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Appendix A. Literature Review

Final Report for Defra Project FO0419

Effective approaches to environmental labelling of food products

Agriculture and Environment Research Unit
Science and Technology Research Institute
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Food Ethics Council

Policy Studies Institute

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Contents

List of Tables

List of Figures

Executive summary

Introduction

In response to a number of policy drivers, Defra wish to explore the practicality and effectiveness of environmental labelling of food as a mechanism to promote behavioural change in order to reduce the negative environmental impacts of food production and consumption. There is also the need to compare different labelling formats and to investigate the potential burden that introducing such a label would have on industry including food producers and exporters.

This document is the first of several key outputs of Defra project FO0419: "Effective approaches to environmental labelling of food products". It reviews over 210 published documents addressing various aspects of eco-labelling and provides information on over 65 different eco-labels for both food and non-food products. The document examines the different labels types, their role in the delivering policy objectives, modifying consumer and industry behaviour and patterns of consumption. It also summarises other ongoing global initiatives and developments.

Key findings

- The review has shown that interest regarding environmental labelling is very considerable worldwide. However, the focus on food eco-labelling is relatively small, especially with respect to the communication of multiple environmental issues. The lack of food eco-labels is due to a number of factors including the diversity of food products and production systems; the complexities of quantifying environmental impacts and issues related to communicating environmental information to consumers.

- Despite the many technical and scientific hurdles to overcome many countries are now seriously looking at the potential of food eco-labels including the United States, France, Japan, Sweden and Canada.

- Little sound scientific evidence has been published linking eco-labels and environmental improvements. This is not to say that eco-labels do not deliver environmental benefits but is simply a reflection of the technical difficulties differentiating the influence of eco-labels amongst the many other drivers such as regulation, economics and other market influences.

- Eco-labels are widely used for delivering policy as part of the Producer Responsibility concept, whereby they act as a driver for encouraging manufacturers to improve their environmental performance. However, they are a soft policy instrument as they rely on moral and ethical arguments to persuade organisations to engage and consumers to change their purchasing habits. Whilst there may be financial benefits to the manufacturer these are often off-set by costs incurred.

- To be effective policy tools, eco-labels should be based on standards that are transparent and public. They must effectively demonstrate significant environmental differences between labelled and unlabelled products and market penetration is required to ensure consumer awareness.

- Research suggests that the two main factors influencing the success of an eco-label are consumer awareness and brand/product trust. However, awareness may not be sufficient to change consumer choice as other factors such as price will affect purchasing decisions.

Consumers may pay more but only up to a point. Whilst an eco-label may help consumers trust a particular product, trust (potentially mis-placed) may also arise from clever marketing and Public Relations.

- One of the primary routes used to influence consumer behaviour is the provision of information (for example via product labels, packaging, marketing, etc.). However, research has shown that consumers rarely make use of the information provided. Labels are often not read unless the consumer sees a perceived benefit (e.g. consumers may seek low salt or low fat products in support of a specific dietary regime).

- The three main factors influencing consumer decisions are: price, marketing and availability. However, purchasing habits are not simply about sustenance and nutrition but are also related to product recognition, presentation, personal emotions/mood, habits and trust/brand loyalty, moral, social and cultural standards, shopping time and the shopping environment.

- It is clear from the review that the links between food and environment are not appreciated or understood by many consumers. Currently eco-labelling will only appeal to a small proportion of consumers.

- The main environmental benefits will come from influencing change within the supply chain. Evidence does show that many manufacturers react positively to such policy initiatives. However, there is a sensitive balance between the benefits to the manufacturer (such as price premiums, increased market share, competitive advantage, improved public/brand image, risk mitigation etc.) and the costs of implementation (such as scheme fees, administration, data production and handling, label and packaging costs, consumer support).

- Unrecovered costs will be passed to the consumer. Benefits to the manufacturer will depend upon consumer's willingness to pay the premiums and there is no guarantee costs will be recovered.

- Industry also has concerns regarding market saturation with labels as this may cause consumer lethargy and dilute their impact. There are also difficulties regarding the variability in standards across labels. Other concerns address the potential impact on international trade and on the sustainability of developing nations.

- In the UK, the vast majority of food 'eco-labels' that are currently available utilise practice-based standards (e.g. organic, LEAF Marque) and do not quantify emissions or impacts. They are not based on a Life Cycle Approach. This practice-based approach relies on their being sound scientific links between on-farm best practice and environmental benefits. This is not wholly satisfactory as such links are often vague and depend on the specific producer and the specific production site. As such these labels do not infer that any environmental benefits have been realised. This approach has been adopted due to the multiple scientific and technical problems to overcome and for reasons of cost and practicality. However some countries are now looking to move forward. The most scientifically advanced approach is that currently being piloted in the United States – Earthsure.

- The Earthsure eco-label is product and producer specific. The approach has been developed for the whole supply chain including on-farm production, transport, processing etc. Each supply chain component develops its own Environmental Product Declaration (EPD) which declares its actual environmental impact data. The specific data required depends on the component type (i.e. the Product Group) and Product Category Rules specific to that Product Group. A serial

number system for each EPD links to the Earthsure website where consumers and stakeholders can obtain detailed information. Data is presented on the label in a simplified indicator format so that consumers can better understand the information but actual impact measurements can be found on the website. Judgements on the impact data are not made; that is left to the consumer. The Earthsure system uses a comprehensive LCA approach and is probably as scientifically credible as is currently possible. However, it has its weaknesses. Due to the variability in farm production systems and issues of rotation and seasonality it can takes up to 3 years to obtain data for the on-farm EPDs. There are few standard metrics for many of the environmental impact parameters and so the system is constantly evolving and in a state of flux and it is also difficult gaining scientific consensus on the best approaches.

Food for thought

- The proliferation of existing labels has resulted in a drive for greater harmonisation and normalisation between eco-labels to help reduce confusion both within industry and by consumers. As such, any new schemes or frameworks may need to examine how they fit in relation to other schemes to ensure they are harmonised.

- A crucial point is the credibility and transparency of an eco-label. Many of the schemes reviewed are underpinned by a Life Cycle Assessment or by practice-based measures. From published literature one may conclude that the underlying techniques are robust and well established. In reality the methods are far from perfect and, in some instances, may not be very robust. Additionally, with respect to some impact areas, adequate assessment techniques do not exist and consequently such impacts are excluded from the scheme and thus not reflected in the eco-label. This is a critical issue, as the absence of any significant impacts from a label could not only be misleading to consumers but could also externalise that impact from the market thus requiring Government intervention to address it.

1.0. Introduction

1.1. Background

The environmental impacts of food production are complex and have been widely studied (Petchey *et al*., 1995; Skinner *et al*., 1997; Girardin *et al*., 2000; Withers and Lord, 2002; Defra, 2003a; Pretty *et al*., 2000; Pretty *et al*., 2005; Roy *et al*., 2008; Schau and Fet, 2008; Watkiss, 2009). Impacts accumulate throughout a production chain from primary production, processing, packing, distribution, retail to end use (consumption). Agricultural activities consume and utilise materials and energy like any other production process, but farming systems are part of a living landscape, indeed they are agro-ecosystems, and as such these systems are multi-functional in terms of the goods and services they provide. The production of food, fibre, oils and biomass are only some of the functions of farming. It also provides a habitat for biodiversity, a buffer and filter for pollutants and aims to meet the demands of society in terms of desirable landscapes and minimal environmental impact. The potential environmental effects are numerous and can have a range of direct and indirect impacts, both positive and negative. As produce leaves the farm gate it is subject to processing, packing and transport, each of which has the potential for further impacts, be it consumption of fossil fuels and greenhouse gas emissions, the use of water or the production of waste. The product is then distributed for retail upon where it is purchased and consumed, again incurring further impacts.

In an effort to evolve towards more sustainable patterns of production and consumption, it is important to understand the mechanisms of change (Defra, 2005). With respect to production systems, there are two key drivers. Firstly, there are market drivers, such as retail marketing and consumer demand and, secondly, there are legislative instruments that regulate production. Operating within both of these are societal goals and aspirations. For example, consumers may demand higher standards of animal welfare, worker welfare and better environmental protection and the industry may respond to this demand. The alternative driver is for regulations to be imposed to try to achieve these goals. Such regulations are usually imposed when the market fails to deliver the desired standards. This is a process of internalisation, where costs (such as environmental impacts) that have been externalised by the market are internalised into the production system via regulatory intervention, be that financial incentives to comply with standards or through penalties due to non-compliance, the proverbial 'carrot and stick' (Baylis *et al*., 2008; Pretty *et al*., 2000; Pretty *et al*., 2001).

One driver for change that has received attention in recent years is the use of product labels (Forbes *et al*., 2009; Houe and Grabot, 2009; Limnios *et al*., 2009). Attempts to label products, including food, as 'green' are not new. There are, and have been, various schemes to promote food products as environmentally friendly, wildlife friendly, organic, Fairtrade, carbon neutral, energy efficient, etc. (Lewis *et al*., 2008; Tzilivakis *et al*., 2007). Some have been more successful than others with respect to their market penetration but all suffer from problems with respect to what they actually mean and/or the limited extent of the issues covered. As a consequence the interest in labels has now shifted towards what have been termed omni-labels or omni-standards (Lang, 2008), which aim to be single easy to understand labels that integrate various environmental impacts. An example of a potential label of this kind has already been developed by Sustain (2007), utilising an approach based on a radar or 'spider' diagram, developed into 'flower petals' that can then be colour coded in a similar way to the traffic light system used by the Food Standards Agency (FSA) for nutritional information (FSA, 2007). See also Section 6.9.1.

The science and practice of using labels to drive changes in consumer behaviour is complex. Evidence from non-food labelling (e.g. the EU energy label) and other types of food labels (White *et*

al., 2009; Malam *et al*., 2009; PSI, 2009) suggests that many people do not read product labels or find them confusing, while people that do use labels do so only when they perceive a personal benefit from doing so (Jackson and Snowdon, 1999). This means that people are only likely to use environmental labels if they are interested in some aspect of the production or the environmental impact of the food (PSI, 2009). This is not to say everyone that buys products with certain labels will be motivated by environmental concerns; some people may, for example, choose organic because they believe there are health benefits. What it does highlight however is that consumer responses to environmental labels will vary across different consumer groups.

Accurately assessing the impact of labelling on consumer behaviour is also problematic. Previous research, for example the FSA's recent report into 'Front of Pack' (FOP) labels (Malam *et al*., 2009), has found self-reported use of labels (i.e. what people say they do) is higher than observed use by consumers in a retail setting (i.e. what people actually do). This reflects the fact that food is bought habitually and often automatically, and that food purchase decisions are heavily influenced by external influences in the purchasing environment (e.g. special offers, other packaging information, price, brand recognition etc.). When people claim to use labels when shopping, this may be a result of a post-hoc rationalisation of behaviour rather than the recognition of the actual factors that influence consumer choice.

In response to a number of policy drivers (CIAA, 2009; EC, 2009; House of Commons, 2009a & 2009b), Defra wish to explore the practicality and effectiveness of environmental labelling of food as a mechanism to promote behavioural change in order to reduce the negative environmental impacts of food production and consumption. There is also the need to compare the pros and cons of different labelling formats, including omni-labels, and to investigate the potential burden (in particular the costs) that introducing such a label would have on industry including food producers and exporters. This document is the main output of Approach 1 of project FO0419. It reviews the available published literature on environmental labels to date and identifies a range of existing eco-labels, on both food and non-food products. This includes examining the different types of labels that exist, their role in the context of consumer and industry behaviour and patterns of consumption and other ongoing global initiatives and developments.

1.2. The scientific basis of an environmental label for food

It is essential that any environmental label is credible and robust (Carbon Trust, 2008; Defra, 2003b). This is important not only for consumer confidence in the label, but also to ensure that the production chain is driven in a sustainable direction. If the evidence underpinning a label is incorrect or the labelling system itself is flawed, this could result in an incorrect perception of the environmental impact of a product. Consequently this can mislead consumers and producers to the extent that either the label becomes meaningless or environmental issues are not properly addressed. Consequently the science and data and information management framework that underpins any labelling scheme needs to be scrutinised to understand its strengths and weaknesses. A critique of the scientific and assessment frameworks forms the bulk of the work undertaken in Approach 2 of project FO0419 and this will be reported upon separately. However, a summary of some of the key issues that have arisen in this work to date is presented here to provide additional context and material in support of the literature review.

There have probably been as many different frameworks for environmental impact assessment as there have been environmental impact studies. The nature and complexity of the environment often means that every study has its own idiosyncrasies in order capture and reflect the impacts either observed or modelled. However, over the years some common frameworks, indicators and measures have emerged to help assess and characterise environmental impacts in a more consistent

manner. In the context of assessing the environmental impacts of a product, the most notable framework that has emerged is Life Cycle Assessment (LCA), whereby the impacts that arise from the production, use and disposal (cradle to grave) of a product are allocated to that product on a functional unit basis, e.g. per tonne. The LCA framework provides an overview of where in the chain from cradle to grave the most significant impacts are being incurred and thus which parts should be changed to bring about the greatest reduction in impact. It also provides a structure whereby two or more products (or production chains) can be compared and thus the one that has the better profile with respect to the impacts that arise can be identified. However, although LCA provides a holistic, overarching and consistent framework, some of the techniques used within the LCA are not well established and/or are inconsistent. This is particularly the case with respect to impact characterisation, where despite efforts to gain greater consensus on the approaches taken (e.g. Hauschild *et al*., 2008) there remains a number of areas where inconsistencies arise, different approaches are taken and thus uncertainty remains.

Some impact categories within LCA (and also used outside LCA) are well established. The emission of greenhouse gases (GHGs) and the calculation of Global Warming Potential (GWP) (carbon dioxide equivalents), is one example. Climate change is high up the political agenda and so it is no surprise that the interest in carbon labelling has increased in recent years, but this interest has also been aided by the fact that the techniques to assess emissions of 'carbon' embedded in products are well established. Although well established, this does not mean there are no uncertainties. For example, the calculation of GWP is based on radiative forcing of a gas relative to carbon dioxide over a specific time horizon (e.g. 100 years), and consequently there are some uncertainties attached to this. For example, it is difficult to predict the lifetime of a gas that is highly reactive to other gases in the atmosphere, because the gas's lifetime is likely to be hard to quantify and have a changing lifetime, over the time period of measurement. Also, because our measurement tools are imprecise, it is difficult to measure the composition of the atmosphere accurately as it changes. Finally, as substances interact and change in the atmosphere, their ability to absorb outgoing radiation can also change. As a result, its ability to absorb outgoing infrared radiation may also change over time. Taking a wider perspective, some activities can also sequester carbon, e.g. absorbing carbon dioxide into soil and plant matter, removing it from the atmosphere and thus potentially offsetting any GHG emissions. Such processes could be potentially significant in the context of food production. However, the processes involved with carbon sequestration can be more uncertain than emissions calculations. Additionally, frameworks such as PAS 2050 (BSI, 2008) state that emissions offset mechanisms should not be used in the life cycle of the product in order to claim reduction in the emissions associated with the product. The reason for this so that the PAS reflects the GHG intensity of the production process prior to any offset.

The issue of greenhouse gas emissions and carbon is one of the simpler more well established impact categories that could be potentially used within the context of an environmental label for food. It is however just a single issue and with respect to the impacts of food production and consumption and in relation to omni-labelling, there are more impact areas to consider many of which are not so well established and also contain significant areas of uncertainty. The impact areas include:

- Air quality
- Biodiversity
- Climate change
- Landscape and heritage
- Noise
- Odour
- Resource use
- Soil quality
- Stratospheric ozone depletion
- Waste and recycling
- Water quality

Each of these impact areas are currently being reviewed and analysed as part of Approach 2 of project FO0419 and this will be reported upon separately. However, it is important to acknowledge that in many of these areas there are sub-impacts. Indeed, an important process in any environmental assessment is the aggregation of information and data. Environmental assessments inherently involve large amounts of data. This needs to be analysed, assessed and presented in a form to aid the original purpose of the assessment, which is usually to support decision making in one form or another. This typically involves taking all the information and data associated with the environmental effects of a product over its lifecycle and then through a process of analysis and aggregation distilling the findings into a small set of impact areas or categories. Given the complexities and amount of data involved, it is important to maintain transparency in any environmental assessment. There needs to be clear distinctions between different phases in an assessment and there needs to be a clear understanding of the effects of aggregation, especially for communication purposes, and any uncertainty that this introduces.

Part of this process involves understanding and acknowledging the chain of linkages between causes and end impacts. This is often expressed using different terminology in different disciplines for example source-pathway-receptor (DETR, 2000; Environment Agency, 2004), stressors-midpoints-endpoints-damages (Bare and Gloria, 2008) or activity-effect-outcome (Tzilivakis *et al*., 2009). There is a hierarchy of impact areas, impact categories and indicators and measures – a pyramid whereby information and data are collected, analysed and aggregated. In the context of an eco-label the impact areas are what is likely to be displayed and not necessarily individual impact categories. For example, photo-oxidant formation (an impact category commonly used in LCA) may fall under the air quality on an environmental label, rather than be presented on its own. Similarly, in many instances, impact categories will have sub-impacts or indicators. For example, under climate change there are greenhouse gas (GHG) emissions and carbon sequestration, and under GHGs there are specific emissions of CO_2, N_2O and CH_4, each of which can be used as a means of judging impact, but which are combined under the heading of climate change. It is also important to acknowledge that some commonly recognised impact categories are probably midpoints (using LCA terminology) rather than actual endpoint impacts. For example, there are many consequences of climate change including impacts on biodiversity, agricultural production and human health, but emissions of greenhouse gases is generally used as the measure of assessing impact.

Different impact assessment techniques and approaches have their own steps and phases. However, generally, any impact assessment process can split into the following sections or stages:

1. Stressors: These are the actual recorded, observed, calculated or modelled effects associated, in this instance, with the full life-cycle of a food product. They can include quantitative data such emissions of pollutants and toxic substances, which would form part of the inventory phase of an LCA (LCI results), but can also include qualitative information.
2. Effects or mid-point impact categories: These are identifiable, and usually quantifiable, effects associated with the measurements (from stage 1) and usually involve some aggregation. For example, converting emissions of different greenhouse gases into a common measure of Global Warming Potential (GWP) using carbon dioxide equivalents. This is often referred to as a process of impact characterisation.
3. Damage or endpoint impact categories: These are the end consequences of the effects identified in stage 2 and this process aims to place the effect on a scale of damage caused, for example in terms of biodiversity this might be the Potentially Disappeared Fraction of a species or group of species as a consequence of an ecotoxicity effect identified in stage 2, due to an emission of a toxic substance identified in stage 1. This process may involve some further aggregation, for example combining all biodiversity impacts in stage 2 (e.g. ecotoxicity, eutrophication,

acidification, etc.) in a single damage category of ecosystem health. This is often referred to damage characterisation.

4. Normalisation: This stage aims to place the impacts in context with respect to the contribution that the impact of the product has in relation to the entire impact being observed. Normalisation can be applied to the outputs of either stage 2 or 3. For example, emissions of greenhouse gases for a product could be compared to the total emissions of greenhouse gases for a region, e.g. Europe, and/or can be further normalised by examining this data on a per head of population basis - so in terms of a food product its GWP could be expressed as a percentage of the total GWP for an average person in Europe per year.

Many environmental assessments do not go beyond stage 2. This is because there are inherent difficulties associated with damage characterisation and normalisation (Bare *et al*., 2000; Jolliet *et al*., 2004; Pennington *et al*., 2004; Sleeswijk *et al*., 2008; UNEP, 2003). There is a lack of established techniques and data which in combination with additional aggregation can make the assessment less transparent and more uncertain. However, being able to place any impacts in context, e.g. with meaningful baselines, and communicating those impacts, are important aspects within the context of an environmental label for food, so they need to be considered with respect to how environmental impacts are communicated.

2.0. Environmental labels: Types, performance and policy context

2.1. Methodologies and classifications

2.1.1. What is an environmental or eco-label?

The title of this project refers to environmental labelling and this is commonly shortened to eco-labelling. These terms are used interchangeably within this report, but they mean the same thing.

An eco-label is a legally protected image that certifies that the product or service displaying that image complies with certain pre-defined environmental (and sometimes human health and social) criteria. It makes a positive statement about the product or service, acts as a reward for environmental leadership and an industry driver for improvements. Eco-labels enable those products with the least environmental impact to be distinguished from other similar products.

The International Standards Organisation (ISO), as part of its ISO 14000 series of environmental standards, has classified environmental labels into three typologies – Type I, II and III and has also specified the preferential principles and procedures for each. However, there are other types of label that are hybrids of these and those that do not fall easily into the ISO classification system. For these types of labels no ISO guidelines exist. For example, those labels often used on food products are not LCA-based but practice-based (identified herein as Type IV). However they are granted by a third party certification agency that refers to a specific environmental or sometimes ethical / social characteristic of the product, e.g. certified organic cotton, dolphin-safe tuna fishing or sustainable forestry.

In some instances companies are required by law to provide certain information on product labels that may relate to health, safety or the environment. For example hazardous substances must be labelled accordingly and energy / fuel consumption information must also be provided on certain products. These types of label are usually a Type II or Type III and are mandatory.

2.1.2. Type I: LCA Eco-labels (DIN EN ISO 14024)

Type I labels are normally voluntary, multi-criteria based, third party verified schemes that award a licence to use the scheme label/logo for specific products or services that meet prescribed standards based on a life cycle assessment approach including, for example, energy and water consumption, emissions, disposal, etc. The standards and scheme criteria are usually developed through the involvement of stakeholders and awarded after an independent process of verification. Examples of Type I eco-labels include the Dutch Stichting Milieukeur and the EU Eco-label.

The development of Type I labels tend to follow a similar strategy:

1. Product groups are selected for labelling. A product group consists of similar products or services (e.g. paints, varnishes and lacquers or shower gels, bath foams and shampoos) where it can reasonably be expected that their environmental impacts will be broadly similar. Generally only those product groups where there is sufficient scope for environmental improvement are selected to enable them to stand apart from others in the market place.
2. Within each product group a set of criteria is established that must be complied with in order for a product to be approved to use the label. These criteria are based upon the product life cycle (cradle to grave) and will include stages similar to those shown in Figure 2.1 below. This analytical process identifies the environmental impacts throughout the product's life cycle and

makes decisions regarding their significance. The types of impacts considered include depletion of non-renewable resources, energy (including climate change) and water usage, polluting emissions, waste generation, implications for air, water and soil quality, effects on biodiversity and their habitats and impacts on human health. This information is then used to establish baseline criteria, which is the minimum standard products and services within that product category must reach before the label may be used. Whilst the process is similar across schemes the impacts identified as significant and the criteria used may differ significantly. In the majority of schemes the criteria is finalised after consultation with scientists, industry and consumer groups.

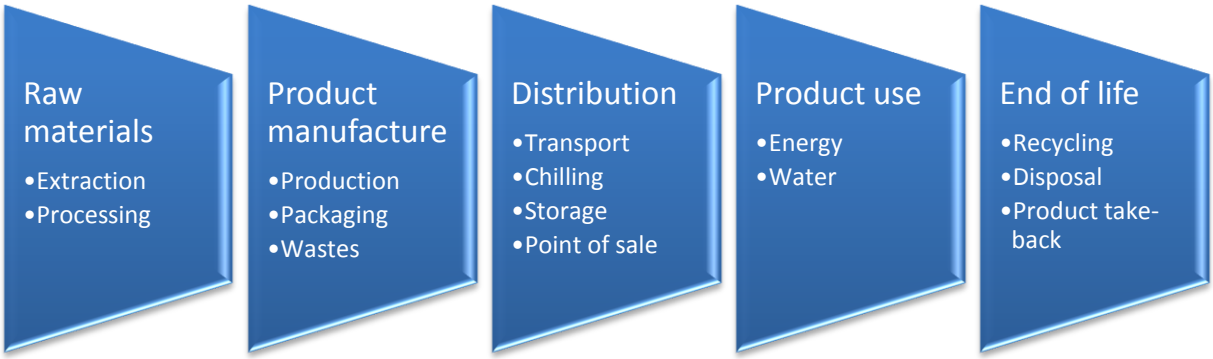


Figure 2.1: Typical Life Cycle Stages

3. Manufacturers and service providers are then invited to apply for the label by submitting evidence that their product meets the established product group criteria. How this evidence is handled varies from scheme to scheme. Some use independent third parties to audit the company and verify the data. Some ask the applicant to submit samples to independent third party laboratories and then accept the results as evidence. Yet others do not verify as standard but accept an organisations' evidence as valid and then carry out spot checks and unannounced random site audits. Companies found to have been dishonest face stringent penalties and/or prosecution.
4. When a product is found to comply with the product group criteria a licence is given to the manufacturer or service provider for a fixed period (1-3 years typically). During this time criteria may be revised and the licensee may need to prove that they continue to meet the necessary standard. Fees are charged for the application process and annually thereafter. Annual fees are often a percentage of annual turnover. Some schemes also make additional charges for auditing and testing.

2.1.3. Type II: Self-declared environmental claims (DIN EN ISO 14021)

This type of label is the most widely used to provide environmental information to consumers and other stakeholders. According to the official ISO definition, they are not awarded or verified by an independent authority but usually developed internally by companies and tend to take the form of a declaration, a logo, a commercial, etc. For example: 'made from x% Recycled materials', 'Biodegradable', 'Recyclable' or 'Free from chlorine'.

There have been many concerns about this type of label as some investigations have shown that claims can be vague, misleading and sometimes untrue. Some industries have developed voluntary codes of practice regarding this type of labelling. Whilst label information of this type may not be malicious and may be well intentioned, in the absence of independent checks for compliance there is no way the consumer can identify if the manufacturer has abided by such codes. This is known as 'greenwashing' and can lead to consumers mistrusting labels in general.

2.1.4. Type III: Environmental impact labels (DIN EN ISO 14025)

Type III labels are one of the most detailed forms of providing environmental information and like Type I are based on life cycle impacts. These types of labels are product specific and do not normally assess or weight the environmental performance of the products they describe but only the raw data, such as the quantity of emissions, is provided. Their evaluation is left to the consumer. Many of the carbon labels fall into this category whereby the amount of CO_2 eq. emitted (as g/unit) is provided on the label. Other examples include the Earthsure label currently being piloted in the USA (see section 5.3.2) and the carbon Reduction label launched by the Carbon Trust Footprinting company (see section 5.3.3).

The approach used in Type III labels involves the development of Product Category Rules (PCR), which are developed for each functional unit in a supply chain based on a life cycle approach. PCR's are owned by the labelling scheme.

Figure 2.2 shows the type and range of functional units that might occur in a food supply chain, but there are others including energy and fuel suppliers, fertiliser and pesticide suppliers, suppliers of packaging, etc.

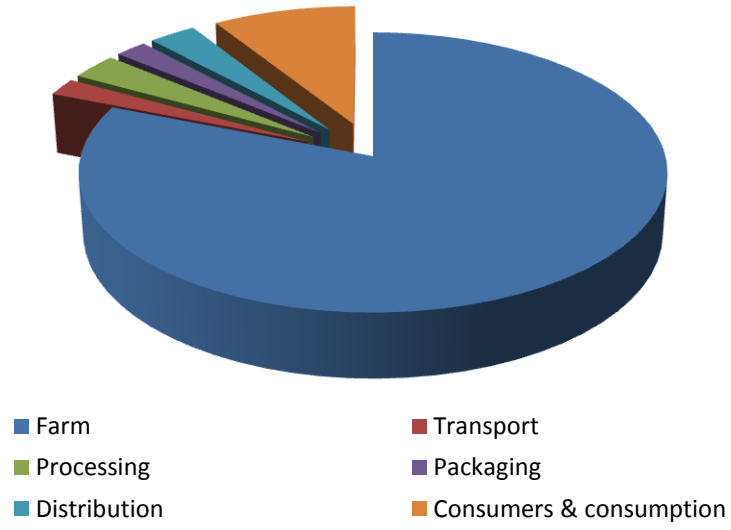


Figure 2.2: Example of functional units in a food supply chain (theoretical)

Environmental Product Declarations (EPDs) are then developed by individual companies to provide the data and information specified in the PCR. This approach does not make judgement on whether or not a product is environmental preferable or allow products to be compared easily. It simply discloses environmental information (Karlson and Imrell, 2003). However, an actual interpretation of the environmental credentials of the product cannot be made without a comparative baseline. Consequently, a variation of this type of label is sometimes used and is known as a 'Type III Comparative label'. Given any particular product these types of labels seek to provide clear information allowing the performance of that product to be compared with other similar products and so can act as benchmarks of excellence (de Boer, 2003). Some of the energy efficiency labels fall into this category where by efficiency categories have been devised.

2.1.5. Type IV: Environmental Impact labels (No ISO standard)

Type IV labels go beyond the ISO Type II definition and do undergo a form of independent verification by a third party but do not rely on a life cycle assessment approach or actual measurements. These labels are generally based on a set of 'best practice' criteria or standards that are used to differentiate the product from main stream products, usually on the basis of the reputation of the organisation issuing the label. For example, the Forest Stewardship Council certifies that labelled products are from forests managed to a specific set of protocols. An auditing process is undertaken to verify compliance and add credibility but a life cycle assessment of practices and their environmental impact is not undertaken.

Other attempts to classify labelling scheme have been made but the majority of these build on the basic ISO framework. For example, the US Environmental Protection Agency chose regulation as its main classification criteria, concluding that the most important aspect is whether or not a programme relies on first-party or third-party verification (Stø *et al*., 2005; US EPA, 1998) and hence there is an overlap with the ISO system. In a second step, the US EPA further classifies third-party labelling as either mandatory or voluntary leading to the awarding of a seal of approval or a single-attribute certification. This is shown in Figure 2.3.

