins 1997). In contrast, Bougherara & Grolleau (Bougherara & Grolleau 2005) and Rubik & Weskamp (Rubik & Weskamp 1996) argue that labelling is more influential in the case of high involvement products like fridges, cars etc.[13]

A supply side or company oriented approach makes the selection of the product groups dependent on the relevance for the business, market opportunities, and the improvement potential including the ability to effectively control or influence the respective supply chain (UNEP/Wuppertal Institute Collaborating Centre 2007).

Which of these approaches is taken will most likely depend on the actors involved in the institutionalisation of the labelling scheme.

5.1.3 DEFINING PRODUCT GROUP CATEGORIES

After selecting product groups, the next step is to define their precise boundaries. According to Kaiser, a common approach is to base this definition on the degree to which products can substitute for each other in terms of their basic function (Kaiser 1996). However, different goods are seldom perfect substitutes for one another and some of the products may also have many different uses (Gallastegui & Spain 2002). Moreover, substitutability and the definition of the basic function depend to a large degree on personal judgement (Kaiser 1996). In the course of recent discussions around CO_2 labelling Innocent's co-founder, Richard Reed, for example questioned "whether it is fair to compare a bottle of crushed fruit and something largely made of water?" (Jowit 09.03.09). Is the basic function of a fruit drink only to satisfy thirst or also to deliver nutrition and vitamins? If the latter is the case product group boundaries would need to

---

[13] This shows that the affective power of labelling on end consumers has been highly debated. More research would need to be conducted at this point to make any valuable statements.

be drawn around fruit juices. If the former is the case product group boundaries would need to be drawn around any possible drink.

An example from the Blue Angel ecolabel illustrates the impact these decisions can have and shows that conflicts can arise between different functions and aims of labelling schemes. Deodorant sprays used to be awarded the German ecolabel Blue Angel if they were free of CFC. Deodorant sticks on the other hand were not able to receive the label since they were defined as not belonging to the same product category as deodorant sprays. The resulting message was that deodorant sprays were environmentally beneficial compared to deodorant sticks. In this instance the label failed in its role to signal what appears to be the lower impact purchase option. Nevertheless the label still achieved its aim to motivate producers of deodorant sprays to produce in a more environmental friendly way (by reducing the use of CFCs). In fact, motivating producers to produce CFC free sprays would not have happened had only sticks been positively labelled (Salzman 1991).

To use another example: is it the role of a label to tell the consumer that riding a bike is preferable over driving a car? Or should the label assume the consumer knows about such things? In the former case, this could lead to defining both cars and bicycles as belonging to the same product group (means of transport) and all cars being negatively labelled. If cars and bicycles are not defined as belonging to the same product group a bicycle that is not more sustainable compared to the status quo of current bicycle production and consumption could gain a negative assessment (e.g. for using certain chemicals during production etc.) while a car could be positively labelled if it reduced the most important sustainability problems along the production and consumption system (e.g. via reducing fuel consumption). Is it most effective to show the consumer the purchase of a bicycle as the most sustainable option or to motivate manufacturers to produce bicycles and cars more sustainably?

As briefly discussed in section three, assuming the only function of labeling schemes is to show consumers the most environmental or socially friendly product alternative and viewing consumers as the key drivers for the effectiveness of labelling schemes oversimplifies and ignores the dynamics found within existing labelling schemes and the plethora of factors influencing individual purchase decisions. For many labeling schemes the influence of end consumer demand has in fact been limited (see Dendler 2010 for further discussion). A sole focus on communicating the most sustainable consumption option through very wide interpretations of product group boundaries, which leads to less influence on the production side, does therefore not seem advisable. Instead the right balance between the two conflicting interests will need to be found per product group.

5.1.4 SUMMARY

Although a labelling scheme becomes more complex the more product groups are included, a large scope in terms of included product groups is arguably most likely to be able to effectively condense the amount of currently existing labelling schemes in the long term. In the short term the amount of product groups included will need to be restricted and prioritised. This prioritisation can either follow a consumer, a business, a cost or a success oriented process. A complicating factor is the definition of the correct product group category to avoid conflicts between the aim of showing the consumer the most sustainable consumption option and to motivate producers to produce more sustainably.

5.2 CRITERIA

After having decided which product groups to include one of the most central parts follows: the definition of criteria the chosen product groups are supposed to be assessed against. Some labels

aim to present information as neutral as possible, in a sense that they leave as much of this assessment decision as possible to the consumer. Neutrality or objectivity is a contested term however. Taking a critical realist stance even though objective truths and reality exist, reality is structured, sratified and changing and inevitably subject to multiple interpretations (Bhaskar 1978; Sayer 2000). Labelling schemes are based on compromises between various societal actors involved (Dendler 2010) and a subjective social construction of reality rather than an objective truth. However, depending on the degree of decision making on the part of the labeling institution, it is assumed that results can be more or less subjective. Examples for supposedly less subjective labels are the communication of a product's energy usage, warning that a product contains certain substances, or the environmental footprint of a product based on life cycle assessment.[14] Other schemes (mainly ISO type I and II ecolabels and most social labels) have developed detailed criteria against which products are assessed by the labelling scheme. They signal the accordance with specific product standards. Usually such criteria are determined by life cycle assessments, but defined according to general targets of the respective label developed in a stakeholder dialogue (Prakash et al. 2008).

Considering the very wide and complex concept of sustainable consumption the communication of 'neutral' information seems even more difficult for a sustainability label. One of the main problems in defining a sustainability label is the "overly general nature" of the concept of sustainability "that hinders its operational use without further specification" (Muller 2008, p 199). Any labelling scheme will probably need to define and also restrict in some way what is meant by a sustainable product. A vital part of any new form of sustainability label is therefore the choice what kind of criteria a sustainable product should characterise. The following sections will discuss which issues criteria would probably need to address (section 5.2.1) either via a relative or an absolute approach (section 5.2.2), for what parts of a products life cycle (section 5.2.3), how to identify these issues (section 5.2.4) and their point of reference (section 5.2.5), how flexible and how rigorous criteria need to be (section 5.2.6 and 5.2.7) and how they get revised (section 4.2.7).

5.2.1   SCOPE AND ISSUES TO ADDRESS

The basic foundation of any sustainability label is a definition of a sustainable product. In a very broad sense, a sustainable product can be defined as a product that supports more sustainable consumption. The concept of sustainable consumption is highly debated however and there are various definitions of sustainable consumption focussing on different conceptions of sustainable development. Baedeker et al. summarize the following dimensions:

- Sustainable consumption is an aim, not a description of a target state;

- Consumption is sustainable if it meets the needs of the present population without compromising the ability of future generation to meet their own needs;

- Sustainable consumption aims for an ecological, social, and economic enhancement of quality of life;

- The whole consumption and production process has to be taken into account (Baedeker et al. 2005).

Most authors agree that social and ecological criteria need to be part of a sustainability label. They disagree however to what extent economic criteria need to be included. One possible

---

[14] The neutrality of environmental footprinting is particularly debatable. See page 29 et seqq. for further discussion.

economic criterion, according to Belz and Billharz, is that sustainable consumption decisions should not compromise individual net utility (Belz & Bilharz 2007). Yet, only individuals themselves can evaluate their net utility. The degree of constriction of net utility can hardly be directly included in a labelling scheme. Other economic criteria are a profitable and efficient operation of the participating economic actors (included for example in Mazijn et al. 2004 and Teufel et al. 2009 suggestions for a sustainability label). Eberle (2001) and Belz and Bilharz (2007) highlight that both these criteria are communicated to the consumer via the price. For these authors, a sustainability label should be restricted to the social and ecological dimension. Teufel et al., for example, suggest not only including a threshold of maximum life cycle costs but also quality and usability criteria (Teufel et al. 2009). Mazijn et al. add to this investment into research and development, anti corruption policy, and the correct payment of taxes (Mazijn et al. 2004).

Another open question is the inclusion of health aspects. In the UK for example, there are ambitions to include health issues into sustainability labels for the food sector. A sustainability meta label could potentially include the health aspects of a product. This could be an additional dimension or might be considered as part of the social dimension. To what extent such criteria should be part of a labelling scheme will most likely depend on the product and the respective labelling organisation.

Due to the very wide scope of the sustainability concept labelling schemes usually need to restrict which aspects they take into account. Such an approach has been taken for example by Teufel et al. to derive relevant sustainability criteria for their study on the development of a sustainability label in Germany. Mazijn et al. suggest focusing on the most relevant social, environmental, and economic impacts for the implementation of a sustainable development label in Belgium (Mazijn et al. 2004). There are multiple ways to decide for the most relevant issues: the UK House of Commons Environmental Audit Committee, for example, argues that "it is crucial for labels to reflect the most important environmental priorities, both in terms of consumer behaviour and the environmental priorities identified for each sector" (House of Commons Environmental Audit Committee 2009, p 9). One prominent example is the issue of climate change and the emission of green-house gases along a product's life cycle. According to a recent survey of European consumers by the Gallup Institute even more important than climate change impact is whether a product can be recycled or reused; confirmation that the product comes from environmentally-friendly sources and has eco-friendly packaging (The Gallup Organisation 2009). In addition to environmental priorities, a lack of data and difficulties in defining boundaries or tradeoffs between different sustainability dimensions can influence the decision which impacts to take into account.

In short, the decision as to which product groups to choose but also which impacts are judged as being relevant can be based on different grounds and are rather subjective. As with most other parts of the labelling process, the stakeholders involved in the institutionalisation of the labelling scheme will probably determine the scope of the labelling scheme and which particular criteria are used.

5.2.2 RELATIVE VS. ABSOLUTE APPROACHES

Another open question is how strictly the sustainability concept should be interpreted. Belz and Bilharz (2007) distinguish between two different forms of sustainable consumption: First, sustainable consumption options defined as relative improvements compared to the status quo. They reduce social-ecological problems of the production and consumption process compared to conventional consumption without majorly compromising the individual net utility. Second, sustainable consumption defined in an absolute sense as consumption acts or patterns that are

permanently transferable to the whole world population without endangering the aims of sustainable development.

Sustainable consumption in an absolute sense is a stringent product criterion and raises definitional issues. All production changes the environment in some way (Kaiser 1996). In aggregate, environmental impact is not only a function of a product's environmental efficiency, but also the level of consumption and affluence (Ehrlich and Ehrlich). Signalling the absolute sustainability of a product would make it necessary to include overall consumption in the calculations. Such statements are hypothetical and difficult to make. Moreover, sustainability thresholds and definitions (including acceptable, tolerable levels of impact) are debated. It is not clear how many 'green' consumer options are transferable to the whole population.[15] Purchasing a hybrid car for example may not be a sustainable consumption option in an absolute sense, as its consumption may not be transferable to 6 billion people on earth without an unsustainable level of impact. However such a car would more likely be defined as sustainable consumption in a relative sense.

The majority of existing labelling schemes target achieving sustainable consumption in a relative sense, aiming to show the consumer which product is more sustainable than a comparable one. Many seal of approval labels for example highlight all products that meet certain standards which lead to a reduction of clearly unsustainable practices. ISO type I labels like the EU ecolabel follow a more dynamic approach, highlighting products that are the most preferable within their product category. The standards of the EU ecolabel are intended to be achievable by 20-30% of the products within one product category. The intention is that these standards are then gradually raised. Some labelling schemes also try to communicate absolute figures in terms of the environmental impacts of one particular product to enable relative evaluations between different products. Examples include type III labels but also recent CO2 labels.

Similarly for a sustainability meta labelling scheme, it would seem that the only realistic option is to signal sustainable consumption options in a relative sense: products that meet individual utilities for a justifiable price while reducing socio-ecological problems compared to conventional products (Schoenheit et al. 2002; Belz & Bilharz 2007).

5.2.3 PARTS OF THE LIFE CYCLE TO TAKE INTO CONSIDERATION

Socio-ecological problems arise along the whole life cycle of a product. Teufel et al. for example point to the high environmental and social impacts at the primary production stage. Yet, so far primary production has hardly been included in existing sustainability related labelling schemes (Teufel et al. 2009). Some highlight that there is a need to also consider later stages of the supply chain not only in terms of ecological but also social impacts (regardless of whether they take place in developing or developed countries).[16] Others criticise labelling schemes that exclude the

---

[15] There are concepts that work towards achieving sustainable consumption in an absolute sense. The so called consistency strategy aims to implement a cyclic, renewable system which operates like a natural system by not producing any waste but only reusable products (Scherhorn 2008). But products in line with such an approach are very rare so far.

[16] Spillemacker argues that also many European companies do not accept unions or employ teenagers for minimal wages (Spillemaeckers 2007). Also forced labour can take various forms. In some developed countries, prisoners for example are obliged to work for minimum compensation (Spillemaeckers 2007). Such issues have lead to heated debates regarding the Fair Trade label for example where companies selling Fair Trade products were not in accordance with social standards at the later stages of the supply chain. Starbucks for example sells Fair Trade products but at the same time uses prisoner workers in North America, and has been accused of anti-union activities (Fridell 2009). Other examples include

use phase which often has very high environmental impacts (Eberle 2001). Most authors therefore call to take into account the whole life cycle when identifying labelling criteria a product would need to adhere to in order to reduce these socio-ecological problems (e.g. Rubik et al. 2007 or Mazijn et al. 2004).

However, there is a trade-off between taking into account every step of the life cycle and ensuring the clarity, comprehensibility and (with increasingly complex and international supply chains) the feasibility and affordability of the scheme (Eberle 2001; Spillemaeckers 2007). As for other labelling schemes, decisions will probably need to be made which parts of the life cycle are the most relevant ones for a sustainability meta label. Instruments that can be used to identify socio-ecological problems along the whole life cycle of a product and decide upon the most relevant ones are discussed in the next section.

5.2.4 LIFE CYCLE ASSESSMENT PROCESSES

The most prominent instruments to assess and measure environmental and social impacts of products along their lifecycle are life cycle assessment (LCA) and product line analysis or product sustainability assessment. The use of LCA enables comparison of system alternatives in terms of their environmental impact (Prakash et al. 2008) but has major limitations. By definition, LCAs do not account for unquantifiable issues and usually do not sufficiently address site-specific impacts, which depend on more factors than just the inputs and output of a system. LCA has often neglected more complex environmental issues such as biodiversity impacts from land use, indoor air emissions, and socio-economic impacts (Christiansen et al. 2006). Alternative concepts to LCA are product line analysis or product sustainability assessment. They are largely built on LCAs but take into account additional dimensions and the social and economic impacts of a products life cycle (Eberle 2001). Such broader approaches usually work with qualitative data rather than numerical footprints (Schaltegger et al. 2004). Nevertheless, gathering primary data is very complex and time consuming for all approaches. In many cases databases need to be used when no primary data can be collected and some data may embody assumptions about the future (Schaltegger et al. 2004). Other problems include the use of varying processes in setting the boundaries of the assessment. Decisions made on all of these issues can influence the results of the respective process significantly (Christiansen et al. 2006, p 31). Labelling schemes built on LCAs have therefore been accused of a high degree of subjectivity and an "arbitrariness of the process of selecting and updating criteria" (Gallastegui & Spain 2002, p 318). Indeed, many product systems and supply chains are much more dynamic than the databases and calculations, leading to situations where results do not necessarily represent the actual impacts at a given time (Prakash et al. 2008). For Erskine and Collins, the greatest challenge to LCA in relation to labelling "is its credibility, which requires transparency in system boundary definition, the availability of data, data quality and the methods used" (Erskine & Collins 1997, p 127). But even if transparency is ensured, the subjectivity of the decision making processes can lead to complaints and legal disputes between disadvantaged parties and those responsible for the labelling scheme (Prakash et al. 2008). For all such reasons, measures of sustainability impact communicated to the consumer in terms of absolute figures based on life cycle assessments have to be treated with caution.

