Limits to labels: The role of eco-labels in the assessment of product sustainability and routes to sustainable consumption

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Abstract

There has been rapid development in the methods, data and protocols for the assessment of product sustainability over the past decade. Notwithstanding this welcome development, the widespread provision of sustainable products has not occurred. Moreover, indications from a myriad of surveys suggest that consumers remain full of intent to purchase sustainably, yet these stated preferences have not translated into a widespread uptake in the purchase of more sustainable products.

Heightened interest in climate change over the past couple of years has led to rising calls for labelling to allow consumers to differentiate between more or less sustainable options. Such calls apparently assume that if consumers are presented with appropriate label information their purchases will change and more sustainable purchasing will result. For many observers these calls bring more than a ring of déjà vu as the failures (or at least unfulfilled expectations) of environmental labelling schemes of the past spring to mind.

A review and assessment of eco-labelling schemes is presented. Discussion focuses on the history, successes and failures of such schemes, and consideration of their potential role (or not) in future shifts towards sustainable consumption. Behavioural, social practice, institutional and infrastructure factors are considered and labelling, legislation and other options are explored. Conclusions are drawn regarding potential routes to sustainable consumption, with particular reference to eco-labels.

Introduction

The advocates for a role of eco-labels in fostering more sustainable consumption patterns are numerous. Following the Rio Earth Summit, Agenda 21 identified eco-labelling as a way to encourage consumers to adopt more sustainable consumption patterns through the purchase of products that are more resource and energy efficient. Consumer distrust and confusion over manufacturers' environmental claims has also heralded various calls for third-party labelling schemes (Baker and Miner, 1993; Eden, 1994; Erskine and Collins, 1997). The World Summit on Sustainable Development *Plan of Implementation* to address unsustainable consumption advocates 'developing and adopting on a voluntary basis effective, transparent, verifiable, non-misleading and non-discriminatory consumer information tools' (UNEP, 2002, p. 7). The same report notes success stories, including the area of forests certified by the Forest Stewardship Council (FSC) more than doubling to include over 25 million acres in 54 countries, between 1998–2001; the energy savings through purchase of US Energy Star labelled products reaching the equivalent of 10 million homes' consumption; and the

market share of energy-efficient, single door fridges in Thailand rising from 12% in 1996 to 96% in 1998, attributed to an appliance labelling program.

The study of environmental consumption dates back to the late 1960s (D'Souza *et al.*, 2007). There was a burst of interest in eco-labels in the 1980s and early 1990s, coinciding with the trend away from command and control measures imposed by governments towards a model of market governance, self-regulation and new environmental policy instruments, which include eco-labelling (Jordan *et al.*, 2003). Over the last 2–3 years, recognition of the need to act on climate change has driven a renewed interest in eco-labels as a means to drive a widespread transition towards more sustainable lifestyles. This raises the question of the likely effectiveness of eco-labelling as a relevant strategy. One means to assess likely effectiveness is to examine past practice and existing schemes. In this paper, a review and assessment of eco-labels is reported, and this is used to investigate the extent to which eco-labels have contributed to product sustainability assessment and to uptake of sustainable consumption practices. A key question posed is whether eco-labels have influenced consumer choice and led to the purchase of greener products and, if so, is this likely

to reduce our global environmental footprint, now or in the future? Legislation and other interventions beyond eco-labels are then discussed.

Objectives and method

The objectives for this paper are to:
1. Present a classification of eco-labels
2. Assess a sample of eco-label schemes
3. Analyse the results
4. Discuss the potential role for eco-labels in fostering sustainable consumption practices.

A total of 36 labelling schemes which could be regarded as eco-labels were reviewed, compiled and used to inform a classification (see Figure 1 and section 3). The schemes reviewed were not intended to provide a comprehensive record of eco-labels internationally, but were intended to provide an indication of breadth and range of both type and application; collection continued until saturation in variables was reached. The sample includes both GEN-affiliated and non-GEN affiliated labels; a range of governing body systems including public and private sector; a range of scope of labels and a range of underlying standards methodologies. There is some emphasis on Australia as this is where the research was conducted.

Ten eco-labels were selected for further study, based on their high level of recognition in the literature across an international spread (with three selected from Australia where the study was based). These label systems include a range of scales across government regulated/sponsored, and voluntary Type I schemes (Type II were omitted due to the trust issues raised in numerous consumer surveys):
• Blue Angel, Germany
• EU Flower, EU
• Nordic Swan, Scandinavia
• Environmental Choice, Canada
• Bra Miljoval, Sweden
• Forest Stewardship Council
• International Energy Star
• Good Environmental Choice Australia (GECA)
• Water Efficiency Labelling Scheme (WELS), Australia
• Energy Rating for Minimum Energy Performance Standards, Australia
The results were then analysed and discussed in the context of the prospects of eco-labels and/or other measures to contribute towards uptake of sustainable consumption practices in the future.