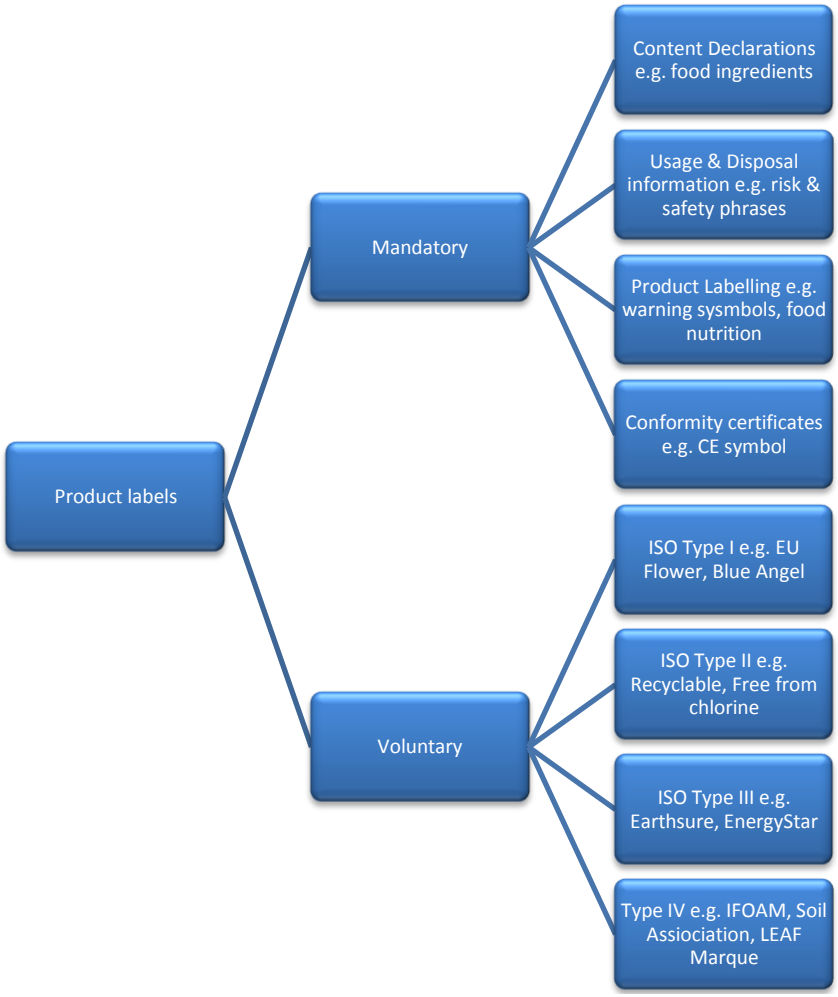


Figure 2.3: Label classification used by the US EPA (after Stø *et al*., 2005; US EPA, 1998)

Truffer *et al*. (2001) distinguish labels in a more simplistic way referring to multi-sector and sector-specific labels. Multi-sector labels, such as eco-labels, are intended to identify comparable levels of

performance, regardless of the product category. Deere (1999) classified labelling schemes according to data and knowledge ownership and arrived at three main types:

- **First party labelling schemes:** These are established by individual companies based on their own product standards. The standards might be based on criteria related to specific environmental issues known to informed consumers through the media or advertising. This form of eco-labelling can also be referred to as 'self-declaration' and corresponds to ISO Type II.
- **Second party labelling schemes:** These are established by industry associations for their members' products. The members elaborate certification criteria, sometimes by drawing upon external expertise from academia and environmental organisations. Verification of compliance is achieved through internal certification procedures within the industry, or employment of external certifying companies. Type IV labels tend to fall into this category.
- **Third party labelling schemes:** These are usually established by a private initiator independent from the producers, distributors and sellers of the labelled products. Products supplied by organisations or resources that are certified are then labelled with information to the consumers that the product was produced in an 'environmentally friendly' fashion. Type I labels usually fall into this category.

For this particular review the ISO classification extended to include Type IV labels has been used.

2.2. The success of eco-labels

Evaluating the success of eco-labels is not an easy task due to other variables affecting markets and consumer behaviour (Telsi and Roe, 2005). However, a number of techniques and methodologies have developed over the years including:

1. Conducting surveys and polls of consumer awareness and acceptance;
2. Collating systematic data on the market share / market penetration of eco-labelled produce;
3. Establishing evidence of environmental benefit and a contribution to the delivery of policy outcomes.

The success of any eco-labelling scheme depends to a large degree on the level of consumer awareness. A few Swedish studies have investigated consumer perceptions of environmental issues and eco-labels. The most common eco-label in Sweden is KRAV for organic products (see Section 5.4.7). Studies undertaken periodically during the late 1990s showed that recognition of the label exceeded 50% each year and was increasing. Consumers associate the label with decreased environmental impact and generally considered the brand to be trust-worthy (Nilsson *et al.*, 2004). Around the same time, in 1996, a survey showed that 80% of West Germans and 56% of East Germans were aware of the national eco-label (Blue Angel), and 51% and 30% percent of West and East Germans respectively claimed that they always, or at least often, paid attention to the label when shopping (Schwar, 1999; UBA, 1998; UBA, 2001).

Teisl *et al.* (2002) found that the introduction of the dolphin safe label had had a significant positive impact on the market share of canned tuna, and that the effect increased over a period of several months. The presence of the dolphin safe label eventually resulted in an estimated market share of canned tuna that was roughly one percent higher than without the label.

Most studies that have been published show that, generally, eco-label recognition and consumer awareness of eco-labels is high. However, there are exceptions. Jordan *et al.* (2002) considered the success of several eco-labels including the EU Flower. Of the eco-label schemes assessed, the German Blue Angel was the only one which has achieved wide consumer recognition and

considerable market penetration although its heyday may have already passed. The number of applications for the Blue Angel scheme has declined in recent years. The Austrian and Dutch environmental labels, and especially the EU flower, have a much lower profile among consumers and a lower uptake from producers. In 2001, there were more than 3500 Blue Angel labelled products/services while only 103 products/services carried the EU eco-label although this was an improvement on the situation in 1996 as Erskine and Collins (1997) reported that only 30 products and services had been certified by then. Data for 2008/9 suggests that over 3000 products had been certified to use the label (European Parliament, 2009). However, data currently on the Europa website for the eco-label states that more than 24000 products and services carry the logo (Europa, 2010a). This suggests either a huge leap in certifications which seems unlikely, that the data is incorrect or that services were not included in the 2008/9 data. Clarification of this has not been forthcoming from the Commission.

The most straightforward way in which an eco-label can be successful, is for an increase in consumer awareness to result in a change in purchasing behaviour (although an eco-label may also be successful without this change, if industry behaviour changes in response to a eco-label regardless of consumer behaviour – see Section 3.3). Several studies have been undertaken to identify purchasing practices after exposure to a particular eco-label (Loureiro and Lotade, 2005; Leire and Thidell, 2005; Loureiro, 2003; Blamey *et al*., 2000). These surveys showed that consumer awareness does not always result in changes in their purchasing patterns and that positive attitudes towards an eco-label does not necessarily mean it will be purchased (Reiser and Simmons, 2005; Leire and Thidell, 2005). Magnuson *et al*. (2001) also supported these findings as they could not identify any relationship between the positive attitudes of Swedish consumers for organic products and their high intention to buy these products. Rex and Beaumann (2007) conclude from their work that whilst eco-labels have emerged as one of the main tools of green marketing and considerable resources have been invested to make them effective and efficient, the market share of eco-labelled products is still low.

Another technique for assessing consumer acceptance is to identify the price premium that consumers are willing to pay for eco-labelled goods (see also Section 4). Bougherara and Grolleau (2005) found that the price premium and market share varied considerably depending on the country and product. For example in the USA, 37% of consumers said they would pay up to 10% more for eco-labelled fresh vegetables. Similar data for the Netherlands found that 70% of consumers would pay up to 5% more. With respect to eco-labelled coffee consumer surveys showed that 42% of Canadian consumers would pay more but only 28% of American consumers would accept a similar price premium.

A study reported by Bjørner *et al*. (2004) sought to quantify the effect of the Nordic Swan eco-label on consumers' brand choices of toilet paper, paper towels and detergents, using a large Danish consumer panel with detailed information on actual purchases from 1997 to 2001. It is found that the label has had a significant effect on consumers' brand choices for toilet paper, corresponding to a marginal willingness to pay for the certified environmental label of up to 18% of the price and it also appears that information on environmental performance has had an effect on consumers' choice of detergent.

Some specific products in certain regions show a very high market share for green products. For example eco-labelled printing paper is reported at >70% in the Nordic countries and in Sweden the market share of eco-labelled laundry detergents is around 90%. However, for organic agricultural products the Swedish ecological farmers' association reported that the market share in some European countries is just a few percent of the total food purchased (Rex and Beaumann, 2007).

If the main objective of environmental labelling is to improve environmental performance then the best way to demonstrate their effectiveness would be to identify positive environmental outcomes.

Rex and Beaumann (2007) report that the Swedish food retailer Coop stated that as a result of consumers purchasing ecologically labelled food during 2004, pesticide use had been reduced by 14,000 kg and synthetic fertilisers by 1,000,000 kg (Coop Norden, 2005; Rex and Beaumann, 2007). However, there does not appear to be any independent verification and it is not clear how the data was arrived at. This reference apart, there is little useful data in the literature. UNEP (2005) reported that their work had failed to arrive at any firm conclusion regarding the environmental effectiveness of five eco-labels studied. This conclusion is supported by others (Rubik and Frankl, 2005; EVER, 1997). The UNEP report also stated that there was no easily accessible, independent body of data on the environmental effectiveness of eco-labelling and there remains an urgent need to collect additional, reliable scientific data on the environmental effects of existing eco-labelling programmes. However, this does not mean they are not effective but just that evidence is inconclusive.

Related problems exist regarding the evaluation of the effectiveness of farming standards. Most farming standards and labels are of Type IV (see Section 2.1.5) and one of the main concerns is the indirect and sometimes vague linkage between the prescribed farming practices and environmental outcomes (Tzilivakis *et al*., 2007; Lewis *et al*., In press). Using a best practice based approach does not allow actual emissions or impacts to be quantified or even broadly estimated, as achieving this requires site specific information and the use of mathematical models for example. Consequently, measuring their effectiveness in raising standards is not an easy task especially as many farms participate in more than one environmental scheme, are also subject to changes in regulation and improving technologies. Many of the studies that do seek to identify environmental benefits are inconclusive. For example, Nguyen *et al*. (2004) undertook a study on farms participating in organic, quality and eco-labelling schemes in France to evaluate environmental benefits. The results showed that the French schemes did provide some environmental benefits but they did not necessarily perform better than other farms in all environmental areas. Hole *et al*. (2005) investigated the potential benefits of organic farming compared with traditional agriculture through a review of comparative studies, in order to determine whether it can deliver on the biodiversity benefits its proponents claim. The results demonstrated that species abundance across a wide-range of taxa, tended to be higher on organic farms than on the conventional farms. However, the authors also concluded that many of the comparative studies encountered methodological problems limiting the conclusions that could be drawn and also raised questions as to whether organic provided greater benefits than targeted approaches. Rundlof *et al*. (2008) looked at the butterfly species richness and abundance on organic farms and whilst populations were significantly higher at the local scale, local butterfly species richness was also positively affected by a large proportion of organic farming in the surrounding landscape, independent of the local farming practice. Holger and Lars (2001) could not find any evidence that nitrate leaching is reduced by organic farming practices especially if the goal is to maintain the same crop yield levels as in conventional farming systems.

This is not to say that farming standards have not contributed towards environmental benefits and there is evidence both for (a few of the more recent examples of many include Garielle and Tscharntke, 2006; Clough, 2007; Stockdale and Watson, 2009) and against (a few of the more recent examples of many include Bergström *et al*. 2008; Chamberlain *et al*., 2010; Bates and Harris, 2009) this premise, but it does serve to illustrate the complexities of identifying sound evidence that labelling schemes and standards are delivering environmental objectives when there are so many variables influencing environmental quality.

Some authors discuss the possibility that eco-labels may be counterproductive by acting as barriers to environmental innovation, because the product criteria can only be based on the current understanding of products, technologies and environmental issues (Rex and Beaumann, 2007; Erskine and Collins, 1997). There is also the possibility that if sufficient end-user support is not provided, then any benefits that have been built into the label for the consumption and disposal

stages of the product life cycle might be lost if consumption and/or disposal is not as assumed in the product criteria (Abe *et al*., 2002) and is less environmentally friendly than anticipated.

In summary, the literature seems to indicate that consumers are aware of the main eco-label schemes and some with greener attitudes might be willing to pay a modest price premium. However, sound scientific evidence that existing schemes and labels have provided environmental benefits is scant.

2.3. Eco-labels and policy

Governments must put in place policies, strategies and instruments in order to obtain desirable environmental outcomes on behalf of society. In doing so, they must use policy mechanisms that achieve the most environmental good but which are also the best value for tax payer's money. As policy tools the eco-label is just one from a large toolbox (see Table 1 (after Charter *et al*., 2001)).

Table 2.1: Types of policy instruments to achieve environmental improvements

Instrument type	Example
Voluntary	• voluntary agreements • Product stewardship • Self-commitments • Industry awards
Voluntary information	• Eco-labels • Product profiles • Product declarations • Codes of practice
Compulsory information	• Hazard, warning and advisory labels • Information responsibility • Reporting requirements
Economic	• Green product taxes and charges • Subsidies • Deposit/refund schemes • Financial responsibility • Grants
Regulatory	• Bans/phase-outs • Product requirements • Mandatory take-back

Product Stewardship, or Producer Responsibility as it is also known, is a policy tool that promotes the sustainable production and consumption of products. It is a concept whereby environmental protection centres around the product itself, and all stakeholders involved during the products life cycle are called upon to take responsibility for reducing its environmental impact (Hart, 1997; Lewis, 2009; Li and Geiser, 2005). It shifts the responsibility for end-of-life management from the public sector (government and taxpayers) alone, to a shared responsibility that includes the private sector (manufacturers and purchasers). It is a concept now widely used for delivering policy objectives, often using a regulatory approach where voluntary measures are not delivering the required outcomes (e.g. EU Batteries Directive 2006/66 and associated UK Waste Batteries and Accumulators Regulations 2009, SI 2009/890; the Producer Responsibility Obligations, SI 2005/3468). Eco-labels themselves may have a role to play in this process by encouraging manufacturers to design,

manufacture and market products that are less environmentally damaging by, for example, redesigning products to use fewer harmful substances, to be more durable, reusable and recyclable, and to make products from recycled materials. This idea is not new. In Sweden, for example, 'Ecocycle' legislation was introduced in 1994 and revised in 2002 and included 'Extended Producer Responsibility which sought to build on voluntary agreements regarding packaging and paper wastes (Regeringskansliet, 2006).

Many countries have opted to use the eco-label approach for achieving policy objectives. As well as the EU-wide approach, national eco-label programmes have been adopted by, for example, New Zealand (1990), Australia (1991), Korea (1992), Netherlands (1992), Spain (1993), Croatia (1993), Czech Republic (1993), Hungary (1993), Lithuania (1995), Slovakia (1996) and Latvia (1997). Despite this Jordan *et al*. (2002) point out that eco-labels are relatively soft policy instruments when compared with traditional regulation as they rely mainly on using moral and ethical arguments to persuade consumers to change their purchasing habits.

The US Environmental Protection Agency (US EPA, 1998) report that if environmental labelling is to be an effective policy tool, a number of conditions must hold true. Firstly, product evaluations must be known and accurate. Second, product standards must be associated with significant environmental differences among products. Third, this information must be disseminated to consumers. Fourth, consumers must understand environmental issues and product-specific information well enough to make informed purchasing decisions. Finally, the label must have substantial market penetration in order to affect a significant number of producers. The report (US EPA, 1998) also states that Governmental association with label schemes can improve the program's financial stability and credibility in the eyes of manufacturers and consumers. On the other hand, a non-governmental program run by a respected consumer or environmental organisation may be more immune to the political pressure that can affect governmental decision-making, and may differ in terms of consumer credibility and confidence. Private sponsorship, however, has its own drawbacks as labels may be limited on what they can achieve due to financial restrictions.

Some authors suggest that eco-labelling schemes managed by Governments may result in unanticipated effects (Bougherara *et al*., 2005). For instance, Mattoo and Singh (1994) show that labelling schemes can sometimes lead to increased prices and hence increased output of both environmentally friendly and not-so-environmentally-friendly products. If environmentally friendly production already exceeds demand at current prices, then the introduction of a labelling scheme could be detrimental. Dosi and Moretto (2001) suggest that if a firm's green activities and associated eco-labels are expected to improve the company's public image, then the company may choose to expand its stock of polluting capital before applying for a label.

Harris and Cole (2003) considered the role of Government in eco-labelling on agricultural products and conclude that, generally, Government should proceed very cautiously with policy mechanisms such as developing their own eco-labels (voluntary or mandatory), endorsing those developed by the private sector, and providing financial incentives for the latter, as such actions are not likely to be cost effective. There are multiple reasons why the authors reach this conclusion including:

- They only target the relatively small number of consumers prepared to pay a premium for environmentally friendly products;
- The environmental outcomes are often difficult, or costly, for government to verify or guarantee;
- More and more government labelling on products leads to 'dilution' of essential messages;
- Labelling can lead to side-effects, or 'perverse' impacts on consumption of products;
- Government eco-labels could displace valuable private sector activity.

This view is supported by Bougherara and Grolleau (2005) who take the view that using eco-labels as a policy instrument will only be efficient if the costs of designing and implementing eco-labelling policies are lower (1) than those of the other solutions and (2) than the value of the anticipated benefits. Other parameters should also be taken into account for example, property rights to use environmental claims, anti-deception, the level of enforcement and credible sanctions, as these will influence the level of transaction costs and the efficiency of eco-labelling. Another important point is raised by Golan *et al*., (2001) who note that labelling may often represent a short-term solution to a difficult regulatory problem.

Harris and Cole (2003) conclude that, considering the pros and cons of government involvement in eco-label schemes that aim to achieve environmental goals, multi-criteria eco-label schemes created and operated by governments are often unlikely to be the most effective mechanism for achieving environmental goals. However, the likelihood of eco-labels making a significant contribution to environmental goals could be improved by developing suitable metrics (measurement systems) and supporting the emergence of recognised benchmarks or minimum standards associated with the use of these metrics. According to de Boer (2003) if there are diverging opinions on the appropriate regulatory response to an issue, labelling can become a compromise that is particularly attractive to policymakers because of its market-based character. In the long term, labelling can become one of the first steps in a government strategy of gradually increasing pressure on producers and consumers to steer their behaviour in a particular direction (e.g. voluntary labelling as a precursor to mandatory labelling).

Governments can also provide a role with respect to providing advice to businesses on how they promote and market their 'green credentials', be that in the form of an eco-label or an environmental claim. For example, Defra have produced practical guidance on how to make a green claim (Defra, 2003b) and have a 'green claims code' (Defra, 2010a) which sets out the standard of information that the public can expect to be given about the environmental impacts of consumer products. The green claims guidance is currently subject to consultation (23 March - 15 June 2010) (Defra, 2010b) to make it easier for businesses to market their 'green' credentials in a fair and understandable way. At the same time there is a related, but separate, consultation on new enforcement powers for energy-using products and energy labelling regulations (Defra, 2010c). The aim is to ensure manufacturers and retailers of products such as dishwashers, washing machines, TVs and fridges meet minimum energy standards and give accurate information on their energy label (see Section 5.6.1). Both of these consultations and initiatives are aiming to help ensure that any environmental information associated with a product (be it an eco-label or claim) is more accurate and credible.

3.0. Eco-labels, consumers and consumption

3.1. Product-labelling and consumer choice

Simple models of consumer behaviour contend that individuals are rational decision-makers who, in any given situation, will seek to maximise utility through the informed consideration of the costs and benefits associated with any given choices (Jackson, 2005). Drawing on these rational models, consumer-facing policies often assume that when individuals make individually- or socially-unfavourable choices, it is the result of imperfect information. These models, such as that presented in Figure 3.1, present policy-makers with two options for influencing consumer behaviour: fiscal incentives (which ensure private costs and benefits reflect social costs and benefits) and the provision of information. In these circumstances, information provision is often favoured as a policy tool because of its marginal cost (compared to other options) and its limited detriment to consumers (BRE and NCC, 2007).

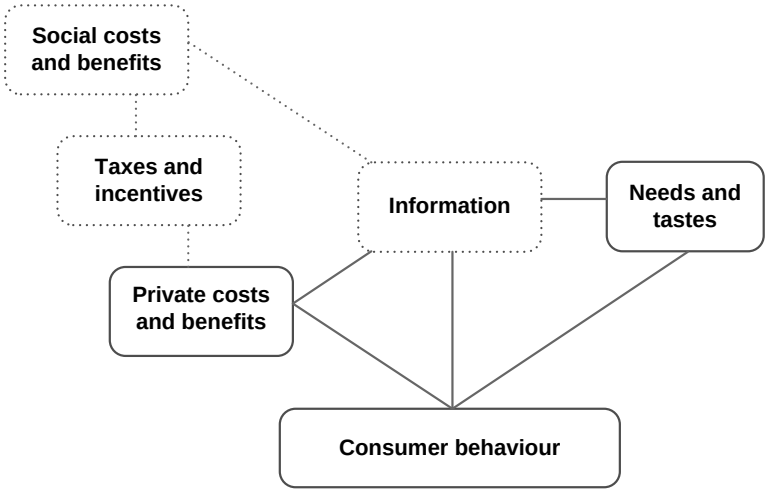


Figure 3.1: A simple model of consumer preference (from Jackson, 2005)

Yet consumers rarely search out, read or properly digest all of the information that is available to them when shopping. In part, this can be reflective of the way in which the information itself is presented: the type, complexity and amount of information provided all have a significant impact on the likelihood of people reading and understanding it (BRE and NCC, 2007).

Moreover, the extent to which consumers process information when shopping is frequently dictated by the benefit they perceive from doing so. If someone sees nothing to gain from, for example, choosing a food product with low salt content or that has been produced to organic standards, they are unlikely to invest time processing information about these product qualities (even if the information is readily available on the label). In turn, this selective processing of information may not even take place consciously: evidence from psychology suggests that motivation actually impacts on the preconscious processing of information and visual perception so that, in some situations, individuals really do see what they want to see (Balcetis and Dunning, 2006).

As indicated by survey data across Europe (see Figure 3.2), the relative importance of labelling in purchasing decisions varies considerably: in the UK, 39% of people claim eco-labels affect their purchase decisions while, in contrast, 27% claim never to read any labels. This also means that labelling affects the purchasing decisions of groups within society differently. According to the same 2009 Eurobarometer survey, eco-labelling plays a more important role in purchasing decisions of women and those with high levels of education than for men, younger people and those with lower levels of education (Eurobarometer, 2008). Recent research on the use of front-of-pack nutritional

labelling in the UK similarly concluded that less educated shoppers, those over 65 years old and from low social grades (C2DE) encountered more barriers to using the labels (BMRB, 2009).

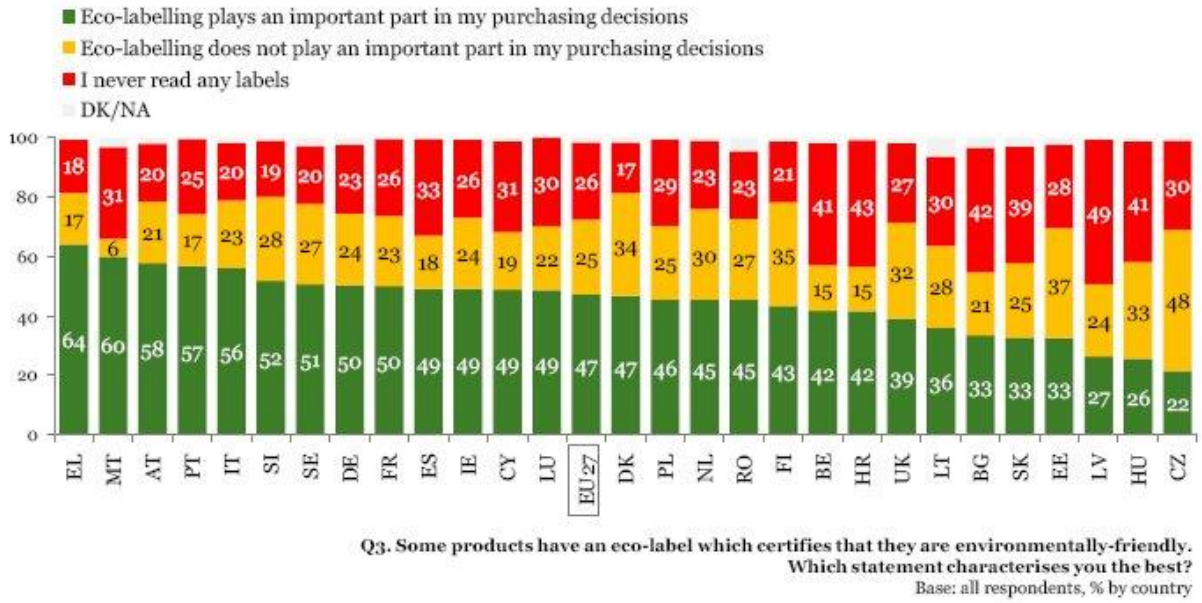


Figure 3.2: The importance of eco-labelling to European consumers (Eurobarometer, 2009)

Regardless of these differences between individuals, the most significant reason why consumers may not always seek out information during purchasing lies with the wealth of other factors that influence human decision-making. In the context of food choice, these factors operate at many different levels.

3.2. Food choice and consumer behaviour

Although price, marketing and availability have been identified as the three most important factors that drive individual food choice (White *et al*., 2009), it is important to recognise the breadth and variety of influences affecting the food that people consume (Figure 3.3). At the individual ('intrapersonal') level, the consumption of food is determined by both emotive (think of 'comfort eating') and biological affects (such as hunger, or cravings). Hunger can lead to what behavioural economists term 'preference bias': when people shop for food while hungry, they shop as if their future preferences will reflect that hunger. Not only does this lead to the purchasing of food that would not be bought otherwise, but that people are more likely to choose unhealthy foods over healthy foods (Loewenstein, 2007). Preference for a food increases with consumption (Camerer *et al*., 2005).

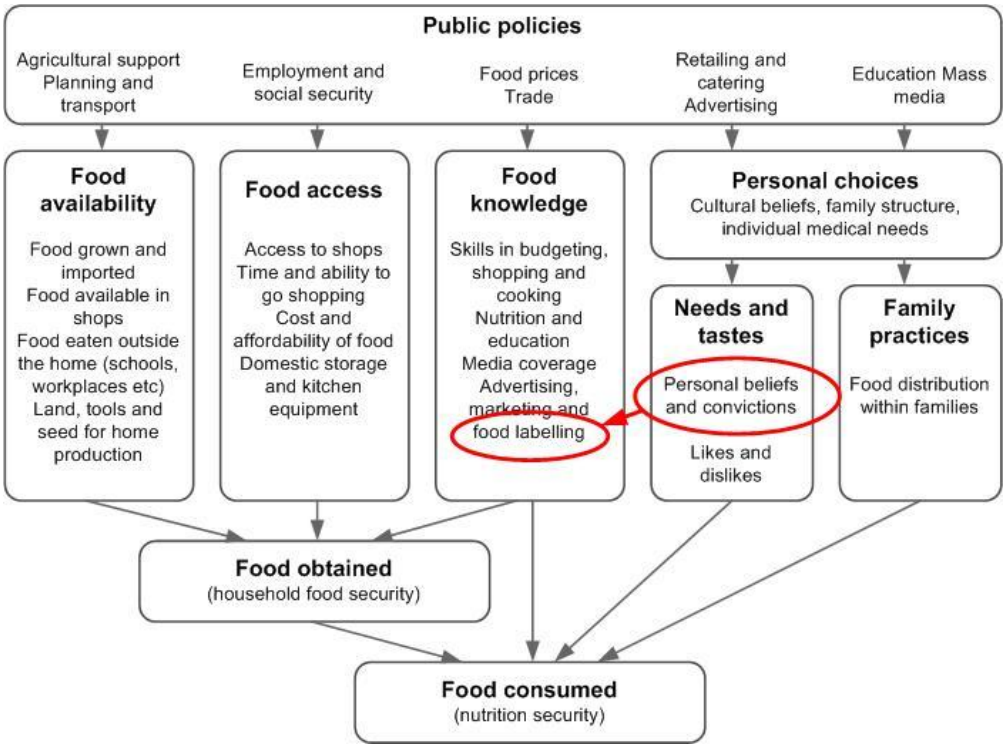


Figure 3.3: Influences on food choice (based on WHO, 2004)

The extent to which these deep emotional and often automatic influences effect food purchasing decisions depends on various processing resources, such as time, distraction while shopping and information available. The regularity with which we buy food and the relatively small amount of time spent considering individual purchase decisions, which has been estimated to be only three seconds in a supermarket (Cabinet Office, 2008), mean food products are more likely to be bought with little deliberation.

Deliberation is also likely to decrease during food purchasing when consumers are over-whelmed with choice. Faced with a proliferation of branded food products, consumers use heuristics or mental rules of thumb to speed up decision-making. The 'recognition heuristic' (Goldstein and Gigerenzer, 2002) is one such short-cut, with evidence suggesting that in some instances a consumer may buy products solely because they recognise them (and regardless of whether the consumer actually knows anything about the product). In the context of food labelling, consumer reliance on recognition suggests value in food labels being simple and easy to recognise. It is clear from this that local contextual factors, such as the environment in which food is bought and the way in which food products are marketed, also play a significant role in food choice. Food choices (in-store) are heavily influenced by the way in which food is presented and promoted. An abundance of choice and what is often very little differentiation between products, lead consumers to form habitual routines that simplify the shopping process but also lead to a reduction in innovation when it comes to choosing food (White *el al.* 2009).