5.2.5 POINT OF REFERENCE

Sustainability problems and solutions depend to a large degree on the respective product. Next to product specific issues some ecological problems, and most economic and social aspects are

---

retailers like Lidl selling Fair Trade products but at the same time not complying with labour regulations in their countries (Krier 2008). See (Dendler In progress c) for more detail.

related to the whole organisation[17] (IEFE – Università Bocconi 2005 ; Mazijn et al. 2004). Teufel et al. (2009) therefore suggest two forms of criteria:
1. Lifecycle related product and process criteria specifying requirements for particular product groups;
2. Organisational criteria specifying requirements for whole organisations but also product requirements that are applicable across many different product groups (Teufel et al. 2009).[18]

5.2.6 FLEXIBILITY

One of the aims of many product labelling schemes is to define standards that cross governmental and national boundaries in ways that reflect the geographical variability of the respective product (Eden & Bear 2010). Yet product and organisational criteria also depend on location. Water use for example might be a problem in some areas but irrelevant in others. Additionally, retailers highlight that cultural differences of consumers call for different labelling standards (Eurocommerce 2006). To address local conditions and avoid discrimination various authors suggest introducing different criteria for different regions within one harmonised scheme (Frankl & Pietroni 2005). The definition of criteria that meet varying local conditions and consumer needs by a central body can be difficult. For that reasons businesses, including producers and retailers, usually call for flexible criteria (Boström & Klintman 2008). Fair Trade for example has faced repeated requests from Southern producers to enable them to adapt the standards to local conditions rather than imposing a universal model on them (Wilkinson 2007). The EU ecolabel has been accused of inflexible criteria non adaptable to local industries and innovation processes (Dendler In progress a). Some labelling schemes, like the MSC, decided to only define very broad criteria on a general level that are then specified by local assessment bodies (Dendler In progress d) but this approach can lead to inconsistent interpretations that can negatively influence the legitimisation and effectiveness of the scheme. Indeed MSC has been repeatedly accused for having less stringent assessment processes in some places than in others (Dendler In progress d). Similarly, the EU ecolabel has been accused of too inflexible criteria in some areas but at the same time faced criticism for incoherent and inconsistent criteria (Dendler In progress a). Criteria therefore need to find a difficult balance between being flexible for local conditions on the one and remaining sufficiently specific to ensure their verifiability on the other hand (Scholl 1999).

5.2.7 RIGOUR

The rigour of a labelling scheme is also contentious. On the one hand less rigour standards are easier to meet by businesses and make the participation of highly unsustainable operating businesses more likely. The modification of their practices can result in large sustainability gains. An evaluation study of the MSC scheme found for example that fisheries demonstrating the greatest overall environmental gain were the more difficult or controversial ones (Agnew et al. 2006). On the other hand less rigour standards can threaten the credibility of the scheme and legitimisation by actors like NGOs and media. Generally a trade off exists between very rigour standards leading to more support by groups like NGOs and higher credibility or lower standards that usually achieve higher market penetrations (Truffer et al. 2001).

---

[17] How a company treats their workers for example usually applies for the whole organisation across different product groups.

[18] A similar approach has been also suggested by Eberle (2001).

Existing labelling schemes greatly vary in their solution for this trade off. While some labelling schemes signal the accordance with minimum standards, others build on very ambitious, so-called gold standards. A hybrid solution between these two allows a sufficient number of producers to enter, after which standards get gradually raised. The EU ecolabel for example aims to label the best 30% within one product group in terms of their environmental performance. This means that such products are preferable compared to the other 70% of the products within their product group. These standards then get gradually raised. Hybrid certifiers "try to set guidelines that allow in enough producers with above-average practices to create a sort of gravity force that draws others to the standard. An ideal hybrid sets the entry hurdle as low as possible without alienating too large a portion of the environmental community. At the same time, hybrid solutions continue to raise the bar, because expectations ratchet up in a set fashion until producers ultimately meet the certifier's goal" (Searle et al. 2004, p 9). Another approach that can ease the decision between ambitious standards on the one hand and ensuring market penetration on the other is the implementation of a graded scheme showing the accordance with very ambitious standards as well as the accordance with semi- or unambitious standards (see p.34 et seqq. for further discussion on a graded scheme).

Searle points out that there is no "right" model (Searle et al. 2004, p 9). Which model is followed will most likely depend on the composition of the participating stakeholders.

5.2.8 CRITERIA REVISION

To ensure their timeliness and stimulate innovation, criteria need to be revised on a regular basis. The setting of the right time frame for revision is tricky: on the one hand criteria need to be up to date with innovation processes with fast changing products like media technology etc; on the other a criteria validity period needs to be ensured that enables also capital intensive industries to adapt accordingly (Gallastegui & Spain 2002). Frankl et al. distinguish between two forms of criteria revision: the first option is a linear tightening of labelling criteria (e.g. reduce allowable CO_2 emission by a certain percentage), though they acknowledge that "technical innovations are seldom linear" (Frankl et al. 2005, p 313). The second option is a qualitative, stepwise improvements approach (Frankl et al. 2005), where the labelling body decides about changes in the criteria on a regular basis. Both rely in a significant way on the estimation of what is technologically (and commercially) feasible (Bleda & Valente 2008) which requires a close relationship between labelling body, scientific community (Frankl et al. 2005) and practitioners (Gallastegui & Spain 2002). The authority in charge of revising criteria should thread "a very narrow path in order to determine the right minimum for environmental [or social] qualities, and because of the uncertainties characteristic of technological innovations and the usual asymmetries of lobbying power, this is probably an extremely hard task" (Bleda & Valente 2008, pp 15–16).

5.2.9 SUMMARY

In the light of the very wide and complex concept of sustainable consumption, the communication of 'neutral' information seems difficult. Any labelling scheme will need to define and also restrict in some way what is meant by a sustainable product. Considering the difficulties in defining any absolute sustainability a relative approach, defining a sustainable product in comparison to the status quo, seems more feasible for a labelling scheme. Consequently, a 'sustainable product' would meet individual utilities for a justifiable price while reducing socio-ecological problems compared to conventional products (Schoenheit et al. 2002; Belz & Bilharz 2007).

It seems necessary for the development process to take into account the whole life cycle of a product though restricting criteria to the most relevant ones. One has to acknowledge however the limitations of the LCA approach and the subjectivity of the decisions involved. Next to lifecycle related product and process criteria for particular product different authors suggest including organisational criteria and product requirements that are applicable across many different product groups. These criteria need to be sufficiently flexible for local whilst remaining sufficiently specific to ensure their verifiability. A balance needs also to be found between ambitious criteria ensuring the credibility of the schemes and the applicability of the criteria to ensure sufficient market coverage.[19] Lastly, criteria need to be revised on a regular basis that stimulates innovation but also enables capital intensive industries to adapt accordingly. The outcome of these balancing acts is essentially shaped by the respective product group and the participating parties. Throughout the whole process one has to be aware of the subjectivity of most decisions that can potentially lead to legal challenges.

5.3 ASSESSMENT AND MONITORING

Next step in the labelling process is to evaluate the adherence of products with the developed sustainability criteria. The House of Common Environmental Audit Committee points out that in order to help drive changes on the supply side, "labels should be underpinned by proper systems for analysis, audit and accreditation" (House of Commons Environmental Audit Committee 2009, p 17). The following sections consider the issues associated with the initial analysis and assessment of a product against sustainability criteria by some form of auditing body (section 4.3.1) and its continuous monitoring (section 4.3.2) in more detail.

5.3.1 INITIAL ASSESSMENT

For the initial assessment it first needs to be decided if products themselves or the standards products already adhere to are supposed to be assessed (section 4.3.1.1). The assessment can then follow different processes which are described in section 4.3.1.2. Assuming a sustainability meta label will follow a relative approach, the assessment will need to be set in relation either within or between product groups. The pros and cons of inter vs. intra product comparison are discussed in section 4.3.1.3.

5.3.1.1 ASSESSMENT BASE

As highlighted in the introduction to section five the main aim of an integrating meta scheme is considered to be the implementation of an instrument that condenses existing product information schemes and communicates the sustainability of a product in a simplified form. This aim could either be achieved via the implementation of a new labelling scheme that evaluates products against sustainability criteria or some form of meta evaluation of certification and labelling standards products already adhere to. The implementation of a completely new product evaluation might risk resulting in just another labelling scheme that adds to the confusion rather than condensing the existing labelling situation. Considering the already existing plethora of labelling schemes, utilising and building upon them might be a more reasonable approach. Such an approach would evaluate to what extent the above mentioned sustainability criteria are met due to the compliance of a product with various standards, including product labelling standards or other standards met by the companies involved (e.g.

---

[19] A potential solution here could be the introduction of a graded scheme which will be further discussed below.

EMAS certification). A similar approach has also been suggested and used by other authors for a potential implementation of a sustainability label (Eberle 2001; Teufel et al. 2009).

Not implementing a new scheme but maintaining existing schemes as an assessment basis and making them more transparent would thereby not only condense the current plethora of schemes for consumers but could potentially also increase the competition between them. Such competition may increase their quality if they competitively try to represent the particular sustainability related superiority of their awarded products and, thus, strengthen their criteria and awarding scheme (Karl & Orwat 1999). On a broader level, competition between labels can also trigger general public debate (Boström & Klintman 2008). Moreover, "labelling competition prevents the development of a situation in which only one or just a very few technologies are favoured by one programme and prevents a possible reduction in product variety because different [...] schemes promote different product and technology alternatives" (Karl & Orwat 1999, p 217).[20]

5.3.1.1.1 REQUIREMENTS FOR THE SCHEMES

To follow the above approach, respective schemes would need to have a sufficiently specified criteria catalogue and ensure that labelled products adhere to these criteria. The latter is usually ensured through an assessment process typically taking the following form: First, a supplier applies to a particular certifier for certification. Second, the certifier conducts a pre-assessment and documentation review of a supplier's facilities and production operations. Third, the certifier conducts field audits. Fourth, when conformity is verified, the certifier issues a certification and allows the supplier to label its products as certified (Hatanaka et al. 2005). This process can be conducted either by an internal or an external auditor. Internal auditors are familiar with the companies' structure, are trusted by the management and are more likely to receive access to confidential information. They usually have fewer difficulties in localising problems within one company but here is likely to be an external perception of not being able to address problems independently. External monitoring has to be divided into second and third party monitoring. In the former case the company sets up the monitoring institution that is independent to a certain degree in terms of its structure but dependent on the company financially. Third party monitoring on the other hand is conducted by parties which are financially as well as structurally independent of the company (Mazijn et al. 2004,). To assure the credibility of a scheme it seems essential that monitoring is conducted by an independent third party (e.g. Jensen et al. 2003; Baedeker et al. 2005). This makes it inevitable to take into account only independently monitored product labelling or standardisation schemes but not company controlled self declarations. The degree of independency can differ. Mazijn et al. distinguish between the following options for third party monitoring (Mazijn et al. 2004):

- The labelling organisation chooses and pays a monitoring institution they recognize as being capable of independent monitoring. For Mazijn et al this the most independent form of monitoring, since there is no dependence between monitoring institution and monitored company.
- "The company itself has to contact and pay a monitoring institution that has been accredited or recognized by the labeling organisation. The monitoring organisation will be controlled by a controlling organisation or by the labeling organisation itself" (Mazijn et al. 2004, p 47). This approach is followed for example by the MSC (Dendler In progress d). With this option the company has a greater influence on the monitoring process by

---

[20] Such advantage could potentially be mitigated however since existing schemes would then be measured against overarching criteria which could channel their approaches into one single direction.

choosing a monitoring body that works most efficiently for them.[21] Such procedures can risk the reputation of the scheme if these bodies are less demanding.[22]

- The labelling organisation itself does the monitoring. Such an approach, according to Mazijn et al, can lead to very accurate monitoring processes but companies are not able to choose the most efficient organisation. In many cases the possibility to obtain a label depends on the existence of a monitoring organisation in the producing country. And because many companies pay for the use of the label, this can negatively influence the independence of the monitoring process.

- To assure the independence of the monitoring body some labelling schemes accredit monitoring bodies through an additional umbrella organisation. This tends to have additional cost implications.

This analysis shows that even if a certification scheme fulfils the criterion of independent assessment it can mean different things. It is therefore not only important to assess the criteria of a scheme and if the scheme is independently monitored but also how the monitoring is conducted.

5.3.1.2 ASSESSMENT PROCESS

As a general requirement, the assessment process needs to be standardised and documented to assure the transparency and credibility of the scheme (Scholl 1999) but also its efficiency. The assessment process also needs to be sufficiently flexible to meet locally changing conditions and avoid discriminating against small scale and international producers.

Products can be assessed either through a scoring or a basic requirement process. Basic requirements have to be fulfilled in order to receive a positive assessment. A basic requirement approach is more stringent but also much less flexible (Mazijn et al. 2004). In a scoring system the company can receive various end results depending on the extent of criteria met. Within the scoring process the monitoring body can either only distinguish between compliance or non compliance or between a range of achievable scores. Moreover, the different criteria can be weighted as more or less important (Mazijn et al. 2004). At the core of the scoring scheme "is the possibility to compensate for the failure of a product regarding some eco/labelling requirements with success regarding other ecolabelling criteria" (Scheer & Rubik 2005, p 65). A scored scheme that might even distinguish between various scores and differently weighted criteria is more flexible in addressing the varying conditions in different locations. However, such a flexible approach needs to balance different dimensions against each other. For example, two products may differ because the first produces more greenhouse gases than the second, but the second requires more heavy metals. Aggregating them into one index is "likely to be somewhat arbitrary" (Bleda & Valente 2008, pp 16–19). A product could attain a positive overall rating even though it scores very poorly in one dimension. This could threaten the credibility of the scheme. To reduce this risk some schemes have gone for a combination of both systems by defining some basic requirements but also some scored criteria.

---

[21] The formal application procedure of the EU ecolabel, for example, has been repeatedly accused of being too slow and bureaucratic especially for products with a short life cycle and quick modifications (Lohse & Wulf-Schnabel 2000; Vermeire et al. 2003).

[22] Indeed the MSC has been accused of inconsistent interpretations of their standard due to competition between different certifiers (Pope 2009). See (Dendler In progress d) for more detail.

To avoid discriminating against certain groups and to ensure sufficient participation, some labelling schemes accept continuous improvement measures by the producer. This means they do not define specific minimum performance standards, "rather, producers commit to demonstrating continuous progress in reducing the harmful impact they cause" (Searle et al. 2004, p 9). Another hybrid solution is to combine these two systems by defining certain minimum requirements but also accept continuous improvements for others. Examples for such an approach are the MSC or the Fair Trade labelling scheme. Both schemes have faced criticism for the use of the continuous improvement approach though.[23]

Deciding which assessment process is most appropriate is not straightforward. Frankl and Pietroni argue that the appropriateness of the assessment procedure largely depends on the product group (Frankl & Pietroni 2005). Nevertheless these different assessment approaches not only have to be considered for the meta labelling scheme itself but also when evaluating to what extent labelling or standardising schemes fulfil respective sustainability criteria. If a labelling scheme follows a scoring and/or conditional approach, adherence to the respective standards does not necessarily imply that all criteria are fulfilled by the product.

5.3.1.3 ASSESSMENT RELATION: INTRA PRODUCT GROUP COMPARISON VS. INTER PRODUCT GROUP COMPARISON

As described in section 5.2.2 a sustainability meta labelling scheme will probably need to follow a relative assessment approach. This means the assessment of a product will need to be set in relation with the status quo. An essential question at this point is if this comparison should happen between or within one product group. Many authors have argued that the main aim of product labelling is to enable comparison within product groups (see e.g. Kaiser 1996). Indeed, most labelling schemes have followed this approach leaving advices like the preference of the bicycle over the car to general education measures (Kaiser 1996). More recent concepts suggest labelling schemes should enable also the comparison between product groups. Christiansen et al. for example propose the implementation of a new form of type III labelling scheme which compares the environmental footprint (largely based on LCA) of a product to spending the same amount of money on a reference product[24] (Christiansen et al. 2006). However, as discussed previously (see p.**Error! Bookmark not defined.** et seqq.), approaches based on LCAs hold several weaknesses. Outcomes of LCAs are subjective and highly vulnerable to external criticism[25]. Footprinting methods are restricted to quantifiable dimensions and struggle to address many dimensions of sustainability. Furthermore, consumers understanding of such

---

[23] See Dendler (In progress d) and Dendler (In progress c) for more detail.

[24] This reference product would represent an abstract average product. Christiansen et al. do not further specify how to define such an "average product".

[25] Prakash et al. argue that approaches whose main aim it is to enable comparison across product groups would be less dependent on product model specific primary data and the problems that come with it (e.g. seasonal and temporal variations). Instead, average data would be preferable to enable the comparison of average products across product groups. Also, they argue, legal disputes as a result of LCAs are less likely to evolve in the case of cross product comparisons (Prakash et al. 2008). But even though cross product comparisons might have fewer problems in terms of gathering accurate primary data, average data will still differ substantially depending on calculation methods used and the definition of the boundaries. The results will thus still involve a rather large degree of subjectivity. In that sense, Prakash's statement about legal disputes is somewhat debatable.

complex messages would need further research.[26] In short, selecting such a reference product would be politically and technically difficult.