Classification of eco-labels

Product environmental labels can be classified and categorized in various ways. There are two initial points of differentiation, namely, whether the scheme is mandatory or voluntary, and whether certification (granting of the rights to use the label) is carried out independently or not. Mandatory environmental labelling is generally prescribed by law and appears more prevalent for specific performance issues such as water or energy consuming devices. Regarding voluntary labelling, the International Standards Organization (ISO) uses three categories, namely Type I, II and III (ISO, 1999a,b, 2000). Type I labels are third-party certified product environmental labels schemes that provide use of a logo

associated with certified products. This type of label is most commonly referred to in the literature as an 'eco-label', although the term used in this paper is broadened to include all product environmental declaration labelling systems. Type II labels are based on the self-declarations of manufacturers, importers, distributors or retailers, while Type III provide quantitative life cycle environmental data in a more extensive report format and they are not considered further here. Beyond ISO, there are Type I-like labels, such as Forest Stewardship Certification, which do not label a variety of product categories, but rather focus on a single product category. Based on these variables, an existing classification from the literature was adapted for this study (Figure 1).

The question then arises as to the relative strength of labels across the classification in contributing to sustainable consumption. There is an extensive literature relating to 'strong' and 'weak' sustainability which is outside the scope of this paper, although the resultant familiar sustainability principles including carrying capacity, conservation of natural capital, intergenerational equity and participative democracy can be applied to a more thorough examination of eco-labels across the classification. Four themes can be identified which indicate strength of eco-labels:
• coverage (range of environmental issues covered, carrying capacity, range of label products covered of relevant issues);
• inclusion of stakeholder needs (participative democracy);
• uptake, independence and acceptance (evidence of influence of the label and participative democracy);
• measured environmental/sustainable consumption outcomes (demonstrating conservation of natural capital and intergenerational equity).

Assessment

The four themes are developed further into label assessment criteria in Figure 2, which is adapted from two sources, including the 'phase model' approach (Rubik and Frankl, 2005).

The Blue Angel eco-label program was established in 1977 as a voluntary third-party scheme. It was criticized in its early years for having a criteria setting process that was dominated by environmentalists and for not consulting adequately with industry (Jordan *et al.*, 2003). It is currently licensed by the German Institute for Quality Assurance and Labelling. The institutional arrangement also includes the Federal Environment Agency (Umweltbundesamt) and the Eco-label Jury, designed to ensure that the scheme is independent. Market penetration varies greatly between product groups and competition among companies may be a driver for manufacturers to adopt the label; 92% of companies with the label have a direct competitor also with the label (Institut für ökologische Wirtshaftsförderung (IOW), 1999). Blue Angel enjoys a high level of recognition and studies suggest that its independence from business and government approval is important for consumers.