Even when food choice is deliberate, consumers' choices are about much more than simply sustenance and nutrition. The purchasing of food reflects a variety of different individual, moral, social and cultural meanings, meanings that are socially constructed and '*embedded by broader social, economic and cultural forces*' (Garnett, 2008). In turn, as Figure 3.3 shows, individual food choices are constrained by macro-factors operating at the public policy level (such as technological and economic drivers) which dictate how available, accessible and affordable food is.

3.3. Environmental labelling and consumer food choice

The links between food and the environment are not salient for most consumers (White *et al.* 2009). Though more environmentally receptive individuals are capable of understanding quite complex links between food, the food system and environmental impacts, the concept of the supply chain and its links to climate change are too complex for many. Across Defra's seven segments, awareness and use of existing environmental labels, and a desire for more labelling, differ according to individuals' environmental attitudes. Those with the most pro-environmental attitudes (the 'Positive Greens') emerge as significantly more likely than members of other groups to make a conscious effort to buy fish certified by the Marine Stewardship Council (MSC) and Freedom Food, compared to those with the least pro-environmental attitudes. 10% of Positive green respondents claimed to make a conscious effort to buy Freedom Food, compared to only 2% of the Honestly Disengaged. Similarly, 13% of Positive Greens report that 'not enough information / labelling' prevents them from making more environmentally-friendly choices in their food and grocery purchases, compared to only 6% of the Honestly Disengaged. Across all segments, cost and availability were much more likely to be cited as barriers than the availability of information (Defra, unpublished).

Similarly, despite some calls that carbon should be given greater prominence than other components of an environmental label (for example, see EAC, 2009) and evidence suggesting consumers hold positive attitudes towards products with a low carbon footprint (Beattie and Sale, 2009), carbon labelling retains a very low appeal for most consumers - even those who are interested (and willing to pay more for) organic or locally sourced food (White *el al*., 2009). Recent research suggests that carbon labelling is more likely to impact on consumer purchasing when used on products (for example, energy saving light bulbs) which consumers already associated with being 'green' (Beattie and Sale, 2009).

Research for the Food Standards Agency found only 4% of respondents mentioned issues relating to climate change, such as food miles, when asked what issues they considered when shopping (Jigsaw Research, 2008). Both qualitative and quantitative studies suggest that when people buy food, health-related concerns are consistently given priority over environmental concerns (Opinion Leader, 2007). When environmental considerations are important, these tend to centre on animal welfare concerns or concerns relating to recycling and waste. Eurobarometer (2009) found that *'whether or not a product can be recycled / reused*' was the most important information UK consumers wanted to see on an environmental label, while forthcoming research for the FSA's new 'eatwell' website found that recycling was the environmental aspect of food that most consumers were interested in (in White *et al*., 2009).

The Cabinet Office's '*Food Matters'* recognises that with choice and variety comes complexity and trade-offs (Cabinet Office, 2008). It could be argued that providing an omni-label, which speeds up consumer decision-making and perhaps reduces the extent to which consumers engage with difficult trade-offs that food choice unavoidably entails, is actually less likely to encourage 'food culture' than single-use labels. The Environmental Audit Committee recognises that *'single-issue labels allow consumers to follow their own priorities, which is an important part of environmental engagement with the market'* (EAC, 2009). This suggests that consumers should be free to decide for themselves which impacts are most important and that the most effective omni-label will be one that still allows deliberation of single issues.

Even if consumers do have an interest in seeking out the information contained on a label (for example, if they are concerned with the environment), evidence suggests there is a marked difference between self-reported levels of label use and actual use. For example, recent research by the Food Standards Agency (FSA) into the impact of front-of-pack nutritional labelling of food on

consumer behaviour, found that while many people claimed that they were influenced by nutritional labels, in reality it was largely those concerned with healthy-eating – or following some kind of special diet – who used the labels. In most cases, other external factors (for example price, special offers, brand loyalty and the type of product) played a more influential role in purchasing decisions (BMRB, 2009).

Given that environmental labelling, at present, will only appeal to a small segment of consumers, efforts to raise environmental awareness and encourage an increase in pro-environmental attitudes may be necessary if the market share of environmentally-preferable food products is to be driven by labelling (EAC, 2009). The efficacy of labelling schemes is likely to be improved if implemented as part of a broader marketing and education campaign (EAC, 2009).

However, even with such campaigns, the fact that food labelling is often overlooked by consumers has led to the recent conclusion that the real potential for environmental labelling lies in influencing change within supply chains (White *el al.,* 2009). In turn, this is something consumers are likely to support: it has been suggested that consumers believe approximately 75% of the responsibility for addressing social and environmental concerns lies with retailers and only 25% with consumers themselves (EAC, 2009). Individuals believe that retailers, food manufacturers and the government all have important roles in making sustainable choices easy for consumers (Opinion Leader, 2007).

3.4. What makes a good label?

Our review of existing research suggests a number of key considerations that relate to good practice in the context of food labelling:

- **Ease of understanding**. A key factor in the effectiveness of product labelling is how easy the label is to understand. Lessons from marketing highlight the importance of labels being easily recognisable, because consumers may buy labels they recognise, regardless of whether or not they read the information. However, labels should not be designed based solely on the labels that consumers prefer: '*shopper preference alone is not a reliable basis on which to design FOP labels'* (BMRB, 2009).
- The **healthy eating agenda** is repeatedly highlighted as a 'hook' through which environmental interests may be promoted, with calls for the investigation of '*the possibilities for integrating environmental with health indicators' (*White *et al.*, 2009).
- The need for **independent verification**. Consumers repeatedly report not trusting supermarkets and brand manufacturers as a source of information (White *et al.*, 2009) or more generally a distrust in food labelling (BMRB, 2009).
- **Labels as social indicators**. The King Review of Low Carbon Cars calls for colour-coded tax discs that reflect CO_2 emissions using a traffic light approach. The suggestion (which was not adopted by government) was welcomed by experts in transport behaviour, for the innovative way in which it would enable the development of descriptive social norms around vehicle emissions (King, 2008).
- The **provision of comparative figures** on the class average or best in class. Consumers are receptive to labels that enable an easy comparison between best and worst products. It is important to note that '*comparisons of products are more common than single product evaluations when shopping'* (BMRB, 2009).
- Related to this, **the use of categories** is also helpful to consumers. Consumer decision-making is aided when the attributes of different products are easily comparable, something which labelling can help facilitate. Consumers will weigh up different attributes (for example, price, nutritional value, environmental impact and brand), eliminating product options according to the relative value the consumer assigns to different attributes. Using categories, which can be

easily compared on a label, helps simplify this differentiation. In general, it is accepted that consumers can consider no more than seven options at any one time (Productivity Commission, 2008). An additional benefit of categories is that they provide manufacturers with targets (through the provision of category boundaries) to aim for when improving products.

- EAC (2009) highlights the FSA's traffic light' scheme, praising its simplicity and 'its ability to graphically convey high or low performance more or less instantaneously' (EAC, 2009), and suggests 'adapting' it to environmental labelling. The EAC also highlight Sainsbury's 'petal' food label as an effective label.
- BMRB (2009) found no evidence that using three different methods of providing information (% GDA; traffic light colours and text) created difficulties for shoppers – instead found that each type of info appealed to a different user. Those that wanted help making decisions quickly liked the traffic light colours; shoppers who understood nutrition information favoured % GDA etc. People who found the label difficult to use, found all front of pack labelling difficult.
- Static systems not effective. For example, there is little value in a system whereby industry improvements mean that all products are in 'A' grade and none in 'E' – labels are more useful to consumers when they enable comparison. Lessons from energy labelling show that a dynamic system is important, to ensure labels reflect technological advancement and best practice. The temporary use of A+ and A++ energy labels has been criticised as it is not well understood by consumers.

Typographical and graphical recommendations (largely from Egan and Waide, 2008)**:**

- Labels should reflect varying levels of importance in the information they contain. EAC (2009) suggest that more important impacts (e.g. carbon) should be given greater prominence on environmental labels.
- Labels should use standardised font sizes, highlighting important and minimising less important information.
- Labels are also effective when they utilise a two column format with the parameter on the left and the value in the adjacent column.
- Labels that present the efficiency of a product on a comparative scale such as stars, letters or numbers are vastly more preferred and are more easily understood and motivating than those that present technical information only.

4.0. Eco-labels, industry and trade

4.1. Introduction

The primary objective of environmental labelling is to provide consumers with clear information regarding the environmental impact of a product such that they can make more informed purchasing decisions. The theory then follows that market pressures will force other manufacturers to improve their own environmental performance to match or exceed that of the eco-labelled products to improve their own market share, thus forcing standards up across the board. Whilst there are potentially strong environmental reasons for such labels they are also a marketing tool providing value to industry.

The benefits of eco-labels to create a market based incentive for improving the environmental impacts of production processes has been recognised for several decades, since the first eco-labelled products were offered for sale in Germany in the late 1970s. Since then, and particularly over the last decade, most industrialised countries have adopted eco-labels for a wide range of products and goods. However, probably due to the complexities of measuring environmental impacts caused by primary production processes, food eco-labelling has not been widely undertaken (Lewis *et al*., 2008). Bruce and Laroiya (2007) argue that manufacturers may not be able to adequately communicate environmental benefits to consumers due to the complexities of production techniques, the multiple ways in which even small changes can affect the environment and the costs involved. There are signs that this situation is now beginning to change and a driver for this appears to be the desire to use the eco-label approach to influence consumer consumption choices and to help align them better with sustainability policy objectives such as environmental protection and public health (Golan *et al*., 2001; Nilsson *et al*., 2004).

As with any policy to intervene in such a finely balanced system the costs and benefits of that intervention must be carefully considered. The literature review undertaken and reported herein identifies industry's main criticisms and concerns regarding the introduction of eco-labels. These can be broadly summarised as follows:

1. The eco-label cost-benefit relationship for producers
2. Market saturation, information overload and clarity
3. Concerns about the impact on international trade and the sustainability of developing nations

4.2. The eco-label cost-benefit relationship for producers

There are two main reasons why industry would adopt an eco-label: (i) it is mandatory and/or (ii) there is an economic benefit (UNEP, 2005). There are concerns currently that many businesses perceive eco-labels to be expensive and time consuming to introduce, and that the burden to the producer may not be matched or exceeded by market benefits. Many organisations believe that there is only limited evidence that consumers will respond as industry and policy makers would like.

Costs generally fall into the following categories (French *et al*., 1992; Nimon and Beghin, 1998):

- Application and annual fees to the labelling organisation and/or the certifier;
- Costs of producing, administrating and managing the data and information;
- Costs of designing and producing packaging, labels and consumer information;
- Provision of on-going consumer support, website costs.

However there are many areas where eco-labels can offer benefits to industry including (UNEP, 2005; Keeping and Shiers, 1996; Morris, 1997):

- Price premiums and economic incentives;
- Improved corporate reputation and positive brand impact;
- Implies a strong corporate governance;
- Can improve relationships with regulators;
- Can help with risk mitigation and management (crisis avoidance, defence of existing markets, reduced risk of business disruption, avoidance of fines for environmental pollution);
- May provide a competitive advantage and access to new markets;
- Identification of potential cost reductions such as waste minimisation, efficiency improvements and/or reduced insurance costs.

The link between eco-labelling and economic incentives is obviously an important determinant of whether market forces on their own can promote voluntary environmental improvements. The introduction of labelling of any sort represents a cost to industry and this will undoubtedly be passed on to the consumer. There are several reports that claim the financial costs to industry may not be realised as consumers do not sufficiently care where their food comes from or, where they do, the price premium demanded is not seen as justifiable (Bougherara and Combis, 2009; Golan *et al*., 2001; Melser and Robinson, 2005). However, Telsei *et al.* (2002) provide market-based evidence that consumers can respond to eco-labels and cite the increased market share of canned tuna seen by produces using the dolphin-safe label (see also Section 5.4.5).

There is also evidence that eco-labelling can provide not just increased market share but also price premiums. For example, it was reported by the Australian representative at the WTO's Committee on Trade and Environment (CTE) meeting in 2008 that the Australian national experience on minimum energy performance standards and mandatory labelling requirements had led to an increase in sales of energy efficient appliances in Australia (WTO, 2010). Nimon and Beghin (1998) undertook a study that showed that in the USA the apparel industry did enjoy significant premiums for clothing that used organic fibres particular with respect to baby items. Data from the United Nations illustrated that European organic produce commanded an average price premium of 15-25% in 2005 and with respect to the premium for organic eggs in Germany this was as high as 274% (United Nations, 2006). Gallastequi (2002) provides a number of examples collated from literature that demonstrate that quite substantial price premiums may be achieved in some sectors. New Zealand Trade and Enterprise (2009) provides data relating to the share of total food sales ecologically labelled food has in Sweden. This ranges from 0.9% for sugar, jam, honey and confectionary products to 7% for dairy produce.

However, this data was collated from before the global recession and there is now evidence that when under financial pressure many consumers may not pay such price premiums. For example it has been reported that sales in organic produce have declined by up to 30% since the recession (Clearlyso, 2009; Beef Magazine, 2009; Carrigan and De Pelsmacker, 2009) and this may threaten the adoption of eco-labels if the price premium does not exceed the costs of implementation. The general opinion is that as consumer confidence returns with recovery from the recession then sales should recover but this is not guaranteed. There are other examples where the price premium obtained for green products may not cover the cost of achieving certification. For example, Loureiro (2002) found that the estimated premium may be quite small (less than 5%) on some food stuffs e.g. for eco-labelled apples, reflecting the overall difficulty with obtaining a premium based on 'environmentally sound' practices and the fragility of the premium in uncertain economic times.

Whilst financial benefits may be on offer there may be a time lag before producers see these benefits. For example with organic farming a three year conversion period is required and the producer may not see a price premium during this time and may suffer an economic disadvantage if yields are reduced and the conversion period is not subsidised by government. Similarly if a manufacturer needs to make capital investments to meet label criteria there will be an associated payback period (UNEP, 2005).

Many researchers have studied the costs of using labels and/or complying with labelling regulations to the industry and whether or not the producer sees a financial return on the investment. For example, French *et al*. (1992) rigorously examined and modelled the compliance costs of food labelling regulations in the USA in the early 1990s. Regulations for two different types of food additives were used as cases studies. The modelling results showed that costs were variable depending upon the compliance period and the severity of the regulation. The actual design and reprinting costs associated with new labelling was also seen as significant.

The use of eco-labels can go beyond the basic first level of economics (e.g. directly raising revenue from sales) and help to improve corporate reputation and create a positive brand impact. Giovannucci (2009) discusses the need for corporate social responsibility (CSR) citing that CSR has become more important since the social and environmental effects of modern production systems have become more transparent. A marketing study undertaken in the US indicated considerable support from consumers for companies that support causes (e.g. environment, health, social, ethical) and switch brands, especially if price and quality are the same (Berkowitz *et al*., 2000). Several authors have reviewed how companies integrate environmental management and stewardship into their organisational strategies and conclude that companies that continue to approach environmental problems with quick fix solutions will ultimately find themselves at a competitive disadvantage. This is widely supported by other authors (e.g. Handfield *et al*., 1997; Dechant and Altman, 1994).

4.3. Market saturation, information overload and clarity

One concern raised by industry is regarding market saturation by labels of different types and the possibility that the plethora of labels will result in a decrease in both their value and impact (Harbaugh *et al*., 2010; Stroud, 2009; Leire and Thidell, 2005; Food Navigator, 2009; Segal and MacMillan, 2009; Edser, 2009). Youssef and Abderrazak (2009) studied the competition and environmental effects of a multiplicity of eco-labels within a given market. The results showed that when information on a label was complete (and of good quality), the introduction of a second eco-label in a market improves the environmental qualities of all eco-labelled goods. When information is incomplete (or poor quality), introduction of a second label leads to a rise in prices and a reduction in the environmental qualities of the goods. The provision of complete information and end user support may be critical.

Some researchers suggest that technical information regarding eco-labels may be too complex for the average consumer and that will also reflect on their value. Scientific studies confirming or countering these arguments is limited. One study undertaken by the UK Food Standards Agency (2010) looked at how consumers understand and use food labels and focused on the country of origin statement. The study reported that there was considerable confusion by consumers on what the statement meant, particularly with respect to meat and meat products. Consumers were unsure if it referred to where the animals were born, where they were raised, slaughtered or where the product was produced. This indicates a greater need for clarity. Clarity was a key issue when the Leopold Centre for Sustainability in Iowa, USA developed their food miles label (American Diabetic Society, 2004; Adams, 2003). Their label (Figure 4.1) design shows the number of miles travelled

from the farm to the retailer, the country / region of origin, mode of transport and categorises the food into one of four environmental impact categories: low, moderate, high, and very high. Once developed the Centre surveyed consumers regarding their understanding of what the labels meant. The study concluded that respondents exhibited basic understanding about the seasonality of produce and what the term 'locally grown' meant. 80% of the consumers consulted strongly agreed or somewhat agreed with the statement that they clearly understood the labels. The labels were designed for market research purposes only and not for actual food application.

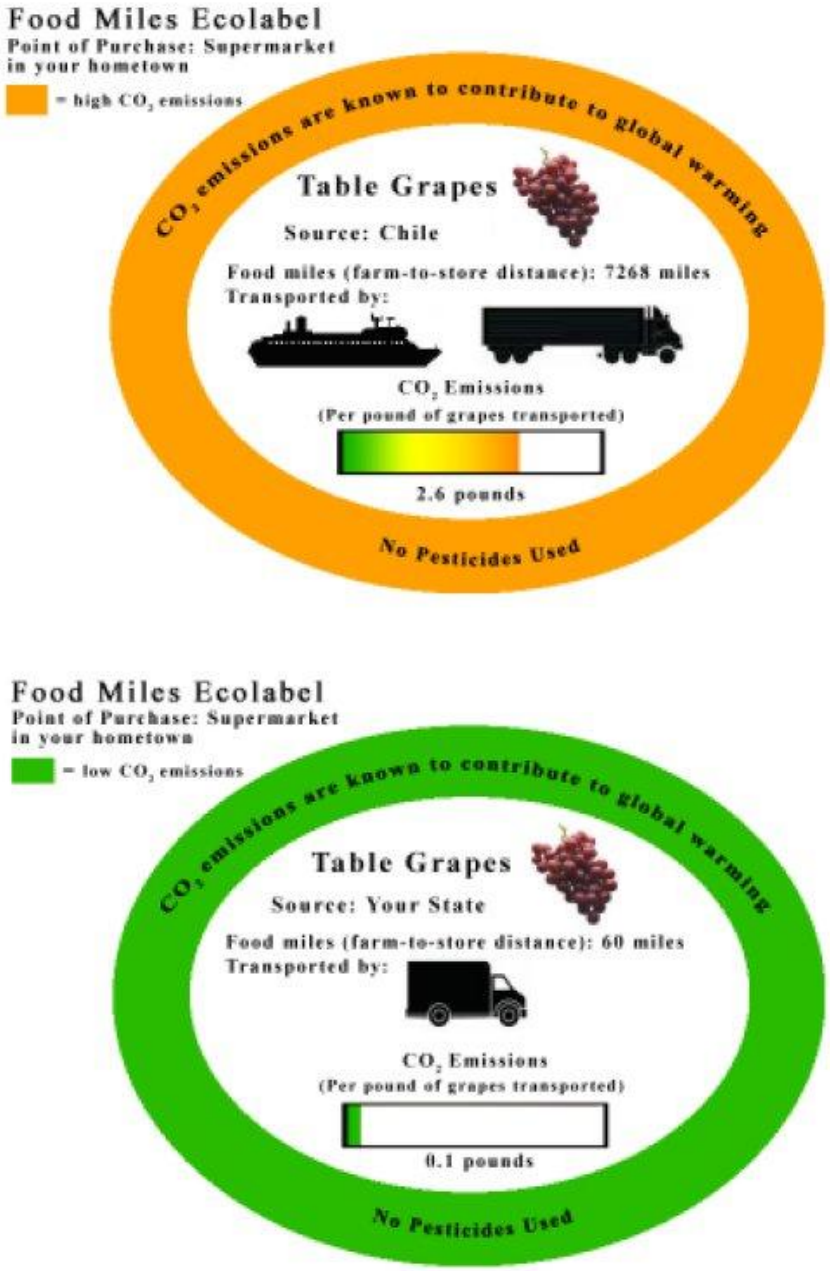


Figure 4.1: Food miles label developed by the Leopold Centre for Sustainability

Thorgersen (2002) points out that recognising a label logo is not the same as understanding its meaning and reports that many consumers fail to fully understand even relatively simple label terminology such as 'recyclable' or 'recycled', and so it follows that more technical information such as the quantification of emissions or information on, for example, photochemical smog or

stratospheric ozone will have been understood even less. Briz and Ward (2009) support this premise as their work showed that the percentage of Spanish consumers that understood the phrase 'organic food' ranged from 29% to 71%, differing across income, age, education, and region of the country. However, it is also pointed out that this misunderstanding may not necessarily be an issue as if the consumer already trusts the brand they may simply assume the label is saying something good.

There is also an ongoing discussion regarding the appropriateness of the standards associated with eco-labels. For example, criteria used in eco-labelling may differ considerably from one scheme to another in terms of stringency and coverage but consumers may not perceive this fact (WTO-CTE, 1997; Grote, 1999).

Very often, standards tend to be geared towards criteria that are technically feasible in the domestic country, rather than preserving the environment (Smith and Potter, 1996). Concerns have also been raised by industry regarding the lack of transparency of the whole process including the lack of objectivity, the difficulty in setting product criteria when products within 'product groups' are not perfect substitutes for each other having potentially different uses, and the arbitrariness of updating and revising criteria (Zarrilli *et al*., 1997; Morris, 1997).

Giovannucci (2009) concludes that there would be added advantage to the development of simple levels of harmonisation across eco-labels within specific sectors. This would benefit all stakeholders, especially their intended beneficiaries (Zarrilli, 1997; Jha *et al*., 1997; Vossenaar, 1997) and would potentially facilitate transactions and reduce compliance costs for producers, processors, and exporters (Schoenmakers, 2008).

4.4. The impact on international trade and the sustainability of developing nations

There is an abundance of published literature that considers the impact eco-labelling may have on trade. For example, Melser and Robinson (2005) argue that in some instances the impetus behind the introduction of eco-labels is that they are seen as an alternative to more trade-restrictive environmental policies, such as import bans or tariffs on goods with harmful environmental effects. An importing country may demand that foreign exporters meet specific environmental requirements (OECD, 1997, 2003; WTO, 1998) and, as a consequence, trigger disputes with trade organisations. There are many examples where using such labels has overcome these types of disputes. The World Trade Organisation (WTO) principles of non-discrimination require that similar products are treated equally irrespective of the country of origin or production technique (Melser and Robinson, 2005; Telsie *et al*., 2002; Dröge, 2001, WTO, 2003a; Piotrowski and Kratz, 1999). However, it is often the production method that differentiates an environmentally friendly commodity, from one that is less so. Therefore the WTO principles are somewhat contrary to the life cycle approach often adopted to identify environmentally sound products and processes. This has led to a number of disputes where trade laws and national environmental policies have clashed. Consequently, governments have sought mechanisms whereby environmental policies and international trade laws might be reconciled. Many eco-labels offer the potential (Melser and Robinson, 2005) for the consumer to discriminate rather than governments to intervene. It is generally agreed that labelling schemes tend to restrict trade less than other methods (WTO, 2003b; FAO, 2001; Lee and Stensel, 1999).

The classic example of where national environmental concerns have caused trade disputes is the case in the USA where the harvesting of tuna using a specific netting technique was associated with the death of dolphins. Under the terms of their Marine Mammal Protection Act, the USA placed import restrictions on countries whose tuna fishing regulations were not considered adequate. This led to the European Union filing a claim against the USA's ban on imported tuna under the General

Agreement on Tariffs and Trade (GATT). The US Dolphin Protection Consumer Information Act, passed in 1990, enforced a dolphin-safe standard in labelling and circumvented the GATT ruling. Studies have since reported that the implementation of dolphin-safe labelling did affect consumer behaviour and so has affected trade and resulted in environmental benefits (Telsie *et al*., 2002, CUTTS Citea, 2009; Crespi and Marette, 2003; Golan *et al*., 2001). For a time, two distinct types of tuna were sold: dolphin-safe tuna and generic tuna caught with any fishing method. The price premium dolphin-safe tuna commanded was measured at $400 per ton (Vogel, 1995). See Section 5.4.5 for more information on the Dolphin Safe label.

Another example concerns the EU's 1999 ban on GMO imports. The USA, Canada and Argentina made a formal complaint to the WTO claiming that there is a lack of scientific evidence that GM foods are harmful and so there was no significant or demonstrable difference between GM and non-GM food and so the ban was unjustified. The EU responded by introducing a labelling requirement that all products which contain an ingredient which itself includes more than 0.9% GMOs must be labelled as such and once the policy was in place the import ban was allowed to expire. There have also been other disputes including issues related to malt beverages, car taxes, asbestos, sardines and shrimp fishing (CUTT Citea, 2009; Melser and Robinson, 2005).

The debate as to whether or not it is permissible under WTO rules to set criteria for the way products are produced is still ongoing. WTO members agree that countries are within their rights under WTO rules to set criteria for the way products are produced, if the production method leaves a trace in the final product, for example, the use of pesticide Maximum Residue Limits (MRLs) in foodstuffs. However, they disagree about discriminatory measures based on process and production methods which leave no trace in the final product. For example you cannot tell whether a table has been produced from sustainably managed wood by simply looking at it. Under these conditions it is argued that measures which discriminate between products based on production methods should be considered inconsistent with WTO agreements (WTO, 2010; Stein, 2009; Crespi and Marette, 2003).

Whilst it may be argued that most national labelling schemes are fully open to applicants from anywhere in the world, such schemes often base their product group criterion and/or their production standards on those achieved by the best performing producers in the domestic market and on local environmental conditions, and these may not be relevant for overseas producers (Dröge, 2001; Zarrilli *et al*., 1997; Morris, 1997). For example, the pressures to conserve natural resources may not be as strong in developing nations as developed nations. Therefore, distinctions made on the basis of how much natural resources were consumed in the process of creating a product might unnecessarily bias a consumer against products made in a developing country where that resource is in abundance (WTO, 2003). As another example, in some countries sulphur dioxide emissions are a concern and eco-label criteria may restrict emissions but in some countries no such concern exists and so this particular criterion would impose additional costs on the producer with no additional environmental gain (CUTTS Citea, 2009).

Giovannucci (2009) reports that another problem arising from the growth of certification and labelling schemes is that it may be difficult for producers to keep up with and even to understand the standards. Blowfield (1999) concluded from his work that many standards and codes of practice have been driven by consumer and NGO perceptions of corporate social responsibility and have been more ad hoc than comprehensive and consultative. Since producers and therefore exporters face difficult compliance hurdles they can become a barrier to market entry for many exports, especially from developing countries. There is a growing body of evidence that if producers and exporters cannot comply, for whatever reason, with label criteria they risk being excluded from

competitive markets with serious consequences for economic growth and poverty alleviation (Vander Stichele *et al*., 2006; Moustier *et al*., 2005; Reardon *et al*., 2003).

Other problems for overseas producers relate to their access to information on labelling schemes, technical barriers such as measuring and collecting the required data and their ability to afford the scheme fees. International standards are often too stringent for developing countries with very limited resources. If the label criteria are very prescriptive it may mandate a particular technology and so effectively becomes a *de facto* standard. This could affect small domestic producers and it will undoubtedly make it difficult for exporters in developing countries to qualify for a label and compete with domestic producers (CUTTS Citea, 2009; Landcare Research, 2006; UNEP, 2005). However, Henson and Jaffee (2007) provide an alternative view and suggest that the eco-labels and other food standards facing developing country exporters are an opportunity to extend trade or at least guarantee a continued market. They argue that, while the required changes to existing control systems and investments in enhanced testing and production capacity may be considerable, the returns in terms of a continuing export market are typically significant. Where overseas producers do engage with a labelling scheme there is evidence that they are at an economic disadvantage which itself may act as a trade barrier simply due to additional costs they may have from participating. This may include higher fees to cover certification, issues relating to currency conversion / fluctuation and even the need to hire translators.

Brenton *et al*. (2008) also present arguments that suggest that exports from developing countries may benefit from eco-labels, particularly regarding carbon footprinting. The common presumption is that products consumed within the country they are produced will have a lower carbon footprint than products imported due to the transportation over long distances. Brenton *et al*. also suggested that many such imports from developing countries will originate from small businesses and farms that would find it difficult to participate in carbon label schemes. The scientific evidence shows that carbon efficiencies elsewhere in the supply chain may more than offset the emissions associated with transportation. Indeed, the effective inclusion of low income countries in labelling schemes may offer important opportunities for carbon emission reductions due to their favourable climatic conditions and their current use of low energy intensive production techniques. Whilst the major debate in this area centres on developing countries there may also be similar advantages for developed nations exporting over long distances. Saunders *et al*. (2009) illustrated this with a case study based in New Zealand that found that due to the different production systems even when shipping was accounted for, NZ dairy products used half the energy of their UK counterparts and in the case of lamb a quarter of the energy. The story was similar for other produce although energy savings were not so striking.

Ponte (2006 & 2008) also discusses the opposing views of developing countries believing that eco-labels potentially promote protectionist effects whilst international organisations counter this premise with assurances of potential advantages, transparency, non-discrimination, and technical assistance. Ponte therefore concludes that developing country producers need dedicated systems of standards and verification procedures, not only special flexibilities.

5.0. Existing label schemes

There are undoubtedly many product labels in existence and many claim to be eco-labels. In this section a selection of such labels for food and non-food products and the approaches taken to their development and administration are reviewed. With the exception of a few selected for their emphasis on environmental issues (e.g. IFOAM, LEAF Marque and Soil Association) food labels more concerned with quality, animal welfare or marketing (e.g. Assured Food Standards, Genesis), despite there being environmental benefits as a consequence of their standards and qualifying criteria, have been omitted. These types of schemes are largely Type IV and were reviewed and critiqued in a previous report (Tzilivakis *et al*., 2008) produced for Defra research project IF0131, entitled 'Assessment of reduction in environmental burdens through targeted measures compared with whole farm approaches in cropping and livestock systems'. An analysis of the contribution a range of primary production assurance schemes make to environmental policy can be found in Lewis *et al*., In press). A wider review of quality and regional food labels can be found in Morris *et al*. (2001).