A sole focus on showing consumers the most sustainable consumption option will also arguably reduce the motivation for producers of certain products to produce more sustainably (see discussion on page 17 et seqq.).

For all these reasons proposals to use product labelling for inter product group comparisons based on footprinting do not seem to offer a real alternative to current intra product comparisons. Like currently existing labelling schemes also a sustainability meta label will probably need to focus on intra product comparisons. The setting of the right product group categories remains a difficult task though.

5.3.2   CONTINUOUS MONITORING

Following an initial assessment of the adherence to the standards, ideally a continuous monitoring should take place. If the chosen meta-label approach is to not assess and monitor the accordance of a product itself with respective sustainability criteria, but to the extent to which the constituent labelling schemes and standards that a product is certified with meet over-arching sustainability criteria, then the assurance that products comply with the criteria they are certified for would lie with the respective schemes. As outlined above, to assure compliance the respective schemes should have an independent assessment in place. Additionally some schemes have implemented independent continuous monitoring processes via regular on site checks. However, most schemes rely on other market participants to ensure the accuracy of the label (Scholl 1999). In the case of the EU ecolabel for example it is assumed that manufacturers themselves will be keen to check the validity of ecolabels awarded to competitors' products and will bring suspect 'awards' to the attention of the respective certification institution (Hale 1996, p 89). An additional requirement for independent continuous monitoring is perhaps not realistic.

5.3.3   SUMMARY

A possible way to unify existing product information whilst retaining competition between different schemes is to base the assessment not on the product itself but on the standards the respective product adheres to. An essential requirement for a scheme to be considered in a meta scheme would then need to be for them to have an independent assessment process in place. The assessment of these standards by a meta labelling scheme could follow different processes. On the one hand the assessment process needs to be standardised and documented to assure its credibility and efficiency; on the other hand assessment needs to be flexible for local conditions. One way to achieve this flexibility is the use of a scoring system and/or the acceptance of continuous improvements. However, their use can result in arbitrary decisions and threaten the schemes credibility. Alternatively less flexible approaches based on a basic requirement process or a combination of the two can be used. Which assessment process is most appropriate will probably depend largely on the product group. It has to be kept in mind that a sustainability meta label has to take these different approaches into consideration when assessing to what extent a certain standard fulfils respective sustainability criteria. This means a sustainability label does not only need to assess what criteria a labelling or standardising scheme uses, if the

---

[26] An extensive discussion of consumers understanding of different labeling schemes is outside the scope of this paper. However, recent consumer studies seem to agree that the communication of ever more complex information especially in numerical terms will most likely not be used by most consumers (see e.g. Upham et al. In Press, Accepted Manuscript; Banerjee & Solomon 2003).

scheme is independently monitored and how the monitoring is conducted, but also what kind of assessment approach is used. All these issues increase the complexity of the evaluation and comparison between different standards.

Assuming a sustainability meta label will follow a relative assessment approach the results will need to be set in relation either within or between product groups. Considering the weakness of currently proposed inter product group comparisons as well as their potential conflict with the motivation of businesses to produce more sustainably, an intra product group comparison is probably more advisable.

The task of continuous monitoring lies with the respective product labelling and standardising scheme rather than the meta labelling scheme. The inclusion of a requirement for an independent continuous monitoring process therefore seems desirable, albeit probably not realistic given that it is not conducted by most schemes.

5.4   COMMUNICATION

Next crucial step is the communication of the assessment results. Section 5.4.1 expands on this form of product communication which is usually conveyed via a label (section 5.4.1.1). Many schemes also provide additional product information via with product leaflets or through their website. Such information needs are discussed in the second part of section 5.4.1. Additionally, communication and information on the labelling scheme on a more general level is necessary, as discussed in section 5.4.2. Lastly, most labelling schemes try to increase the prominence of their scheme through public relations (section 5.4.3).

5.4.1   WITH PRODUCT COMMUNICATION

5.4.1.1 COMMUNICATION THROUGH A LABEL

The communication through the label itself can differ in terms of the degree of information aggregation conducted by the labelling scheme, the amount of data made available to the end consumer as well as the form of this information (comparative vs. seal of approval labels), and the design of the label that is intended to convey this information. The following sections will expand on these four issues.

5.4.1.1.1 INFORMATION AGGREGATION

Inherent in the concept of product labelling is the aggregation of information and restriction of the amount of information made available. Information aggregation means the condensing and codification of incoming information (e.g. assessment results) into higher level criteria or information (Hansen & Kull 1995; Rubik & Weskamp 1996). There are two main factors influencing the degree of aggregation: first, the information input to the scheme, and second the information output to the audience. Schemes like the EU energy label for example allow only a small amount of data entering the system by restricting its scope, product groups taken into account, etc. (Dendler In progress b). Other schemes take a large amount of data into the system but also transport a rather high amount of data to the audience leaving a certain degree of evaluation to them (e.g. type III declarations). Some schemes aggregate a large amount of data entering the scheme into a single symbol representing a condensed evaluation of the product performance based on a complex assessment of all relevant product aspects (e.g. the EU ecolabel) (Rubik & Weskamp 1996).

The more a labelling institution condenses information and assessment results the more choices are made by the labelling scheme and the more the recipient becomes dependent on expert

knowledge and decisions (Hansen & Kull 1995). The recipient can actually "lose sight of what they are getting at" (House of Commons Environmental Audit Committee 2009). Moreover decisions made throughout the labelling process are essentially subjective and can be highly controversial (see discussions above). Labelling schemes based on high rates of aggregation and decision making are seen as quite normative (Teisl & Roe 2005) and less precise (Teisl & Roe 1998).

Despite these pitfalls, aim of a meta labelling scheme is assumed to be condensing existing labelling schemes related to social as well as ecological product attributes for many different product groups. A high intake of information into the system and aggregation seems therefore unavoidable. In this case Eberle (2001), Klemisch (2004) and Hansen & Kull (1995) point to the importance of documenting, justifying and making transparent every aggregation step for every actor demanding such information.

5.4.1.1.2 QUANTITY OF DATA MADE AVAILABLE

The nature of the 'right' amount of information to be made available has been highly debated. In terms of the right amount of information for individual consumers many have criticised highly condensed forms of information for taking away decision making from the consumer (e.g. Teisl & Roe 2005; Teisl & Roe 1998). Such criticism finds support in different consumer studies. According to Teisl, product labelling schemes entailing more detailed information on environmental product attributes achieve a higher satisfaction on the side of the consumer (Teisl & Roe 2005). Highly condensed type I labels, on the other hand, achieved low credibility grades, lead to the smallest satisfaction of the consumers and were less usable for product comparison (see below for discussion on comparative labels) (Teisl 2003).[27] In a Danish consumer focus group study Jensen found for electronic products that simple environmental disclosure labels where consumers could determine what is most important to them "was seen as a good alternative to the eco-labels, which many found too superficial in their communication, as consumers were not told on what the labels are based" (Jensen et al. 2003, pp 43–50).

Klemisch highlights however that the higher the aggregation the more comprehensible the information becomes for most consumers (Klemisch 2004). Truffer et al. argue that single level labels will be easier to understand than labels with multiple levels (Truffer et al. 2001, p 889). Banerjee and Salomon state: "While seal of approval labels may be oversimplified and judgmental, experience has shown that the proportion of informed consumers who are willing and able to use technical information effectively is low. Also consumers often confuse [more detailed] disclosure labels as a seal of approval" (Banerjee & Salomon 2003, p 120).

---

[27] Teisl refers to a postal survey on labelling of wood products with 1948 US Americans. In his study Teisl presented the participants four different levels of information:
- a single seal of approval ecolabel
- a single seal of approval ecolabel including contact information
- a single seal of approval ecolabel including contact information and an overall numerical rating achieved (including additional information on average, highest and lowest ratings achievable)
- a single seal of approval ecolabel including contact information, an overall numerical rating achieved, and a table with the rating for various subcategories (e.g. labour standards)

Participants were then asked to rank credibility, environmental friendliness of the product, satisfaction with the amount of information, and preference for the product assuming equal quality and price. Credibility and satisfaction increased with the attachment of contact information and the attachment of the detailed table. Credibility decreased with stating the overall numerical rating and only slightly increased the satisfaction rate. The most detailed label was rated the most credible and satisfactory (even though only slightly more credible than the seal of approval label including contact information (Teisl 2003).

One of the reasons for such different statements, many argue, is that the appropriate amount of information (but also the degree of aggregation and design of the label) strongly depends on the product group as well as the consumer (Teisl & Roe 2005; Teisl & Roe 1998). Rubik et al. for example highlight that "simple products such as paper need only a very short and simple item of environmental information. On the contrary, with more complex products like washing machines, a logo or a phrase may not be enough" (Rubik et al. 2007, p 185). Similarly, purchase decisions on every day products will need less information than high involvement products like for example washing machines where consumers make careful comparisons during purchase (Bougherara & Grolleau 2005; Rubik & Weskamp 1996; Frankl & Pietroni 2005). For the latter, Frankl and Pietroni argue that mandatory comparative labels which leave more choice to the consumer are most appropriate (Frankl & Pietroni 2005). The Environmental Audit Committee takes a similar view (House of Commons Environmental Audit Committee 2009). In terms of the dependence on the consumer Kaiser argues that if information can tie in with already existing knowledge and interest in sustainability aspects, information provision can be more extensive, rational and factual. Uninterested and uninformed consumers will more likely be looking for clear and concise information as found for example with seal of approval labels (Kaiser 1996).

But evidence is mixed (Bei & Widdows 1999) and individual consumption processes, including their influence by information, is highly debated. Findings seem to depend to a large degree on the researcher and the paradigm and discipline in which they are working. Thinking within sociology for example highlights that many if not most consumption decisions are based on routines and practices rather than conscious decision making (e.g. Empacher & Stieß 2007; Randles & Warde 2006). Many psychologists highlight that most consumers are scarce in time and cognitive capacity, overloaded and/or uninterested and consumption decisions often happen on a limited, habitual, impulsive and emotional rather than rational decision making based on information (Reisch 2003). Such findings question to what extent product information can effectively influence individual consumption decisions. In fact, recent research has shown that for many labelling schemes the influence of end consumer demand has been limited (Dendler 2010). This is not to say that there are no individual consumers actually purchasing in a sustainable way, for which product labelling can be more or less helpful to make informed choices. However, individual consumption behaviour is complex and far from being understood. Clearer statements regarding the appropriate amount of data made available and perspectives would need further, interdisciplinary research.[28]

As briefly explained in section two and more extensively discussed in (Dendler 2010), next to communication with individual consumers, businesses often use labelling schemes to meet broader societal demand for more sustainable supply chains (Dendler 2010). The other way around, more information ideally leads to higher comparability between products and increased societal pressure for more sustainable supply chains. In reaction to such increased pressure businesses potentially react with increased use of legitimised labelling and certifications schemes. From a business perspective, Teisl argues (in terms of the environmental dimension) that the more environmental friendly a product is the more it benefits from environmental information disclosed (and the rise of societal demand for more sustainable supply chains). Accordingly, very environmental friendly producers usually support very detailed information disclosure; medium environmental friendly products who, for example, would just achieve a positive label through a type I label prefer highly condensed information; and businesses with potentially a high environmental impact favour no information disclosure whatsoever (Teisl 2003). The same holds probably true for the broader sustainability theme.

With regard to the meta labels agenda it seems difficult to find a single criterion to express the overall sustainability of a product: the concept is complex and includes many facets and

---

[28] See Dendler (2010) for further discussion.

tradeoffs (Eberle 2001). Finding one single symbol able to satisfy the information needs of myriad consumers and other stakeholders adds to this difficulty. A subdivision of the information into a social and an ecological dimension (but potentially also further subcategories) is therefore worth considering. As suggested by the House of Common report this subdivision could be more or less exhaustive depending on the product. A subdivision would make it possible to communicate the different social and ecological impacts along the life cycle and enable the consumer to make decisions between them. In view of the varying levels of demand with current labelling schemes it is likely that the result of product assessments will vary significantly in the different dimensions. More detailed information on these differences could further increase competition between existing schemes (leading to advantages as described in section 5.3.1.1) and, as just discussed, potentially facilitate societal demand for more sustainable supply chains as well as their use to meet this demand. On the other hand a potential overload of the label has to be kept in mind at this point. A label transmitting a huge amount of information inconsistent between different product groups will "require complicated trade-off decisions by the consumer, and would reduce the effectiveness of environmental labelling" (House of Commons Environmental Audit Committee 2009, p 9). In general terms there seems to be a conflict between a labels aim to facilitate individual consumer demand for more sustainable products on the one and broader societal motivation for businesses to modify their supply chains in a more sustainable way on the other hand. An ease for this conflict might be the implementation of a graded scheme, illustrated by a traffic light system. The following two section further discuss these options.

5.4.1.1.3 FORM OF THE INFORMATION: GRADED VS. SEAL OF APPROVAL LABEL

One of the central decisions is to choose either a graded or a seal of approval label. Seal of approval labels in most cases (and definitely in the case of type I labels) only aim to highlight the most beneficial products (e.g. the EU ecolabel aims to only label the 20-30% most environmentally friendly products within a product group). They segment the market into highly beneficial products and the rest (Bleda & Valente 2008). Graded labels[29] on the other hand not only highlight products that fulfil very high standards but also ones that are in line with semi stringent standards as well as products that are below the average standard. They therefore have a higher area of application.

To ensure the comparability of products, graded schemes often build on legal obligations making product information mandatory for all products within a product group. An alternative to mandatory comparative labelling schemes, Frankl and Pietroni, suggest the implementation of voluntary comparative labels especially for energy using durable products (Frankl & Pietroni 2005). Voluntary comparative labelling schemes might risk only products that achieved positive assessment being labelled mitigating the comparability. As pointed out by Grankvist et al., "it is not likely that a producer would voluntarily pay an independent organization to have a product labelled as 'worse than average for the environment'" (Grankvist et al. 2004, p 391). Similarly in a Danish consumer focus group study conducted by Jensen for electronic products none of the participants believed that the producers would use an eco-label or an environmental declaration voluntarily (Jensen et al. 2003). In fact a voluntary approach might lead to the same outcome as with seal of approval labels. Participants believed that a scheme where information can be compared will function best if most products on the market carry the label (Jensen et al. 2003). For Grankvist et al. to implement a system that not only includes positive, but also neutral and negative information "a regulation that prescribes that all products should be classified into one of these three categories will be needed" (Grankvist et al. 2004, p 391).

---

[29] The terms graded and comparative labeling schemes have been used interchangeable in the literature both referring to the concept as described in the following.

Recent years have seen an increase in scholars advocating comparative labelling schemes (e.g. Eberle 2001; Bleda & Valente 2008; Grankvist et al. 2004; Teisl & Roe 2005; Kaiser 1996). Bleda for example argues that the consumer receives much broader information through graded eco labels; products can be differentiated more precisely enhancing their comparability (Bleda & Valente 2008). Assuming the mandatory nature of the scheme leading to all products being labelled (see above) a graded scheme would enable the consumer to evaluate which product is preferable in terms of its sustainability performance between any pair of products (Bleda & Valente 2008). Some argue that such labels could achieve a higher satisfaction in terms of information on the side of the consumer (Teisl & Roe 2005; Roe et al. 2001) and that this would target a much broader group of consumers.[30] Grankvist et al. expect a much higher correlation between environmental concern and the influence of negative labels than is the case for positive labels (Grankvist et al. 2004). "Consumers with an intermediate environmental concern would perhaps not choose products with a positive eco-label, but they would sort out products with negative labels" (Grankvist et al. 2004, p 391).[31] The assumption that negative information is more effective than positive information is debated however.

On the business side seal of approval labels pose "a fixed target for firms. Thus, once (and if) this target is reached, firms have no incentives to further improve the environmental [or social] qualities of their products" (Bleda & Valente 2008, pp 15–16). Comparative labelling schemes on the other hand, especially when based on legal obligations, offer more precise information on the environmental or social friendliness of a business. They mitigate the possibility for false statements while type I labels could even facilitate misleading and falsified product information. As is the case with more detailed information (see above) the implementation of comparative labels would therefore potentially be more effective in influencing producers to produce more sustainably since they know that if they do not do so, a negative label would be attached to their product (Grankvist et al. 2004; Bleda & Valente 2008; Allison & Carter 2000). For a company this would be beneficial the more sustainably they produce (Teisl 2003, p 678; Roe et al. 2001).