The EU Flower eco-label program was established in 1992 as a voluntary multi-criteria-based third-party scheme. Each member state designates a 'competent body' charged with implementing the scheme at national or regional level. Setting criteria across different national conditions requires compromise, although the conformity it provides may be welcomed by manufacturers, due to the simplified transaction costs. Among the extensive literature regarding the strengths and weaknesses of the EU Flower (e.g.
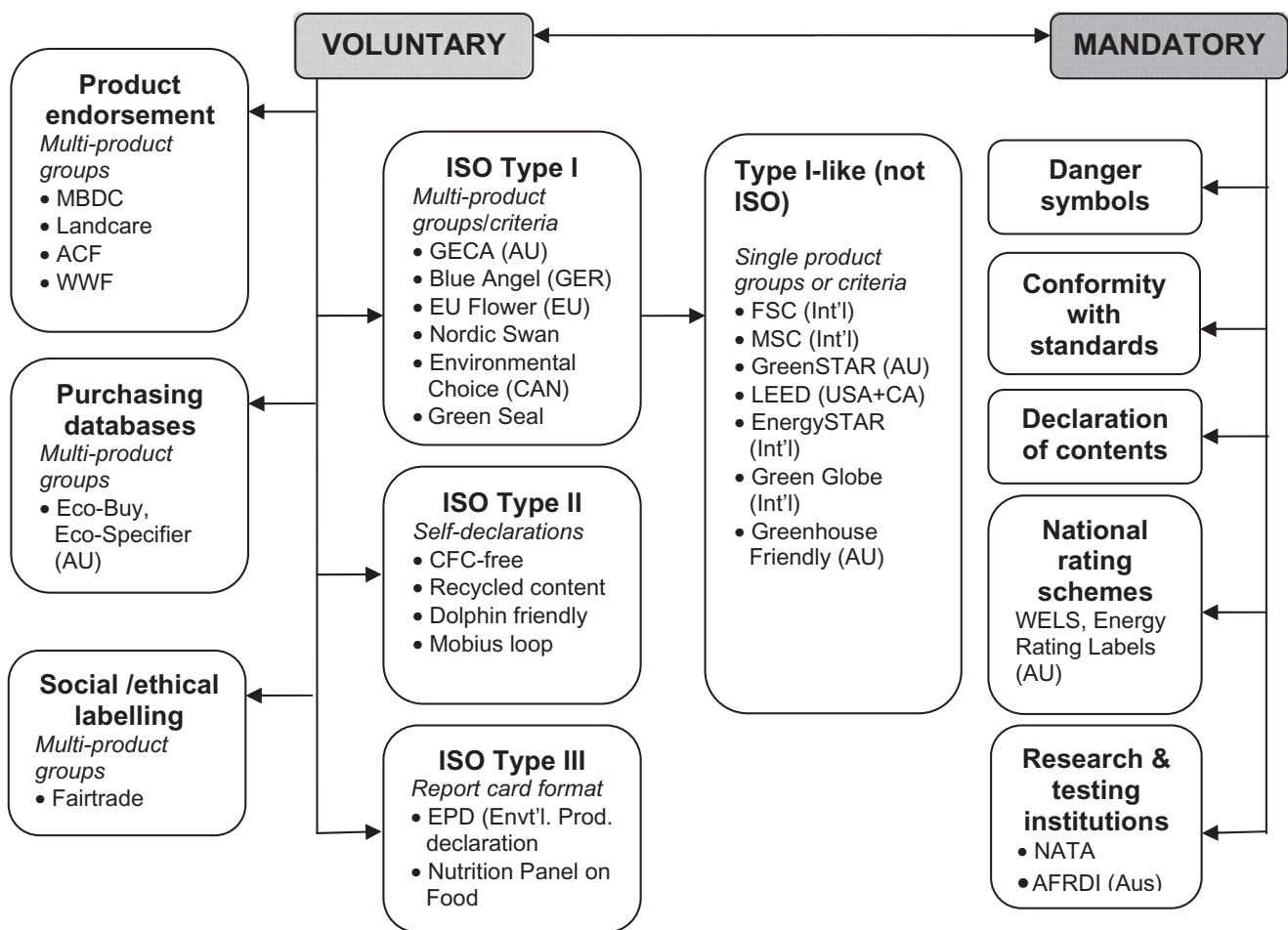
Figure 1 Classification of product environmental labels by type (adapted from Rubik and Frankl, 2005).

Phase	Success indicators
Establishment phase	• Number of criteria developed for a product group • Quality of criteria • Significance of the criteria (environmental) • Continual development of new criteria for other significant sectors • Involvement of key stakeholders in the criteria development • Economic costs outweigh the benefits
Market phase (supply and demand side)	• Number of labelled products available in stores • Number of licensed products on the market • Market shares of labelled goods and services • Environmental significance of available goods and services • Consumer awareness, knowledge and trust of the label • Consumer and producer behaviour changes attributed to the label • Producer acceptance of the label • Involvement of NGOs and other relevant organisations
Monitoring and assessment phase	• Environmental impacts (gains and losses)

Figure 2 PELs assessment model (adapted from Rubik and Frankl, 2005; US EPA, 1994).

Hale, 1996; Manzini *et al.*, 2006), it is clear that the international scale, regular updates and services aspects of the scheme are generally regarded as positives, while the bureaucracy, complexity, rigidity, delays in setting criteria, costs, access (it targets only the top 20%–30% of products), and lack of 'star-rating' type differentiation of products constitute key weaknesses. Claims that political arguments and interests rule over scientific and environmental arguments remain as explanations for the low uptake and impact of the label (Erskine and Collins, 1997). Furthermore, it has struggled in states where strong national schemes exist, such as Germany. Despite well-funded information campaigns, a 2006 study that interviewed over 24,000 people in the 25 member states of the Flower program found that nearly half (48%) of respondents do not know what the EU Flower label means (European Commission, 2007). Hence, unsurprisingly, the EU Flower has been heavily criticized for its low uptake and market impact.

Nordic Swan is another supranational scheme, involving Scandinavian countries. It was established in 1989 partly to avoid competition and confusion between separate national schemes. Relatively well funded, it enjoys wide recognition (Leire and Thidell, 2005). A 2005 evaluation of the influence of the label on total environmental load established some environmental relevance, but a lack of focus on environmentally significant areas, such as transportation and product use impacts.