5.1. Food eco-labels: Type I

5.1.1. Stichting Milieukeur

	SMK Netherlands
Example applications	Food, household goods, fire extinguishers, paper goods, cat litter
Type and Approach	Type I (or could possibly be classified as a Type IV depending on product group)
Costs (Feb 2010)	Variable. A routine check fee is charged on an annual basis, and in addition to this, there is a fee depending on the annual sales of the certified product. The more reliable the information furnished by the manufacturer upon filing an application the lower the testing costs prior to the award.
Further information	http://www.smk.nl/nl/s357/SMK/Programma-s/Milieukeur/c324-Milieukeur

The Dutch eco-label 'Milieukeur' was developed in 1992 by the independent organisation Stichting Milieukeur (Liefferink, 1996; Andersen and Liefferink, 1997; Zito, 2000; CPI, 2008) and was one of the first such schemes to develop criteria for food. This was driven by the importance of food and flower exports to the Dutch economy (Jordan *et al*., 2002). As the competent body for the eco-label it is responsible for the definition of criteria as well as for the supervision of label awarding. It is a third-party voluntary scheme organised under private Dutch law. The main organisations involved are the Environmental Ministry (VROM) and the Eco-label Foundation (Stichting Milieukeur) which includes representatives of all relevant stakeholders (environmental and consumer NGOs, industry, and government officials). All stakeholders have the same voting rights within the Stichting Milieukeur. NGOs also participate within the Stichting Milieukeur's Board of Experts which plays a central role in defining the criteria for the product and service groups.

Criteria are developed only for product groups in which there are clear differences in environmental quality amongst products in the same category. If the product category is judged to have the potential for environmental benefits, a certifying institution uses a "cradle-to-grave" approach, in

accordance with SETAC guidelines (SETAC, 1993), to establish the range of environmental impacts of different products in the product group. If this study suggests that the environmental benefits from certain approaches could be significant, a standard for that product group is developed based on the life cycle analysis and against which individual products in that group are compared. The production standards are very prescriptive and highly detailed. For example, in the case of fire extinguishers the label is awarded based upon the following criteria:

- The Halogenated hydrocarbons in the fluoro-surfactants must not be volatile;
- Foam must not, according to EC-directive 88/379/EEG, be classified as:
    - mordant/corrosive(C)
    - harmful (Xn)
    - toxic or very toxic (VT)
- Every organic premix ingredient present at more than 0.1% must have an aquatic toxicity better than 10mg/L ;
- Grade of zinc must be below 750 ppm;
- Only readily biodegradable surfactants should be used.

However, in the case of food products the criteria can be described as best practice standards and are not environmental standards per se. For example in the case of arable crops and field vegetables there are:

- A fertiliser plan must be produced based on soil samples taken and analysed before production starts. There are crop specific quantitative limits on nitrogen and phosphate – manure applications and total N and P applied.
- 14 metre no-spray zones are enforced around all ditches and water bodies and additional 'uncultivated and no input zones' are enforced in certain situations.
- The total quantity of pesticides applied is limited. The choice of pesticides is limited to those on an approved list. Each pesticide has an associated number of points according to an environmental impact assessment.
- Detailed prescriptions for ditch cleaning.
- Management plans are required for water, which must be drawn up with a qualified adviser and include estimation of water requirements, statements on general water and irrigation water source and its sustainability. In addition the amount of water used and its source must be officially registered.
- The use of irrigation planners (various tools permitted) is compulsory.
- All equipment used for the application and handling of pesticides and fertilisers must be periodically inspected by an independent authorised body.
- Detailed prescription for habitat management.
- Bonus points are awarded for activities that go beyond the minimum required such as the use of solar or wind energy, using windbreaks or wind-catch crops, leaving extra uncultivated and/or no-spray areas.

These are similar to the type of standards that might be found in a primary production assurance scheme such as those under the UK's Assured Food Standards. However, they do appear to be much more stringent than is typical of environmental standards in such schemes (Lewis *et al.*, In press).

Product category standards are reviewed on a three-year cycle for most products but in the case of food standards are revised annually to take account of new national legislation, availability of new pesticides and new technologies. Farms are audited twice a year by the certifying body Raad van Accreditatie (RvA– the Dutch Accreditation Council).

When products are seeking certification they submit evidence and undergo inspections where some activities are rewarded with points and others are penalised. The scoring system is product group specific and in the case of agricultural enterprises is crop specific. The producer (grower in the case of food products) must get a positive score at the end of the year (or growing season) for both the company overall and each product to be labelled.

The SMK label is widely adopted in the Netherlands as a benchmarking tool. In the agro-food sector currently around 150 major organisations are certified according to the Milieukeur criteria, thus being authorised to use the label.

Pros	Cons
• LCA approach used for non-food goods • Third party, independently verified • Frequent review of standards • Has public credibility	• LCA approach not used for food products (Type IV approach used instead) • Not producer specific. Identifies product as matching product group criteria but cannot distinguish further.

5.1.2. Other Type I food labels

- **The Ukraine Living Planet** eco-label has been developed for both food and non-food items, including sugar, honey, milk, mineral water and green offices. New criteria are currently being developed for frozen fruit and vegetables, pasta, ceramics and air conditioning. Little information is available on the methodologies adopted.

5.2. Food eco-labels: Type II

5.2.1. Casino Carbon Index

	**The Casino Group** France	
Example applications	Food and drink, primary production processes	
Type and Approach	Type II with elements of Type III, single issue, comparative	
Costs (Feb 2010)	None, borne by company	
Further information	http://www.groupe-casino.fr/en/The-Casino-Carbon-Index-a-green.html	

The CASINO Group (CASINO, 2008) are a multinational company that is a lead player in the global food trade. Their environmental performance has been increasing steadily over several years and now exceeds the market average. The company claim this success is the result of a specific positioning and ability to anticipate changes in lifestyles and consumption. One of the company's goals is to provide consumers with clear information regarding the environmental impact of CASINO products, so that fully informed decisions can be made at the point of sale. Consequently, in June 2008 the company launched its own environmental label, the Casino Carbon Index, on some 100 products.

The index is calculated from the quantity of greenhosue gases emitted as a result of each product during five key life cycle stages from raw material production to the consumers home:

- Production (including agricultural processes)
- Manufacture
- Transport
- Packaging
- Distribution and point of sale.

The calculation method was developed by an independent scientific organisation (Bio Intelligence Service) and was approved by Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME, France). See also Section 6.3.

The carbon footprint index is expressed as the equivalent number of grams of carbon dioxide generated per 100g of end product. Data for the calculations is taken from standard literature. Where primary products and other substances have been combined by recipe into a prepared product, the carbon dioxide emissions for each ingredient is calculated and the index reflects the proportion of that ingredient in the product mass (CASINO, 2008).

The face of the label uses a representation of a green leaf with a number showing the quantify of greenhouse gases (as CO_2 equivalent] emitted per 100g of the product. The reverse of the label and/or the product packaging shows more complete information (see Figure 5.1 below). This includes:

- Casino's environmental commitment;
- A definition of the carbon index and how to interpret the information;
- An image similar to that shown on the front of the label but the leaf is positioned on a colour coded scale from green to red to help aid interpretation;
- Information on product and packaging recycling.

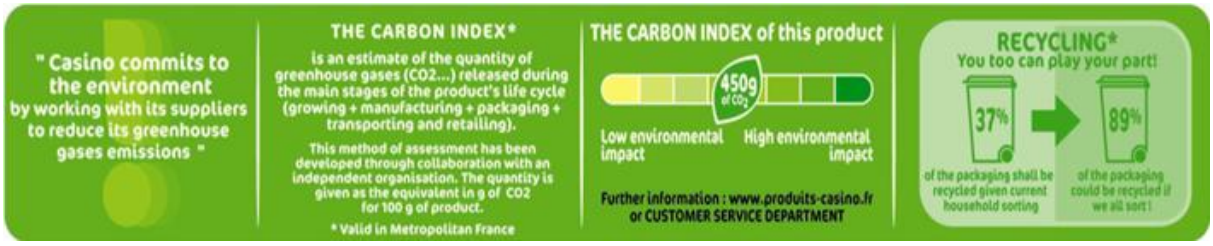


Figure 5.1: CASINO Carbon footprint label (CASINO, 2008)

CASINO have also created a special website for the products carrying the Carbon Footprint label which provides similar but extended data to that on the label.

The CASINO label is a Type II under the ISO 14001 definitions. However, its life cycle approach adds a further dimension making it akin to a Type III without the external verification. It is however fully consistent with the French Grenelle Environment Round Table conclusions discussed in Section 6.3.

Pros	Cons
• LCA approach used • Scientifically sound • Visually informative, well presented	• Single issue • No third party verification

5.2.2. Other examples of Type II labels on Food

- **Genetech Free:** This is a German label that guarantees food products are 'without gene technology'. The aim is allow consumers to make more informed choices. Its primary application is in the identification of foods, such as milk or meat, derived from animals for which no genetically modified plants such as maize or soy were used in livestock feed. However, the declaration 'without gene technology' is not particularly strict as it is also permitted on animal-based products where vitamins, enzymes or other additives manufactured with gene technology are present in feed. The criteria are stricter for other products and neither the application of additives obtained through genetic modification nor the accidental admixture of genetically modified plants is allowed. To date, however, Genetech Free products have not been broadly available. With the exception of a dairy commodity from the Campina Company, the products to which this declaration has been applied generally are made by small, regional manufacturers.

5.3. Food eco-labels: Type III

5.3.1. CarbonNZero

carboNZero certified organisation	**New Zealand** Internationally applicable	Certified Emissions Measurement and Reduction Scheme CEMARS
Example applications	Coffee, honey, travel, tourism, household goods, freight	
Type and Approach	Type III	
Costs (Feb 2010)	Highly variable subject to organisation type, size and annual turnover	
Further information	http://www.carbonzero.co.nz/	

The carboNZero programme is an internationally accredited greenhouse gas (GHG) certification programme that provides tools and resources to help measure, manage and mitigate greenhouse gas emissions. The program includes the administration of a GHG Certification Scheme accredited under ISO 14065. ISO 14065:2007 specifies principles and requirements for organisations that undertake validation or verification of GHG emissions.

CEMARS certification (Certified Emissions Measurement and Reduction Scheme), is the first part of carboNZero certification and is concerned with the measurement and management of GHG emissions. These two steps are independently verified then certified. This scheme has been developed for large organisations or large emitting industries where offsetting is not a viable option or they wish to take a measured approach and further gauge the cost benefit of positioning their organisation and products/services in the carbon neutral market space. CEMARS allows companies to measure their greenhouse gas emissions, put in place plans to reduce them and have both of these steps independently certified. However, there are three further steps to obtaining full certification under the carboNZero programme. These are:

- Mitigate or offset the remaining, unavoidable emissions through the purchasing and cancelling of verified and high quality carbon credits. These may include participation in renewable energy generation or energy efficiency projects or through the sinking of carbon dioxide such as via the regeneration of native forests.
- The actions taken to mitigate must be independently verified prior to certification.
- CarboNZero then help their label holders communicate their carbon zero status in the market.
- Certification is subject to annual renewal.

The CarbonNZero programme also offers a range of online tools and services to a wide range of end users including calculators for calculating GHG emissions, self-assessment tools for GHG management and mitigation, a unique online GHG inventory tool, 'E-Manage', that enables emissions to be calculated using the appropriate emissions factors by geographical region and measurement period. The E-manage tool also enables GHG emissions to be managed by organisational or operational structure, e.g. by business unit or by production unit. One of the many useful features of E-manage is the ability to benchmark against internal or external measures to monitor performance and progress towards emissions reduction.

Measurement of the greenhouse gas emissions associated with products, services and events includes additional life-cycle emissions relevant to the type of carboNZero certification being sought. Where there is existing industry or sector-based best practice for measurement and reduction, this is taken into account in the programme requirements for carboNZero certification. The company claims that their tools meet and exceed the requirements of relevant international standards: the Greenhouse Gas Protocol for corporate accounting and reporting and ISO 14064-1 the international standard for quantification and reporting of greenhouse gas emissions and removals.

The CarboNZero programme actively maintains an emissions factor database that is used by E-Manage and its calculators. The emissions factors are sourced from the Intergovernmental Panel on Climate Change (IPCC) emissions factors database, New Zealand Ministry of Economic Development (MED) annually published energy-related greenhouse gas emissions data, the United Kingdom Department for the Environment, Food and Rural Affairs (Defra) for some international freight emissions factors not otherwise available, the Australian Department for Climate Change emissions factor workbook, and their own and externally published research.

Pros	Cons
• Product specific, product comparative • Limited application on food so far • Third party, independently verified, internationally accredited • Frequent review of standards	• Single issue • Complex process • Factors used to calculate the CO_2 emissions not available for scrutiny • Not transparent.

5.3.2. Earthsure

earthsure	**Institute for Environmental Research and Education (IERE)** USA
Example applications	Food and agricultural product systems (excludes biofuels from crops)
Type and Approach	Type III
Costs (Feb 2010)	Costs range $1000 to $5000 per farm per year but this may not be charged as some/all funding may come from a small fee added to the cost of each labelled item sold. Government subsidies for the program are currently being negotiated.
Further information	http://earthsure.org/ http://www.iere.org/sustain/IEREprogram.html

IERE is a not-for-profit organisation based in Iowa and Washington State, USA. IERE's initial involvement in eco-labelling began when the organisation were approached to provide third-party verification on environmental performance. Their work in the field has led them to advocate the life-cycle assessment approach to identify and rank the environmental impacts of a process. IERE firmly believe that eco-labels are an important economic driver, leading to increased profitability. IERE also believe that the development of such labels should (Schenck, 2008 & 2009; Schenck *et al*., 2008):

- Comply fully with ISO 14001;
- Should involve the community and all stakeholders;
- Ensure full disclosure of environmental performance and so be of ISO Type III.

In 2000, following this philosophy IERE began to develop its own eco-label for meat production systems. However, the success of the scheme encouraged diversification and in 2006 the label name of 'Earthsure' was patented. Earthsure is a Type III environmental product declaration label that fully complies with ISO 14025:2006 and is now applicable to all food and agricultural product systems.

The Earthsure program covers the entire life cycle scope of agricultural production, as shown in Figure 5.2 below (Earthsure, 2009). The overall aim of the scheme is to provide detailed environmental information to purchasers (e.g. retailers, consumers) so that market forces can drive up environmental performance in the sector.

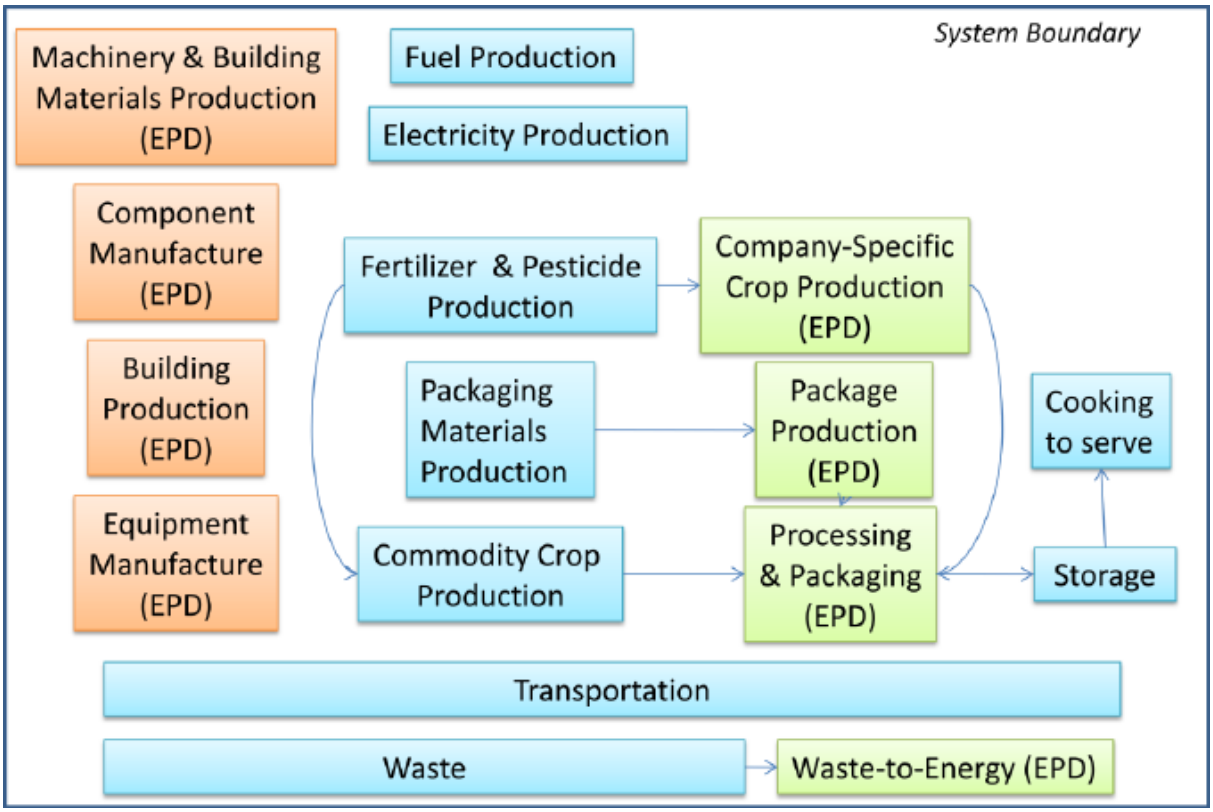


Figure 5.2: The Earthsure Agricultural EPD System (Earthsure, 2009)

IERE's approach is unique in that the Eco-label is producer specific, such that (referring to Figure 5.2) a separate Environmental Product Declaration (EPD) may be developed for each component involved in the production and supply chain e.g. the building materials, the equipment manufacture, on-farm production, consumer handling (cooking, storage etc.) and waste management. Each EPD includes a unique serial number that is linked to a website providing more detailed information, such that potential buyers can check on the environmental performance of that producer. The LCA

information may be printed on the product packaging, and may be available on the product-specific website and/or in printed materials (Earthsure, 2009).

Like other schemes, products are grouped into broad categories and criteria for certification are identified by a committee that includes representatives from the organisation seeking certification and suppliers plus environmental and consumer NGOs. These criteria are product group specific and will include identification of the product group's significant environmental impacts via a full life cycle assessment (LCA). For example, the significant environmental impacts with respect to the farming component of Figure 5.2 may include:

- Climate change
- Airborne toxicity
- Fossil fuel depletion
- Use of GMO's
- Soil conservation
- Stratospheric ozone
- Aquatic toxicity
- Mineral depletion
- Use of antibiotics
- Photochemical smog
- Eutrophication
- Land use & biodiversity
- Hormone Use

Other criteria may include:

- An environmental management system. In the case of primary food production this is a requirement and will include processes for monitoring compliance with regulations, record keeping, monitoring, remediation, operational controls, emergency planning and auditing;
- Disclosure of significant environmental aspects;
- Goals for improvement and a history of meeting previous goals;
- Substantive compliance to environmental laws and regulations.

Collectively the product group criteria form the Product Category Rules (PCR).

Whenever a new PCR is developed a third-party review of both the product group PCR and the supporting LCA is undertaken. The review is undertaken by a committee led by an LCA professional with input from industry experts. The review committee's role is to validate the processes undertaken to produce the LCA, to ensure that the PCR has been developed in accordance with ISO 14025 and to check compliance with the Earthsure programme rules. Funding to off-set costs associated with the development of new PCRs is usually paid by the first companies interested in developing a label for that product group and the program is maintained by fees for the use of the eco-label. Fees are developed on a case-by-case basis. PCR's are reviewed at least every 5 years.

When an organisation applies for certification under the Earthsure program the product, process or service is analysed following the PCR, either by IERE or by another qualified LCA expert. Actual measurements are converted into indicator values allowing for simpler cross product comparisons. The results are the EPD. Verification is by an independent third party and IERE provides the training for the auditors. Each producer must undertake an annual audit and the full results of that audit are published on the internet. Table 5.1 shows the results and their presentation for a ready-meal type product called 'Chili with beans'. The data refers to the environmental impacts per single serving.

In the case of primary production, data is collected on farm activities such as cultural practices, fertiliser and pesticide use, irrigation, fuel and electricity use, and soil nutrient status as well as production statistics relating to crop yields, and livestock (Schenck, Pers Comm., 2010).

Table 5.1: Earthsure Ecoprofile for 'Chili with beans'

Impact category	Units per single serving	Indicator result
Climate change	kg CO_2 eq	0.81
Stratospheric ozone depletion	kg CFC-11 eq	2.3E-08
Acidification	H^+ moles eq	0.28
Eutrophication	kg N eq	1.3E-03
Photochemical smog	kg NO_x eq	3.4E-03
Ecotoxicity	m^3-yrs	2127
Water use	L water	25
Mineral resource	gm minerals	7.2
Fossil fuel depletion	MJ eq	10
Land use/biodiversity	m^2 land occupied	0.99
Soil depletion	gm soil	156

Data from this information is then used to calculate, using standard emission factors and mathematical models, the environmental impacts on a per single serving basis. The results are also converted to an indicator value by comparing with the US average for that product category. Where this is not appropriate other, simple processes are used. For example, the indicator for acidification is based upon the Redfield ratio which is the optimal N/P ratio for phytoplankton growth (Schenck, Pers Comm., 2010).

For exotoxicity the SETAC recommended measure Use-Tox (Rosenbaum *et al*., 2008) is used. The use of indicators allows the results to be put into perspective and so become more meaningful to end users. No eco-label will be approved if the product is not better than the average across all environmental categories.

Land use and biodiversity presents special issues due to the lack of scientific consensus on the most approrpriate indicators to measure the impacts. However, there is clear consensus that this category is critical. Therefore IERE are currently working to produce a suite of indicators that are likely to be of the following type:

- Area of habitat that is physically protected (e.g. by fencing);
- Area of habitat not farmed that is identified as being designated (by Earthsure criteria) as environmentally important;
- Total length of aquatic habitat that is physically protected compared with the total area managed;
- In environmentally protected area the density off non-native vegetation;
- Road length per unit area;
- Areas dominated by native species compared with total area managed.

Pros	Cons
• Producer specific, producer comparative • Scientifically sound, highly transparent • Public information and support material strong • Multi-issue • Constantly being refined • Third party, independent verification	• Expensive, no national funding as yet • Resource demanding • Complex • Might be too complicated for the average consumer to comprehend

5.3.3. Carbon Reduction Label

	**Carbon Trust Footprinting Company** UK
Example applications	Food and non-food goods
Type and Approach	Type III, Single issue
Costs (Feb 2010)	Varies, upwards of a few thousand pounds.
Further information	http://www.carbon-label.com/business/forbusinesses.htm

The Carbon Label Company was set up by the Carbon Trust in 2007. In 2009, the company became the Carbon Trust Footprinting Company to reflect the breadth of services it now provides for both businesses and consumers. With respect to businesses it provides guidance and support to help organisations to measure, reduce and communicate the lifecycle greenhouse gas (GHG) emissions of their products and services, including food and drink. The provision of this information helps consumers make informed purchasing choices to help them reduce their own carbon footprints, and to educate them on how the way they use the products they buy can lower their carbon footprints. The Carbon Trust Footprinting Certification Company was established in 2009 to provide independent and impartial certification services for product carbon footprints.

The Carbon Trust, along with Defra, instigated BSI's development of a Publicly Available Specification, PAS 2050 (BSI, 2008), for assessing GHG emissions of products and services. Developed in parallel, the Code of Good Practice on GHG emissions and reductions claims (the Code) (Carbon Trust, 2008), provides guidance on developing and making GHG emissions claims.

The Carbon Trust Footprinting Company will work with organisations to assess GHG emissions via a process closely related to that given in PAS 2050. The Carbon Trust Footprinting Company's measurement process consists of several steps including:

1. A process map is built that includes setting boundaries, understanding data available and identifying sources/contacts. The whole product supply chain is involved in this process;
2. The necessary data is collected from the organisation and members of the supply chain;
3. Identifying limitations, data uncertainty and accuracy;
4. Building the carbon footprint. This is done with the aid of a comprehensive toolkit, known as 'Footprint Expert', that allows organisations to produce a reliable, consistent and certifiable carbon footprint in accordance with the published product carbon footprinting standard PAS 2050 (BSI, 2008). Footprint Expert includes a guide to the footprint process, various calculators to generate outputs for key common elements of the value chain, e.g. transport or refrigeration and reference data. The Carbon Trust also organise a variety of training programmes.

Independent, third party certification of the Footprint is provided by The Carbon Trust Footprinting Certification Company. The certification process verifies compliance with the PAS 2050, the Code of Good Practice and the certification requirements within Footprint Expert. Once the information has been verified a licence is issued to use the Carbon Reduction Label. This shows the total greenhouse

gas emissions for all the product life cycle stages (within the previously defined product boundaries) and may include: production, transportation, preparation, use and disposal. For example in the case of most food products the life cycle stages include raw materials (including primary production), manufacturing, packaging, distribution, end use and disposal. The footprint calculations consider all greenhouse gases reported as total CO_2 equivalent as is consistent with other recognised GHG reporting. The data is usually provided per product pack, per serving or per unit as supplied depending on the product.

Whilst the main method of communication is the on-product label, the carbon footprint information is also available from other sources including:

- Point of sale material
- Websites belonging to the product manufacturer or service provider
- Online reseller product catalogues (products) and online directories (services)
- Advertising, product brochures, catalogues and other sales materials
- Product manuals – where carbon-reducing usage advice can be explained.

The Carbon Trust Footprinting Company applies its own set of proprietary data to the PAS 2050 and the Code to ensure standardisation of measurements within product and service categories. It is this process that allows customers to easily compare the GHG footprints of different products, whatever their origins. However, this data is not readily identifiable and so hinders the transparency of the system. It may also have implications for comparing the Carbon Trust footprint with other Footprints that also use PAS 2050 but may use different data sets.

Pros	Cons
• Producer specific, producer comparative • Scientifically sound, highly transparent except for data used. LCA based. • Standardised methodology • Public information and support material strong • Third party, independent verification	• Expensive • Data not transparent • Single issue

5.3.4. CarbonCounted

161 g CARBON counted.com	**CarbonCounted Carbon Footprint Solutions** Canada
Example applications	Food and non-food products
Type and Approach	Type III, Single issue
Costs (Feb 2010)	Annual Registration for access to the CarbonConnect web application is ~ $100/year. Annual verification costs for certification are typically $100-250 for small-medium businesses to perform a document review. Costs are $1,000-5,000 for larger corporations requiring on-site audits.
Further information	http://www.carboncounted.com/

CarbonCounted Carbon Footprint Solutions is a Canadian-based not-for-profit organisation that provides web-based tools and consultancy services to enable business to calculate their carbon emissions. The companies mandate is to enable fast, third-party verified, cost efficient carbon

footprints and product carbon footprints. CarbonCounted provide web services that enable a supply chain wide approach rather than the simpler product based methodology. The company provides online tools to determine GHG inventories and product carbon footprints using a greenhouse gas inventory system based on PAS 2050 (BSI, 2008) and to provide third party verification of the carbon footprint.

CarbonConnect is the third-party verified application tool. Instead of an isolated 'snap-shot' of GHG emissions, the web application links all sources of carbon emissions together into a live supply chain. If suppliers change their emissions, it will automatically adjust the emission data for the downstream life cycle stages.

Once a company has used the web-based calculator and the verification tool, the label showing the carbon footprint of the product can be downloaded from the web. Currently the approach is being used by a number of Canadian based companies including a major supermarket. However, the method utilised by the software applications and the data are not transparent.

Pros	Cons
• Inexpensive • Whole supply chain	• Doubts have been raised regarding the accuracy and integrity of the process • Neither data nor the exact methodology is not transparent • Single issue

5.4. Food eco-labels: Type IV

5.4.1. IFOAM Organic Production

	International Federation of Organic Agricultural Movements' Standards Global
Example applications	Organic farming certification companies
Type and Approach	Type IV
Costs (Feb 2010)	Annual fees are paid by the certification body to IFOAM.
Further information	http://www.ifoam.org/index.html

IFOAM is a global umbrella organisation for the organic movement and organic certification. The IFOAM label is used by organic certifiers to demonstrate compliance with the IFOAM basic standards. As such it is not strictly used on products or services.

Since its establishment in 1972, IFOAM has developed organic standards and accredits organic certifiers in over 100 countries. Organic standards are used to 'describe' what an 'organic' claim on a product means, and to some extent, to inform consumers. Currently there are hundreds of private organic standards worldwide; and in addition, organic standards have been codified in the technical regulations of more than 60 governments including the UK. Examples of IFOAM accredited schemes in the UK include the Soil Association (see Section 5.4.4), Organic Farmers & Growers Ltd and the Organic Food Federation.

All food sold as 'organic' must be produced according to European laws on organic production. These laws require food sold as 'organic' to come from growers, processors and importers who are registered and approved by organic certification bodies, often certified themselves by IFOAM and

registered by the Department for Environment, Food and Rural Affairs (Defra) or a similar control body elsewhere in the European Union. Organic certification bodies must appoint independent inspectors who undertake site visits to verify compliance with the organic standards.

Originally organic farming and the IFOAM standards were largely based on codes of practice developed by independent organisations. Members of these organisations voluntarily adhered to these codes. However, since 1993 when Council Regulation (EEC) 2092/91 became effective, organic food production has been strictly regulated in Europe. This Regulation together with various amendments and annexes describe the practices and inputs that may be used in organic farming and the procedures for registration and inspection.