All this is of particular advantage in the case of a meta labelling scheme. Existing labelling schemes differ substantially in their degree of ambition and rigour. The aims of a meta labelling scheme include making these differences more transparent, to increase the use and quality of labelling schemes for political consumerism and as political and supply chain management instrument. If a meta labelling scheme decided only to highlight the most sustainable products, adherence with parts of the sustainability criteria by less ambitious or more focussed certification schemes would not become transparent. By labelling not only the best but also medium and 'unsustainable' products (in terms of accordance with sustainability criteria) a graded scheme could offer a solution for the above discussed trade off between stringent and ambitious standards and a high market penetration (Truffer et al. 2001, p 890). For similar reasons Salzmann sees graded schemes as a potential solution (or at least ease) for the conflict in terms of defining the right product categories. With a graded scheme, a deodorant roller could in principle be labelled preferable over a deodorant spray while deodorant sprays without CFCs would be still labelled preferable over deodorant sprays with CFCs (Salzman 1991).

---

[30]Yet it has to be kept in mind that the amount of information transmitted to the consumer and the degree of aggregation do not need to be correlated. Attempts to transmit more detailed information to the consumer do not necessarily need to include less evaluation work on the part of the labelling institution.

[31] An example for a negative label can be found with the EU energy label where some products have a red sign applied to them for their low energy efficiency.

For all these reasons, the implementation of a graded, comparative labelling scheme seems best placed to achieve the aims of a sustainability meta label. The implementation of graded schemes is complex. There are concerns about its difficulties with a voluntary implementation, a potential confusion of the consumers, the precision of evaluations, but most of all the expected conflict with businesses (Salzman 1991). The publication of negative information through a third party will most likely lead to a lot of opposition and potentially legal challenges. It would therefore need further (amongst others legal) investigation.

5.4.1.1.4 LABELLING DESIGN

A general means of reducing the information burden for the consumer is to standardise the information provided (Teisl & Roe 1998). However, the "issue of optimal label design, in so far as how consumers value the different attributes of a particular label is concerned, remains an open question" (Grote et al. 2007, p 3). In terms of a comparative labelling scheme there are different design options. Type III declarations for example use precise numbers for various environmental impacts. Recent carbon labels consist of the numerical carbon footprint of a product. With the help of this footprint the consumer is supposed to be able to compare different products. The usefulness of such absolute figures however is highly debated. Studies have shown that consumers in many cases do not understand such labels (Upham et al. In Press, Accepted Manuscript). In particular, consumers have little idea as to how the footprint scores relate to their personal carbon emissions or budget (Upham et al. In Press, Accepted Manuscript). Furthermore, there are several weaknesses related to the calculation of numerical footprints (see page **Error! Bookmark not defined.** et seqq.). For these reasons a numerical assessment of products is not likely to be appropriate for the implementation of a sustainability meta label.

A more appropriate option could be the implementation of an alphabetical scale. Alternatively (or additionally), traffic light systems are increasingly discussed and are used for example in the case of UK nutrition information or the EU energy label. Many argue that such traffic light schemes make the information more comprehensible for the consumer and therefore increase the impact of the information. The EU energy label's combination of a traffic light system with an alphabetic scale has generally been commended for its effectiveness in signalling consumers in an easy to understand way the relative efficiency of products (Commission of the European Communities 2008; Ipsos Marketing 2008). During interviews conducted for a report by the House of Common Environmental Audit Committee on environmental labelling, a Tesco representative argued that also "nutritional labelling provides a powerful example of what might be achieved with effective, specific and targeted environmental labelling. By moving the nutritional advice from a small, mathematically complex box on the back, to a simple Guideline Daily Amount key on the front, we saw sales swing dramatically. For example, prawn mayonnaise sandwiches saw a sudden drop in sales while those of the healthy living alternative increased. In the eight weeks following the introduction of front of pack GDA labelling on a frozen beef strogano ready meal (salt GDA 46%) sales fell by 46% as customers shifted to healthier alternatives. These sales patterns also led to rapid product reformulation; if a manufacturer was able to remove salt, fat and calories from their product, it was in their interest to do so. In fact, as a result of this reformulation, over the past 12 months salt levels have been reduced in over 500 products" (House of Commons Environmental Audit Committee 2009, pp Ev. 43). Although such statements are anecdotal and are not independent, other actors have also pointed to the benefits of traffic light systems, especially to inform about nutrition information. In a quantitative consumer survey the market research company Synovate evaluated on behalf of the UK Food Standards Agency, four different signposting concepts of nutrition information: Simple Traffic Lights (only saying if the product is healthy, medium healthy or unhealthy), Multiple Traffic Lights (showing for different variables like sugar, fat etc. if their proportion is high medium or low), Colour-coded guideline allowances (GDA) and Monochrome GDA. They found that Multiple Traffic Lights and Colour-coded GDA performed strongest in assisting

consumers in assessing the level of fat, saturated fat, salt or sugar in an individual product, or to compare levels of two of these nutrients in a pair of products. Overall Colour-coded GDA was the most favoured signpost (Synovate (UK) 2005).

	Per serving	GDA
FAT	7.7g	70g
SATURATES	2.0g	20g
SUGAR	42.4g	40g
SALT	2.0g	6g
■ HIGH ■ MEDIUM ■ LOW		

FIGURE 5: GDA CONCEPT WITH COLOUR CODING
Source: Synovate (UK) 2005

In a Danish consumer focus group study conducted by Jensen (2003) both focus groups put forward suggestions to combine environmental declarations with colour codes or the A scheme, so that consumers wanting the simplified statements can still find them in the declaration. In a separate study, participants in carbon label focus groups also advocated colour coding as a means of communicating (Upham et al). If data are placed in an interval scale, e.g. category A or B, the consumer can easily see where the product stands compared to other similar products (Jensen et al. 2003). The UK House of Common Environmental Audit Committee also proposed highlighting aspects which are most important for consumer: "So if, for instance, a 'traffic light' or 'petal' scheme was adopted and embedded carbon was felt to be the most important element, in each sector this could make up a larger or more prominent portion of the label" (House of Commons Environmental Audit Committee 2009, p 9).

A traffic light system, potentially combined with an alphabetical scale and the highlighting of different aspects, might therefore be the best option to communicate different degrees of sustainability to increase societal demand for more sustainable supply chains and the motivation of businesses to implement respective modifications while remaining easily understandable for the individual consumer. More definite statements however will need further research especially with end consumers.

5.4.1.2 ADDITIONAL/ALTERNATIVE WITH-PRODUCT INFORMATION

There has been an ongoing debate as to what extent labelling schemes need to educate consumers themselves and to what extent they have to build on existing education and awareness (Allison & Carter 2000). Rubik et al. argue that "in particular, for those products that have the main impact in the use phase, additional user information is needed, as a guidance for correct use" (Rubik et al. 2007, p 185). It has been debated to what extent labelling schemes need to clarify their basic logic of highlighting only relative and not absolute benefits and thereby only addressing sustainable consumption in a wide sense. However, the trade off between extensive information and comprehensibility should be kept in mind at all times. Attempts to educate the consumer could potentially confuse and add to the complexity of information provision (Allison & Carter 2000). In the light of such fears some product information schemes provide additional information via leaflets or on their website. During focus group discussions conducted by Jensen et al., some suggested that instead of having more

complex labels, single symbol ecolabelled products should come with more information (leaflets etc.) saying what the product is labelled for (Jensen et al. 2003). Such an approach has been followed for example by the EU energy label which aims to provide information that can easily be understood even with a quick look via the label. Complex information can be provided in product documentation for more demanding consumers (Commission of the European Communities 2008). According to different consumer studies and stakeholder consultations, the design of the EU energy label has been quite successful in achieving this aim (Europe Economics et al. 2007; Winward et al. 1998).[32] For Winward et al. "the dual approach of placing Labels on the appliances themselves, with more detailed information in the 'fiche' is an appropriate one" (Winward et al. 1998, pp 59–60).

Alternatively innovative approaches like the use of the barcode on products "as a gateway to further information on environmental issues if in-store scanners and displays were provided for consumers by retailers" could offer further information at the point of sale (House of Commons Environmental Audit Committee 2009, p 20). Some of the existing online product evaluation schemes have already developed applications for mobile phones to assist shoppers during purchase decisions (see e.g. GoodGuide).

5.4.2   COMMUNICATION ON THE SCHEME

Transparency about all processes related to the scheme including the development of its standards, assessment and aggregation has been highlighted by many authors as one of the key factors for credibility (Scholl 1999; Kaiser 1996). For the House of Commons Environmental Audit Committee, information should be publicly available to those who seek it (House of Commons Environmental Audit Committee 2009). Currently existing labelling schemes often utilise their website or leaflets for such purposes. The MSC for example offers extensive information on the standards, methodologies, certified fisheries etc. on their website.

5.4.3   PUBLIC RELATIONS

Next to communication with the product and on the general labelling scheme, public relations, in the sense of use of broadcast media and other non-pack means, are commonly highlighted as an essential measure to assure the prominence and facilitate the actual use of the scheme (Banerjee & Solomon 2003; IEFE – Università Bocconi 2005) . According to Reisch/Kreeb and the evaluation study of the EU ecolabel this includes mass communication via television, newspapers, internet etc. to raise the short term prominence as well as individual dialogue through shop assistants to raise the awareness of consumers (Reisch & Kreeb 2007; IEFE – Università Bocconi 2005). Additionally, authors such as Eberle (2001), Reisch and Kreeb (2007,), and Boughera and Grolleau (2005) suggest to highlight not only social and ecological benefits related to the consumption of products labelled as being more sustainable but also its individual benefits. This can include health, quality or lifestyle aspects (IEFE – Università

---

[32] According to a consumer survey conducted by Winward et al. for those consumers seeking information on energy efficiency, who are in a hurry, the energy label is the most important source of information together with information from the retail staff. "Among those who carried out research before buying, manufacturers' brochures were clearly the most popular source of information" (Winward et al. 1998, pp 59–60). According to a more recent focus group study (in UK, France, Netherlands, Italy, Poland, Sweden) by Ipsos Marketing consumers who had purchased white goods within the last 12 months referred to the product energy label as the most important source of information followed by product technical specifications supplied, information from retailer, and information on the Internet (Ipsos Marketing 2008).

Bocconi 2005) . Villinger et al. recommend a mainly factual communication paired with an emotional positioning (Villiger et al. 2000). For Schommer et al. the marketing of sustainability product attributes has so far lacked creativity (Schommer et al. 2007). Cooperation with NGOs and governmental bodies (IEFE – Università Bocconi 2005; Banerjee & Solomon 2003) is supportive for PR purposes: in the case of Fair Trade joint campaigns with NGOs, governmental bodies and public and private institutions like schools, cities, churches etc. proved to be very beneficial for the labels prominence.[33] It has to be kept in mind however that such public relations measures will be difficult to implement without sufficient marketing budgets.

5.4.4 SUMMARY

The more a labelling scheme aggregates information, the more reliant is the result on normative decisions about what to make most prominent. In the case of the meta label, a high intake of information and rather large degree of aggregation seems unavoidable. Yet, even with a high degree of aggregation, labelling schemes still differ in the amount of information transmitted to the consumer. In the case of a sustainability meta label, the communication of one single symbol appears to be difficult. To increase the comparability between products and potentially increase societal pressure for more sustainable supply chains and respective modifications by businesses as well as meet the needs of at least some consumers, more detailed information and a subdivision into different categories is worth considering. Yet the risk of information overload has to be kept in mind probably for the majority of the consumers. Conflicts could therefore arise between the use of a meta labelling scheme to facilitate individual consumer demand for positively labelled products on the one and facilitate broader societal demand for more sustainable supply chains and respective modifications by businesses on the other hand. The implementation of a graded scheme, potentially illustrated through a traffic light system, is perhaps most likely to be able to meet both aims and potentially ease this conflict. The main challenge would be its implementation. In addition to communication through a label, there is a need for additional with-product information, including use advice and information about the basic logic of the label. Importantly, the whole labelling process needs to be made transparent and the label's prominence would need to be raised through public relations work.

6 CRITCISM AND POTENTIAL PROBLEMS

As the last section has already pointed to, there are many problems and pitfalls the implementation of a sustainability meta label would probably face and that need further research. This includes the subjectivity of many processes within the labelling scheme and potential legal challenges related to it but also the need to organise a huge amount of dynamic data and deal with substantially different labelling and certification schemes; limitations in assuring the sustainability of a product through existing schemes as well as compliance problems; and lastly the limitations of a sustainability meta label itself in supporting sustainable consumption. The following five sections will expand on these limitations and problems.

6.1.1 SUBJECTIVITY AND POTENTIAL LEGAL CHALLENGES

Throughout the text the subjective judgement involved in all phases of the implementation stages of the labelling scheme has been repeatedly pointed out. A comparative evaluation of products based on such subjective decision processes has critical implications and will most likely face legal challenges.

---

[33] See (Dendler In progress c) for more detail.

Furthermore, a sustainability meta label could potentially be in conflict with WTO law. The production of more sustainable products can cause problems especially for small and medium enterprises in developing countries. If a scheme favouring such products is supported by a government, the respective government could be accused of interfering in free international trade in favour of the national industry. On the other hand it can be argued that no product is prevented from being traded and competing with other products in the market. The success of the product is in fact decided by the consumer (Keck 2002). To what extent a labelling scheme as discussed in this paper could conflict with WTO law would need further consideration. However, it would also largely depend on its exact institutionalization.

6.1.2 DATA PROBLEMS

A major difficulty will also result from the need to organise a huge amount of (frequently-changing) data. The UK retailer M&S for example states in the recent House of Common Environmental Audit Committee report: "You would have to be generating vast databases of information across multiple locations. So, as I say, M&S has got 15,000 farmers supplying it. I would guess the supermarkets probably have 40—50,000. You would basically have to have the information on the reforms of every single one of those locations to be able to come up with an aggregate label" (House of Commons Environmental Audit Committee 2009, pp Ev. 19). He also points to the difficulties in assessing sustainability impacts with regular changing suppliers: "With product development in supermarkets you are basically changing a quarter to a third of your products every year[…] What we do when we are buying fruit and vegetables around the year is we try and buy as much as possible in the British season. Britain is out of season. You might get your apples from Chile, then from France, then from New Zealand, every single one of which will have a different carbon footprint, a different issue to do with labour standards, a different issue to do with pesticides. Your whole system will have to shift. You will have to change all your labels on your apples" (House of Commons Environmental Audit Committee 2009, pp Ev. 19). This statement was not build on the assumption of a sustainability meta label based on existing labelling schemes. But even if the meta label would not coordinate specific information and footprints on every products life cycle, it would need to know the standards every product adheres to. This is clearly a costly and time consuming task.

Furthermore, throughout the paper it has been repeatedly pointed out that existing labelling schemes differ quite substantially in terms of issues like boundary setting, decisions about relevance, assessment and monitoring processes etc. An evaluative comparison between them will be highly difficult and complex.

6.1.3 PROBLEMS ASSURING SUSTAINABILITY THROUGH EXISTING SCHEMES

One essential question is to what extent existing labelling and standardisation schemes are able to ensure sustainable production and consumption options. According to (Teufel et al. 2009), the ecological dimensions along many parts of a product's life cycle are covered relatively sufficiently by ecolabels like the EU ecolabel or the blue angel (Teufel et al. 2009). This statement is true, at least in theory, in terms of ecological standards existing for many products covered by schemes like the EU ecolabel (in case of the EU ecolabel currently 26 product categories EC Environment 2010). In practice however, products that are certified with the EU ecolabel are rare. Regarding the social dimension a labelling scheme as discussed here could build for example on existing labour standards or the Fair Trade labelling scheme. In terms of health aspects, Teufel et al. argue, management standards like EMAS or ISO might be usable (Teufel et al. 2009). Teufel et al found however that none of the existing labelling schemes covers all sustainability dimensions (Teufel et al. 2009).

6.1.4   COMPLIANCE PROBLEMS

Even if the coverage of existing labelling schemes was sufficient to ensure sustainable consumption options, many producers will struggle to adhere to them. Supply chains are often spread over the whole globe with various actors involved who do not have direct relations with each other. In relation to the EU ecolabel for example, many producers highlight their difficulties in controlling their supply chains (Dendler In progress a). The assurance of social standards is extremely difficult as well. In many cases there are no long term contracts and manufacturers only work with their direct supplier (Seuring et al. 2004; Back 2003). According to (Spillemaeckers 2007) only a few businesses can guarantee the adherence already to basic social standards throughout the supply chain. Especially in countries with oppressive regimes the implementation of (Western interpretations of) fundamental rights like freedom of association, speech etc. is hardly possible. Also corruption can cause problems in many cases. Fulfilling sustainability standards according to labelling schemes as well as monitoring the adherence is therefore highly difficult.