The Canadian Environmental Choice Program (ECP) was created by Environment Canada in 1988, and private marketing firm took over management in 1995, subsequently shifting the target audience from private retail consumers to professional purchasers, including government, industry groups, school boards, and private institutions. The majority of its recent market impact stems from the increasing uptake in the professional purchasing market, particularly in relation to construction materials and office consumables.

Bra Miljoval is owned and operated by the Swedish Society for Nature Conservation (SSNC), and is of interest because it positions itself as a label superior to Nordic Swan. However, more extensive environmental requirements are offset by criticisms of its organizational structure and potential for product categories being controlled by the interests of SSNC and their environmental campaigns. The most frequent reason given for companies' support of the FSC scheme is the fact that it has been developed in a multi-stakeholder environment, resulting in significant public credibility (UNEP, 2005). This places FSC apart from the majority of sustainable forest products standards internationally. Arguably, FSC has had no shortage of brand recognition – indeed, a barrier noted to increased market uptake of FSC-certified timber is that supply has often not been able to meet demand (Gulbrandsen, 2006).

Energy Star was created by the US Department of Energy and the US EPA in 1992 for office equipment, and has now expanded this to cover household appliances, home electronics, office equipment, heating and cooling equipment, windows, residential light fixtures and more, and the criteria extends beyond 'sleep mode' capability to include some energy efficiency considerations. International formal arrangements now exist; products approved in one country are licensed to display the label in other participating countries and product information is shared. The US founders retain responsibility for developing endorsement criteria, but there is a process to consult all partners when developing new specifications.

With no government-endorsed or sponsored multi-criteria third-party verified eco-label, GECA is the only voluntary multi-criteria eco-label in Australia. Low uptake may have been influenced by a lack of clear organizational process and meaningful stakeholder engagement. As a limited-funded, privately run scheme, it has also been open to criticism with regard to the robustness of the research underpinning new labels, the transparency and evidence base of the program, and the extent of meaningful stakeholder engagement. Such factors could contribute to longer term issues with credibility and low consumer awareness.

The WELS is an Australian government-driven single-attribute scheme originating in 2003 and covering showerheads, washing machines, dishwashers and toilets. During the development of the standard, extensive consultations and focus groups took place with a wide range of stakeholders, including water service providers, industry regulators, plumbing regulators, product manufacturers, importers, retailers and consumers. Liability for testing, registration, and enforcement of non-compliance penalties was established. Surveys in 2005 prior to the scheme becoming mandatory indicated 41% recognition, rising to 53% when prompted (Artcraft Research, 2005).

Government-led energy labelling has a longer history, being introduced in some Australian states in 1986, with Minimum Energy Performance Standard (MEPS) introduced from 1999. To overcome complex state-federal arrangements, the National Appliance and Equipment Energy Efficiency Committee was established to coordinate the program, maintain consistency and set future directions. Standards Australia establishes test procedures and publishes regulatory standards governing ratings calculations and other program requirements. Mandatory display of energy star rating labels has now existed for nearly two decades and covers refrigerators, freezers, room air-conditioners, dishwashers, clothes washers and clothes dryers. The program is widely regarded as among the most informative and successful: 94% of consumers recognize it and 88% use it in purchasing (Artcraft Research, 2005). It may also be productive in terms of energy savings, with reductions in energy consumption of new appliances calculated in the range 3–4% per year (1993–2005) for fridges, freezers and dishwashers (AGO, 2006).

Analysis

Across the eco-label schemes analysed, there was a range of degrees of fit with the criteria. However, there was no clear, consistent pattern of eco-label 'strength' around a particular type, according to the classification. On this measure, success factors appear to be independent of the classification, and dependent upon the particular circumstances of application. The following analysis is presented under the four main categories of assessment identified in the method above.

Coverage

Most of the labels analysed included a range of environmental impact criteria, with the exception of the energy/water labels which are restricted operational energy/water consumption. However, there is a wide range of methods used to establish environmental criteria, invariably relating more to what is considered practical performance aspirations rather than any systematic consideration of environmental carrying capacity.

Eco-labels may also be focussing on the 'wrong' things in other ways. For example, 'black' products, associated with especially significant environmental impacts, such as cars, power lawn mowers and pesticides are often avoided by voluntary eco-labelling programs for fear of harming label credibility as a 'green clean' brand. The EU Flower does not currently address product groups where environmental impacts are deemed to be the greatest, so consumers may not be alerted to the fact that these products are 'worse' than those where eco-labels are routinely used. Moreover, market effects of eco-labels have been widely questioned with regard to welfare outcomes, incentive issues, compliance and international trade, and problems of burden shifting, with some economists suggesting eco-labels may not produce environmental benefits in a global market economy (Robertson, 2007).