Organic standards are not based upon a life cycle assessment to identify the significant environmental effects. No measurements or scientifically based predictions of environmental releases are undertaken. Instead standards are based on a set of 'best practice and performance' criteria that is used to differentiate the product from main stream non-organic products.

Pros	Cons
• Standards set in European law - transparent	• Not based on LCA approach • Actual environmental benefits not identifiable • Not producer specific. Identifies product as a top performer but cannot distinguish further.

5.4.2. Fairtrade

	Fair Trade Federation (FTF) There are currently 19 Fairtrade Labelling Initiatives covering 23 countries in Europe, North America, Japan, Australia and New Zealand.
Example applications	Food, fibre and ornamentals including bananas, coffee, cocoa, cotton, flowers, fresh fruit, honey, fruit juice, sugar, tea and wine.
Type and Approach	Type IV
Costs (Feb 2010)	Unknown
Further information	http://www.fairtrade.net/what_is_fairtrade.html

Fairtrade is an alternative approach to conventional trade and is based on a partnership between producers and consumers. Working for producers, Fairtrade seeks to provide a better deal and improved terms of trade. This allows them the opportunity to improve their lives and plan for their future. Fairtrade offers consumers a powerful way to reduce poverty through their every day shopping.

There are two distinct sets of Fairtrade standards, which acknowledge different types of disadvantaged producers. One set of standards applies to smallholders that are working together in co-operatives or other organisations with a democratic structure. The other set applies to workers, whose employers pay decent wages, guarantee the right to join trade unions, ensure health and safety standards and provide adequate housing where relevant.

Fairtrade standards also cover terms of trade. Most products have a Fairtrade price, which is the minimum that must be paid to the producers. In addition producers get an additional sum, the Fairtrade Premium, to invest in their communities.

When a product carries the FAIRTRADE Mark it means the producers and traders have met Fairtrade standards. The standards are designed to address the imbalance of power in trading relationships, unstable markets and the injustices of conventional trade.

The scheme is administered by Fairtrade Labelling Organisations International (FLO) that is a non-profit, multi stakeholder body. It is responsible for the strategic direction of Fairtrade, setting the standards and providing support to producers. FLO-CERT is the independent certification company, owned by FLO. FLO-CERT inspects producers and traders to ensure they comply with Fairtrade standards. In addition to the administrating organisation there are national organisations that market Fairtrade in their country. There are also producer networks and Fairtrade marketing organisations that support producers and certify products in South Africa and in the Czech Republic.

Pros	Cons
• Third party independent verification	• More ethical than environmental • Not LCA based • Not producer specific. Identifies product as a matching scheme criteria but cannot distinguish further.

5.4.3. Marine Stewardship Council

	MSC UK, global application
Example applications	Fishery products
Type and Approach	Type IV
Costs (Feb 2010)	Fees are negotiated between the client and the certifier. The main elements of the fishery assessment and certification process that carry a cost are: (i) pre-assessment, (ii) full assessment and (iii) annual audits. Grants are available for several sources including the EU.
Further information	http://www.msc.org/

The MSC is an independent, not for profit, international body based in the UK. It was initiated by the World Wide Fund for Nature (WWF) and Unilever, to promote sustainable and responsible fisheries and fishing practices worldwide. The MSC has, in collaboration with a selected group of parties interested in and with experiences in fisheries issues, established a broad set of Principles and Criteria for Sustainable Fisheries (Deere, 1999). Fisheries meeting these standards are eligible for third party certification by bodies accredited by the MSC. Fish processing, wholesaling and retailing companies are encouraged to make commitments to purchase fish from certified fisheries only. Unilever, for example, has since 2005 purchased only MSC certified fish. By opting to use the MSC logo, producers of fishery products are expected to give consumers the option to buy fishery products that have been derived from sustainable, well managed sources (Federal Association for German Industry, 2008).

The MSC standard was developed following an international consultation exercise with a wide range of stakeholders between 1997 and 1999. This consultation included eight regional workshops and two 'expert drafting' sessions and involved more than 300 organisations and individuals around the world. The standard is based on the FAO Code of Conduct for Responsible Fisheries and other international conservation instruments (FAO, 2008). The standard has three main principles:

- Principle 1: Sustainable fish stocks. The fishing activity must be at a level which is sustainable for the fish population. Any certified fishery must operate so that fishing can continue indefinitely and is not overexploiting the resources.
- Principle 2: Minimising environmental impact. Fishing operations should be managed to maintain the structure, productivity, function and diversity of the ecosystem on which the fishery depends.
- Principle 3: Effective management. The fishery must meet all local, national and international laws and must have a management system in place to respond to changing circumstances and maintain sustainability.

Certification is a multi-step process carried out by an independent certifier who is appointed by a fishery. The first stage of the process is the 'Pre-assessment' step. The certifier visits the fishery seeking to identify if it is suitable for a full assessment. A confidential report is prepared by the certifier which explains the certifiers findings and may also give guidance about how to get ready for full assessment. The second step involves the fishery preparing for the full assessment. This may involve discussions with stakeholders, grant application and appointment of staff to oversee the application. Finally the full assessment is undertaken. This, itself, comprises of seven stages to determine if the fishery meets the MSC standard. It involves consulting with stakeholders, developing performance indicators, scoring the fishery, developing improvement strategies, peer review and finally making a decision on standard compliance.

Pros	Cons
• Third party, independent verification	• Not LCA based • Limited application • Not producer specific. Identifies product as matching scheme criteria but cannot distinguish further.

5.4.4. Soil Association

	UK
Example applications	Primary production, food and drink, textiles, health, beauty and hygiene products, ethical trade products
Type and Approach	Type IV
Costs (Feb 2010)	Variable but are typically: For farms: Application fees including first inspection and 6 months' service: ~£200. Annual fee ranges from ~£325-£450. For processors: Application fee including first inspection and 6 months' service: ~£250. Annual fee is based on turnover - typically in the region of £500 to £1000
Further information	http://www.soilassociation.org/

The Soil Association is Britain's best known organic standards setting body, having been established in 1946; and as well as setting standards, they are also heavily involved in organic research, and the public relations side of the industry. Their certification scheme was launched in 1973, and is described as going beyond the standards required by regulation. They have also developed standards for areas not covered by government or EU regulations. These include conservation, fish farming, textiles and health and beauty care products.

Like other organic farming schemes the standards are comprised of a set of best practice and performance criteria to which farmers are required adhere. Farmers wishing to gain certification must fill out a detailed application. Following receipt of the application the Soil Association organises a site inspection and the inspector writes a detailed report and an action summary form outlining any areas where standards have yet to be met. Once any corrective actions have been made certification should be approved.

For first-time farm certification, the soil must meet basic requirements of being free from use of prohibited substances (synthetic chemicals, etc) for a number of years. A conventional farm must adhere to organic standards for this period, often, two to three years. This is known as being in *transition*. Transitional crops are not considered fully organic.

Organic standards are not based upon a life cycle assessment to identify the significant environmental effects. No measurements or scientifically based predictions of environmental releases are undertaken. Instead standards are based on a set of 'best practice and performance' criteria that is used to differentiate the product from main stream non-organic products.

Pros	Cons
• Standards above those set in European law – transparent • Third party, independent verification • Goes beyond EU basic organic standards	• Not based on LCA approach • Actual environmental benefits not identifiable • Not producer specific. Identifies product as organic but cannot distinguish further.

5.4.5. Dolphin Friendly / Dolphin Safe / Salmon Safe

DOLPHIN FRIENDLY	**Used in Canada, Europe, USA**	U.S. Department of Commerce Dolphin Safe	SALMON SAFE
Example applications	Food and wine e.g. tuna products		
Type and Approach	Type IV, Production label		
Costs (Feb 2010)	Unknown		
Further information	http://www.sustainableproducts.com/susproddef2.html#Salmon		

Products bearing this label have been assessed as having production (i.e. fishing, processing) methods that are safe to dolphins and/or salmon. This may include the fishing technique and/or the harmful discharges have not occurred.

Dolphin safe labelling was established in the USA in 1990 with the overall aim of reducing the number of number of dolphin deaths in tuna fisheries in the Eastern Tropical Pacific. The label seeks to assure consumers that the tuna they purchase has not been caught using methods that deliberately hunt, capture or cause the subsequent death of dolphins.

Standards for dolphin-safe tuna have also been developed by the Inter-American Tropical Tuna Commission (IATCC) and the Agreement on the International Dolphin Conservation Program (AIDCAP). AIDCAP is a binding international instrument adopted in 1998 by countries (including Mexico, Venezuela, USA, Spain and Ecuador) fishing for tuna in the Eastern Tropical Pacific (ETP). Parties to the Agreement are required to adhere to certain management measures to progressively reduce dolphin mortality in their fishing operations. Enforcement of these measures, however, is left entirely to the discretion of the individual national fisheries agencies and violations are often ignored. Although a 'binding' agreement, nations can leave at any time – Mexico is currently threatening to leave the Agreement because they cannot falsely label their tuna as 'dolphin-safe' and sell it in the USA. The IATCC/AIDCAP standards are weaker than those international standards approved by the Earth Island Institute (EII) and do not prohibit the intentional chasing, netting or encirclement of dolphins (known as 'dolphin fishing' which is 'dolphin-deadly'). Provided there is no observed mortality or injury to dolphins by onboard IATCC observers, the tuna can be labelled as 'dolphin-safe'. This definition may be misleading as many unobserved deaths are caused by physiological stress (some dolphin schools are chased and netted as often as three times a day), injuries incurred during netting with subsequent death after release and death of calves who become separated from their mothers. Furthermore, the IATCC definition allows mixing of 'dolphin-safe' and 'dolphin-deadly' tuna aboard ship.

With the exception of 'dolphin-friendly' or 'dolphin-safe' labelling of canned tuna, few marine products from wild caught fisheries are labelled to promote environmental responsibility. This is changing, however, as interest in accreditation of fisheries and labelling of fish products as a measure to harness consumer support for conserving fish stocks develops.

Salmon Friendly Products

Wild salmon populations are estimated to be at less than 5% of their historic productivity and occupy only a fraction of their historic range and distribution in coastal watersheds. Due to this critical situation, an effort is underway in the critical agricultural watersheds of the north western U.S. to introduce conservation methods to farms where the runoff of silt is dirtying rivers and killing salmon.

With respect to the salmon version of this label the focus is to introduce conservation methods in critical agricultural watershed regions of north western USA where silt runoff is seriously affecting water quality in salmon rivers. Produce and wine from certified salmon-safe farms is now distributed in over 200 outlets in the USA. Wine from sixteen Oregon vineyards that have adopted erosion controls is certified as "salmon-safe." Altogether the owners of more than 15,000 acres have earned the right to use the designation.

Pros	Cons
• Standards set in European law - transparent	• Not based on LCA approach • Actual environmental benefits not identifiable • Not producer specific. Identifies product as matching scheme criteria but cannot distinguish further.

5.4.6. LEAF Marque

	Linking Environment And Farming (LEAF) UK and Global
Example applications	Primary production, fresh produce
Type and Approach	Type IV
Costs (Feb 2010)	Membership of LEAF is required and ranges from £70 to £212 depending on farm size. Food chain companies (not farmers) require corporate membership ranging from £680 to £2350. LEAF Marque application is payable to the certification body and LEAF take a royalty. Typical costs range from £150.00 to £500.00, depending on farm size.
Further information	http://www.leafuk.org/leafuk/industry.aspx

LEAF (Linking Environment And Farming) was established in 1991 in order to develop and promote Integrated Farm Management (IFM), something it considers to be a "common sense" approach to farming. It does this through the provision of a network of demonstration farms, guidelines and management tools, including the LEAF Audit and LEAF Audit Light, and (more recently) a certification scheme in the form of the LEAF Marque.

The LEAF Marque is intended to be an add-on to an existing farm assurance scheme (e.g. those coming under the Assured Food Standards (Red Tractor) umbrella which are more concerned with quality than environmental protection). Farmers applying for LEAF Marque status must register with a LEAF approved certification body, who will then arrange for an inspection visit; which can be carried out at the same time as other farm assurance assessments. In order to pass inspection, farms must achieve standards in excess of all relevant "critical failure points", and cannot be signed off as passing until they have done so (LEAF, 2007).

Certificates are issued to members in order to define their compliance status, and can have one of four statuses.

- **Full –** Inspected and certified as fully achieved all critical failure points and able to use the LEAF Marque logo.
- **Not approved –** Registered and inspected for the first time but with non-conformances on critical failure points outstanding, farms have 3 months to clear non-conformances on critical failure points.
- **Suspended –** Subsequent inspections have found non-conformances of critical failure points and these have not been cleared within the 28 days (or relate to a food safety issue). Suspended growers will have to re-apply and be re-inspected.
- **Withdrawn –** Certificate has been withdrawn through membership being closed, or failure to comply within the 3-month time limit.

Renewal inspections are arranged once within each scheme year (1st January to 31st December), at intervals of between 6 and 18 months, although this is in part determined by the requirements of other schemes. This variable interval system ensures that inspectors do not always visit a given farm at the same time of year.

In addition to the basic LEAF Marque system, LEAF has developed the LEAF Tracks traceability system. This allows consumers to enter the LEAF Tracks Number on a product label into a web-based search system that will bring back information on the certificate status of the producer, company name, and the crops they grow. Additionally, growers can if they wish add an address, photo, and some additional text.

LEAF Marque is most commonly associated with Waitrose, who have stated that by 2010 all its fresh, prepared and frozen fruit, vegetables and flowers will either be organic, certified by the Soil Association, or have qualified for the LEAF Marque. However, it is not exclusive to them, and is increasingly supplying other retailers (e.g. Marks and Spencer, Tesco and ASDA). In addition, produces data is placed in a web-based directory for buyers, which allows LEAF Marque certified produce to be sourced directly.

The LEAF Marque Standards (LEAF, 2007) have been developed and are reviewed in collaboration with a 'technical advisory committee' made up of regulatory bodies, scientific and technical experts, environmental organisations, industry and growers.

Like other Type IV labelling schemes the standards take the form of best practice criteria and are not based on a life cycle assessment approach. Measurements or estimates of emissions are not made and so the environmental benefits cannot be quantified. Since LEAF Marque is intended to be applicable to all sectors of the agricultural and horticultural industry, the questions on which the certifier must base their assessment on are designed to be generic, and as such concentrate on the procedures in place on the farm to ensure sound environmental practices. The vast majority, rather than setting specific requirements, seek to establish that appropriate management plans are in place to ensure best practice is utilised on a day-to-day basis, and that suitable recording protocols are used to be able to demonstrate that fact.

Pros	Cons
• Third party, independent verification • Goes beyond other primary production assurance schemes that are more quality orientated than environmental (e.g. Red Tractor)	• Not LCA • Actual environmental benefits not identifiable • Not producer specific. Identifies product as matching scheme criteria but cannot distinguish further

5.4.7. KRAV

	Sweden (and beyond)
Example applications	Organic food, restaurants and industrial kitchens, fishing, and textiles
Type and Approach	Type IV
Costs (Feb 2010)	Unknown
Further information	http://www.krav.se/sv/System/Spraklankar/In-English/

KRAV has been a major player in the organic market in Sweden since 1985 and have developed organic standards under the KRAV-label. Like other organic food labels the standards go beyond environmental protection and also consider human health, animal health and welfare and social responsibility.

The KRAV label is administered and managed by the Swedish society for the inspection of organic cultivation. Its overall strategy and organisation is as an incorporated association with, at present, 27 members that includes farmers and other stakeholders including processors, suppliers and representatives from consumer, environmental and animal welfare groups.

KRAV has adapted the standards to IFOAM Basic Standards (see Section 5.4.1). The KRAV standards also fulfil the EU standards for organic production in the regulations (EC) No 834/2007, (EC) No 889/2008 and (EC) No 967/2008. In some cases the KRAV standards are stricter than the EU standards (NZ Trade and Enterprise, 2009). The KRAV standards encompass more areas, such as certification of restaurants and industrial kitchens, fishing, and textiles (Cejie, 2009). KRAV's regulations are strict in terms of animal husbandry and the cultivation of crops, but they have resulted in 4.1% of Sweden's agricultural area being organically farmed today.

As is the case for other organic standards and Type IV labelling schemes the KRAV standards take the form of best practice criteria and are not based on a life cycle assessment approach. Measurements or estimates of emissions are not made and so the environmental benefits cannot be quantified.

Recently, KRAV announced that their certified producers will have to satisfy additional standards focused on reducing greenhouse gas emissions. These will include using renewable fuels, significant measures aimed at reducing energy consumption across the farm and reducing nitrogen emissions during fertiliser spreading.

Pros	Cons
• Third party, independent verification • Goes beyond EU basic organic standards	• Not LCA • Actual environmental benefits not identifiable • Not producer specific. Identifies product as organic but cannot distinguish further

5.4.8. Other Type IV Food Labels

- **Assured Food Standards:** Assured Food Standards (AFS) was established in 2000 and was set up to manage the assurance schemes in the principle commodity sectors and promote them under a single banner known as the 'British Farm Standard' (BFS) using the 'little red tractor' logo. There are 10 schemes that fall under the umbrella of AFS. Six of these are wholly-owned subsidiaries of AFS and the others are separate organisations that have equivalent status. The schemes include Assured Produce, Assured Combinable Crops Scheme, Assured Chicken Production and Assured British Meat. Schemes not wholly owned but considered equivalent include Genesis Quality Assurance, Farm Assured Welsh Livestock and Quality Meat Scotland. These are all Type IV schemes and are not strictly speaking eco-labels but more concerned with food safety, quality and animal welfare to gain a marketing advantage.
- **Demeter Biodynamic:** This label is associated with cotton products and indicates that they were produced without the use of synthetic pesticides and fertilisers, and without animal by-products. They prohibit the use of genetic engineering. This is a third party verified, Type IV label based on best practice guidelines, and does not use an LCA approach.
- **Certified Naturally Grown:** A USA label scheme whereby primary producers commit to sustainable practices by adhering to natural biological cycles. The use of direct marketing is highly encouraged. This label utilises the USDA National Organic Program's standards for crop and livestock production, but provides an alternative certification process that omits monetary and paperwork requirements. Verification occurs through peer inspection, meaning that certified producers audit each other's farms annually. Producers are also subject to random

plant tissue testing for chemical residues. Each certified producer's application and up-to-date records are posted online for public viewing. The certification is free, although a yearly donation from producers of $50 to $175 is encouraged.

- **Protected Harvest:** This scheme uses the principles of Integrated Pest Management, which aims to reduce the application of chemicals on farm crops by encouraging the beneficial ecological relationships among agricultural crops and insects, microorganisms, etc. Specific practices include field walking, weed, disease, and insect management, ecosystem restoration. Producers first seek to prevent pest problems with mechanical controls then biological controls. Chemical controls may be utilised only as a last resort but must stay below a designated number of "Toxicity Units." Genetically engineered crops are prohibited.
- **Stemilt Growers, Inc**., a large fruit packer in the USA, instituted an in-house Integrated Farming program several years ago called **'Responsible Choice'**. They based their approach on the Environmental Impact Quotient (Kovach *et al*., 1992). The program encompasses aspects of both field production and packing. It focuses on the four core areas of Integrated Pest Management (IPM), worker safety, environmental safety, and consumer safety, within the boundaries of market economics. However, the approach proposed by Kovach *et al*. has been severely criticised by many researchers (e.g. Bues *et al*., 2004, Newman, 1995) and is now outdated.
- **Predator Friendly:** This is a US label that recognises the important role of native predators and farms to conservation. In 1991, a coalition of ranchers, conservationists and clothing manufacturers began to certify wool growers using Predator Friendly practices. Many predators are critical to an ecosystem and Predator Friendly producers coexist with coyotes, bears, mountain lions and other wild animals. Certified farms and ranches use humane practices to keep livestock safe and wildlife alive. Through pasture management strategies, guardian animals such as dogs and llamas, and vigilant observation, Predator Friendly producers reduce the risk of conflict between livestock and wildlife. In 2003, the program expanded to include producers of meats, eggs, honey and other food products.
- **The Eco-OK** label identifies cocoa, coffee, orange juice, oranges, and bananas that have been grown in a socially and environmentally responsible manner. The Rainforest Alliance - together with several Latin American conservation groups - works with companies to help them implement these guidelines.
- **The California Clean** label began in 1988, when a group of farm families joined together to promote environmentally responsible farming and strengthen small family farms. They called themselves the California Clean Growers Association. Since that time the Growers Association (CCGA) has grown to become an internationally known organisation that has received extensive recognition in the news media and from other environmental organisations. CCGA focuses on grower education and research, giving farmers a forum to share knowledge about natural farming.
- **Partners with Nature** is an Integrated Pest Management (IPM) certification program that recognises Massachusetts growers who have taken special steps in practicing IPM. It is a collaborative venture between the Massachusetts Department of Food and Agriculture, University of Massachusetts Extension Program and the USDA Consolidated Farm Service Agency (CFSA). Growers who follow specific procedures, meet specific IPM standards, document their practices and complete a verification process become IPM-certified and can display the Partners with Nature trademark and logo at their farm.

5.5. Non-food eco-labels: Type I

5.5.1. EU Eco-Label Award Scheme

	**European Flower Logo** Used in the European Union and the EEA countries (Norway, Iceland and Liechtenstein).
Example applications	Product groups include cleaning products, appliances, paper products, textile and home and garden products, lubricants and services such as tourist accommodation.
Type and Approach	Type I – Utilises an LCA approach on a product group basis
Costs (Feb 2010)	Application costs between €200-€1200 plus a €1500 annual fee
Further information	www.ecolabel.eu http://ec.europa.eu/environment/ecolabel/index_en.htm

The European Eco-label was set up in 1992 to encourage businesses to market products and services that meet prescribed environmental and performance standards (CPI, 2008). Products and services that meet the required criteria are awarded the Eco-label status and are permitted to use the flower logo for marketing in order to demonstrate high standards and to allow consumers to make reasoned choices. The voluntary nature of the scheme means that it does not create barriers to trade and many producers find that it gives them a competitive advantage. The EU Eco-label is part of a broader action plan on Sustainable Consumption and Production and Sustainable Industrial Policy adopted by the European Commission on 16 July 2008 (Federal Association for German Industry, 2008).

The scheme is managed at EU level by the Eco-labelling Board (EUEB). At national level the scheme is managed by a 'Competent Body' which is an independent and neutral organisation responsible for implementing the scheme. The EUEB is comprised of representatives of the Member State Competent Bodies and other interested parties. The EUEB, in collaboration with the European Commission, is responsible for developing, publishing and promoting criteria for product groups in order to minimise the environmental impacts of a wide range of products and services over their whole life-cycle. In the UK the Competent Body is Defra (England and Wales) and TUV NEL Ltd (Scotland).

The European Eco-label covers a range of product groups, including household cleaners and detergents, personal hygiene products such as soaps and shampoos, electrical equipment and computers, furniture, and DIY products such as paints and varnishes. The environmental and performance criteria are defined at product group level and are identified on the basis of comprehensive studies of the environmental aspects related to the entire life cycle of the product - starting from raw material extraction in the pre-production stage, through to production, distribution and disposal. The environmental and performance standards are agreed at European level, following wide consultation with experts. The standards are normally reviewed every three years to allow for regular revision to take into account technical improvements and changes in the market. This may require the life cycle studies to be repeated. Currently product criteria do not include carbon footprinting however work is currently ongoing to see if this can be systematically considered within the Eco-label criteria development process.

As an example consider the criteria for indoor paints and varnishes (taken from 2009/544/EC: Commission Decision of 13 August 2008 establishing the ecological criteria for the award of the Community eco-label to indoor paints and varnishes (notified under document number C(2008) 4453)):

- A limit on the white pigment content.
- Limits on the emissions and discharges of wastes from the production of any titanium dioxide pigment including SO_X emissions, sulphate and chloride wastes.
- Limits on volatile organic compounds (VOC).
- Limits on volatile aromatic hydrocarbons (VAH).
- A ban on the use of certain heavy metals and limits on others.
- The product must not be classifiable as very toxic, toxic, dangerous to the environment, carcinogenic, toxic for reproduction, harmful, corrosive, mutagenic or irritant in accordance with EU Directive 1999/45/EC.

The product must also meet certain requirements regarding fitness-for-use such as its spreading rate and coverage, wet scrub resistance, water resistance, adhesion, abrasion and provision of consumer information on the packaging.

Applications from companies wishing to use the Eco-label are made via the appropriate national Competent Body. The applicant must develop and submit a detailed dossier of data to the Competent Body which includes a full LCA analysis of the product performed according to the SETAC guidelines and the draft ISO standards on LCA (ISO 14040 series). The aim of the LCA is twofold: to give an overview of all environmental aspects related to the life cycle of the product and to identify the most important processes and emissions with respect to the environment. This dossier is then assessed against the prescribed environmental and performance standards. The label itself is only awarded after verification that the product meets these high environmental and performance standards.

In March 2009 MEPs backed Commission plans to make the voluntary EU Eco-label system for environment-friendly products, less costly and bureaucratic to use. Consequently a new Regulation came into force in February 2010 that aims to allow faster and more efficient criteria development and revision procedures. The goal is to increase the number of product groups covered by the scheme to between 40 and 50 by 2015, with an emphasis on products that have the most significant environmental impacts and the highest potential for improvement. Other changes include a reduction in fees and linkages to public purchasing and other EU policies.

See also Sections 6.1 and 6.2 for information on the EU flower label on food items and regarding carbon footprinting,

Pros	Cons
• LCA based • European wide • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.2. The Blue Angel

	**Der Blauer Engel (The Blue Angel)** Used mainly in Germany
Example applications	Very wide range of non-food product groups: approx 10,000 products and services in 80 different product categories.
Type and Approach	Type I – Utilises an LCA approach on a product group basis
Costs (Feb 2010)	One off handling fee of €250 plus annual fee relating to the turnover of the eco-labelled product. State subsidised.
Further information	www.blauer-engel.de/en/index.php

The Blue Angel was introduced in Germany in 1978 (RAL Umwelt, 2008; OECD, 1999; Schwar, 1999; CPI, 2008; Federal Association for German Industry, 2008) and was one of the first eco-labels to emerge. The main objective of the scheme is to inform consumers about the environmental and health credentials of specific products and services allowing them to make informed purchasing decisions. The scheme seeks to ensure consistency, clarity and safety within specific product categories. A licence to use the Blue Angel logo to professionally promote eco-friendly products in the market is awarded to manufactures for specific products when compliance with certain criteria is demonstrated.

The Blue Angel offers industry, trade and crafts companies the opportunity to document their environmental competence in a simple and inexpensive, transparent way. It is claimed that by using the Environmental Label, they can significantly increase the competitive market potential for their products and services.

The Blue Angel is owned by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. The Basic Award Criteria are established by the Federal Environmental Agency "Eco-labelling, Eco-declaration and Eco-procurement" department and then debated and adopted by the Environmental Label Jury (Jury Umweltzeichen) (RAL Umwelt, 2008) usually with the support of consumer associations, scientific institutes and the industries. The Jury decides on the products and services to be awarded the Blue Angel as well as on the underlying Basic Award Criteria and the respective product compliance verifications. Anyone can submit proposals for a new product category.

Life-Cycle Analysis is used to identify the most important environmental impacts associated with a product from manufacture to use and ultimate disposal, and criteria are developed to address these. The product groups are currently classified into four different 'protection goals': health, climate and energy, water and resources. Whilst an individual product might excel and be classified within a specific protection goal, they must also meet exacting requirements with respect to other environment and health issues. The label-award agency is the German Institute for Quality Assurance and Labelling (RAL gGmbH) that also administers the European Flower scheme in Germany.

Compliance with the criteria is monitored through the mechanisms of free market competition. The scheme administrators follow up all incoming information from competitors, consumer associations and individual consumers on possible abuse. License to use the eco-label may be withdrawn if the

terms of the contract are not respected. Licenses are currently awarded for a minimum of four years. However, if the criteria within a product category are revised license holders must re-apply and demonstrate their compliance with the new criteria.

Currently, about 10,000 products and services in 80 product categories carry the Blue Angel eco-label. Products include asbestos free brake and clutch linings, hairsprays, deodorants and other sanitary/cosmetic products, biodegradable lubricants, heating systems, paper products, mobile phones and other electrical devices, paints, lacquers and varnishes and products used for horticultural and landscape gardening.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.3. The Nordic Swan

	Miljömärkt Used in the Nordic countries – Denmark, Finland, Norway, Iceland and Sweden
Example applications	Covers 66 different non-food product groups from washing-up liquid to furniture and hotels
Type and Approach	Type I – Utilises an LCA approach on a product group basis
Costs (Feb 2010)	Application fee of around €2000 plus annual fee relating to the turnover of the eco-labelled product – usually around 0.3-0.4%
Further information	www.svanen.nu

The Nordic Eco-label was first introduced in 1989 by the Nordic Council of Ministers which is representative of the five Nordic countries. It is now one of the most well-known eco-labels in the world. At present the label covers over 65 different product groups including washing-up liquid, batteries, furniture, and paper products. The label has also been successfully applied to service industries such as hotels, youth hostels, cleaning services and supermarket style grocery stores (OECD, 1997; CPI, 2008).

For each product group representatives from industry, the research community and environmental organisations propose a set of criteria, which is then reviewed by national authorities and finally approved by the Nordic Eco-labelling Board. The criteria take into account environmental factors throughout the product's life cycle from raw material use, production processes and distribution, transport, use and disposal. Experience has shown that that it is impracticable to consider the full influence on the state of the environment. Consequently, the most important parameters are identified, such as consumption of natural resources and energy, emissions into air, water and soil, as well as generation of waste and noise. The criteria established are selected such that they are precise, measurable and are generally based on existing standards. Criteria are reviewed and updated on a regular basis to take account of changing technologies and standards.