And even if respective certificates are achieved, corruption, a lack of monitoring or simply the use of scoring or conditional assessment approaches (see p. 28 et seqq.) can result in products not actually adhering to all the respective standards.

6.1.5   LIMITATIONS IN ACHIEVING AIMS OF SUSTAINABLE CONSUMPTION THROUGH A META LABELLING SCHEME

The extent to which labelling schemes can lead effectively to more sustainable consumption is hotly debated. Because only the most relevant sustainability aspects will be addressed (with decisions about relevance always being subjective) and certification does not necessarily mean that a product fulfils the standards in practice, the scope of a sustainability meta label would be inherently limited.

Experience from existing labelling schemes has shown that in many cases larger businesses are more likely to be able to adhere to complex standardisation and monitoring processes. Standardisation processes often unintentionally favour large businesses over smaller ones. Standard development is often influenced by local conditions and stakeholders. Since many standards are devised in the developed world this can cause additional trade barriers for producers from developing countries. At worst, producers might even feel pressured to compensate such disadvantages through cheaper, potentially more environmentally and socially harmful, production.

Criteria defining a sustainable product are based on what exists in the market today and publicly known development. They can hardly anticipate future developments (de Boer 2003). If there are changes in the marketplace "appropriate changes in the labelling scheme may be greatly lagged because of institutional bureaucracies and coordination difficulties" (Teisl & Roe 1998:142). Especially for fast moving consumer goods and products with a short market life span the length of criteria development and the application process, can cause major problems. Furthermore most labels restrict their criteria to certain areas reflecting "only a part of the whole range of product improvements" (Karl & Orwat 1999:217). Other improvements can remain unrewarded. Labelling schemes risk to channel innovations only to product attributes which are encompassed by the labelling criteria (Karl & Orwat 1999). In this way basing decisions on labels or even implementing new labelling schemes can also become an obstacle for innovation.

While all the problems discussed above might be addressable through ever more enhanced product information schemes, there are also some limitations inherent in the instrument of

labelling. When an intra product comparison approach is followed a positively labelled product does not necessarily need to be more sustainable per se but only in comparison to other products within its product group. If the whole product group is unsustainable, even a less unsustainable product will struggle to achieve aims of sustainable consumption. Furthermore, most labelling schemes do not address questions of sufficiency – is the consumption of the product necessary in the first place? In terms of the environmental dimension, positive evaluations based on a relative definition of sustainability are often based on more efficient resource use. This means the label does not take into account the overall effects of consumption activity. Efficiency gains can be compensated due to so-called "rebound effects"; improvements made through the consumption of more efficient products are compensated by a growth in consumption (e.g. the environmental benefits of the purchase of a more efficient car may be negated by increased use of the car or additional expenditure on some other form of travel or product, funded from the reduced fuel costs of the more efficient car). Lell argues that a positive label suggesting the consumer the product is more sustainable could even encourage such dynamics (Lell 2003, pp 42–43). For such reasons, a measure like the sustainability meta label will have to be accompanied by measures addressing problems revolving from overall effects of consumption (Jacobs 1994, p 45). The following section will briefly introduce some of such accompanying measures.

7   ACCOMPANYING INSTRUMENTS

The following sections briefly introduce education, procurement, additional incentives, and choice editing as the most prominent measures that have been discussed to enhance the effectiveness of labelling schemes.

7.1.1   EDUCATION

The more a label can build on existing education and awareness, the more likely is its use by consumers. If a consumer is generally not interested in or does not have any knowledge of the sustainability agenda the likelihood for an influence by a label on the purchase decision seems small. An essential (although not sufficient) condition is therefore education and awareness to enable and motivate consumers to use product information. Possible measures to do so include education in public institutions, databases, consumer advice, help lines, and corporate environmental reports (Allison & Carter 2000). A potential measure to increase awareness could also be the implementation of feedback systems informing consumers about the degree of sustainable purchases at the point of sale.

As outlined above there has been an ongoing debate to what extent labelling schemes need to educate consumers on general issues, such as the relative environmental impacts (and health benefits) of cycling and walking relative to short car journeys, and to what extent they have to build on existing education and awareness (Allison & Carter 2000). Some see a large responsibility for this education with the labels themselves. For others a label is just a tool to be used by an informed and aware consumer. Surely the options for a label to include extensive education are limited and additional education measures are vital. Also, to reduce the size of rebound effects, consumers arguably need to be made aware for example of the need not only to modify consumption but also reduce the overall amount of consumption.

7.1.2   PROCUREMENT POLICIES

Procurement by public as well as private institutions has been repeatedly highlighted as a great facilitator for the effectiveness of labelling schemes (e.g. OECD 1997; Gulbrandsen 2006; Allison

& Carter 2000). Examples include Fair Trade town campaigns leading to increased procurement of Fair Trade products by public institutions or the MSCs cooperation with school canteens (Millerold 2008). Especially public procurement can take a pioneering role not only to increase respective demand but also to set examples of best practice to influence the procurement policies of businesses (Allison & Carter 2000).

7.1.3 ADDITIONAL INCENTIVES

Many authors stress that information alone will not lead to behaviour change (HM Government 2005). For Collins "information and influencing campaigns will work best when people have a reason to want to know" (Collins et al. 2003, p 45). In their report on environmental labelling the UK House of Commons Environmental Audit Committee suggests rewarding the purchase of environmental friendly labelled products and raising awareness, for example through special offers, loyalty points, sales etc. and/or combining labelling schemes with fiscal measures (House of Commons Environmental Audit Committee 2009). Fiscal measures have proved to be very effective in the case of the EU energy label.[34]

7.1.4 CHOICE EDITING

Consumer representatives have argued that "sometimes consumers want less choice rather than more, safe in the knowledge that certain issues have already been dealt with" (Yates 2008, p 98). According to Ipsos Mori, proof for such statements can be found in recent consumer surveys (Ipsos Mori 2008). A term often referred to at this point is choice editing. The sustainable consumption roundtable defines choice editing as: "Pre-selecting the particular range of products and services available to consumers. [...] Choice-editing is done by manufacturers and service-providers when they decide which products and services to offer, and to what specification; by retailers when they decide what to put on their shelves; and by governments in the product standards which they set" (sustainable consumption roundtable 2006, p 63). In terms of choice editing for sustainable consumption, UNEP defines this as "editing out high-impact products and services and replacing them with low-impact ones that consumers see as equally good or better" (UNEP 2008, p 29).

7.1.4.1 CHOICE EDITING THROUGH GOVERNMENTS

For the Sustainable Consumption Roundtable, "government has a responsibility to act as choice editors on behalf of citizens, who often struggle to understand what issues of concern mean for their shopping routines" (sustainable consumption roundtable 2006, p 22). One way to do so is by setting minimum standards (sustainable consumption roundtable 2006) especially for impacts that are less likely to be subject to consumer demand or other political consumerist pressure. Labelling schemes can thereby function as a guide for the setting of such minimum standards (sustainable consumption roundtable 2006) as has been the case for example with the EU energy label. However, there are legal implications of such an initiative.

7.1.4.2 CHOICE EDITING THROUGH BUSINESSES

Choice editing can also happen on a voluntary basis through voluntary agreements and self regulations. The EC Energy Label, for example, has been used to phase out some of the least efficient appliances through a voluntary agreement by manufacturers (Allison & Carter 2000).[35]

---

[34] See (Dendler In progress b) for more detail.

[35] The energy label case also shows however that voluntary agreements are often less ambitious than governmentally set minimum standards. See (Dendler In progress b) for more detail.

Also retailers have shown to be an essential factor in influencing the production and consumption system in many sectors[36] (OECD 1997). Retailers act as mediators between consumers and focal-companies. The retailer is a sort of 'gatekeeper': on one side, he is a sensor of consumption trends, as he can transfer consumer demand upwards to producer companies on the other side, he is an amplifier of more sustainable supply (IEFE & ICEM CEEM 1998). Examples for choice editing through retail companies can be found with the MSC where the German retailer, Edeka Group, pledged to offer 100% sustainable seafood (Marine Stewardship Council 2009), the UK's Co-operative Group's conversion of all of its own-label coffee and chocolate to Fair Trade, or Sainsbury's decision to only sell fair trade bananas (Mohan 2009).

8   SUMMARY AND CONCLUSIONS

To facilitate more sustainable consumption different actors have introduced various schemes over the past few decades informing about environmental, social or other product attributes. Even so, the current product information situation has been criticised for delivering insufficient information and being confusing for both, consumers and producers. More and more actors from government, NGO and business are calling for the introduction of a scheme that unifies existing product information to inform about sustainability related product attributes in a more condensed way. Such an attempt could potentially increase the effectiveness of existing labelling schemes as a mean for political consumerism by individual consumers and broader society as well as a mean for businesses to modify supply chains into a more sustainable direction through making existing (or non existing) certification measures more transparent and less confusing. Based on findings from academic and grey literature within the broader theme of product information as well four case studies on the EU energy label, the EU ecolabel, the Fair Trade label and the MSC, this paper starts a discussion on a potential implementation of such a unifying sustainability meta label along the following stages: product groups included, criteria setting, assessment and monitoring, and communication.

In brief, the following conclusions can be drawn:

- **Product groups included**: Although a labelling scheme becomes more complex the more product groups are included, a large scope in terms of included product groups is perhaps most likely to deliver a condensing of existing product information schemes in the long term. In the short term, the amount of product groups included will probably need to be restricted. This restriction can either follow a consumer, a business, a cost or a success oriented process. One challenge is the definition of the right product group category potentially leading to conflicts between the aim of a product label to show the consumer the most sustainable consumption option and the motivation of producers to produce more sustainably.

- **Criteria development**: Given the very wide and complex concept of sustainable consumption, any labelling schemes will need to define and also restrict in some way what is meant by a sustainable product. Considering the difficulties in defining any absolute sustainability a relative approach, defining a sustainable product in comparison to the status quo, seems more feasible for a labelling scheme. Consequently, a 'sustainable product' would meet individual utilities for a justifiable price while reducing socio-ecological problems compared to conventional products (Schoenheit et al. 2002; Belz & Bilharz 2007). It seems

---

[36] Examples for this can be found with the EU ecolabel, the MSC label, the Fair Trade label, and the EU energy label. See Dendler (In progress b); Dendler (In progress a); Dendler (In progress c); Dendler (In progress d) for more detail.

necessary for the development process to take into account the whole life cycle of a product whilst acknowledging the limitations of the LCA approach and the subjectivity of the decisions involved. A restriction to the most relevant issues along the life cycle will probably be necessary. Next to lifecycle related product and process criteria for particular product different authors suggest including organisational criteria and product requirements that are applicable across many different product groups. These criteria need to be sufficiently flexible for local whilst remaining sufficiently specific to ensure their verifiability. A balance needs also to be found between ambitious criteria ensuring the credibility of the schemes and the applicability of the criteria to ensure sufficient market coverage. A potential solution could be the introduction of a graded scheme that allots products to different points on a performance scale (e.g. A to G). It is important also that criteria are revised on a basis that ensures the facilitation of innovation but also enables capital intensive industries to adapt accordingly. The outcome of these balancing acts will be shaped by the respective product group and the actors involved in the institutionalisation of the scheme. Throughout the whole process one has to be aware of the subjectivity of most decisions which can potentially lead to legal challenges.

- **Assessment**: Considering the weaknesses of currently proposed inter product group comparisons as well as their potential conflict with the motivation of businesses to produce more sustainably, comparative assessment will probably need to be made within product groups rather than between product groups. A possible way to unify existing product information while also encouraging competition between different schemes is to base the assessment not on the product itself but on the standards that the respective product adheres to. An essential requirement for a standard to be considered would then be their independent assessment. The assessment process of a meta label needs to be standardised and documented to assure its credibility and efficiency whilst remaining flexible with respect to local conditions. One way to achieve this flexibility is the use of a scoring system or the acceptance of continuous improvements by the respective business. However, their use can lead to arbitrary decisions and threats for credibility. Alternative approaches are a less flexible basic requirement process or a mixture of the different approaches. Which assessment process is most appropriate depends largely on the product group. A sustainability meta label has to take these different approaches into consideration when assessing to what extent a certain standard fulfils respective sustainability criteria. This means a sustainability label does not only need to assess what criteria a labelling or standardising scheme uses, if the scheme is independently monitored and how the monitoring is conducted, but also what kind of assessment approach is used. Furthermore if labelling schemes are based on life cycle assessments their approaches in terms of data base use, boundary setting etc. might differ. All these issues increase the evaluation and comparison between different standards.

- **Communication**: The more a labelling scheme aggregates information, the more reliant is the result on normative decisions on the part of the labelling institution. In the case of a sustainability meta label, the high intake of information and rather large degree of aggregation seems unavoidable. Even with a high degree of aggregation the amount of information transmitted to the consumer can still vary. Considering the complexity of the sustainable consumption concept, the huge variations between current labelling and certification schemes, the facilitation of the use of labelling and certification schemes to place societal demand for more sustainable supply chains and the needs of at least some consumers, more detailed information and a subdivision into different categories is worth considering. Yet the risk of information overload has to be kept in mind for most consumers. Conflicts could therefore arise between the use of a meta labelling scheme to facilitate individual consumer demand for positively labelled products on the one and facilitate broader societal demand for more sustainable supply chains and respective modifications by

businesses on the other hand. The implementation of a graded scheme, illustrated through a traffic light system, is perhaps most likely to be able to meet both aims and potentially ease this conflict. The main challenge would be its implementation. In addition to communication through a label, there is a need for additional with-product information, including use advice and information about the basic logic of the label. Importantly, the whole labelling process needs to be made transparent and the label's prominence would need to be raised through public relations work.

The question posed is quite open-ended and subject to multiple possible resolutions. This paper has not aimed for an exhaustive coverage of every single detail of the labelling process. Nor has it aimed to reflect the whole discussion taking place around product labelling. In fact there are many problems and pitfalls the implementation of a sustainability meta label would face and that need further research. This includes the subjectivity of many processes within the labelling scheme and potential legal challenges related to it. Another major difficulty will result from the need to organise a huge amount of dynamic data. Existing labelling schemes differ quite substantially in terms of issues like boundary setting, decisions about relevance, assessment and monitoring processes. An evaluative comparison between them will therefore be highly difficult and complex. Furthermore existing labels are limited in their extent to what they can assure the sustainability of a product. This is due to their limited scope but also problems with monitoring, corruption and supply chain management. Likewise, the sustainability meta label itself will face problems in its contribution to more sustainable consumption such as limitations in terms of sustainability issues taken into account, potential discrimination of small scale producers from developing countries, and possible barriers to innovation. Finally a sustainability meta labelling scheme based on an intra product comparison cannot address consumption patterns that are unsustainable per se. More generally a labelling scheme as here discussed following a relative approach to sustainable consumption does not address the effects of overall levels of consumption. The degree to what a sustainability labelling scheme can contribute to sustainable consumption is therefore limited and will need to be accompanied by other measures. Most prominent measures to increase the effectiveness of labelling schemes are education to increase individual demand for positively labelled products but also the awareness for an additional need to reduce overall levels of consumption, respective procurement policies to increase the demand for positively labelled products from governmental bodies, the connection with additional (for example fiscal) incentives, and the editing out of the least sustainable choices by businesses and governmental bodies. Yet even if such measure might increase the effectiveness of labelling schemes, most of them (at least in the currently applied way) still do not address overall effects of consumption (except probably for education measures). Facing limited resources and most urgent needs to drastically reduce negative environmental effects like CO_2 emissions on the one and an increasing population and large scale growth rates of economies in countries like China and India on the other hand a reduction of the amount of overall consumption especially in western countries seems very urgent though. To address such issues instruments that much more fundamentally challenge our current structures are probably needed. Yet as long as such instruments are missing, international regulation still fails to address urgent problems like climate change and society does not seem to be ready for deeper changes an enhancement of the current product labeling situation through some form of meta labeling scheme might improve the current situation and potentially even path a way towards more radical changes.

9 LITERATURE

Agnew, D, Grieve, C, Orr, P, Parkes, G & Barker, N 2006, *Environmental benefits resulting from certification against MSC's Principles & Criteria for Sustainable Fishing* [14 November 2009].