Inclusion of stakeholder needs

Inclusion of the three key stakeholder groups (consumers, producers/marketers, and government and other agencies) is not consistent, with resources behind the label and 'ownership' (whether industry, government or NGOs) affecting the breadth and emphasis of stakeholder involvement. More industry-led labels (e.g. GECA) may suffer from lack of trust among consumers. Over two-thirds of participants in one survey (Lloyd, 2006) distrust information from large companies, and similar numbers agree that corporations have no morals or ethics. A 2005 European survey of consumer trust in delivery of eco-labels found identical results across all four countries polled (Norway, Spain, Germany and Italy): consumer or environmental organizations were ranked first, independent bodies were ranked second, while governments were ranked third and retailers were last (Gertz, 2005).

For producers and marketers as stakeholders, the choice to overtly market products through eco-labels seems as often fraught with danger as it is with opportunity. Potential 'tall poppy syndrome' effects of positioning a product as a green trailblazer and the complexity of environmental issues combine to question the efficacy and benefits of eco-label product claims. It could be expected that this risk would be heightened in the case of NGO-led labels. Nevertheless, there are successful examples; with the FSC, stakeholder engagement is central, and this may reflect the particularly contested nature of the sustainable forestry debate.

In contrast, government-run eco-labels tend to fare well in including all stakeholders in the process, particularly where schemes are mandatory. Success of these labels may also be assisted by the fact that consumers tend to expect a legislative/example setting from public authorities (Zaccaï, 2008). For this reason, a supportive role from governments and government-based agencies as stakeholders is critical in all eco-labels.

Uptake and acceptance

Green purchasing is a complex process, given the dynamic and diverse context of purchasing situations (Manzini *et al*., 2006), involving the interplay of price, awareness, trust, and the complexity and availability of information, not to mention product availability, social practices and habits, brand reputation and identity. Eco-label uptake and consumer/producer acceptance is also highly variable, with even well-funded labels sometimes struggling to achieve significant market penetration (e.g. EU Flower).

Many people view themselves as green consumers, but relatively few act consistently green, as evidenced by the low market share of environmentally preferable products and the observation that most voluntary labelled products are not market leaders (OECD, 2005; Pedersen and Neergaard, 2006). While there is awareness and willingness to buy eco-labelled products, price is an issue, and consumers also prioritize quality, while their purchases are often also guided by habit (Gallastegui, 2002). Other key factors include consumer satisfaction, values, identification and social pressure/consumer boycotts (Hemmelskamp and Brockman, 1997).

Where eco-labels suggest a 'niche' product with a price premium, consumers may wish to avoid being in the minority of 'payers' while the majority remain as free riders, getting cheap goods, with the consequences through increased environmental impacts affecting all. Environmental consumption is a particular manifestation of a perennial social issue – ensuring that individual behaviours that threaten the wellbeing of the social group are discouraged and those that promote the social good are encouraged (e.g. Gardner and Stern, 2002). However, differential penetration in different sectors for different schemes suggests that there are also other more complex factors which warrant further study. Some labels have 'followed the market', for example, developing B2B focus targeting professional purchasers rather than B2C (consumer-based) markets (e.g. ECP). Mandates or widespread publicity are factors in uptake, and particular problems affect poorly supported or poorly funded schemes (e.g. GECA).

Information overload for consumers is rife: In one study, 97% of those surveyed indicated that there 'was more stuff to read than I could ever dream of reading' and 92% indicated that they felt 'surrounded' by information (Lloyd, 2006). The increased number of voluntary eco-labels in the market place has resulted in consumer confusion between third-party certified and self-declared labels (OECD, 2008). Moreover, environmental consciousness does not automatically lead to environmentally friendly behaviour and environmental awareness does not always lead to changes in purchasing behaviour (Pedersen and Neergaard, 2006). Consumers may not connect specific environmental problems and appropriate purchasing behaviour. Different green consumers exist; some may be 'selectively green' and/or may be manipulated to purchase products which are not green because of imperfect information: Such issues may affect all eco-label initiatives.

Outcomes

The eco-labels concept suggests environmental sustainability through substituting purchases leading to more sustainable consumption. However, demonstrating that an eco-label has led to increased conservation of natural capital and intergenerational equity is complex given the range of variables at play. A qualitative review of the Blue Angel label and the lessons learned was published in 2002 (Muller, 2002), and a later study stated that a continuous reduction of negative environmental impacts (e.g. reduced CO_2 or nitrogen oxide emissions) paralleled the tightening of the Blue Angel criteria, although it added: 'However, in all cases, technological developments had taken place in parallel that made it difficult to quantify the ratio of improvement actually attributable to the label' (OECD, 2005, p. 17).