As an example the current criteria for dishwasher detergent include:

- An assessment of the Critical Dilution Volume. This is a measure of how much water is needed for a detergent formulation to have no traceable environmental impact. It is calculated from the dosage, degradation rate and toxicity of the ingredients.
- Certain toxic and environmental substances must not be present. There are also limits on allergenic substances, certain bleaches and surfactants. Ingredients should be readily anaerobically biodegradable.
- Phosphorus content. The total quantity of phosphorous must not exceed 2.0 g/wash and the total quantity of phosphonates must not exceed 0.05 g/wash. National legislation takes precedence over this requirement.
- There are specific guidelines related to the fragrance content with bans on some substances and content limits on others. Only approved colourants may be used.
- There are limits on the dosage. The maximum dosage must not exceed 20 g/wash.
- There are special regulations for packaging and the provision of consumer information. For example, PVC and other halogenated plastics must not be used for packaging. The 'fill ratio' is also considered. This is the ratio between the number of doses and the package volume in litres.
- Performance must be tested and declared according to specific regulations (EN 50242).

Applicants wishing to apply for the right to use the Swan label must demonstrate that their product meets these criteria by submitting a dossier providing environmental, quality and health arguments appropriate to the product. Analytical data must come from independent laboratories, certificates and control visits. If the evidence is assessed as complying with the product group criteria the applicant is invited to agree to the voluntary license system that defines the scheme regulations for using the label. The licensee must guarantee compliance with safety regulations, working environment legislation, environmental legislation and conditions/concessions specific to the operations at all sites where the Nordic Eco-labelled product is manufactured or the service provided.

For a product to successfully win the right to use the label, it must be of equivalent quality and cause less environmental harm and hygienic hazards than the alternative products. Foreign products may be awarded the eco-label if they comply with the criteria. They often obtain the eco-label following a request from the Nordic importer.

The licence generally lasts for three years after which the applicant must re-apply. During the licence period the applicant must notify the eco-labelling organisation before any major changes are made to processes, product composition, design, materials, etc. that may affect the properties and environmental impact of the product in relation to the criteria document. The Eco-label authorities also undertake site inspections to ensure that there is full compliance with the scheme regulations and that the submitted dossier is accurate.

One other objective of the Nordic Swan administrators is to work towards the harmonisation of eco-labelling programmes in the Nordic countries, in order to avoid confusion in the marketplace resulting from a proliferation of such schemes.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.4. Bra Miljöval - Good Environmental Choice

	**'The Good Green Buy' also known as the Falcon.** Administered in Sweden but used throughout Scandinavia (Sweden, Norway, Denmark, Finland)
Example applications	Agriculture, forestry and fishing; Manufacturing; Transport, postal and warehousing; Electricity supply
Type and Approach	Type I
Costs (Feb 2010)	The fee is ~6000 SEK for the first product and ~2000 SEK for each additional product. This fee is paid only once unless the product is disqualified and a new application is submitted.
Further information	http://www.naturskyddsforeningen.se/in-english/Ecolabelling/

The Bra Miljöval or Good Green Buy label was established in 1988 by the Swedish Society for Nature Conservation (SSNC) and three Swedish retailers, who now collectively control 75% of the grocery business in Sweden. The retailers provide three quarters of the financing for the scheme and the SSNC the balance.

The label is administered by a Board comprised of representatives of SSNC and the retailers. This Board selects the product categories for which criteria should be developed and decides when to revise the criteria (OECD, 1997).

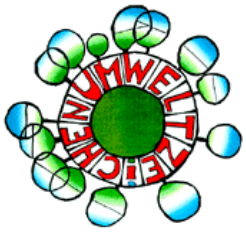
SSNC develop the criteria within product categories for approval by the Board. Initially a preliminary study is conducted to identify the main environmental impacts of the products being considered for labelling. This study includes interviews with a range of manufacturers and retailers. A report from this study, which includes a ranked list of environmental impacts, is then circulated for comment to industry, scientific organisations, universities and trade representatives. Once comments have been received, these are considered alongside the study report by SSNC. On the basis of the proposal and the outcome of discussions, agreement is reached on criteria for the product category. The criteria are established so that approximately 10 to 15% of the existing market should qualify for the label. The Board then decides when the criteria should take effect and how frequent a revision or review will be needed. Criteria may be revised at any time, after which manufacturers holding an existing Eco-label licence in that product category are given 6 months to comply with the new criteria.

Once the final product group criteria have been formalised, applications for labelling can be made. Applicants must declare the composition of their products to the SSNC and products which meet the criteria will be awarded use of the label. The products are not tested for compliance, a licence is granted on the basis of the information and guarantees provided by the applicant, including results from laboratory testing if necessary. If the information provided is found to be unreliable, the applicant may be subject to heavy fines.

Currently, the Bra Miljöval has been awarded for a wide range of goods and services in twelve product categories. Products include electricity supply, paper and textile goods, freight and passenger transport, detergents, household cleaners, stain removers and bleaches, soaps, shampoos, nappies, newspapers and batteries.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.5. Umweltzeichen Bäume

	**Good Environmental Choice** Mainly seen in Austria
Example applications	Building sector, household products, cleaning and sanitary, renewable energy sources and energy efficiency, office equipment and gardening / horticultural products.
Type and Approach	Type I
Costs (Feb 2010)	An annual fee relating to labelled product turnover is payable. Typically this is around 0.1%. In addition, an initial, one-off handling fee of about 25% of the annual fee is changed.
Further information	http://www.umweltzeichen.at/

The Austrian eco-label was developed by the Ministry of Land, Forestry, Environment Protection and Water Management (Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft – BMFLUW) in 1990. The elaborate and distinctive label is used in both coloured and black and white versions and both are protected trademarks. The label symbolises the connection of earth, water, air and nature, where the Earth is situated in the middle and is covered with trees (CPI, 2008).

The Austrian Eco-Label (CPI, 2008) seeks to provide consumers with information on the environmental impact of production, use and waste disposal of products and presents the environment friendly product alternatives to consumers. It seeks to motivate producers and service companies to produce and offer less environment-polluting products. More specifically a life cycle approach to establishing environmental impacts is utilised and the following issues are considered:

- Consumption of raw materials and energy
- Toxicity of the product components
- Emissions (e.g. air pollutants, greenhouse gases, sewage, noise, odour)
- Disposal/recycling (waste, recycling potential)
- Packaging
- Distribution and transport

As with most eco-labels of this type, product groups are selected for the scheme and a suite of standards or criteria is established for each group. An expert working group is established for each product category and their task is to discuss proposals regarding the criteria in collaboration with government bodies and the Consumer Association, and where possible, to come to a unanimous decision regarding the criteria.

Manufacturers wishing to use the eco-label must prove that their products or services meet these criteria. Proof is submitted to the administrating body in the form of a certificate issued by an accredited testing body. The certificate is than verified by BMFLUW or the VKI (consumers' association). The licence to use the eco-label is granted for 1 year. If the baseline criteria have not

changed and the product processes have not changed then the licence can be renewed for a further year. A fresh application must be made after 3 years. Applicants must be residents of Austria.

The eco-label products comprise, for example, mineral water, cleaning agents, wooden furniture, lacquer, light bulbs, and electricity supply. Additionally, the label is given to the tourism industry, for example hotels, restaurants and inns, schools and training facilities.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.6. Environmental Choice

	Canada Mainly used in Canada but may be found on some products in the USA
Example applications	Office equipment, paper goods, printing services, adhesives, paints and solvents,
Type and Approach	Type I
Costs (Feb 2010)	Initial verification and audit is variable but typically $1,500 – $5,000. Price depends on type and number of products. Subsequent verification for additional products/services is typically $250 - $2,000. Annual fees are based on sales typically 0.5% with a minimum fee of $2000 per product category.
Further information	http://www.ecologo.org/en/

Canada's Environmental Choice Program is an eco-labelling scheme that was established by Environment Canada in 1988 to help consumers identify services and products which are less harmful to the environment. The label is now one of the most recognisable eco-labels in North America and seeks to address multiple environmental attributes related to both human health and environmental impacts across the life cycle of a product or service. In doing so, the scheme only certifies those products and services which represent environmental leadership (OECD, 1997; CPI, 2008; GEN, 2008).

The scheme administrators claim that the Standard Development and Review process is scientifically rigorous and robust and guided by the principles of transparency and openness. The process begins with a critical evaluation of the environmental profile of the product or service of interest. This includes a life cycle assessment, a profile of the industry and assessment of potential economic impacts and benefits, and an assessment of the market status of the product category. Stakeholder input during the standard development or review process, and public consultation on draft standards constitute a large part of the process and are considered to be essential to the success of the Program. A new on-demand approach is now used to choose product categories for eco-labelling, whereby industry expresses an interest in the development of a guideline for a product category.

Guidelines, standards and criteria are generally reviewed every three years to ensure they continue to be relevant and appropriately stringent. They may then be reconfirmed, revised or revoked. The

criteria may however be revised at any time, if significant technical or market developments occur. For instance, if large portions of the marketplace are able to meet the criteria, the criteria may be tightened.

After the standard is finalised, any manufacturer that demonstrates compliance with the stringent requirements within a specific product group is eligible for certification. Following a successful third-party audit of the product against the standard's requirements, certification can be claimed, and the product can bear the Eco-Logo mark.

There are currently thirteen product and service categories for which standards have been established. Products and services currently awarded the eco-label include adhesives, batteries, domestic cleaning products, paper goods, floorings, lubricants, paints and solvents, and electricity supply

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.7. NF Environment

	NF Environment Found mainly in France but is seen occasional throughout Europe.
Example applications	Automobiles, finance industry, construction, energy, tourism, transport, sports, domestic products such as paints and varnishes, dustbin bags, adhesives, mechanical washing aids and vacuum cleaners.
Type and Approach	Type I
Costs (Feb 2010)	An initial registration fee is payable plus site visit fees and compliance test fees. Annual fees related to turnover of the labelled product are also payable – typically 0.1%
Further information	http://www.marque-nf.com/pages.asp?ref=gp_reconnaitre_nf_nfenvironnement&Lang=English

This is a voluntary French scheme that took three years to set up and was finally introduced in 1991. The scheme is administered by the NF Environment label Committee ((CFE) comprised of industry, distributors, environmental organisations, consumer associations and public authorities), the French Environment and Energy Management Agency (ADEME), AFNOR Certification (the French standards organisation) and the chairperson of the Scientific Council, which is a network of environment experts appointed by the Director General of AFNOR. A "Groupe de travail restreint" or limited working group, formed of a representative from each interest group (industry, retailers, environment and consumer NGOs), ADEME and AFNOR is responsible for developing the draft criteria within each product group related to environmental protection and fitness for purpose (CPI, 2008; OECD, 1997).

New product groups for eco-labelling are generally proposed by industry representatives or environmental authorities. The proposals are considered by AFNOR and CFE and if accepted work begins to establish draft criteria. The first step is a preliminary feasibility study conducted by ADEME in collaboration with industry. If this study is acceptable the work moves on to the criteria (technical rules). Once established the draft rules are released for industry consultation. Comments are then considered before the draft criteria are adopted by majority vote of the CFE and finally ratified by the General Director of AFNOR. Criteria are to be revised systematically every 3 years, following which the eco-label may be extended, modified or cancelled. Criteria are established such that they apply to 5-30% of products in a particular category.

Manufacturers make their application to AFNOR who appoint an auditor and arrange a site visit to inspect the products. The eco-label is awarded if audit and test reports confirm compliance with the eco-label criteria. Periodic validation checks are undertaken to ensure compliance with the eco-label criteria. In the event that a licensee is found not to comply with the criteria or scheme regulations sanctions are applied, which may include the suspension or the withdrawal of the right to use the eco-label.

Initially French industry was strongly opposed to the eco-label and several key industries were not covered including pharmaceuticals, services and the automobile sector. However, many of these sectors are now included.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.8. Green Seal

	USA Rarely seen outside of the USA
Example applications	Construction materials, equipment and systems, cleaning products, office and communication products, toiletries and paper goods.
Type and Approach	Type I
Costs (Feb 2010)	Variable – Evaluation fees are determined based sales income and are typically $1000- $10,000 depending on single or multiple product registrations. Annual monitoring fees are also changed and are typically $1000- $7,000
Further information	http://www.greenseal.org/about/index.cfm

The Green Seal was established in 1989 and is a non-profit making organisation. It claims to use science-based environmental certification standards that are credible, transparent, and essential in an increasingly educated and competitive marketplace. Green Seal issued its first environmental standards in 1991-2 and the first product certifications were completed in 1992 (CPI, 2008; OECD, 1997).

Product categories are selected for inclusion in the scheme based upon a number of different factors including the significance of environmental impact, the opportunity for its reduction, public interest, manufacturer interest and promotional opportunity.

Criteria (also known as standards) within product or service categories are established using a life-cycle approach to ensure that all significant environmental impacts are considered in the development of a standard, from raw materials extraction through manufacturing to use and disposal. Such an evaluation involves thorough, state-of-the-art scientific evaluations using internationally accepted methodologies. An Environmental Standards Board formed of experts such as academic scientists approves the final criteria. The scheme seeks to identify environmental leadership and therefore a maximum of 15-20% of products in the same product category should be able to comply with the criteria. The criteria are revised every three years.

Once certified, products are subject to ongoing compliance monitoring to ensure that the product offered for sale continues to meet the Green Seal standard. Any deviation is immediately brought to the manufacturer's attention and corrective action must be instituted within an appropriate time. Non-compliance may result in termination of the manufacturer's privilege to carry the Green Seal on its product.

Hundreds of products and services from major companies such as 3M, Benjamin Moore, and Andersen Windows have now been certified to meet Green Seal standards, and the number of major product categories covered by standards has increased to more than 40. These include construction materials, equipment and systems, household cleaning products, office and communication products, soaps and other toiletries, paper products and food associated products such as paper coffee filters, baking paper and paper plates. However, food products themselves are not included.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.9. Thai Green

	Thailand Administered and mainly seen in Thailand but can be found on some products throughout the East.
Example applications	Fluorescent Lamps, household white goods, paints and varnishes, paper goods, detergents and household cleaning products, computers and electronics, building materials, soaps, shampoos and hygiene products and many others.
Type and Approach	Type I
Costs (Feb 2010)	An application fee of 1,000 Baht (~ €25) is charged to all applicants. Upon approval of the product, applicants must pay a user fee of 5,000 Baht (~€125) for the license to use the label throughout the contract term.
Further information	http://www.tei.or.th/greenlabel/

The Thai Green Eco-label Scheme was initiated by the Thailand Business Council for Sustainable Development (TBCSD) in October 1993 as a TBCSD council project. It was formally launched in August 1994 by the Thailand Environment Institute (TEI) in association with the Ministry of Industry. Participation in the scheme is voluntary. Scheme administration is undertaken by the Labelling Board. This is comprised of representatives from government, industry, consumer associations, marketing associations and the Thai standards association. The tasks of the board are to decide on the basic strategies of the green label scheme, to select product groups, decide on the group criteria for awarding the label and to decide on issues such as fees, advertising and other supporting activities (CPI, 2008).

A technical subcommittee, with participation from TEI and other stakeholders develops proposals for green labels including product criteria, test methods (if necessary), and other requirements for applicants. A new subcommittee is established for each selected product category and this consists of experts from institutes, industry, and environmental groups and others if appropriate and available. Together with the proposals, the technical subcommittee reports on the environmental significance and the impacts of the product group and estimates the market share of the product group. Product criteria are reviewed every two years.

The green label criteria are developed using an environmental assessment of the product throughout its life cycle, taking into account all aspects of environmental protection, including the efficient use to raw materials and focusing on opportunities to achieve significant reductions in detrimental environmental impacts. The criteria also takes into account the contribution the product might make towards policy issues particularly those with a high political priority such as waste reduction and climate change/energy efficiency.

The Green Label is awarded to specific products that are shown to have minimum detrimental impact on the environment in comparison with other products serving the same function. The scheme is developed to promote the concept of resource conservation, pollution reduction, and waste management. Its objectives are to provide reliable information to consumers to enable them to make informed choices thus creating market incentives for manufacturers to develop and supply more environmentally sound products.

If the product is proven to meet the product criteria a licence is issued giving the manufacturer the right to use the Green Label for a maximum period of two years or until the criteria for Green Label status are re-evaluated.

The Thai Green Label Scheme applies to products and services, not including foods, drinks, and pharmaceuticals. Products or services which meet the Thai Green Label criteria can carry the Thai Green Label.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.10. Vitality Leaf

	Russia Only found in Russia.
Example applications	Household cleaners and detergents, household electrical items such as vacuum cleaners and televisions, shampoos and personal hygiene products.
Type and Approach	Type I
Costs (Feb 2010)	Unknown
Further information	http://www.ecounion.ru/ru/site.php

The Russian eco-label "Vitality Leaf" was developed by a non-commercial partnership "Saint-Petersburg Ecological Union" (SPbEU) in 2001. The "Vitality leaf" eco-label is unique in Russia.

The schemes main objective is to encourage the demand for and supply of those products and services that cause less environment damage by providing full environmental information to consumers. It seeks to motivate manufacturers to reduce their environmental impacts by identifying those that are the best environmental performers and so able to provide leadership. As such the scheme aims to improve environmental quality and encourage the sustainable use of resources.

For each product group draft criteria for the product lifecycle (excluding the finished product) are developed by environmental experts in the field of water, air, soil and waste pollution. Draft criteria for the finished product are developed by scientific institutes and hygienic experts. The draft criteria are then sent for approval to the Scheme controlling bodies, governmental bodies (e.g. the Committees of St. Petersburg City Administration), public organisations (e.g. Chamber of Commerce and industry) and independent expert institutes.

The final criteria will include a range of constraints such as:

- The absence of (or restrictive limits on) certain prescribed substances in the finished product that may be harmful to humans or the environment;
- Safe and sustainable extraction and use of primary resources used in the product;
- Minimum negative effects on the environment and human health during all stages of the products life cycle including production, packaging, distribution, transport, use and end of life disposal.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.11. AENOR Medio Ambiente

	**Spain** Administered and found on products in Spain and sometimes Portugal.
Example applications	General consumer products, paints and varnishes, refuse sacks and plastic bags, paper products, reprographic machinery and photovoltaic modules etc.
Type and Approach	Type I
Costs (Feb 2010)	Variable, related to the annual turnover of the product and the product group
Further information	http://www.aenor.es/

The Spanish eco-label was developed by the private and independent Associación Espanola de Normalización y Certificación (AENOR) and first awarded in 1994. The administrative institution is the Technical Certification Committee comprised of representatives of industry, trade, manufacturers, consumer protection and environmental protection organisations and the competent ministries. The Committee's responsibilities include the determination of product group criteria and confirmation of product compliance with these criteria before awarding a licence to use the label (CPI, 2008).

Product group criteria are focused on the life cycle stages which have the largest environmental impact, whether this be due to the existence of toxic substances, polluting emissions, or another reason. Consequently, the whole product life cycle is examined including manufacture, distribution, use, and disposal. The impact of these stages is evaluated on three mediums: air, water, and soil.

Applicants must present an application to AENOR that includes evidence that the product meets the necessary standards. AENOR technical services visit the applicant's facilities, where evidence provided in the application is checked and verified. Samples for independent testing may also be taken. Once the documentation and the inspection and laboratory reports have been studied, the Environmental Technical Certification Committee decides whether or not to grant the right to use the label. Licences are usually awards for three years. During the three-year duration of the contract, the product may be subject to regular checks at the manufacturing site and samples may be taken at the point of sale. Licence holders must also comply with regulations regarding the placing of the eco-label on products, its size and presentation.

There are currently around 450 products in 12 product groups holding licences to use the label.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.12. Eco Mark Japan

	**Japan** Rarely seen outside of Japan.
Example applications	Product groups are varied and include clothes, bags, household textiles, cleaning products, paper goods, oils and lubricants, plastic goods, building and construction products and computers.
Type and Approach	Type I
Costs (Feb 2010)	The license fee is relative to the retail price and sales volume of the awarded products and is typically 10,000 to 1 million yen. (approx €100-€8300)
Further information	http://www.ecomark.jp/english/

The Eco Mark scheme is administered by the Japan Environment Association (JEA) with the help of two advisory bodies: the Eco Mark Promotion Committee and the Eco Mark Expert Committee. The Eco Mark Promotion Committee is formed of specialists in environmental conservation, specialists from administrative agencies, consumer groups and relevant enterprises. This Committee selects product categories, approves the criteria for the Eco Mark eco-labels and establishes policies and regulations related to running the scheme. The Eco Mark Expert Committee is formed of experts in environmental impact assessment and is responsible for preliminary surveys and approving Eco Mark products (CPI, 2008; OECD, 1997).

Product categories can be suggested by anyone and these suggestions are then considered by Eco Mark Promotion Committee. If accepted a working group, set up by the Secretariat, formed of experts and interested parties establishes a draft of the eco-labelling criteria on the basis of the analysis of environmental impacts throughout the product's life cycle. The product's life cycle is considered taking into account a selection of environmental impacts including the consumption of resources, emissions of greenhouse gases, emission of ozone layer depleting substances, destruction of eco-systems, generation of air and/or water pollutants, emission/disposal of wastes, use/emission of toxic substances and other environmental impacts. The draft criteria are then released for public consultation. The final criteria are then established based on the draft and the comments gathered during the consultation exercise. The objective is to establish criteria that only a small percentage of products within a category will obtain. Criteria are regularly revised (every 3 to 5 years) to ensure only the highest performing products earn the label. As an example, the criteria established for clothing include:

- Fibre content and the proportion of virgin and recycled fibres,
- Use of chemicals used in product finishing, bleaching and dying. Certain chemicals are prohibited,
- Use of chemicals or mildew proofing, fluorescent whitening, softening and sanitation. Certain chemicals are prohibited.
- Use of fire retardant agents.
- Recycling potential.

When the criterion for a particular product group has been finalised manufacturers and service providers may apply to use the logo and submit evidence that the criteria are matched. Once the

application has been approved, a license contract will be issued for the use of the Eco Mark, effective for two years and is renewable.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.13. Environmental Choice - New Zealand

	New Zealand Extensively seen throughout New Zealand and Australia.
Example applications	Household detergents, recycled plastics, paper products, personal hygiene goods, carpets, furniture and household fittings, construction materials and textiles.
Type and Approach	Type I
Costs (Feb 2010)	Registration fee of $250 (~€125), a Verification and Application Processing Fees charged at cost+5% and an annual sales dependant fee ranging from $750 (~€375), to $17,500 (~€8750).
Further information	http://www.enviro-choice.org.nz/

New Zealand's 'Environmental Choice' eco-label was developed by the Ministry of the Environment in 1990 and the first labels were awarded two years later. It is a voluntary, multiple specifications based environmental labelling programme, which operates to international standards and principles (CPI, 2008). The schemes administrative bodies involved in developing the criteria and in the award procedure are Telarc (Accreditation Authority for Quality Assurance, Laboratory Testing and Industrial Design) and the Environmental Choice Management Advisory Committee (ECMAC). Whilst the label is owned and significantly subsidised by Government it is operated on an independent basis. Since its establishment approximately $1.35 million has been spent.

The objectives of the programme are to improve the quality of the environment by encouraging more sustainable processes through e.g. the design, production, marketing, and use of products which have a reduced environment impact during their entire life cycle. It also seeks to provide a clear, credible and independent guide to help consumers (including business consumers) identify products and services that are less harmful to the environment.

The technical specifications which products must meet to be licensed to use the eco-label are the foundation of the programme. As an example the types of standards included in the baseline criteria for a paint product are:

- The product must fully comply with all local environmental laws;
- It may not include any of certain prescribed substances including cadmium, mercury, arsenic, selenium or lead;
- Restrictions on the type of solvent that may be used including the prohibition of aromatic hydrocarbons, halogenated solvents and ethylene glycol;
- Content limits on the crystalline silica content of raw materials;

- The prohibition of prescribed toxic or hazardous substances such as those classified as carcinogenic, mutagenic or toxic to reproduction/development;
- The prohibition of any volatile organic substance in the formulation;
- The provision of consumer information such as material safety data sheets and product stewardship guidance;
- Criteria relating to waste management and the products packaging;
- Criteria relating to energy efficiency.

Applications are made directly to ECMAC who then arrange for an independent third party to check compliance with the standard. Unlike many other schemes, licences have no fixed term. Unless the licence is suspended or cancelled it continues to be valid whilst the products or services meet the requirements of the product group criteria and the scheme regulations and Licence conditions. If criteria are amended a new licence is awarded on evidence that the labelled product meets the new criteria. If a labelled product does not meet the new criteria a period of grace is given to allow the product to upgrade. At any time whilst a licence is held, the administrating authority may undertake site visits or obtain samples for verification that the product meets the criteria.

The New Zealand eco-label is closely related to the Australia version (Section 5.5.14).

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.14. Environmental Choice - Australia

	GECA Extensively seen throughout Australia and New Zealand
Example applications	Furniture, adhesives, cleaning products, computers and home electronics, textiles, paper and plastic products.
Type and Approach	Type I
Costs (Feb 2010)	Application fees range between $200 (~€130) to €800 (~€530). Verification and audit fees are also charged (up to $4,200 (~€2770)). There is also an annual fee based on product turnover, typically around 0.2%.
Further information	http://www.geca.org.au/

The Australian Good Environmental Choice (GECA) Label was first established in 1994, when Australian Environmental Standards Pty Ltd was registered. The company changed its name to GECA in 2001. It is the only environmental labelling program in Australia which indicates the environmental performance of a product from a whole of product life perspective for consumer goods. The label is awarded to products that meet voluntary environmental performance standards which have been created and assessed in conformance to international environmental labelling standards. The program is internationally recognised and growing in demand and awareness in a number of industries. GECA seeks to distinguish and reward those producers and service providers

that have improved their environmental performance, and provide an environmentally preferable product or service, from those that do not (CPI, 2008; GECA, 2002).

The Standards Development Division of GECA, in consultation with environmental, consumer, government and industry groups identifies a list of priority product groups (known as the proposed standards list) for possible preliminary consideration. This list is not restrictive, is periodically reviewed and forms the basis of the work program for the Division. Within each product group criteria (standards) are developed using a public procedure that uses a life cycle assessment methodology where ever possible to select the main areas of environmental impact and define suitable criteria for judging environmental performance. Draft criteria are drawn up based upon existing standards both locally or overseas, published scientific research and environmental performance reviews, Life Cycle Assessment studies or new research work may be undertaken for the particular product category. This draft is then subject to government and public consultation and comments are then considered alongside the draft before the final criteria are ratified.

Award of the GECA Eco-label is granted when a manufacturer or service provider demonstrates that their product complies with the standards (criteria) describing the required environmental performance of a specific product group. On application a verification process is undertaken that seeks to gather and assess evidence of compliance to the relevant criteria. This stage typically requires product inspection or site inspection and the gathering of quantifiable evidence of conformity. Commissioning of new testing or research may be required, the cost of which must be borne by the applicant. Like the New Zealand version (Section 5.5.13) of this eco-label licences have no fixed term.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.15. Kela Eco-Label

KOREA ECO-LABEL Reasons for certification	**Republic of Korea** Administered and used in the Republic of Korea only
Example applications	Paper goods, adhesive tapes, computers, printers and associated products, furniture, construction materials, textile and leather goods, household detergents and cleaning products.
Type and Approach	Type I
Costs (Feb 2010)	Application Fee of KRW100,000 (~€64) per application and an annual fee based on annual sales ranging from KRW1,000,000 (~€640) to KRW5,000,000 (~€3200)
Further information	http://www.koeco.or.kr/eng/business/business01_01.asp

The Korean Eco-labelling Program (KOECO) is a voluntary certification program designed to provide consumers with information to help them distinguish the more environmentally sound products of all those on the market. The aim is to reduce all environmental impacts generally and enable a

decrease in the consumption of energy and resources and to minimise generation of polluting substances (CPI, 2008). The eco-label seeks to provide consumers with accurate environmental, health and safety information about labelled products and to, therefore, encourage manufacturers to develop and produce products that are more sustainable. The label is owned by the Korean Ministry of Environment and KOECO are responsible for its operation and in particular product group selection and criteria establishment. KOECO also carry out the product verification and label licensing. Kela certified products are favoured under Korean law whereby public agencies must select certified products for purchase ahead of uncertified goods.

New product groups may be proposed by anyone and once accepted a technical committee is established to draw up draft criteria for that group. Once the draft is completed it is subject o public consultation before being accepted in its final state. When final criteria are available for a product group the process is open to applicants. The application process involves submission by the manufacturer of evidence that the criteria within that group are complied with. KOECO then undertake a paper audit of the evidence and undertake a site visit whereby samples may be taken for testing and verification. If compliance is verified a licence to use the eco-label is given. Miss-information or fraudulent information provided by the company awarded the licence in respect of the eco-label is treated as very serious and may be subject to imprisonment or a large fine.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.16. Environmentally Friendly

ENVIRONMENTAL LABEL ENVIRONMENTALLY FRIENDLY	**Croatia** Seen in Croatia only.
Example applications	Plastic containers, lubricants and oils, computers and associated electronics, adhesives, paints and varnishes, paper and card goods.
Type and Approach	Type I
Costs (Feb 2010)	Unknown
Further information	http://www.mzopu.hr/default.aspx?id=5145

Environmental Label Award scheme of the Republic of Croatia was established in 1993 and is based upon the European Flower scheme and Germany's Blue Angel. The Label is managed by the Ministry of Environmental Protection, Physical Planning and Construction and the processes leading to the award of a licence to use the label is administered by a Labelling Jury. Jury members are appointed from expert institutions such as research and scientific organisations, consumer and industry groups and other stakeholders.