Allison, C & Carter, A 2000, *Study on different types of Environmental Labelling (ISO Type II and III Labels). Proposal for an Environmental Labelling Strategy,* Oxford.

Back, S 2003, 'Was Unternehmer von Fußballspielern lernen können. Oder: Stoffstrom-Management in der Praxis' in *Symbole und Substanzen. Perspektiven eines interpretativen Stoffstrommanagements.,* eds U Schneidewind, M Goldbach, D Fischer & S Seuring, Metropolis Verlag, Marburg, pp. 37–68.

Baedeker, C, Liedtke, C, Welfens, JM, Busch, T, Kristof, K, Kuhndt, M, Schmidt, M & Türk, V 2005, *Analyse vorhandener Konzepte zur Messung des nachhaltigen Konsums in Deutschland einschließlich der Grundzüge eines Entwicklungskonzepts. Abschlussbericht zur gleichnamigen Vorstudie im Auftrag der Bundesanstalt für Landwirtschaft und Ernährung als Projektträger und dem Bundesministerium für Verbraucherschutz, Ernährung und Landwirtschaft.*

Banerjee, A & Solomon, BD 2003, 'Eco-labeling for energy efficiency and sustainability. A meta-evaluation of US programs', *Energy Policy*, no. 31, pp. 109–123.

Bei, L & Widdows, R 1999, 'Product Knowledge and Product Involvement as Moderators of the Effects of Information on Purchase Decisions: A Case Study Using the Perfect Information Frontier Approach', *Journal of Consumer Affairs*, vol. 33, no. 1, pp. 165–186.

Belz, F & Bilharz, M 2007, 'Nachhaltiger Konsum, geteilte Verantwortung und Verbraucherpolitik. Grundlagen' in *Nachhaltiger Konsum und Verbraucherpolitik im 21. Jahrhundert,* eds F Belz, G Karg & D Witt, Metropolis, Marburg, pp. 21–52.

Bhaskar, R 1978, *A realist theory of science,* Harvester Press [u.a.], Sussex.

Big Room Inc. 2010, *ecolabel index*. Available from: http://www.ecolabelindex.com/ecolabels/?st=category,foodfood_services [19.07.10].

BjØrner, TB, Hansen, LG & Clifford, SR 2004, 'Environmental labeling and consumer´s choice - an emperical analysis of the effect on the Nordic Swan', *Journal of Environmental Economics and Management*, no. 47, pp. 411–434.

Blake, J 1999, 'Overcoming the value-action gap in environmental policy: Tensions between national policy and local experience', *Local Environment*, vol. 4, no. 3, pp. 257–278.

Bleda, M & Valente, M 2008, 'Graded Eco-Labels: A demand-oriented approach to reduce pollution', *Technological Forecasting and Social Change*, In press.

Boström, M & Klintman, M 2008, *Eco-standards, product labelling and green consumerism,* Palgrave Macmillan, Basingstoke. Available from: http://www.gbv.de/dms/zbw/566280760.pdf.

Bougherara, D & Grolleau, G 2005, 'Designing Ecolabels in order to mitigate Market Failures. An Application to Agrofood Products', *Journal of Interdisciplinary Economics*, no. 16, pp. 411–430.

Carbon Trust 2010, *The Carbon Reduction Label*. Available from: http://www.carbon-label.com/the-label [17 September 2010].

Christiansen, K, Wesnæs, M & Weidema, BP 2006, *Consumer demands on Type III environmental declarations. Report commissioned by ANEC* [29 May 2010].

Climate Labelling for Food 2009, *Standard for reducing climate impact in the production and distribution of food*. Available from: http://www.klimatmarkningen.se/wp-content/uploads/2009/02/climate-labelling-for-food-2009-1.pdf [21.02.10].

Collins, J, Thomas, G, Willis, r & Wilsdon, J 2003, *Carrots, sticks and sermons: influencing public behaviour for environmental goals. A Demos/Green Alliance report produced for Defra*.

Commission of the European Communities 2008, *COMMISSION STAFF WORKING DOCUMENT. IMPACT ASSESSMENT*. Accompanying document to the Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products, Brussels.

Committee on Employment and Social Affairs 2006, *REPORT on corporate social responsibility: a new partnership (2006/2133(INI))*. Available from: http://www.europarl.europa.eu/meetdocs/2004_2009/documents/a6/p6_a(2006)0471_/p6_a(2006)0471_en.pdf [05.06.09].

Davis, L & North, D 1970, 'Institutional Change and American Economic Growth: A First Step Towards a Theory of Institutional Innovation', *The Journal of Economic History*, vol. 30, no. 1, pp. 131–149.

Dendler, L In progress a, 'The EU eco label. A literature review', *Tyndall Working Paper*.

Dendler, L In progress b, 'The EU energy label. A literature review', *Tyndall Working Paper*.

Dendler, L In progress c, 'The Fair Trade label. A literature review', *Tyndall Working Paper*.

Dendler, L In progress d, 'The Marine Stewardship Council. A literature review', *Tyndall Working Paper*.

Dendler, L 2010, 'Sustainability meta labelling. Key Actors and Factors for a potential Institutionalisation'. *Knowledge Collaboration & Learning for Sustainable Innovation ERSCP-EMSU conference,* eds TU Delft & The Hague University, Delft.

Duke, M 2009, *Sustainability Index Fact Sheet* [15 June 2010].

Eberle, U 2001, *Das Nachhaltigkeitszeichen. Ein Instrument zur Umsetzung einer nachhaltigen Entwicklung?* Dissertation, Öko-Inst., Freiburg.

EC Environment 2010, *EU Ecolabel*. Available from: http://ec.europa.eu/environment/ecolabel/index_en.htm [14.04.10].

Eden, S & Bear, C 2010, 'Third-sector Global Environmental Governance, Space and Science: Comparing Fishery and Forestry Certification', *Journal of Environmental Policy & Planning*, vol. 12, no. 1, pp. 83–106.

Empacher, C & Stieß, I 2007, 'Nachhaltiger Konsum im Alltag - Konzeptioneller Zugang und empirische Erkenntnisse' in *Handbuch Nachhaltigkeitskommunikation. Grundlagen und Praxis,* eds G Michelsen & J Godemann, Oekom-Verl., München, pp. 463–473.

Engelund, B, Andersen, LK, Kristensen, P & Nielsen, B 2005, *Integrated Supply Chain Information,* Copenhagen.

Erskine, CC & Collins, L 1997, 'Eco-labelling: Success or failure?', *Environmentalist*, vol. 17, no. 2, pp. 125–133.

Eurocommerce 2006, *DG SANCO CONSULTATIVE DOCUMENT ON LABELLING, COMPETITIVENESS, CONSUMER INFORMATION AND BETTER REGULATION FOR THE EU. Eurocommerce Comments,* Brussels.

Eurocommerce 2009, *Corporate Social Responsibility - Increasing awareness*. Available from: http://www.eurocommerce.be/content.aspx?PageId=41021 [06 June 2009].

Europe Economics, Fraunhofer-ISI, BSR Sustainability & FfE 2007, *Impact assessment study on a possible extension, tightening or simplification of the framework directive 92/75 EEC on energy labelling of household appliances,* London.

European Commission 2008, *Attitudes of European citizens towards the environment. Special Eurobarometer*. Special Eurobarometer 295/Wave 68.2 – TNS Opinion & Social. Available from: http://ec.europa.eu/public_opinion/archives/ebs/ebs_295_en.pdf [05.06.08].

Council of Ministers, 2004, *Federal Plan for Sustainable Development 2004-2008*. Approved by the Council of Ministers on 24 September 2004.

Frankl, P & Pietroni, L 2005, 'Conclusions' in *The future of eco-labelling : making environmental product information systems effective,* eds F Rubik & P Frankl, Greenleaf Publ, Sheffield, pp. 236–290.

Frankl, P, Pietroni, L, Scheer, D, Rubik, F, StØ, E & Montcada, E 2005, 'Recommendations' in *The future of eco-labelling : making environmental product information systems effective,* eds F Rubik & P Frankl, Greenleaf Publ, Sheffield, pp. 291–324.

Fridell, G 2009, 'The co-operative and the corporation: Competing visions of the future of fair trade', *Journal of Business Ethics*, vol. 86, SUPPL. 1, pp. 81–95.

Führ, M 1998, 'Rahmen für proaktives Handeln der Unternehmen' in *Das Management von Stoffströmen. Geteilte Verantwortung - Nutzen für alle,* ed H Friege, Springer, Berlin, pp. 138–145.

Gallastegui, IG & Spain, S2 2002, 'The use of eco-labels. A review of the literature', *European Environment*, vol. 12, no. 6, pp. 316–331.

GoodGuide, I, *GoodGuide | Find safe, healthy, and green products*. Available from: http://www.goodguide.com/ [27 August 2010].

Graig, T 2007, 'Maintainability for sustainability', *Retailing Today* 10 September, p. 3.

Grankvist, G, Dahlstrand, U & Biel, A 2004, 'The impact of environmental labelling on consumer preference. Negative vs. positive labels', *Journal of Consumer Policy*, no. 27, pp. 213–230.

Greener One 2008-2009, *Greener One: About Us*. Available from: http://www.greenerone.com/about [27 August 2010].

Grießhammer, R 2001, 'TopTen-Innovationen für einen nachhaltigen Konsum' in *Nachhaltiger Konsum. Forschung und Praxis im Dialog,* eds U Schrader & U Hansen, Campus-Verl., Frankfurt/Main, pp. 103–116.

Grote, U, Basu, AK & Chau, NH 2007, 'Outline and emerging Issues' in *New Frontiers in Environmental and Social Labeling,* eds U Grote, AK Basu & NH Chau, Physica-Verlag Heidelberg, Heidelberg, pp. 1–10.

Gruner, B, Tamandl, C, Gouveia, P, Pallière, C, Doering, A, Carroll, J, Quoden, J, O'Brien & declan 2009, *JOINT PRESS RELEASE. Key food chain partners to launch sustainability roundtable*. Available from: http://www.ciaa.be/asp/documents/detailed_doc.asp?doc_id=863 [26.03.10].

Gulbrandsen, L 2006, 'Creating markets for eco-labelling: are consumers insignificant?', *International Journal of Consumer Studies*, vol. 30, no. 5, pp. 477–489.

Hale, M 1996, 'Ecolabelling and cleaner production: principles, problems, education and training in relation to the adoption of environmentally sound production processes', *Journal of Cleaner Production*, vol. 4, no. 2, pp. 85–95.

Hansen, U & Kull, S 1995, 'Öko-Label als umweltbezogenes Informationsinstrument. Begründungszusammenhänge und Interessen' in *Verbraucher- und umweltorientiertes Marketing. Spurensuche einer dialogischen Marketingethik,* ed U Hansen, Schäffer-Poeschel, Stuttgart.

Hatanaka, M, Bain, C & Busch, L 2005, 'Third-party certiWcation in the global agrifood system', *Food Policy*, vol. 30, pp. 354–369.

HM Government 2005, *Securing the future. Delivering UK sustainable development strategy*. The UK Government Sustainable Development Strategy.

House of Commons Environmental Audit Committee 2009, *Environmental Labelling. Second Report of Session 2008–09,* London.

IEFE & ICEM CEEM 1998, *Project for the promotion and the diffusion of the EU ecolabel in Italy and the Benelux. Final Report,* Gent, Milan.

IEFE – Università Bocconi 2005, *EVER. Evaluation of EMAS and Ecolabel for their Revision*. Options and Recomendations for the Revision Process, Brüssel.

Ipsos Marketing 2008, *EU Energy Labelling Global Research Report*.

Ipsos Mori 2008, *Sustainability Issues In The Retail Sector*. Available from: http://www.ipsos-mori.com/_assets/reports/sustainability-issues-in-the-retail-sector.pdf [28.05.09].

Jacobs, M 1994, *The green economy. Environment, sustainable development and the politics of the future,* Pluto Press, London.

Jensen, ML, Sørensen, SY, Schmidt, A & Grinderslev, M 2003, *Consumers' Opportunities of and Interest in Purchasing Green Electronic Products - an Analysis of Consumers' and Retailers' Efforts to Promote Less Polluting Electronic Products. Environmental Project No. 837*.

Jowit, J 09.03.09, 'Questions over ratings as Coke publishes carbon footprint', *The Guardian* 09.03.09.

Kaiser, A 1996, *Ökologiebezogene Produktkennzeichnung - Entstehung, Hintergrund, Anforderungen. Dargestellt am Markenzeichen "Textiles Vertrauen - Schadstoffgeprüfte Textilien nach Öko-Tex-Standard 100" als umweltbezogenes Informationsinstrument*. Dissertation, Kassel.

Karl, H & Orwat, O 1999, 'Environmental labelling in Europe: European and national tasks', *European Environment*, vol. 9, no. 5, pp. 212–220.

Keck, A 2002, *Freiwilliges Ökolabelling als Verzerrung des freien Welthandels? Eine interdisziplinäre Analyse,* Verl. PCO, Bayreuth.

Klemisch, H 2004, *Umweltmanagement und ökologische Produktpolitik. Partizipation betrieblicher und gesellschaftlicher Akteure an Ökologisierungsprozessen in Unternehmen und Branchen,* Hampp, München. Available from: http://www.gbv.de/dms/zbw/396038190.pdf.

Krier, JM 2008, *Fair Trade 2007: new facts and figures from an ongoing success story. A report on Fair Trade in 33 consumer countries* [03 March 2010].

Lell, O 2003, *Umweltbezogene Produktkennzeichnungen im deutschen, europäischen und internationalen Recht. Unter besonderer Berücksichtigung von gentechnisch hergestellten Lebensmitteln und von Lebensmitteln aus ökologischer Landwirtschaft,* Schmidt, Berlin.

Lohse, J & Wulf-Schnabel, J 2000, *Marketing the European Eco-Label in Germany and Austria*.

Marine Stewardship Council 2009, *Annual Report 2008/09*. Available from: http://www.msc.org/documents/msc-brochures/annual-report-archive/MSC-annual-report-2008-09.pdf [18 November 2009].

Mazijn, B, Vanhoutte, G, Spillemaeckers, S, Liesbeth Taverniers, Luc Lavrysen, Van Braeckel, Bernard & Jorge Duque Rivera 2004, *Ecological, Social and Economic Aspects of Integrated Product Policy. Integrated Product Assessment and the Development of the Label Sustainable Development for Products*. Final report, Brüssel.

McLeod, L & Audran, X 2009, *Gain Report. Proposed Carbon Footprint Labeling Could Step on Trade.*

Micheletti, M, Follesdal, A & Stolle, D 2006, 'Introduction' in *Politics, products, and markets. Exploring political consumerism past and present,* ed M Micheletti, Transaction Publ., New Brunswick, pp. ix–xxvi.

Millerold, J 2008, *MSC annual report 2007/2008* [11 September 2009].

Mohan, S 2009, 'FAIR TRADE AND CORPORATE SOCIAL RESPONSIBILITY', *Economic Affairs*, vol. 29, no. 4, pp. 22–28.

Morris, J 1997, *Green goods? Consumers, product labels and the environment,* IEA Environment Unit, London.

Muller, A 2008, 'Risk management in the Clean Development Mechanism (CDM) – the potential of sustainability labels' in *Economics and Management of Climate Change,* eds b Hansjürgens & r Ante, Springer, pp. 193–207.

Nilsson, H, Tuncer, B & Thidell, A 2004, 'The use of eco-labelling like initiatives on food products to promote quality assurance - is there enough credibility?', *Journal of Cleaner Production*, no. 12, pp. 517–526.

OECD 1997, *Eco-Labelling: Actual Effects of Selected Programme,* Paris. Available from: http://www.olis.oecd.org/olis/1997doc.nsf/LinkTo/NT000029CA/$FILE/06E71962.PDF.

Pope, F 2009, 'Concerns raised over Marine Stewardship Council's fish label', *Times* 09 November.

Prakash, S, Manhart, A, Stratmann, B & Reintjes, N 2008, *Environmental product indicators and benchmarks in the context of environmental labels and declarations.* Available from: http://www.anec.eu/attachments/ANEC-R&T-2008-ENV-005final.pdf [25 May 2010].

Proto, M, Malandrino, O & Supino, S 2007, 'Eco-labels: a sustainability performance in benchmarking?', *Management of Environmental Quality*, vol. 18, no. 6, p. 669.