Modelling marginal changes arising from product substitution is rarely attempted and may not be possible. In general, eco-label applicant products do not require testing, as standards are designed to provide assurances about planning and implementation rather than absolute measurements of performance. While consumers often assume that the quality of the environment actually improves through the production and consumption of these products, this may be incorrect, and even marginal improvements through product substitution are questionable, since eco-labels do not generally require specific, systematic life cycle assessment of multi-criteria eco-label products. An extensive review of eco-labelling schemes found that 'the claim that eco-labels might guide consumers to more environmentally sound purchases is untenable' (Morris, 1997, p. 35).

Single criteria schemes such as WELS and MEPS are simpler to model marginal benefits for (although of course they are silent on 'total' environmental performance). As reported above, marginal reductions in energy use have been modelled successfully for labelled products (AGO, 2006). While these are encouraging, they do not capture the 'systemic' variables arising from social practice changes due to new technologies. New and different products change practices and possibilities of utilization in many and complex ways, and may lead to increased environmental impact through burden shifting, rebound effects or a myriad of other unintended outcomes.

Discussion: labels or legislation?

It is clear that eco-labels can affect consumer choice although it is less clear whether this leads to reduced environmental impacts. Qualitative differences exist between the eco-labels studied and this may affect their effectiveness given the following findings:
• Consumers are attracted to simple eco-labels because they provide for clear decision making, but simplicity can undermine efficacy of environmental claims;
• Criteria consistency and difficulty of making direct functional comparisons between products can operate against simplicity aims;
• Commercial independence and multi-stakeholder involvement are critical precursors to significant uptake;
• Self-funded voluntary eco-label schemes can suffer from poor/slow processes and resultant declines in reputation;
• Bureaucratic trans-national, institutional programmes can struggle to gain both industry and consumer support, while a poor reputation can plague lighter-footed private voluntary programmes;
• Mandatory labels generally enjoy broad recognition and support among consumers, and provide a 'level playing field' for producers.
It follows from this that there is no clear path to improved uptake for eco-labels. In some settings, consumers may recognize and act on eco-labels; in other settings, an eco-label symbol may be insufficient to convey required information. Government involvement in eco-labels generally improves uptake, and governments have also used other mechanisms such as procurement policies to support eco-label schemes.

However, eco-labels can only usefully form part of a sustainable consumption strategy, since they say little about consumption itself, and they essentially are limited to providing product infor-

mation. As Charter comments: 'Education and information campaigns to raise customer awareness, along with other instruments, should be used in conjunction with eco-labelling to ensure the effectiveness of the scheme' (Charter *et al.*, 2001, p. 675). Potential government interventions include; product bans and standards; binding extended producer responsibility; taxation, levies and subsidies to 'fix' externalities; incentive based programmes such as take-back schemes, deposit-refunds, innovation schemes, and accountability frameworks.

A wide range of social and behavioural research, from the socio-technical work of Shove and others (e.g. Shove, 2003) to the more behavioural based work of Mackenzie-Mohr and others (e.g. McKenzie-Mohr and Smith, 1999) indicates that information or understanding is insufficient on its own to drive changes in behaviour or practice. Much consumption takes place around social practices which are not centred on conspicuous consumption, but around practice norms. In this context, a shopping trip is as likely to be a hurried affair, where different symbols from competing eco-labels promote guilt, powerlessness, confusion and suspicion, as it is to be an opportunity to reflect on one's opportunities to make tangible contributions to sustainable consumption through buying specific eco-labelled products. In such circumstances, changes in norms and habits of purchasing and consumption may not result automatically from a 'niche' eco-label which applies to only a small group of products.

Tackling consumption practices must involve consumers rather than simply presenting product information to them. Policies and initiatives targeting consumer policy are likely to fail if they do not involve consumers in co-managed solutions to consumption problems (e.g. Kramer, 1993). Eco-labels can only succeed as part of a causal-linked strategy rather than a symptom-based 'solution'; 'policies to promote sustainable consumption are successful only when technological development, economic structures, and information are all in accordance with each other, and this is the case only when sustainable consumption does not conflict with economic growth' (Christensen *et al.*, 2007, p. 91). As Jackson (2006) points out, modern liberal society is bound up with the notion of freedom of choice over consumption and governments interfere with such choices at their peril, yet the need to make deep cuts in greenhouse gas emissions beyond those achievable through resource efficiency means new interventions are appropriate.