As with other labels of this type, criteria for product groups are established using a life cycle assessment of the product at all stages of its manufacture, use and disposal. Once product group criteria are finalised applicants are invited. A written application including evidence of compliance with the product group criteria is required and this is then considered by the label Jury. Part of this

process involves a site inspection, analysis of the product and a comparison between the product to be labelled and other equivalent products in the Croatian market

The extension of the environmental label programme continues to have priority in Croatia, assuming that the labelling of environmentally friendly products forms a basis for trade in other sectors, too. In 1994, criteria existed for 25 product groups. Product testing is made upon application of the manufacturers.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.17. Green Label Singapore

	SGLS Found mainly in Singapore and Malaysia.
Example applications	Product standards currently exist for 36 product groups including paints, adhesives, decorative wall coatings, household cleaners, furniture, and construction materials.
Type and Approach	Type I
Costs (Feb 2010)	Fees are variable with product category. One-off application fees range from $350-1500, renewal fees $200- 1000
Further information	http://www.sec.org.sg/awards/greenlabel

'Green Label Singapore' was developed in 1992 by the Ministry of the Environment. The scheme applies to most products, except food, drinks and pharmaceuticals. It does not apply to services and processes. The Singapore Environment Council (SEC) has administered the scheme since June 1999. The Council is a nationally orientated, non-governmental organisation that seeks to raise the level of environmental awareness and action within industry and the community. The SEC secretariat recommends product categories and invites suggestions from industry for new categories. It also approves applications for the Green Label.

Criteria within a product category are identified using a simplified life-cycle analysis to check the product's main parameters for their relative environmental performance from cradle to grave. This work is overseen by an Advisory Committee comprising representatives from government, private sector organisations, academic institutions and statutory boards. The draft criteria are available for industry consultation before being finalised. Once the criteria are set and approved by an approving board, manufacturers and distributors of that product may apply for the Green Label. Both local and foreign companies can participate in this Scheme.

Manufacturers wishing to apply to use the label must submit a product sample to an accredited laboratory in Singapore for testing against the specified Final Qualifying Criteria. Once test results have been attained and all test results pass the requirements stated in the criteria, the documentation is sent with the application form to SEC. This evidence is then considered by the SEC secretariat for approval. Once approval has been gained a licence to use the eco-label is granted. Licences are usually given for 1 to 3 years but may be renewed subject to the product meeting the current criteria.

The fee structure for this particular eco-label is somewhat different from the norm. If the application for the Green Label is filed within 12 months from the first publication of the award criteria for a certain product its use is cost-free for the first five years. After this one-year period an initial application fee is charged but the use is cost-free for the initial period of use (up to three years), after which an annual fee is charged.

Pros	Cons
• LCA based • Scientifically sound	• Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.18. TCO Certified

	TCO Development (Tjänstemännens Centralorganisation) Europe/Global
Example applications	IT products – computers, media displays, notebooks, projectors, mobile phones.
Type and Approach	Type I
Costs (Feb 2010)	Application fees are typically in the order of €5000-€6000, annual fees are also payable (typically €2000-€3000), as are fees if any aspect of the product changes requiring re-testing or a new certificate (~ €500).
Further information	http://www.tcodevelopment.com/

TCO Certified is an eco-label for IT products. TCO Certified claims to go beyond environmentally sound production and design and includes features such as high performance and ergonomic design. It does, however, claim to have the most stringent environmental standards on the market (GEN, 2009). This combination of Usability and Environment makes the TCO Certified label unique. The type of criteria required by the scheme, for desktop computers, for example, include:

- Substantial reduction of magnetic and electrical fields.
- Low energy consumption.
- Low noise levels.
- Reduced emissions of halogenated flame retardants, mercury, cadmium, lead and chromium into the environment.
- Preparations for recycling that facilitate material recovery.
- Visual quality.
- Ergonomics.

TCO Certified is a third party verified program, where every product model is tested by an accredited, independent laboratory. The scheme also supports the quality assurance process with regular after-market checks and test rounds. Licenses typically last for 1 to 3 years.

Pros	Cons
• LCA based • Scientifically sound	• Limited range of products • Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.19. EPEAT

	**Green Electronics Council (GEC)** USA based but also seen in Canada, Europe, China, Japan, Taiwan, Australia, New Zealand, Brazil and Mexico
Example applications	Electronics – computers, laptops, monitors
Type and Approach	Multi-issue, Comparative tool, similar to Type I
Costs (Feb 2010)	Annual registration fees are based on annual sales and range from $1500 to $100,000.
Further information	http://www.epeat.net/

GEC was established in 2005 to identify and highlight the special issues of electronics and sustainability, and to find constructive paths forward. Soon after GEC was founded EPEAT, the green electronics 'certification' and purchasing system was set up to create a market incentive for more environmentally sound laptops, desktops, and monitors (CPI, 2008).

EPEAT is the required method for assessing environmental impacts of electronic products for US Federal Agencies and is a procurement tool designed to help evaluate, compare and select products that meet minimum performance standards for a range of issues such as energy efficiency, toxicity reduction, polluting emissions, end-of-life strategies and corporate responsibility. Random spot checks are used to verify the accuracy of information supplied by manufacturers.

EPEAT's environmental criteria are contained in a public standard, IEEE 1680 (IEEE, 2008). EPEAT evaluates electronic products in relation to 51 environmental criteria contained in IEEE 1680 - 23 required criteria and 28 optional criteria (IEEE, 2008). To qualify for registration as an EPEAT product, the product must conform to all the required criteria. For example the criteria for laptop computers include:

- A reduction, compared to similar products on the market, of hazardous substances such as cadmium, chromium and mercury, flame retardants and plasticisers;
- Use of batteries free of lead, cadmium and mercury
- Limits on the use of Polyvinyl chloride and chlorinated plastics
- Standards related to the use of recycled materials
- Standards related to the use of renewable/bio-based plastic materials
- Standards related to disposal and waste management
- Standards related to the design for recovery through disassembly
- Product longevity and upgradeability
- Energy efficiency
- Packaging
- Corporate policy

Products are evaluated against the defined criteria and are ranked in EPEAT according to three tiers of environmental performance - Bronze, Silver, and Gold. All registered products must meet the required criteria, and achieve at least Bronze status (IEEE, 2008).

In the EPEAT system, manufacturers add their products to the registry by declaring that the products meet specific individual criteria of IEEE 1680. Registrations last for one year only. Unconventionally product declarations are not validated; however manufacturers must be able upon request at any time following product registration to produce the required supporting evidence spelled out in the IEEE standard. In order to maintain the credibility of the system, EPEAT periodically selects a batch of products and criteria from the registry and verifies that they meet the criteria as declared.

All criteria declared by all products on the registry are subject to verification at any time. Criteria are selected for investigation by the Product Verification Committee (PVC) based on random selection, environmental significance, or the expectation that a criterion may be difficult to meet or highly significant in terms of environmental impact.

The verification process may simply require a manufacturer to provide production reports, lab analysis or other data, or EPEAT may independently obtain products and subject them to detailed laboratory analysis or destructive disassembly.

Pros	Cons
• LCA based • Scientifically sound	• Limited range of products • Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

5.5.20. GreenGuard

	GREENGUARD Environmental Institute (GEI) Found throughout the USA
Example applications	Buildings, construction material
Type and Approach	Type I
Costs (Feb 2010)	Unknown
Further information	http://www.greenguard.org/.

GREENGUARD Environmental Institute (GEI) is an independent, non-profit organisation with a scientific, third-party board that creates air quality standards for indoor products and building materials. The Scheme was established in 2001 and is based in the USA. The scheme is overseen by an advisory board comprised of independent volunteers, who are renowned experts in the areas of indoor air quality, public and environmental health, building design and construction and public policy, which provides guidance and leadership to GEI.

GREENGUARD claims to be the only certification and labelling program in the world that tests for low-emitting interior and building products. Their goal is to improve public health and quality of life by encouraging and helping manufactures to make better, safer products and to uphold environmental practices in product development, manufacturing and distribution. The organisation oversees the entire certification process, including all audits and qualifying criteria for each product category.

Products, textiles and mould growth are the primary sources of polluting emissions that contribute towards poor air quality inside buildings and homes and have negative impacts on health. Such problems can also have economic consequences. Under the GREENGUARD certification scheme

products are tested for formaldehyde, VOCs, respiratory damaging particles, ozone, carbon monoxide, nitrogen oxide and carbon dioxide emissions using environmental chamber testing that follows the guidelines of ASTM D5116-97and D6670-01. The GREENGUARD Certification programs provide best practice guidelines, evaluation criteria and verification procedures necessary to control the sources of these problems.

To gain certification measured emissions are converted to exposure concentrations that are then compared against specific pollutant standards for each product type. All construction materials, furnishings and furniture must meet these standard levels within a 7 to 14 day period. This allows for typical off gassing and decay of pollutants associated with newly manufactured products. Office equipment and certain indoor processes must meet pollutant requirements immediately upon operation.

In general, all products found to meet the GREENGUARD Certification standards will contribute only minimal levels of pollutants to the indoor environment. These standards are subject to change to accommodate changes in international, federal and state regulations.

With respect to products, once certified, the eco-logo can be used on all products, packaging and marketing materials for the life of the product as long as it continues to meet the standards. Products undergo quarterly monitoring tests to verify continued compliance to the low-emitting standards. Where the certification is for a building, licence to use the logo lasts for one year only.

Pros	Cons
• LCA based • Scientifically sound	• Limited range of products • Not producer specific. Identifies product as meeting product group criteria but cannot distinguish further

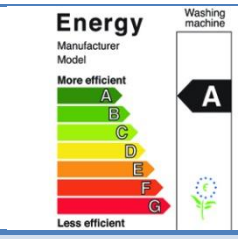
5.5.21. Other Examples of This Type of Label

- **Norppa** is a Finnish eco-label, developed by the Finnish Society for Nature Conservation, which applies the same ecological, age and investment criteria as the Swedish Bra Miljöval label.
- **Umweltzeichen UZ 46** is an Austrian eco-label developed by the Austrian Federal Environment Agency for environmentally sound products and services. The agency's objectives are the same as those mentioned above for the Milieukeur eco-label.
- **Label EVE** is a French eco-label, developed by CLER and WWF France. It guarantees that strict ecological and environmental criteria have been satisfied. Participating companies are required to invest a share of profits in and set up an eco-fund for ecological projects, and energy producers must be certified to EMAS or ISO 14001.
- Based in Switzerland, **Bluesign-standard** is an eco-label that can be found on clothing world-wide. Bluesign-standard was started in 2000. With the recent additions of clothing manufacturers such as Schoeller, Vaude-Sport, and the North Face Division of VF Outdoor, Inc. using this eco-mark, Bluesign-standard ensures that consumers world-wide are provided with quality, environmentally friendly clothing. The Bluesign-standard focuses on marking textiles that are good for consumer's health and the environment.
- The eco-Institut examines and evaluates products such as mattresses, bedding goods, furniture and building products for toxic emissions and distinguishes these with the **eco-INSTITUT** label.
- The **China Environmental United Certification Center** is an exclusive certification body that is based upon the German Blue Angel label to ensure the validity and impartiality of certification. As of June 1st 2009, 71 product categories in major fields including textiles, automobiles,

construction materials, building and decoration materials, household electronic devices, office electronic devices and detergents are available.

5.6. Non-food eco-labels: Type II

5.6.1. EU Energy

	**Found throughout the European Union and Europe.**
Example applications	Refrigerators, TV's, cookers, washing machines, dishwashers, light bulbs and cars
Type and Approach	Type II+, Mandatory, Single Issue
Costs (Feb 2010)	Borne by the manufacturer/supplier
Further information	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31992L0075:EN:HTML

Since 1992 most white goods (refrigerators, cookers, washing machines, dishwashers etc), light bulbs and cars must have an EU Energy Label clearly displayed when offered for sale or rent. This is a regulatory requirement under various EU Directives (e.g. 92/75/CEE, 94/2/CE, 95/12/CE, 96/89/CE, 2003/66/CE). The aims of the label are to enable consumers to compare the energy efficiency of appliances and to provide an incentive for manufacturers to improve the energy performance of their products.

The energy efficiency of the item is rated in terms of a set of energy efficiency classes from A to G on the label, A being the most energy efficient, G the least efficient. For refrigerated appliances two additional classes are available A+ and A++ and reflect the recent advances in energy efficiency seen in these goods. A+ and A++ appliances must be at least 25% more efficient than the basic 'A' rated products. Some A++ models are 60% more efficient.

The energy label also gives other useful information to the customer enabling them to differentiate various models and manufacturers. For example, the energy label for light bulbs often shows its lumens (perceived power) and Watts (the consumption of joules of energy per second).

Manufacturers/suppliers are obliged to provide technical documentation relating to the products energy consumption which must be sufficiently detailed to enable the accuracy of the information contained on the label to be assessed. It must include:

- A general description of the product,
- The results of design calculations carried out, where these are relevant,
- Test reports, where available, including those carried out by relevant notified organisations as defined under other Community legislation.

Suppliers are responsible in law for the accuracy of the information. This documentation must be made available for inspection for at least five years beyond the end of production of the item.

A recent criticism of the scheme was the lack of a harmonised verification process. However, since 2009 European household appliance manufacturers have developed and agreed on a fast and efficient programme to verify the correctness of the energy labels of each others' products. The programme is named the Bilateral Verification Procedure (BVP). The BVP establishes a protocol for companies to challenge energy label declarations in a structured and objective way. It accelerates the correction of inaccurate declarations on the energy labels with the aim of ensuring that remedial actions are undertaken as soon as possible and without waiting for the full deployment of legal procedures.

Appliances are tested at external laboratories that have been recognised by the participating companies and CECED, the European domestic appliance manufacturers' association. In cases of inaccurate declarations, the companies will face financial penalties, will have to correct the erroneous labels and inform their business partners accordingly.

Pros	Cons
• Product specific • Allows product comparisons • Scientifically sound • Mandatory	• Single Issue • No third party verification but enforced by law

5.6.2. WELS Scheme

	**Water Efficiency Labelling and Standards (WELS) Scheme** Found throughout Australia and New Zealand
Example applications	Water use appliances such as washing machines and dishwashers, showers, toilets, urinals and water flow control equipment.
Type and Approach	Type II+, Mandatory
Costs (Feb 2010)	None, borne by manufacturer/supplied
Further information	http://www.waterrating.gov.au/index.html http://www.mfe.govt.nz/issues/water/wels-scheme.html

WELS is Australia's water efficiency labelling scheme that requires certain products to be registered and labelled with their water efficiency in accordance with the standard set under the national Water Efficiency Labelling and Standards Act 2005. The scheme was established in 2006 and is owned by the Australian Government. The aim of the label is to indicate the water efficiency of water-using appliances enabling consumers to compare products using a zero to six star rating. The more stars on the label, the more water efficient the appliance. This label is mandatory for specified water-using appliances sold in Australia. It is a voluntary scheme in New Zealand, although mandatory use is proposed.

All WELS products must be registered, rated and labelled according the requirements of the WELS Standard 'AS/NZS6400:2005 Water-efficient products-Rating and labelling'. The WELS Standard is cross-referenced to the performance requirements of other product standards and technical specifications.

The scheme is administered and enforced by the WELS Regulator, within the Australian Department of the Environment and Heritage. The Regulator is committed to ensuring the integrity and credibility of the WELS Scheme including the requirements imposed by the legislation and standards. The work of the Regulator is undertaken by a team of inspectors who monitor compliance and/or investigate alleged breaches of the WELS Act. The regulator has the power to impose significant fines and penalties for breaches of the WELS Act and may withdraw a product from the market if non-compliance is identified.

Pros	Cons
• Product specific • Allows product comparisons • Scientifically sound • Mandatory	• Single Issue • No third party verification but enforced by law

5.6.3. Other Examples of This Type of Label

- **Recyclable** - means the product can safely go through the recycling process. This is a simple example of a Type II label.
- **The UK Fuel Economy Label** for cars has a similar layout to the EU Energy label, but is actually a voluntary scheme which has been adopted across the UK industry. The label was introduced in 2005 and is intended to inform consumers about the potential environmental impact of a particular car and provides information of CO_2 emissions per kilometre. CO_2 data is also used an indicator of fuel efficiency. A banding system, similar to the Energy label (see Section 5.6.1) is used and these bands are consistent with the car road tax categories.
- **The Green Dot** (German: Der Grüne Punkt) is the license symbol of a European network of industry-funded systems for recycling the packaging materials of consumer goods. The logo is trademark protected worldwide. The label was introduced in 1991 by 'Duales System Deutschland', a non profit organisation. Since 1994, it has been accepted by EU member states as well as some other European countries. The Green Dot scheme is now mandatory under the European Packaging and Packaging Waste Directive - 94/62/EC, which is binding on all companies if their products use packaging and requires manufacturers to recover their own packaging. According to the Directive, if a company does not join the Green Dot scheme, they must collect recyclable packaging themselves, although this is almost always impossible for mass products and only viable for low-volume producers. Regulatory authorities in individual countries are empowered to fine companies for non-compliance, although enforcement varies by country.
- **NatureMade** is a Swiss eco-label, developed by the Association for Environmental Friendly Electricity (VUE) to promote environmentally friendly electricity. The criteria are established by the electricity industry. The label comprises two distinct qualities, NatureMade Basic, where the electricity is derived from renewable sources and NatureMade Star, which makes more stringent ecological quality demands and requires 2.5% of energy to be derived from new renewable sources.
- **TÜV SÜD** is a German certification organisation that operates in various industry sectors. Their own eco-labels EE01 and EE02 impose strict environmental and ecological criteria and also require investment in ecological projects and new production. Under the scheme, a total of 25% of energy generation should come from power plants no more than 3 years old. The TÜV NORD

Group and the TÜV Rheinland Group have no eco-labels of their own, but are responsible for developing control routines for a number of other eco-labels.

- **The Grüner Strom Label** is a German eco-label, developed by Grüner Strom Label e.V. It comprises two different labels: GSL Gold and GSL Silver. These labels guarantee that green power offered to German consumers adds additional value for the environment, and is derived from 100% renewable sources.
- **Roland DG Corporation** produces printers, scanners and printing electronics and is an example of a company producing its own eco-label. Roland DG's eco-labels are designed to promote the development of environmentally-conscious products and to disclose important environmental product information to customers. These labels are attached to products that satisfy Roland's independently developed 'Guideline for Environmentally-Conscious Product Design'. These are self-declarations based on standards stipulated by ISO 14021 for Type II environmental labelling.
- The US Environmental Protection Agency (EPA) has developed the **Green Vehicle Guide** as a convenient and simple way to illustrate where vehicles fit on an eco-friendly scale. If a car meets certain guidelines it receives the SmartWay label. The best performers are named SmartWay Elite vehicles. To qualify vehicles for SmartWay status, the EPA looks at three criteria: (1) traditional exhaust pollutants (2) and the amount of carbon dioxide (CO_2) produced per mile and (3) fuel economy.
- **Certified Humane Raised and Handled**: This is an eco-label used in the textile market to certify that the organic wool that you buy was purchased from farmers who treat their animals humanely. In existence since 2003, and based in the USA, their methods are verified by an outside source, unlike other eco-label companies who verify their own practices in-house.

5.7. Non-food eco-labels: Type III

5.7.1. Energy star

	USA, Australia, Canada, Japan, New Zealand, Taiwan and the European Union have adopted the program
Example applications	Computers, fax machines, printers, copiers, lighting, household appliances, windows, buildings
Type and Approach	Type III Single issue, Comparative
Costs (Feb 2010)	Unknown
Further information	http://www.energystar.gov/

This label is funded by the US Department of Energy (DOE) and the US Environmental Protection Agency (EPA). The purpose of the label is to rate the energy efficiency of electrical products and show consumers which products pass or fail US energy efficiency standards. Currently labelled products represent the top 25% energy efficient products in the US market (CPI, 2008; Energy Star, 2008).

The goal of the label is to create Energy Star specifications for only those product categories where it is clear that the energy savings potential of a product will translate into tangible energy savings when the product is used. That is, installation or system integration issues have little or no impact on a consumer's ability to realise the product's energy efficiency. This is essential to building and

maintaining consumer confidence in the label. As a result, the Agencies are very cautious about labelling products that are components of larger building or industrial systems.

To use the label, manufacturers must verify that they have tested their products to meet the required standard for the product type. The standards usually require products to operate a specified percent more efficiently than comparative products. Standards are product group specific. For example Energy Star qualified fluorescent lighting must use at least 75% less energy and last up to ten times longer than normal incandescent lights (Energy star, 2008).

To develop product standards, the EPA and DOE use a systematic process that relies on rigorous procedures as well as input from industry stakeholders. Before developing or changing an ENERGY STAR specification, the Product Development team follows an established evaluation process, which draws upon the expertise and resources of other stakeholders, including manufacturers, utilities, environmental groups, and other government agencies. The energy consumption of a wide range of products that fall into a product group are measured and standards are set so that only the top performers will qualify to use the label. This process allows us to make an informed decision as to whether or not to proceed with formulating or revising a product specification. It also ensures that new product specifications are consistent with the ENERGY STAR Specification Development Guiding Principles .

This process seeks to ensure that the label identifies products where large gains in energy efficiency and pollution reduction can be cost-effectively realised and those that can play an influential role to expand the market for these products.

Products distributed to different countries and markets do not necessarily have the same standards. For example, those goods targeted for the European market are labelled to different standards than those for the USA.

Pros	Cons
• Product specific • Allows product comparisons • Scientifically sound • Third party verification	• Single Issue • Limited range of products

5.7.2. WaterSense

	USA
Example applications	Toilets, flushing urinals, showers, taps and accessories, new homes and irrigation equipment,
Type and Approach	Type III Single issue, Comparative, Voluntary
Costs (Feb 2010)	Unknown
Further information	http://www.epa.gov/watersense

WaterSense, a partnership program sponsored by the US Environmental Protection Authority, seeks to protect the future of US water supplies by promoting water efficiency and enhancing the market for water-efficient products, programs, and practices. The WaterSense label, similar to the EnergyStar label, helps consumers identify water-efficient products. American Rivers has been an active partner of the WaterSense program serving as the only environmental non-profit organisation on its founding steering committee.

The EPA develops specifications for water efficient products through a public consultation process. If a manufacturer makes a product that meets those specifications, the product is eligible for third-party verification to ensure the stated efficiency and performance criteria have been met. If the product passes the test, the manufacturer is rewarded with the right to put the WaterSense label on that product.

Pros	Cons
• Product specific • Allows product comparisons • Scientifically sound • Third party verification	• Single Issue • Limited range of products

5.8. Non-food eco-labels: Type IV

5.8.1. Forest Stewardship Council

	FSC Found globally.
Example applications	Wood and timber products including paper goods
Type and Approach	Type IV
Costs (Feb 2010)	The costs, timescale and resources required for FSC forest management certification can vary considerably as it depends on the size and complexity of the woodland and its setting.
Further information	http://www.fsc-uk.org/

FSC is an international, non-governmental organisation dedicated to promoting responsible management of the world's forests. It was founded in 1993 in response to public concern about deforestation and demand for a trustworthy wood labelling scheme. There are national working groups in more than 50 countries including the UK. FSC UK is a registered charity. It is supported by NGOs including WWF, Greenpeace and the Woodland Trust (FSC, 2009; FSC, 1996; Federal Association for German Industry, 2008).

FSC is a certification system that provides internationally recognised standard-setting, trademark assurance and accreditation services to companies, organisations, and communities interested in responsible forestry.

The FSC system maintains three label types based on the content of particular product lines.

1. **FSC Pure** - All content in 'Pure products' must come from an FSC certified forest. No recycled or non-FSC fibre of any kind is permitted.
2. **FSC Recycled** - An FSC Recycled product means that a minimum of 85% of the wood fibre content is from post-consumer sources, with a maximum of 15% coming from post-industrial sources.
3. **FSC Mixed** - Mixed source products are a blend of FSC Pure, Recycled and/or Controlled fibre. Controlled fibre refers to any wood fibre in an FSC product that isn't from an FSC forest or recycled. All Controlled sources are screened to ensure they aren't contributing to any of the five most destructive practices in forestry such as illegal logging, land use change or destruction of high conservation value forestry.

One of the three Forest Stewardship Council's logos is used on products to show that it is certified under the FSC system. Use of the FSC logo implies that timber and other wood products, such as paper, may be purchased with the confidence that the production has not contributed to the destruction of the world's forests.

The FSC Principles and Criteria describe the standards by which the forests must be managed to meet the FSC's sustainability objectives. They include managerial aspects as well as environmental and social requirements. There are ten principles and 56 criteria that form the basis for all FSC forest management standards. Based on these principles, the FSC has developed further rules (called policies or standards) that further define and explain certain requirements stipulated in the 10 principles.

The principals and criteria include issues such as:

- Prohibition of conversion of forests or any other natural habitat
- Respect of international worker's rights
- Respect of human rights with particular attention to indigenous peoples
- Prohibition of the use of hazardous chemicals
- Identification and appropriate management of areas that need special protection (e.g. cultural or sacred sites, habitat of endangered animals or plants)

Many of the points listed appear very basic however this is a reflection of the fact that in many places even these basic requirements are not fulfilled. This is where FSC can have the biggest positive impact.

Pros	Cons
• Third party, independent verification	• Not based on LCA approach • Actual environmental benefits not identifiable • Not producer specific. Identifies product as meeting scheme standards but cannot distinguish further.

5.8.2. PEFC

PEFC	**Programme for the Endorsement of Forest Certification** Found globally.
Example applications	Wood and timber products
Type and Approach	Type IV
Costs (Feb 2010)	The annual subscription fee is payable to PEFC and is calculated based on the member country's latest three year rolling average round wood production figures according to the official UNECE/FAO statistics. There is also a development fee charged by the certification body.
Further information	http://www.pefc.co.uk/ http://www.pefc.org/index.php

The PEFC Council is an independent, non-profit, non-governmental organisation, founded in 1999 which promotes sustainably managed forests through independent third party certification. PEFC

provides an assurance mechanism to purchasers of wood and paper products that they are promoting the sustainable management of forests (Federal Association for German Industry, 2008).

PEFC is a global umbrella organisation for the assessment of and mutual recognition of national forest certification schemes developed in a multi-stakeholder process. These national schemes build upon the inter-governmental processes for the promotion of sustainable forest management, a series of on-going mechanisms supported by 149 governments covering 85% of the world's forest area.

PEFC has in its membership 32 independent national forest certification systems of which 25 to date have been through a rigorous assessment process involving public consultation and the use of independent consultants to provide the assessments on which mutual recognition decisions are taken by the membership.

Some 30 Schemes account for nearly 210 million hectares of certified forests producing millions of tonnes of certified timber, making PEFC the world's largest resource of certified timber. The other national members schemes are at various stages of development and are working towards mutual recognition under the PEFC processes.

PEFC bases its Sustainability Benchmark on broad consensus by society, expressed in globally respected international and intergovernmental process and guidelines. Their best practice standards promote environmentally sound, socially just, and economically viable management of forests globally. Standards are developed at national level in compliance with PEFC International's Sustainability Benchmark. Standards are documents, established by consensus and approved by a recognised body, that provide, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree or order in a given context. PEFC International Standards are adopted by the General Assembly.

Developing standards nationally means that they can be tailored to the specific local biodiversity, environmental and ecological conditions in a country, and with consideration for local political, socio-economic, cultural and administrative conditions, thereby reflecting and responding to national and local concerns and priorities.

Within PEFC-certified forests, managers must ensure that:

- Forest management activities maintain, conserve and enhance biodiversity,
- Forests are managed to preserve biomass and biodiversity thereby strengthening their resilience and enabling them adapt to and mitigate for climate change impacts.
- The social dimension is considered including indigenous peoples rights, health and safety issues, and contributions to local employment.
- Management is undertaken to protect watercourses, groundwater, water resources and soils;
- Managers must ensure the legality of the timber.

Forest managers are required to ensure that special key biotopes are protected, harvest levels and forest productivity are balanced, and degraded forest ecosystems are rehabilitated.

As the scientific evidence of potential benefits and dangers of genetically modified organisms (GMOs) and its impact on biodiversity remains insufficient, the PEFC General Assembly has determined that GMO cannot be considered as part of PEFC certified material.

PEFC criteria also stipulate chemicals such as pesticides and herbicides are substituted by natural alternatives or minimised.

PEFC offers two types of labels

(i) **PEFC Certified** for products where at least 70% of wood comes from PEFC-certified forests that meet or exceed PEFC's Sustainability Benchmark and wood from controlled sources.

(ii) **PEFC Certified & Recycled** for products where at least 70% of wood comes from PEFC-certified forests that meet or exceed PEFC's Sustainability Benchmark and/or post-consumer recycled material and wood from controlled sources. Post-consumer recycled material must meet PEFC's requirements for chemical and non-chemical contamination. The amount of post-consumer recycled material is specified within the recycling symbol.

Pros	Cons
• Third party, independent verification	• Not based on LCA approach • Actual environmental benefits not identifiable • Not producer specific. Identifies product as meeting scheme standards but cannot distinguish further.

5.8.3. OK Power

	Germany Found mainly in Germany.
Example applications	Electricity Generation and Supply
Type and Approach	Type IV
Costs (Feb 2010)	Unknown
Further information	http://www.energie-vision.de/

'OK Power' is a German eco-label, developed by the Öko-Institut, World Wide Fund for Nature (WWF) Germany and the Consumer Agency NRW (jointly known as the Energy Vision Association - 'EnergieVision e.V.') and has been established since 2000. The main aims of the label are to encourage the expansion of renewable energy generation through new plants, to improve the environmental impacts associated with electricity generation and to create transparency in the electricity market.

The label guarantees that strict ecological and environmental criteria have been met. The age criteria applied stipulate that a minimum of one third of the volume of generated power comes from power plants less than 6 years old, and a maximum of one third of the volume comes from plants more than 12 years old. The label also certifies that the company invests in renewable energy generation through new power plants and seeks demonstration that the company has gone beyond the requirements of Germany's Renewable Energy Law (REL).

The certificate can be issued for two different kinds of green energy products (i) green energy products 'Händlermodelle' and (ii) standard energy products - 'Fondsmodelle'.

The types of criteria which companies must comply with in order to gain approval to use the OK-Power label include:

- Investments must be made in the expansion of renewable energy generation,
- At least 1 % of the Green Power should come from solar energy,
- New barrages (dams) are not allowed,
- Only 50 % should come from CHP-electricity (combined heat and power cycle),
- For both product categories there are also other requirements on the environmental impact of renewable power plants.