Randles, S & Warde, A 2006, 'Consumption: the view from theories of practice' in *Industrial ecology and spaces of innovation,* eds K Green & S Randles, Elgar, Cheltenham, pp. 220–237.

Reisch, L & Kreeb, M 2007, 'Kommunikation des Nachhaltigen Konsums' in *Handbuch Nachhaltigkeitskommunikation. Grundlagen und Praxis,* eds G Michelsen & J Godemann, Oekom-Verl., München, pp. 463–473.

Roe, B, Teisl, MF, RONG, H & Levy, AS 2001, 'Characteristics of Consumer-Preferred Labeling Policies: Experimental Evidence from Price and Environmental Disclosure for Deregulated Electricity Services', *Journal of Consumer Affairs*, vol. 35, no. 1, pp. 1–26.

Rubik, F, Frankl, P, Pietroni, L & Scheer, D 2007, 'Eco-labelling and consumers: towards a re-focus and integrated approaches', *International journal of Innovation and Sustainable Development*, vol. 2, no. 2, pp. 175–191.

Rubik, F & Weskamp, C 1996, *Verbraucherschutz durch Produktkennzeichnung. Gutachten im Auftrag des Bundesministeriums für Wirtschaft,* Berlin.

Salzman, J 1991, *Environmental labelling in OECD countries,* OECD, Paris.

Sayer, A 2000, *Method in social science. A realistic approach,* Routledge, London.

Schaltegger, S, Herzig, C, Kleiber, O & Müller, J 2004, *SUSTAINABILITY MANAGEMENT IN BUSINESS ENTERPRISES. Concepts and Instruments for Sustainable Organisation Development,* Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Köln.

Scheer, D & Rubik, F 2005, 'Environmental Product Information schemes: an overview' in *The future of eco-labelling : making environmental product information systems effective,* eds F Rubik & P Frankl, Greenleaf Publ, Sheffield, pp. 46–88.

Schmidt, A & Brunn Poulsen, P 2007, *Benchmarking and additional environmental information in the context of Type III environmental declarations. commissioned by ANEC – European Association for the Co-ordination of Consumer Representation in standardisation,* Brussels.

Schoenheit, I, Dahle, M, Geisler, S, Grünewald, M & Müller, A 2002, *Der nachhaltige Warenkorb. Eine Hilfestellung für den nachhaltigen Konsum,* Berlin; Hannover.

Scholl, G 1999, *Label für nachhaltige Produkte,* Heidelberg.

Schommer, P, Harms, T & Gottschlich, H 2007, *LOHAS. Lifestyle of Health and Sustainability.*

Searle, R, Colby, S & Smith Milway, K 2004, *Moving Eco-certification Mainstream.*

Seuring, S, Koplin, J & Goldbach, M 2004, 'Integrating Environmental and Social Criteria into Supply Management. Examples from the Textile Industry' in *Corporate social responsibility. Sustainable supply chains,* eds S Reddy & SA Seuring, ICFAI Univ. Press, Nagarjuna Hills, Hyderabad, India, pp. 51–65.

Spillemaeckers, S 2007, *The Belgian Social Label. A governmental application of Social LCA.*

Steedmann, P 2005, *Desperately seeking sustainability? Summary of NCC research into information and advice on sustainable lifestyles.*

sustainable consumption roundtable 2006, *I will if you will. Towards sustainable consumption.* Available from: http://www.sd-commission.org.uk/publications/downloads/I_Will_If_You_Will.pdf [10.09.08].

Swedish Environmental Research Institute Ltd. 2009, *Environmental Product Declaration. RH Ambio*. Available from: http://www.environdec.com/reg/epde35.pdf [17 September 2010].

Synovate (UK) 2005, *Quantitative Evaluation of Alternative Food Signposting Concepts. Report of Findings,* Kent. Available from: http://www.food.gov.uk/multimedia/pdfs/signpostquanresearch.pdf [06.06.08].

Teisl, MF 2003, 'What We May Have Is a Failure to Communicate. Labeling Environmentally Certified Forest Products', *Forest Science*, no. 49, pp. 668–680.

Teisl, MF & Roe, B 1998, 'The economics of labeling. An overview of issues for health and environmental disclosure', *Agricultural and resource economics review*, vol. 27, no. 2, pp. 140–150.

Teisl, MF & Roe, B 2005, 'Evaluating the factors that impact the effectiveness of eco-labelling programmes' in *Environment, information and consumer behaviour,* eds S Krarup & C Russel, Elgar, Cheltenham, pp. 65–90.

Teufel, J, Rubik, F, Scholl, G, Stratmann, B, Graulich, K & Manhart, A 2009, *Untersuchung zur möglichen Ausgestaltung und Marktimplementierung eines Nachhaltigkeitslabels zur Verbraucherinformation. Endbericht,* Freiburg.

The Commission of the European Communities 2009, *COMMUNICATION FROM THE COMMISSION TO THE COUNCIL, THE EUROPEAN PARLIAMENT AND THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE. Contributing to Sustainable Development: The role of Fair Trade and nongovernmental trade-related sustainability assurance schemes.* Available from: http://trade.ec.europa.eu/doclib/docs/2009/may/tradoc_143089.pdf [17 January 2010].

The Gallup Organisation 2009, *Europeans' attitudes towards the issue of sustainable consumption and production. Analytical report.*

The Sustainability Consortium 2009-2010, *The Sustainability Consortium*. Available from: http://www.sustainabilityconsortium.org/members [25 June 2010].

The Sustainability Consortium 2010, *The Sustainbaility Consortium. European Roundtable*. Available from: http://www.sustainabilityconsortium.org/wp-content/uploads/TSC_EU_Roundtable_3-12-2010.pdf [25 June 2010].

Truffer, B, Markard, J & Wüstenhagen, R 2001, 'Eco-labeling of electricity. Strategies and tradeoffs in the definition of environmental standards', *Energy Policy*, no. 29, pp. 885–897.

UNEP 2008, *Planning for Change: Guidelines for National Programmes on Sustainable Consumption and Production*. Available from: http://www.unep.org/pdf/UNEP_Planning_for_change_2008.pdf.

UNEP/Wuppertal Institute Collaborating Centre 2007, *Retailers Calendar. Exploring New Horizons in 12 Steps towards Long-term Market Success*. A Guidelines Manual for Retailers towards. Available from: http://www.unep.fr/shared/publications/pdf/WEBx0006xPA-RetailersCal.pdf.

United States Environmental Protection Agency 1998, *Environmental Labeling. Issues, Policies and Practices Worldwide,* Washington.

Upham, P, Dendler, L & Bleda, M In Press, Accepted Manuscript, '"Carbon labelling of grocery products: public perceptions and potential emissions reductions"', *Journal of Cleaner Production*.

Vermeire, I, Le Roy, D, Aendekerck, V & Vanlangendonck, C 2003, *DEVELOPMENT AND IMPLEMENTATION OF MARKETING ACTIONS FOR THE EUROPEAN ECO-LABEL IN BELGIUM. Final report – Non-Confidential,* Antwerpen.

Villiger, A, Wüstenhagen, R & Meyer, A 2000, *Jenseits der Öko-Nische,* Birkhäuser, Basel, Boston, Berlin.

Walmart 2010, *Walmart Announces Sustainable Product Index,* BENTONVILLE, [15 June 2010].

Wilkinson, R 2007, 'Fair Trade: Dynamic and Dilemmas of a Market oriented Global Social Movement', *Journal Consum Policy*, vol. 30, pp. 219–239.

Winward, J, Schiellerup, P & Boardman, B 1998, *Cool labels. The first three years of the European energy label,* Energy and Environment Programme Environmental Change Unit Univ.of Oxford, Oxford.

Yates, L 2008, 'Sustainable Consumption. The consumer perspective', *Consumer Policy Review*, vol. 18, no. 4, p. 96.

Tyndall Centre for Climate Change Research

Tyndall Working Paper series
2000 - 2010

The Tyndall Centre working paper series presents results from research which are mature enough to be submitted to a refereed journal, to a sponsor, to a major conference or to the editor of a book. The intention is to enhance the early public availability of research undertaken by the Tyndall family of researchers, students and visitors. They can be downloaded from the Tyndall Website at:

http://www.tyndall.ac.uk/publications/working_papers/working_papers.shtml

The accuracy of working papers and the conclusions reached are the responsibility of the author(s) alone and not the Tyndall Centre.

Papers available in this series are:

• McLachlan, C.(2010) **Tidal stream energy in the UK: Stakeholder perceptions study.** Tyndall Working Paper 144;

• Upham, P., and Julia Tomei (2010) **Critical Stakeholder Perceptions of Carbon and Sustainability Reporting in the UK Renewable Transport Fuel Obligation.** Tyndall Centre Working Paper 143;

• Hargreaves, T. (2010) **The Visible Energy Trial: Insights from Qualitative Interviews.** Tyndall Working Paper 141;

• Newsham, A., and D. Thomas. (2009) **Agricultural adaptation, local knowledge and livelihoods diversification in North-Central Namibia.** Tyndall Working Paper 140;

• Starkey, R.. (2009) **Assessing common(s) arguments for an equal per capita allocation.** Tyndall Working Paper 139;

• Bulkeley, H., and H. Schroeder. (2009) **Governing Climate Change Post-2012: The Role of Global Cities – Melbourne.** Tyndall Working Paper 138;

• Seyfang, G., I. Lorenzoni, and M. Nye., (2009) **Personal Carbon Trading: a** critical examination of proposals for the UK. Tyndall Working Paper 136.

• HTompkins E. L, Boyd E., Nicholson-Cole S, Weatherhead EK, Arnell N. W., Adger W. N., (2009) **An Inventory of Adaptation to climate change in the UK: challenges and findings**: Tyndall Working Paper 135;

• Haxeltine A., Seyfang G., (2009) **Transitions for the People: Theory and Practice of 'Transition' and 'Resilience' in the UK's Transition Movement:** Tyndall Working Paper 134;

• Tomei J., Upham P., (2009) **Argentinean soy based biodiesel: an introduction to production and impacts:** Tyndall Working Paper 133;

• Whitmarsh L, O'Neill S, Seyfang G., Lorenzoni I., (2008) **Carbon Capability: what does it mean, how prevalent is it, and how can we promote it?**: Tyndall Working Paper 132;

• Huang Y., Barker T., (2009) **Does Geography Matter for the Clean Development Mechanism?** : Tyndall Working Paper 131;

• Huang Y., Barker T., (2009) **The Clean Development Mechanism and Sustainable Development: A**

Panel Data Analysis: Tyndall Working Paper 130;

• Dawson R., Hall J, Barr S, Batty M., Bristow A, Carney S, Dagoumas, A., Evans S., Ford A, Harwatt H., Kohler J., Tight M, (2009) **A blueprint for the integrated assessment of climate change in cities**: Tyndall Working Paper 129;

• Carney S, Whitmarsh L, Nicholson-Cole S, Shackley S., (2009) **A Dynamic Typology of Stakeholder Engagement within Climate Change Research**: Tyndall Working paper 128;

• Goulden M, Conway D, Persechino A., (2008) **Adaptation to climate change in international river basins in Africa: a review:** Tyndall Working paper 127;

• Bows A., Anderson K., (2008) **A bottom-up analysis of including aviation within the EU's Emissions Trading Scheme:** Tyndall Working Paper 126;

• Al-Saleh Y., Upham P., Malik K., (2008) **Renewable Energy Scenarios for the Kingdom of Saudi Arabia:** Tyndall Working Paper 125

• Scrieciu S., Barker T., Smith V., (2008) **World economic dynamics and technological change: projecting interactions between economic output and CO2 emissions :**Tyndall Working Paper 124

• Bulkeley H, Schroeder H., (2008) **Governing Climate Change Post-2012: The Role of Global Cities - London:** Tyndall Working Paper 123
• Schroeder H., Bulkeley H, (2008) **Governing Climate Change Post-2012: The Role of Global Cities, Case-Study: Los Angeles**: Tyndall Working Paper 122

• Wang T., Watson J, (2008) **Carbon Emissions Scenarios for China to 2100**: Tyndall Working Paper 121

• Bergman, N., Whitmarsh L, Kohler J., (2008) **Transition to sustainable development in the UK housing sector: from case study to model implementation:** Tyndall Working Paper 120

• Conway D, Persechino A., Ardoin-Bardin S., Hamandawana H., Dickson M, Dieulin C, Mahe G, (2008) **RAINFALL AND WATER RESOURCES VARIABILITY IN SUB-SAHARAN AFRICA DURING THE 20TH CENTURY:** Tyndall Centre Working Paper 119

• Starkey R., (2008) **Allocating emissions rights: Are equal shares, fair shares? :** Tyndall Working Paper 118

• Barker T., (2008) **The Economics of Avoiding Dangerous Climate Change**: Tyndall Centre Working Paper 117

• Estrada M, Corbera E., Brown K, (2008) **How do regulated and voluntary carbon-offset schemes compare?**: Tyndall Centre Working Paper 116

• Estrada Porrua M, Corbera E., Brown K, (2007) **REDUCING GREENHOUSE GAS EMISSIONS FROM DEFORESTATION IN DEVELOPING COUNTRIES: REVISITING THE ASSUMPTIONS**: Tyndall Centre Working Paper 115

• Boyd E., Hultman N E., Roberts T., Corbera E., Ebeling J., Liverman D, Brown K, Tippmann R., Cole J., Mann P, Kaiser M., Robbins M, (2007) **The Clean Development Mechanism: An assessment of current practice and future approaches for policy**: Tyndall Centre Working Paper 114

• Hanson, S., Nicholls, R., Balson, P., Brown, I., French, J.R., Spencer, T., Sutherland, W.J. (2007) **Capturing coastal morphological change within regional integrated assessment: an outcome-driven fuzzy logic approach**: Tyndall Working Paper No. 113

- Okereke, C., Bulkeley, H. (2007) **Conceptualizing climate change governance beyond the international regime: A review of four theoretical approaches**: Tyndall Working Paper No. 112

- Doulton, H., Brown, K. (2007) **'Ten years to prevent catastrophe'? Discourses of climate change and international development in the UK press**: Tyndall Working Paper No. 111

- Dawson, R.J., et al (2007) **Integrated analysis of risks of coastal flooding and cliff erosion under scenarios of long term change**: Tyndall Working Paper No. 110

- Okereke, C., (2007) **A review of UK FTSE 100 climate strategy and a framework for more in-depth analysis in the context of a post-2012 climate regime**: Tyndall Centre Working Paper 109

- Gardiner S., Hanson S., Nicholls R., Zhang Z., Jude S., Jones A.P., et al (2007) **The Habitats Directive, Coastal Habitats and Climate Change – Case Studies from the South Coast of the UK**: Tyndall Centre Working Paper 108

- Schipper E. Lisa, (2007) **Climate Change Adaptation and Development: Exploring the Linkages**: Tyndall Centre Working Paper 107

- Okereke C., Mann P, Osbahr H, (2007) **Assessment of key negotiating issues at Nairobi climate COP/MOP and what it means for the future of the climate regime**: Tyndall Centre Working Paper No. 106

- Walkden M, Dickson M, (2006) **The response of soft rock shore profiles to increased sea-level rise.** : Tyndall Centre Working Paper 105

- Dawson R., Hall J, Barr S, Batty M., Bristow A, Carney S, Evans E.P., Kohler J., Tight M, Walsh C, Ford A, (2007) **A blueprint for the integrated assessment of climate change in cities.** : Tyndall Centre Working Paper 104

- Dickson M., Walkden M., Hall J., (2007) **Modelling the impacts of climate change on an eroding coast over the 21st Century**: Tyndall Centre Working Paper 103

- Klein R.J.T, Erickson S.E.H, Næss L.O, Hammill A., Tanner T.M., Robledo, C., O'Brien K.L.,(2007) **Portfolio screening to support the mainstreaming of adaptation to climatic change into development assistance**: Tyndall Centre Working Paper 102

- Agnolucci P., (2007) **Is it going to happen? Regulatory Change and Renewable Electricity**: Tyndall Centre Working Paper 101

- Kirk K., (2007) **Potential for storage of carbon dioxide in the rocks beneath the East Irish Sea**: Tyndall Centre Working Paper 100

- Arnell N.W., (2006) **Global impacts of abrupt climate change: an initial assessment**: Tyndall Centre Working Paper 99

- Lowe T.,(2006) **Is this climate porn? How does climate change communication affect our perceptions and behaviour?**, Tyndall Centre Working Paper 98

- Walkden M, Stansby P,(2006) **The effect of dredging off Great Yarmouth on the wave conditions and erosion of the North Norfolk coast**. Tyndall Centre Working Paper 97