The rhetoric of consumer sovereignty is not useful here; governments are co-creators of cultures of consumption and, in the context of routes to sustainable consumption, the question is whether information (in the form of eco-labels) is enough, or whether legislative/other means are warranted – the evidence from this review is clearly that eco-labels are not enough. This suggests fundamental reframing of how the need for information and choice are constituted in a consumer society.

Conclusion

The adoption of eco-labels is seen variously as an opportunity for increased sales through product differentiation, increased accountability, or increased choice for consumers in a greening retail environment. The reality often is too many products, too much information, too little time, and a paucity of independent, accessible, readily accessible and understandable information about environmental performance.

The analysis suggests that regulated or government-sponsored labels are generally favoured over others. However, a wider, socially realistic response is required, which incorporates the role of environmental information such as eco-labels into the wider spectrum of social and behavioural phenomena. The contribution of current eco-labels to sustainable consumption is unknown, although in some circumstances the most environmentally sustainable option is no purchase at all, and in this case there is nowhere to place the label. It is critical that a wider frame is set for the development of eco-labels in the future, and it is encouraging that a principle applied by the Nordic Swan label for the selection of new product groups is to evaluate whether a certain product is even necessary and hence should be avoided altogether.

Eco-labels are not enough, and the role of government in both legislation setting and strategy and goal setting is critical. In this context, the language of co-management of sustainable consumption is now becoming more prevalent, for example, in the endearing title of the UK Sustainable Consumption Roundtable publication 'I will if you will' (SCR, 2006). To realize sustainable consumption, the political importance attached to key 20th-century indicators of 'progress' such as GDP will need to change as part of a specific transition, which will result from a set of linked, intentional efforts and actions undertaken through shared responsibility: 'Transition . . . is a matter of long breath, far longer than the typical cabinet period, which in itself may already constitute a serious barrier to carry it out. This poses the challenge of developing robust long-term policies that are relatively unsusceptible to whimsical political winds' (Elzen and Wieczorek, 2005, p. 660). The success of the eco-label experiment in contributing meaningfully to sustainable consumption is tied closely to the strength, speed and direction of this wider transition.

Acknowledgements

References

AGO (2006) *Program Evaluation in Australia, Department of Environment and Heritage*. Commonwealth of Australia, [WWW document]. URL http://www.energyrating.gov.au/gfk.html (accessed on 13 February 2009).

Artcraft Research (2005) *Appliance Performance Labelling in Australia and New Zealand*, E3, Manuka, ACT.

Baker, J.A. & Miner, K.J. (1993) Corporate environmentalism. *Journal of Environmental Health*, **56**, 25–27.

Charter, M., Young, A., Kielkiewicz-Young, A. & Beluane, I. (2001) Integrated Product Policy (IPP) and Eco-Product Development (EPD). In *Sustainable Solutions, Developing Products and Services for the Future* (ed. by M. Charter & U. Tischner), pp. 98–117. Greenleaf Publishing, Sheffield.

Christensen, T.H., Godskesen, M., Gram-Hanssen, K., Quitzau, M. & RØpke, I. (2007) Greening the Danes? Experience with consumption and environment policies. *Journal of Consumer Policy*, **30**, 91–116.

European Commission (2007) *Eco-label Flower week 2006*, Special Eurobarometer 275/Wave 66.3 – TNS Opinion & Social.

D'Souza, C., Taghian, M., Lamb, P.O. & Peretiatko, R. (2007) Green decisions: demographics and consumer understanding of environmental labels. *International Journal of Consumer Studies*, **31**, 371–376.

Eden, S. (1994) Business, trust and environmental information: perceptions from consumers and retailers. *Business Strategy and the Environment*, **3**, 1–9.

Elzen, B. & Wieczorek, A. (2005) Transitions towards sustainability through system innovation. *Technological Forecasting & Social Change*, **72**, 651–661.

Erskine, C. & Collins, L. (1997) Eco-labelling: success or failure? *The Environmentalist*, **17**, 125–133.

Gallastegui, I.G. (2002) The use of eco-labels: a review of the literature. *European Environment*, **12**, 316–331.

Gardner, G. & Stern, P. (2002) *Environmental Problems and Human Behaviour*, 2nd edn. Pearson, Boston, MA

Gertz, R. (2005) Eco-labelling – a case for deregulation. *Law, Probability and Risk*, **4**, 127–141.

Gulbrandsen, L.H. (2006) creating markets for eco-labelling: are consumers insignificant? *International Journal of Consumer Studies*, **30**, 477–489.