- Anthoff, D., Nicholls R., Tol R S J, Vafeidis, A., (2006) **Global and regional exposure to large rises in sea-level: a sensitivity analysis**. This work was prepared for the Stern Review on the Economics of Climate Change: Tyndall Centre Working Paper 96

• Few R., Brown K, Tompkins E. L (2006) **Public participation and climate change adaptation**, Tyndall Centre Working Paper 95

• Corbera E., Kosoy N, Martinez Tuna M, (2006) **Marketing ecosystem services through protected areas and rural communities in Meso-America: Implications for economic efficiency, equity and political legitimacy**, Tyndall Centre Working Paper 94

• Schipper E. Lisa, (2006) **Climate Risk, Perceptions and Development in El Salvado**r, Tyndall Centre Working Paper 93

• Tompkins E. L, Amundsen H, (2005) **Perceptions of the effectiveness of the United Nations Framework Convention on Climate Change in prompting behavioural change,** Tyndall Centre Working Paper 92

• Warren R., Hope C, Mastrandrea M, Tol R S J, Adger W. N., Lorenzoni I., (2006) **Spotlighting the impacts functions in integrated assessments. Research Report Prepared for the Stern Review on the Economics of Climate Change**, Tyndall Centre Working Paper 91

• Warren R., Arnell A, Nicholls R., Levy P E, Price J, (2006) **Understanding the regional impacts of climate change: Research Report Prepared for the Stern Review on the Economics of Climate Change,** Tyndall Centre Working Paper 90

• Barker T., Qureshi M, Kohler J., (2006) **The Costs of Greenhouse Gas Mitigation with Induced Technological Change: A Meta-Analysis of Estimates in the Literature**, Tyndall Centre Working Paper 89

• Kuang C, Stansby P, (2006) **Sandbanks for coastal protection: implications of sea-level rise. Part 3: wave modelling**, Tyndall Centre Working Paper 88

• Kuang C, Stansby P, (2006) **Sandbanks for coastal protection: implications of sea-level rise. Part 2: current and morphological modelling**, Tyndall Centre Working Paper 87

• Stansby P, Kuang C, Laurence D, Launder B, (2006) **Sandbanks for coastal protection: implications of sea-level rise. Part 1: application to East Anglia**, Tyndall Centre Working Paper 86

• Bentham M, (2006) **An assessment of carbon sequestration potential in the UK – Southern North Sea case study:** Tyndall Centre Working Paper 85

• Anderson K., Bows A., Upham P., (2006) **Growth scenarios for EU & UK aviation: contradictions with climate policy,** Tyndall Centre Working Paper 84

• Williamson M., Lenton T., Shepherd J., Edwards N, (2006) **An efficient numerical terrestrial scheme (ENTS) for fast earth system modelling**, Tyndall Centre Working Paper 83

• Bows, A., and Anderson, K. (2005) **An analysis of a post-Kyoto climate policy model**, Tyndall Centre Working Paper 82

• Sorrell, S., (2005) **The economics of energy service contracts**, Tyndall Centre Working Paper 81

• Wittneben, B., Haxeltine, A., Kjellen, B., Köhler, J., Turnpenny, J., and Warren, R., (2005) **A framework for assessing the political economy of post-2012 global climate regime**, Tyndall Centre Working Paper 80

• Ingham, I., Ma, J., and Ulph, A. M. (2005) **Can adaptation and mitigation be complements?**, Tyndall Centre Working Paper 79

- Agnolucci,. P (2005) **Opportunism and competition in the non-fossil fuel obligation market**, Tyndall Centre Working Paper 78

- Barker, T., Pan, H., Köhler, J., Warren., R and Winne, S. (2005) **Avoiding dangerous climate change by inducing technological progress: scenarios using a large-scale econometric model**, Tyndall Centre Working Paper 77

- Agnolucci,. P (2005) **The role of political uncertainty in the Danish renewable energy market**, Tyndall Centre Working Paper 76

- Fu, G., Hall, J. W. and Lawry, J. (2005) **Beyond probability: new methods for representing uncertainty in projections of future climate**, Tyndall Centre Working Paper 75

- Ingham, I., Ma, J., and Ulph, A. M. (2005) **How do the costs of adaptation affect optimal mitigation when there is uncertainty, irreversibility and learning?**, Tyndall Centre Working Paper 74

- Walkden, M. (2005) **Coastal process simulator scoping study**, Tyndall Centre Working Paper 73

- Lowe, T., Brown, K., Suraje Dessai, S., Doria, M., Haynes, K. and Vincent., K (2005) **Does tomorrow ever come? Disaster narrative and public perceptions of climate change**, Tyndall Centre Working Paper 72

- Boyd, E. Gutierrez, M. and Chang, M. (2005) **Adapting small-scale CDM sinks projects to low-income communities**, Tyndall Centre Working Paper 71

- Abu-Sharkh, S., Li, R., Markvart, T., Ross, N., Wilson, P., Yao, R., Steemers, K., Kohler, J. and Arnold, R. (2005) **Can Migrogrids Make a Major Contribution to UK Energy Supply?**, Tyndall Centre Working Paper 70

- Tompkins, E. L. and Hurlston, L. A. (2005) **Natural hazards and climate change: what knowledge is transferable?**, Tyndall Centre Working Paper 69

- Bleda, M. and Shackley, S. (2005) **The formation of belief in climate change in business organisations: a dynamic simulation model**, Tyndall Centre Working Paper 68

- Turnpenny, J., Haxeltine, A. and O'Riordan, T., (2005) **Developing regional and local scenarios for climate change mitigation and adaptation: Part 2: Scenario creation**, Tyndall Centre Working Paper 67

- Turnpenny, J., Haxeltine, A., Lorenzoni, I., O'Riordan, T., and Jones, M., (2005) **Mapping actors involved in climate change policy networks in the UK**, Tyndall Centre Working Paper 66

- Adger, W. N., Brown, K. and Tompkins, E. L. (2004) **Why do resource managers make links to stakeholders at other scales?**, Tyndall Centre Working Paper 65

- Peters, M.D. and Powell, J.C. (2004) **Fuel Cells for a Sustainable Future II**, Tyndall Centre Working Paper 64

- Few, R., Ahern, M., Matthies, F. and Kovats, S. (2004) **Floods, health and climate change: a strategic review**, Tyndall Centre Working Paper 63

- Barker, T. (2004) **Economic theory and the transition to sustainability: a comparison of approaches**, Tyndall Centre Working Paper 62

- Brooks, N. (2004) **Drought in the African Sahel: long term perspectives**

and future prospects, Tyndall Centre Working Paper 61

• Few, R., Brown, K. and Tompkins, E.L. (2004) **Scaling adaptation: climate change response and coastal management in the UK**, Tyndall Centre Working Paper 60

• Anderson, D and Winne, S. (2004) **Modelling Innovation and Threshold Effects In Climate Change Mitigation**, Tyndall Centre Working Paper 59

• Bray, D and Shackley, S. (2004) **The Social Simulation of The Public Perceptions of Weather Events and their Effect upon the Development of Belief in Anthropogenic Climate Change**, Tyndall Centre Working Paper 58

• Shackley, S., Reiche, A. and Mander, S (2004) **The Public Perceptions of Underground Coal Gasification (UCG): A Pilot Study**, Tyndall Centre Working Paper 57

• Vincent, K. (2004) **Creating an index of social vulnerability to climate change for Africa**, Tyndall Centre Working Paper 56

• Mitchell, T.D. Carter, T.R., Jones, .P.D, Hulme, M. and New, M. (2004) **A comprehensive set of high-resolution grids of monthly climate for Europe and the globe: the observed record (1901-2000) and 16 scenarios (2001-2100)**, Tyndall Centre Working Paper 55

• Turnpenny, J., Carney, S., Haxeltine, A., and O'Riordan, T. (2004) **Developing regional and local scenarios for climate change mitigation and adaptation Part 1: A framing of the East of England** Tyndall Centre Working Paper 54

• Agnolucci, P. and Ekins, P. (2004) **The Announcement Effect And Environmental Taxation** Tyndall Centre Working Paper 53

• Agnolucci, P. (2004) **Ex Post Evaluations of CO2 –Based Taxes: A Survey** Tyndall Centre Working Paper 52

• Agnolucci, P., Barker, T. and Ekins, P. (2004) **Hysteresis and Energy Demand: the Announcement Effects and the effects of the UK Climate Change Levy** Tyndall Centre Working Paper 51

• Powell, J.C., Peters, M.D., Ruddell, A. and Halliday, J. (2004) **Fuel Cells for a Sustainable Future?** Tyndall Centre Working Paper 50

• Awerbuch, S. (2004) **Restructuring our electricity networks to promote decarbonisation**, Tyndall Centre Working Paper 49

• Pan, H. (2004) **The evolution of economic structure under technological development**, Tyndall Centre Working Paper 48

• Berkhout, F., Hertin, J. and Gann, D. M., (2004) **Learning to adapt: Organisational adaptation to climate change impacts**, Tyndall Centre Working Paper 47

• Watson, J., Tetteh, A., Dutton, G., Bristow, A., Kelly, C., Page, M. and Pridmore, A., (2004) **UK Hydrogen Futures to 2050**, Tyndall Centre Working Paper 46

• Purdy, R and Macrory, R. (2004) **Geological carbon sequestration: critical legal issues**, Tyndall Centre Working Paper 45

• Shackley, S., McLachlan, C. and Gough, C. (2004) **The Public**

Perceptions of Carbon Capture and Storage, Tyndall Centre Working Paper 44

• Anderson, D. and Winne, S. (2003) **Innovation and Threshold Effects in Technology Responses to Climate Change**, Tyndall Centre Working Paper 43

• Kim, J. (2003) **Sustainable Development and the CDM: A South African Case Study**, Tyndall Centre Working Paper 42

• Watson, J. (2003), **UK Electricity Scenarios for 2050**, Tyndall Centre Working Paper 41

• Klein, R.J.T., Lisa Schipper, E. and Dessai, S. (2003), **Integrating mitigation and adaptation into climate and development policy: three research questions**, Tyndall Centre Working Paper 40

• Tompkins, E. and Adger, W.N. (2003). **Defining response capacity to enhance climate change policy**, Tyndall Centre Working Paper 39

• Brooks, N. (2003). **Vulnerability, risk and adaptation: a conceptual framework**, Tyndall Centre Working Paper 38

• Ingham, A. and Ulph, A. (2003) **Uncertainty, Irreversibility, Precaution and the Social Cost of Carbon**, Tyndall Centre Working Paper 37

• Kröger, K. Fergusson, M. and Skinner, I. (2003). **Critical Issues in Decarbonising Transport: The Role of Technologies**, Tyndall Centre Working Paper 36

• Tompkins E. L and Hurlston, L. (2003). **Report to the Cayman Islands' Government. Adaptation lessons learned from responding to tropical cyclones by the Cayman Islands' Government, 1988 – 2002**, Tyndall Centre Working Paper 35

• Dessai, S., Hulme, M (2003). **Does climate policy need probabilities?**, Tyndall Centre Working Paper 34

• Pridmore, A., Bristow, A.L., May, A. D. and Tight, M.R. (2003). **Climate Change, Impacts, Future Scenarios and the Role of Transport**, Tyndall Centre Working Paper 33

• Xueguang Wu, Jenkins, N. and Strbac, G. (2003). **Integrating Renewables and CHP into the UK Electricity System: Investigation of the impact of network faults on the stability of large offshore wind farms**, Tyndall Centre Working Paper 32

• Turnpenny, J., Haxeltine A. and O'Riordan, T. (2003). **A scoping study of UK user needs for managing climate futures. Part 1 of the pilot-phase interactive integrated assessment process (Aurion Project)**, Tyndall Centre Working Paper 31

• Hulme, M. (2003). **Abrupt climate change: can society cope?**, Tyndall Centre Working Paper 30

• Brown, K. and Corbera, E. (2003). **A Multi-Criteria Assessment Framework for Carbon-Mitigation Projects: Putting "development" in the centre of decision-making**, Tyndall Centre Working Paper 29

• Dessai, S., Adger, W.N., Hulme, M., Köhler, J.H., Turnpenny, J. and Warren, R. (2003). **Defining and experiencing dangerous climate change**, Tyndall Centre Working Paper 28

• Tompkins, E.L. and Adger, W.N. (2003). **Building resilience to climate change through adaptive management of natural resources**, Tyndall Centre Working Paper 27

• Brooks, N. and Adger W.N. (2003).

Country level risk measures of climate-related natural disasters and implications for adaptation to climate change, Tyndall Centre Working Paper 26

• Xueguang Wu, Mutale, J., Jenkins, N. and Strbac, G. (2003). **An investigation of Network Splitting for Fault Level Reduction**, Tyndall Centre Working Paper 25

• Xueguang Wu, Jenkins, N. and Strbac, G. (2002). **Impact of Integrating Renewables and CHP into the UK Transmission Network**, Tyndall Centre Working Paper 24

• Paavola, J. and Adger, W.N. (2002). **Justice and adaptation to climate change**, Tyndall Centre Working Paper 23

• Watson, W.J., Hertin, J., Randall, T., Gough, C. (2002). **Renewable Energy and Combined Heat and Power Resources in the UK**, Tyndall Centre Working Paper 22

• Watson, W. J. (2002). **Renewables and CHP Deployment in the UK to 2020**, Tyndall Centre Working Paper 21

• Turnpenny, J. (2002). **Reviewing organisational use of scenarios: Case study - evaluating UK energy policy options**, Tyndall Centre Working Paper 20

• Pridmore, A. and Bristow, A., (2002). **The role of hydrogen in powering road transport**, Tyndall Centre Working Paper 19

• Watson, J. (2002). **The development of large technical systems: implications for hydrogen**, Tyndall Centre Working Paper 18

• Dutton, G., (2002). **Hydrogen Energy Technology**, Tyndall Centre Working Paper 17

• Adger, W.N., Huq, S., Brown, K., Conway, D. and Hulme, M. (2002). Adaptation to climate change: Setting the Agenda for Development Policy and Research, Tyndall Centre Working Paper 16

• Köhler, J.H., (2002). **Long run technical change in an energy-environment-economy (E3) model for an IA system: A model of Kondratiev waves**, Tyndall Centre Working Paper 15

• Shackley, S. and Gough, C., (2002). **The Use of Integrated Assessment: An Institutional Analysis Perspective**, Tyndall Centre Working Paper 14

• Dewick, P., Green K., Miozzo, M., (2002). **Technological Change, Industry Structure and the Environment**, Tyndall Centre Working Paper 13

• Dessai, S., (2001). **The climate regime from The Hague to Marrakech: Saving or sinking the Kyoto Protocol?**, Tyndall Centre Working Paper 12

• Barker, T. (2001). **Representing the Integrated Assessment of Climate Change, Adaptation and Mitigation**, Tyndall Centre Working Paper 11

• Gough, C., Taylor, I. and Shackley, S. (2001). **Burying Carbon under the Sea: An Initial Exploration of Public Opinions**, Tyndall Centre Working Paper 10

• Barnett, J. and Adger, W. N. (2001). **Climate Dangers and Atoll Countries**, Tyndall Centre Working Paper 9

• Adger, W. N. (2001). **Social Capital and Climate Change**, Tyndall Centre Working Paper 8

• Barnett, J. (2001). **Security and Climate Change**, Tyndall Centre Working Paper 7

• Goodess, C.M., Hulme, M. and Osborn, T. (2001). **The identification and evaluation of suitable scenario**

development methods for the estimation of future probabilities of extreme weather events, Tyndall Centre Working Paper 6

• Barnett, J. (2001). **The issue of 'Adverse Effects and the Impacts of Response Measures' in the UNFCCC**, Tyndall Centre Working Paper 5

• Barker, T. and Ekins, P. (2001). **How High are the Costs of Kyoto for the US Economy?**, Tyndall Centre Working Paper 4

• Berkhout, F, Hertin, J. and Jordan, A. J. (2001). **Socio-economic futures in climate change impact assessment: using scenarios as 'learning machines'**, Tyndall Centre Working Paper 3

• Hulme, M. (2001). **Integrated Assessment Models**, Tyndall Centre Working Paper 2

• Mitchell, T. and Hulme, M. (2000). **A Country-by-Country Analysis of Past and Future Warming Rates**, Tyndall Centre Working Paper 1

Tyndall°Centre
for Climate Change Research

For further information please contact

Javier Delgado-Esteban