Hale, M. (1996) Ecolabelling and cleaner production: principles, problems, education and training in relation to adoption of environmentally sound production processes. *Journal of Cleaner Production*, **4**, 85–95.

Hemmelskamp, J. & Brockman, K. (1997) Environmental labels: the German 'Blue Angel'. *Futures*, **29**, 67–76.

ISO (1999a) *International Standard 14024: Environmental Labels and Declarations. Type I Environmental Labelling Principles and Procedures*. International Standards Organisation, Geneva.

ISO (1999b) *International Standard 14021: Environmental Labels and Declarations. Self-declared Environmental Claims: Type II Environmental Labelling*. International Standards Organisation, Geneva.

ISO (2000) *Environmental Labels and Declarations. Type III Environmental Declarations (ISO/TR 14025)*. International Standards Organisation, Geneva.

Institut für ökologische Wirtschaftsförderung (IOW) (1999) *The European Eco-label in Germany. Development of Recommendations for Action to Increase Acceptance*. Federal Environmental Agency, Wuppertal.

Jackson, T. (2006) Challenges for sustainable consumption policy. In *The Earthscan Reader in Sustainable Consumption* (ed. by T. Jackson), pp. 109–126. Earthscan, London.

Jordan, A., Wurzel, R., Zito, A. & Brückner, L. (2003) Consumer responsibility-taking and national eco-labeling schemes in Europe. In *Politics, Products and Markets: Exploring Political Consumerism* (ed. by M. Micheletti, A. Follesdal & D. Stolle), pp. 161–180. Transaction Publishers, Somerset, NJ.

Kramer, L. (1993) On the interrelation between consumer and environmental policies in the European Community. *Journal of Consumer Policy*, **16**, 455–467.

Leire, C. & Thidell, A. (2005) Product-related environmental information to guide consumer purchases – a review and analysis of research on perceptions, understanding and use among Nordic customers. *Journal of Cleaner Production*, **13**, 1061–1070.

Lloyd, S. (2006) Future shock. *Business Review Weekly*, 4 May, 38.

Manzini, R., Noci, G., Massimiliano, O. & Pizzurno, E. (2006) Assessing environmental product declaration opportunities: a reference framework. *Business Strategy and the Environment*, **15**, 118–134.

McKenzie-Mohr, D. & Smith, W. (1999) *Fostering Sustainable Behaviour. An Introduction to Community Based Social Marketing*. New Society Publishers, Gabriola Island, BC.

Morris, J. (1997) *Green Goods? Consumers, Product Labels and the Environment*. IEA, London.

Muller, E. (2002) *Environmental Labelling, Innovation and the Toolbox of Environmental Policy – Lessons Learned from the German Blue Angel Program.* Federation of German Consumer Organisations, Berlin.

OECD (2005) *Effects of Eco-labelling Schemes: Compilation of Recent Studies*, COM/ENV/TD(2004)34/FINAL. Organisation for Economic Co-operation and Development, Paris.

OECD (2008) *Promoting Sustainable Consumption.* Organisation for Economic Co-operation and Development, Paris. [WWW document]. URL http://www.oecd.org/publishing/corrigenda (accessed on 3 December 2008).

Pedersen, E.R. & Neergaard, P. (2006) Caveat emptor – let the buyer beware! Environmental labelling and the limitations of green consumerism. *Business Strategy and the Environment*, **15**, 15–29.

Robertson, P.E. (2007) Global resources and eco-labels: a neutrality result. *Review of International Economics*, **15**, 735–743.

UNEP (2005) The trade and environmental effects of ecolabels: assessment and response. *United Nations Environment Program*. UNEP, Paris.

Rubik, F. & Frankl, P. (eds) (2005) *The Future of Eco-labelling: making Environmental Product Information Systems Effective*. Greenleaf Publishing, Sheffield.

SCR (2006) I will if you will: towards sustainable consumption. *Sustainable Consumption Roundtable* (ed. by G. Stevenson & B. Keehn), p. 78. Sustainable Development Commission, National Consumer Council, London. ISBN 1 899581790.

Shove, E. (2003) Users, technologies and expectations of comfort, cleanliness and convenience. *Innovation*, **16**, 193–206.

UNEP (2002) *Background Paper for the Ministerial Level Consultations: Promoting Sustainable Consumption and Production Patterns*, UNEP/GC.22/8/Add.2, Governing Council of the United Nations Environment Program, Nairobi.

US EPA (1994) *Determinants of Effectiveness for Environmental Certification and Labelling Programs*. US EPA, Washington DC.

Zaccaï, E. (2008) Assessing the role of consumers in sustainable product policies. *Environment, Development and Sustainability*, **10**, 51–67.