Pros	Cons
• Third party, independent verification	• Not based on LCA approach • Limited application • Actual environmental benefits not identifiable • Not producer specific. Identifies product as meeting scheme standards but cannot distinguish further.

5.8.4. 100% Energia verde

100% energia verde	**Italy** Found mainly in Italy.
Example applications	Electricity supply
Type and Approach	Type IV
Costs (Feb 2010)	A registration fee and an annual fee are payable plus royalties for label use depending from the category of the applicant and the amount (in MW) of green electricity to be labelled. For 2005 royalties were: producers €0.05/MWh, with a minimum of €100/yr, associations €2,500/yr, commercial customers €0.25 /MWh, with a minimum of €25/yr, domestic customers €25/yr, traders and distributors €0,01/MWh. The total amount of the fees for each customer cannot be higher than €20.000.
Further information	http://www.greenlabelspurchase.net/100percento-Energia-Verde.html

This is an Italian label certifying the production of electricity derived exclusively from renewable sources (for example: wind, PV, solar, geothermal, sustainable hydro, tidal, biogas and biofuels) and which is generated in a manner that minimises the environmental impact. The label also ensures that there is traceability throughout the entire energy supply chain and that label holders are socially responsible. The certificate is not awarded to any company generating energy from fossil fuels, nuclear and thermal transformation of solid urban wastes. The label aims to create a voluntary market system to improve the production of energy from renewable sources.

The label is owned by REEF (Re-energy Foundation) a non-profit organisation and administered by CESI (Centro Elettrotecnico Sperimentale Italiano) an external certification organisation. Control and overall management is undertaken by a Guarantee Commission, in place for 3 years, comprised of environmental organisations, consumers and customers. The Chairman of the Commission is

appointed by REEF. The Commission is in charge of defining the generic and label baseline criteria, evaluating applications in terms of technical and ethical criteria and undertaking promotion and marketing initiatives. At present 6 producers and 93 other clients have obtained the label.

Pros	Cons
• Third party, independent verification	• Not based on LCA approach • Limited application • Actual environmental benefits not identifiable • Not producer specific. Identifies product as meeting scheme standards but cannot distinguish further.

5.8.5. SmartWood

	Rainforest Alliance Global
Example applications	Furniture, musical instruments, flooring and picture and window frames.
Type and Approach	Type IV
Costs (Feb 2010)	Highly variable
Further information	www.rainforest-alliance.org/programs/forestry/smartwood

The Rainforest Alliance's SmartWood Program works to reduce the negative impacts of commercial forestry by awarding its seal of approval to responsible forest managers who harvest timber that is ecologically sound and socially and economically beneficial to local communities.

SmartWood is one of several certification organisations accredited by the Forest Stewardship Council (FSC). They are accredited for natural forest management certification, plantation, non-timber forest products, chain-of-custody certifications (companies that process, manufacture or sell products made from certified wood) and also offer the SmartWood Rediscovered Program which certifies salvaged or recycled wood from buildings being demolished. SmartWood has certified more than 800 operations and 25 million acres worldwide. Licenses generally last for 5 years after which a new application must be made. To maintain certification during the license period as per FSC requirements, the certified company must undergo an annual on-site audit, provide annual Chain-of-Custody (CoC) audit information to SmartWood authorities, and complete up-to-date payment of related costs (Smartwood, 2005).

Pros	Cons
• Third party, independent verification	• Not based on LCA approach • Limited application • Actual environmental benefits not identifiable • Not producer specific. Identifies product as meeting scheme standards but cannot distinguish further.

5.8.6. Chlorine-Free

	USA	
Example applications	Paper goods and printing	
Type and Approach	Type IV	
Costs (Feb 2010)	Unknown	
Further information	www.chlorinefreeproducts.org	

This is a Type IV label certified by the Chlorine Free Products Association (CFPA). CFPA is a non-profit, third-party corporation committed to the promotion of chlorine-free policies, programs and technologies worldwide. It certifies paper and products that are either Totally Chlorine Free (TCF) or Process Chlorine Free (PCF). Companies and products that pass the necessary audits may use its Totally Chlorine Free and/or Processed Chlorine Free logos.

The TCF label guarantees:

- No chlorine or chlorine compounds were used in the papermaking process.
- All virgin components are certified as total chlorine free.
- The mill has no current or pending violations.
- The mill does not use old growth forest for any of the virgin pulp.
- That the mill has been provided with recommendations on product quality and ways of increasing productivity.

Standards are established to reduce the environmental impacts associated with chlorine and chlorine compounds used in manufacturing, water purification, old growth timber and increased use of recyclable products. They are set on a product group basis. TCF and PCF Standards focus on opportunities to significantly reduce a product's environmental impact.

Manufacturers that can demonstrate their products comply with CFPA's requirements, and have been duly certified, are authorised to use the CFPA TCF/PCF Certification Mark on products and in product advertising. Manufacturers authorised to use the CFPA, TCF or PCF, Mark on their product are subject to an ongoing program of testing, inspection, and enforcement. Currently 27 products and companies have been certified to use the label.

Pros	Cons
• Third party, independent verification	• Not based on LCA approach • Limited application • Actual environmental benefits not identifiable • Not producer specific. Identifies product as meeting scheme standards but cannot distinguish further.

5.8.7. Other non-food examples of Type IV

- **Global Organic Textile Standard (GOTS)**: The aim of GOTS is to define world-wide recognised requirements that ensure the organic status of textiles, from harvesting of the raw materials, through environmentally and socially responsible manufacturing. Standards are reflected in an eco-label in order to provide a credible assurance to the end consumer. It was formed as an initiative to unify the various existing standards (Germany's IVN, UK's Soil Association, USA's OTA, Japan's JOCA). Approved certifiers include, but are not limited to. Control Union (SKAL, KRAV), Ecocert, Soil Association. This is a Type IV label based on best practice guidelines, and does not use an LCA approach. It is, however, third party verified.
- **Oeko-Tex**: The International Oeko-Tex Association comprises textile representatives from Europe and Japan that create standards and is responsible for the independent tests for harmful substances. The Oeko-Tex criteria catalogue provides a uniform, scientifically founded evaluation standard for the human ecological safety of textiles. Raw materials, intermediate and end products at all stages of processing throughout the manufacturing chain are tested and certified. It does not use an LCA approach, but is third party verified.

6.0. Ongoing global developments

6.1. Carbon footprinting and the EU Eco-label

The European Eco-labelling board is considering how carbon footprinting could be systematically considered within its product criteria development process. A small study was commissioned to examine this, and to raise the question with stakeholders of how any specific carbon footprint criteria might be best presented with the Eco-label logo.

The study, undertaken by an EC Service Contract (N.070307/220/486031/SER/G2) (LCE, 2008) addressed both technical and communication issues relating to carbon footprinting. The key goal of the technical element dealt with the measurement toolkit implementation, while the communication activities were aimed at involving key stakeholders, in order to obtain their views and opinions.

The main conclusions of the consultation were that the EU Eco-label should consider, on a case-by-case basis, including limits on life-cycle GHG emissions. Therefore, carbon footprint criteria should be considered as part of the criteria implementation/revision process. However, there was also agreement that data related to CO_2 emissions should not be displayed on the flower logo itself and that the CO_2 calculations should not include applicant participation in off-setting.

The main technical aspects that emerged were that the carbon footprinting tool should rely on a specific database; although, the applicant should have the option of inputting their own data as appropriate, in cases where such data can be properly verified. This database should be based on publicly available data and preference should be given to databases meeting the requirements of the International Life Cycle Data System (ILCD), currently under development and coordinated in Europe by the JRC IES at Ispra.

Since this study was finalised, the PAS 2050 (BSI, 2008) standard has been published. This standard for measuring the embedded carbon in products has not therefore been fully considered by the study. The report and ongoing activities by Member States are still be considered by the Commission.

6.2. Food and the EU eco-label

In April 2009, the European Parliament decided to conduct a study to see if it was technically feasible with respect to product criteria to extend the EU Flower eco-label to food and animal feed products. The study will also consider whether only products certified organic would be eligible for receiving the eco-label award, to avoid confusion for consumers. In order to pursue a harmonisation of environmental labels in the EU, synergies with national environmental labels will also be sought (Food Navigator, 2009).

6.3. The French Grenelle de l'environnement - a regulatory approach

The 'Grenelle de l'environnement' is a think tank and stakeholder consultation forum organised by the French government and established in 2007, to address a wide range of environmental issues facing France. It is a multi-party forum that is aimed at involving representatives of national and local government and other organisations (including industry, labour, professional associations, non-governmental organisations) in the development of national environmental policies. Each member is

given an equal say in the process with the goal of reaching consensus on a particular issue. Between 2007 and 2012 the forum aims to establish a range of policies on ecological and sustainable development issues. To reach the goals of 'Grenelle de l'environnement' a carrot and stick approach is being used which includes financial incentives, such as grants or tax relief if certain measures are taken, and prohibitions and regulations.

The 'Grenelle forum' is currently collecting public and administrative opinions and suggestions for action and legislation. For this purpose, public consultation forums are being held throughout France as well as online. Since its inception the forum has had a significant impact on France's environmental policy, including redefining its transport strategy in order to surpass the European target of obtaining 20% of energy from renewable sources by 2020, defining a common concerted approach to the issue of genetically modified organisms (GMOs), policies to increase the uptake of organic production and development of a new national environment and health plan that deals with the impact of environmental pollution on health. These issues have now been incorporated into French law (Gain Report, 2009; Grenelle de l'environnement, 2010).

The 'Grenelle forum' is now turning its attention to the sustainability of food production and consumption. The aim is to promote products that impact less on the environment and are more sustainable. The main Grenelle developments to date are (Gain Report, 2009; Grenelle de l'environnement, 2010):

- French retailers have undertaken environmental impact assessments across a variety of different environmental criteria for around 300 consumer products both food and non-food;
- Eco-labels (both French and other European labels) have been promoted such that an increase of 10% in sales has been seen (e.g. EU eco-label and the NF environmental seal);
- There is the intention of introducing mandatory carbon and environmental labelling on food by January 2011;
- Organic production is also being promoted strongly to achieve annual growth;
- Disposable shopping bags are being discouraged. During 2005 France used 10.5 billion plastic disposal bags. A decrease of over 85% has been seen in favour of reusable bags since 2007.
- Retailers are making considerable efforts to fund and support initiatives that are focused on the collection and processing of packaging and other type of waste. Attention is being given toward the minimisation of packaging and ensuring it is recyclable;
- Retailers are also taking steps to make their businesses more sustainable by reducing energy consumption, increasing the use of renewable energy (including solar power), reducing greenhouse gas emissions particularly with respect to transportation and seeking other ways of reducing their environmental footprint.

The main item of interest here is the proposed legislation that would make environmental labelling on all products, including food and drink, sold in France mandatory by 2011. The legislative package has been approved by the French Senate and the review process undertaken by the National assembly has now begun. Early reports from this review suggest that whilst eco-labelling will be introduced it may not be mandatory, at least not in the first instance.

The new mandatory French eco-labelling initiative is being managed by the Association Française de Normalisation (AFNOR), the French national standardisation body, in collaboration with the French Environment and Energy Management Agency (ADEME). The approach adopted is a Type III using Product Category Rules to define what must be provided in Environmental Product Declarations (see Section 2.1.4). In late 2009 it was announced that work was underway to develop Product Category Rules in accordance with draft standards for several hundred products and work to deliver and implement the legislation appears on track. Products include around 150 mass produced food and

drink items. One of the interesting facets of development of the standards in France, is that the industry sector organisations are quite deliberately seeking to coordinate with other efforts globally (Schenck, 2009).

There are three AFNOR standardisation committees developing the technical guidance applicable to all products: one on general technical issues, one on packaging and one on transportation. Each industry sector organisation has its own committee developing technical guidance for the sector, and subcommittees developing the product category rules. Finally, the system is supported by a national database that not only includes national average Life Cycle Inventory data, but has simple applications for supporting estimates of energy grids from other nations (Schenck, 2009).

Whilst information on the Product Category Rules has not yet been published, some principles have already been established. For example, labelling will be limited to the ready-to-use product and will exclude impacts post purchase as these cannot be guaranteed. It is likely that environmental criteria will be limited in the first instance to, perhaps, greenhouse gas emissions, biodiversity impacts and water quality. However, the actual methodology is causing some problems especially with respect to establishing impacts on biodiversity (Gain Report, 2009).

There are a number of other initiatives that appear to be driven by the 'Grenelle de l'environnement' agenda. For example, thirteen companies involved in the seafood supply chain are collaborating and have signed a charter for a new association called 'France Filière Pêche'. The objective of the group is to promote a new sea food brand, as well as controlling use of the brand via guidelines that are focused on quality and traceability. Carrefour, a large French retailer, is working with ADEME in order to improve the retail trade's environmental performance. The Carrefour group will provide all its suppliers of its own-brand products with a self-assessment tool to support reductions in energy use and greenhouse gas emissions. It also plans to continue to develop a range of eco-labelled products called "Agir Eco-Planète". This currently includes 18 food products and 129 non-food products. Some twenty of these products carry the European eco-label (see Section 5.5.1) or the NF environmental seal (see Section 5.5.7). The CASINO Carbon label (See section 5.2.1) is also consistent with the Grenelle approach.

It has been reported that the mandatory labelling initiative may cost as much as 5% of the final product price; a cost the French consumer will have to bear, unless retailers and suppliers share the burden (Gain Report, 2009).

6.4. Sweden's proposals for climate friendly food

The Swedish National Food Administration has been working with the Swedish Environmental Protection Agency to produce food recommendations that include information on the impact of food on climate and the environment, in addition to various health aspects. The aim is to create a labelling system that reduces the negative effects of food production and gives consumers a chance to make conscious climate choices as well as strengthening the competitiveness of food producers (New Zealand Trade and Enterprise, 2009).

The Swedish climate label is a joint venture between the Federation of Swedish Farmers, dairies and meat co-operatives, and two labelling organisations for food products: Swedish Seal (a quality label) and KRAV (see Section 5.4.7). It will cover both Swedish and imported produce.

The Swedish eco-label for food will not, however, require a life cycle assessment for products to be certified as the certification guarantees that positive actions have been taken throughout the production by the implementation of Best Available Technologies (BAT). The certification process

will require compliance with a wide range of quite demanding and specific activities which go well beyond what is currently expected by UK primary production assurance schemes (e.g. Assured Food Standards, Genesis) including, for example (CLF, 2009):

- A farm level energy audit, repeated every five years, that assesses the energy consumption for the farm's processes and activities;
- An energy efficiency plan must be drawn up and this must include an analysis of how fossil fuel use can be reduced;
- Electricity use on the farm must come from 100% renewable sources e.g. from eco-labelled (green) electricity suppliers or equivalent;
- Losses (leakage and general emissions) of refrigerants used in equipment for food storage must not exceed 3% over a three year period;
- Transport operations must be carried out using environmentally aware driving techniques and training must be provided;
- Soils must be managed to reduce the loss of organic matter;
- Nitrogen balancing must be undertaken, fertiliser plans must be created and there are limits on when organic manures may be applied. Manures must be directly incorporated into the soil;
- Mineral fertilisers must be selected that do not generate emissions greater than 4 kg CO_2 equivalents per kg N. As from 2012 the limit will reduce to 3 kg CO_2 equivalents per kg N;
- For feed production at least 10% of nitrogen fixing crops must be added to the seed mix;
- Break crops must be used in crop rotations.

There are similar standards for other agricultural and greenhouse activities, milk production, fisheries and certain transport operations. The prescribed standards will be verified by an independent third party at product level (not by the product group approach) and so will be a Type III/Type IV hybrid label. An example of how the label looks on some products is shown in Figure 6.1 below.

The climate certification can only be used in combination with another certification scheme that certifies components of sustainable food production such as environmental protection, animal welfare and social responsibility.

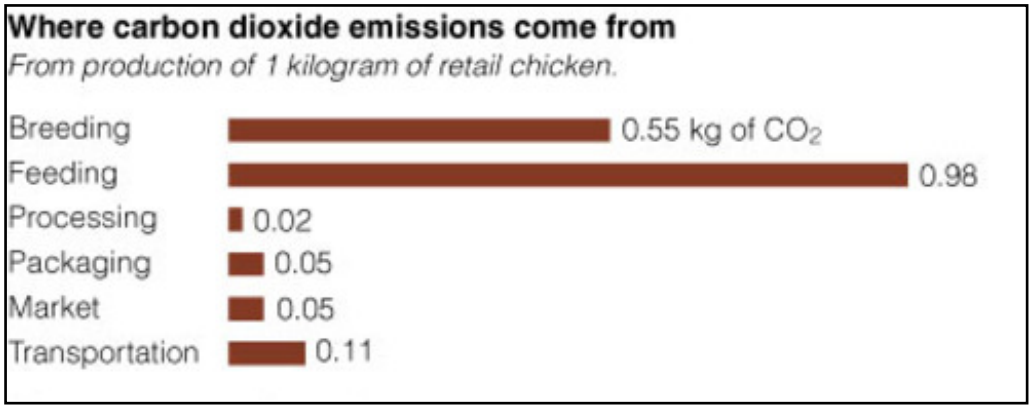


Figure 6.1: An example of the Climate Friendly label

It is reported that the climate-certification for food products could mean reductions in emissions estimated at between 5-80% throughout the whole food supply chain (Farmers Solutions, 2010). As a consequence of these measures, labels listing the CO_2 emissions associated with the production of foods are already appearing on some grocery items and restaurant menus in Sweden.

6.5. European Food Sustainable Consumption and Production Round Table

In 2009 major stakeholders in the European food and drink chain set up a roundtable to promote environmental sustainability. Roundtable members include farmers and their suppliers, agricultural traders, food and drink producers, packaging suppliers, recovery organisations and civil society representatives, supported by the UN Environment Programme and the European Environment Agency. It is co-chaired by the European Commission. Known as the 'European Food SCP Roundtable' their first priority was to facilitate agreement on uniform and scientifically reliable environmental assessment methodologies for food products (SCP, 2009). Other objectives include the identification of suitable tools and guidance for voluntary environmental communication to consumers and other stakeholders and achieving a process of continued improvement throughout the food supply chain (SCP, 2009). On 15th March 2010 the Round Table launched a consultation process to seek the views of stakeholders on the draft guiding principles on the voluntary environmental assessment and communication of environmental information along the food chain, including both business-to-business and business-to-consumer. The guiding principles will serve as a basis for developing a framework assessment methodology for food and drink products and for identifying suitable voluntary communication tools.

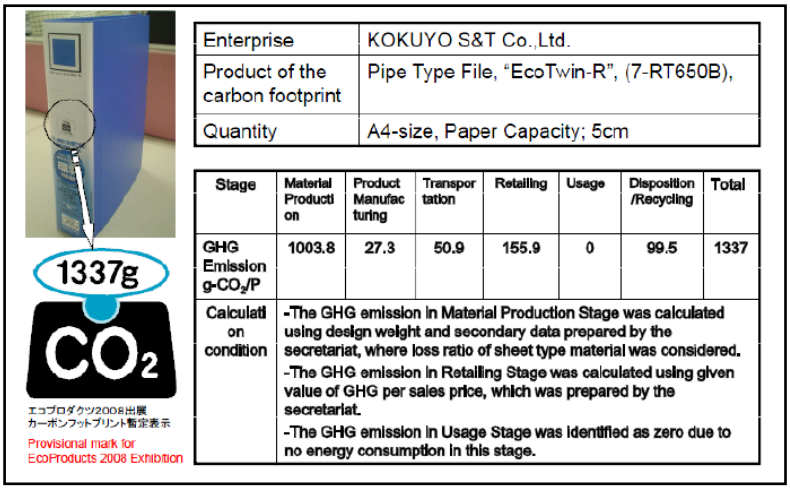
The draft (SCP, 2010) is considered the starting point for identifying the practical implications of various environmental assessment and information systems, their scientific reliability, effectiveness, practicability, relevance for food chain partners and consumers, costs and benefits at the different food chain stages, possible shortcomings and barriers. Issues to be addressed include:

- How to efficiently measure, verify, collect and consolidate environmental information along the entire food chain.
- How to consider the various environmental aspects and/or impacts of the production and consumption of different categories of food and drink products in a consistent framework methodology.
- How to consider specificities of highly diverse food and drink products with different beneficial and adverse environmental impacts at different stages of their life-cycle.

The consultation process ends on 26th April 2010. Agreement on the principals is expected to be reached by 2011.

6.6. Japanese carbon labelling policy

The Japanese government is pursuing a mandatory carbon footprint eco-label to be applied to all products sold in Japan, with labels provided on the package. Standardisation is underway, with full implementation planned for 2010-2011 (Schenck, 2009). The approach being adopted is similar to that being used by the French (see Section 6.3) and is using a combination of national standards (Japanese Industrial Standard) and sector-based specific decisions for Product Category Rules. The process is adhering strictly to the requirements of ISO 14040, 14044 and 14025. The sponsoring governmental body is METI, the Ministry of Economy, Trade and Industry (Schenck, 2009). Figure 6.2 is an example of the proposed label.



Enterprise	KOKUYO S&T Co.,Ltd.
Product of the carbon footprint	Pipe Type File, "EcoTwin-R", (7-RT650B),
Quantity	A4-size, Paper Capacity; 5cm

Stage	Material Production	Product Manufacturing	Transportation	Retailing	Usage	Disposition /Recycling	Total
GHG Emission g-CO_2/P	1003.8	27.3	50.9	155.9	0	99.5	1337
Calculation condition	-The GHG emission in Material Production Stage was calculated using design weight and secondary data prepared by the secretariat, where loss ratio of sheet type material was considered. -The GHG emission in Retailing Stage was calculated using given value of GHG per sales price, which was prepared by the secretariat. -The GHG emission in Usage Stage was identified as zero due to no energy consumption in this stage.						

Figure 6.2: Expected format of the Japanese Carbon Label

6.7. Activities in New Zealand

New Zealand's Ministry of Agriculture and Forestry is currently working with primary food producers to develop a greenhouse gas (GHG) footprint strategy. The goal is to identify, promote and use internationally recognised, transparent and validated greenhouse gas footprinting methodologies. The approach is twofold. Firstly, there is considerable international engagement regarding techniques being used or developed for the primary production sector. Secondly, establishing industry-led initiatives to establish GHG footprints for primary producer supply chains. The overall aim is to measure, manage and mitigate GHG emissions. From January 2013, all agricultural emissions will be introduced into the New Zealand Emissions Trading scheme and monitoring and reporting on emissions will be mandatory.

6.8. Global Eco-labelling Network

The Global Eco-labelling Network (GEN) is based in Canada and is a non-profit association of third-party, environmental performance recognition, certification and labelling organisations founded in 1994 to improve, promote, and develop the eco-labelling of products and services. The organisation focuses on ISO Type I labels and aims to foster co-operation, information exchange and harmonisation among its members, associates, and other eco-labelling programs with regard to eco-labelling. One of the major initiatives that GEN has undertaken recently is to encourage greater cooperation and harmonisation between labelling schemes using its GENICES approach.

GENICES provides a mechanism for enhanced cooperation and collaboration between various labelling schemes across the world especially in the areas of product certification, criteria development and review. Participation is voluntary but only open to the GEN membership. The aim is to adopt a formal methodology for the development of common criteria which are open and transparent such that it promotes multilateral mutual trust. GEN claim that the approach allows new programmes to get started quickly, particularly if criteria already exist elsewhere, that costs can be shared and so the entire process is more cost-effective and efficient. It also helps to address the concerns regarding labels as trade barriers (GEN, 2008).

6.9. Other initiatives

6.9.1. Sustain UK

Sustain UK have been working over the last few years on the development of a sustainability scoring system that could be used for environmental labelling. They have also proposed a number of ways in which such scores could be displayed pictorially that could be used to communicate sustainability impacts to consumers (Sustain, 2007). A variety of these are shown in Figures 6.3 and 6.4 below.

Image A shows a basic radiating scale. The scale increases from the centre point outwards. In the diagram seven sustainability impacts are shown but the approach would work equally well with slightly more or less spokes. The actual scores may be shown on this radiating scale in a variety of ways such as the rose style shown in B and the web shown in C. Alternatively an approach related to the traffic light system could be used whereby poor scores are shown in red, good ones in green and moderate ones in orange as shown in the flower design of D or the more quirky footprint design in E. However, some data accuracy is lost. Sustain (2007) also show other variations of D which could be modified by inclusion of a company logo or a particular issue that the organisation wishes to convey. Image F below shows how D could be modified to include both colour and score. Finally the image shown in Figure 6.4 is another adaptation of this approach used by CASINO (2008) to show the greenhouse gases emitted as a result of French activities. According to CASINO France emits a total of 553 million metric tonnes of carbon dioxide. The proportion emitted by different activities can clearly be seen in the image.

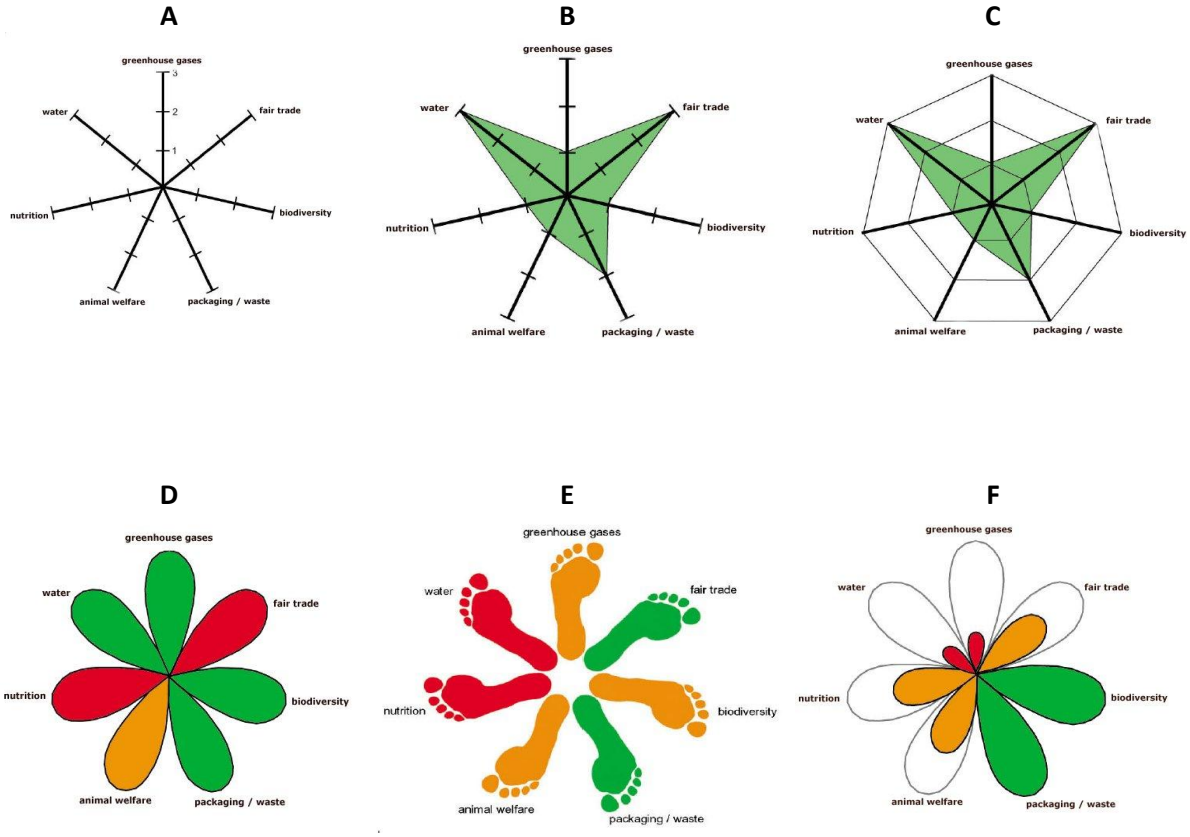


Figure 6.3: Various pictorial representations of sustainability scores (Sustain, 2007)

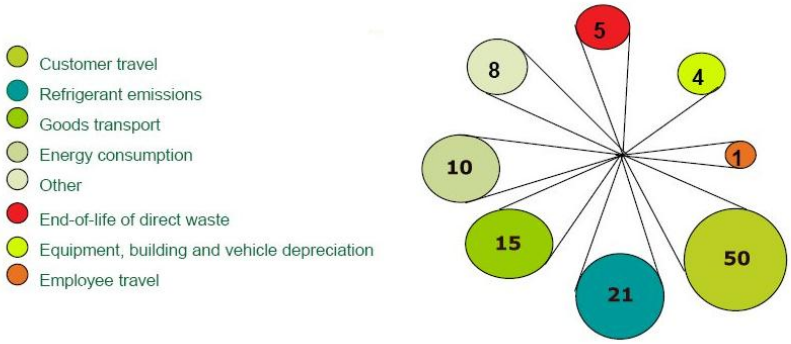


Figure 6.4: Pictorial representations of sustainability scores (CASINO, 2008)

Sustain in collaboration with the Food Ethics Council are also working on how water scarcity might be incorporated into such a label design (Segal and MacMillan, 2009) and have considered the variety of methodologies that might be used including, for example, water footprinting, environmental impact assessments and a water stewardship approach. Segal and MacMillan conclude that a water stewardship approach has the advantage of communicating a complex issue to consumers and although it is not a measurement based approach (i.e. is a Type IV) there are challenges specific to water measurement that would make a measurement approach difficult, costly and potentially misleading.

6.9.2. Conscious Brands carbon label

Conscious Brands is a consulting practice, based in Calgary, Alberta, Canada, that works with companies in the organic food and beverage industry who recognise the benefits of lowering their environmental footprint and want to look at long-term reduction strategies. Their core business is consultancy based on sustainability reporting and carbon labels. Currently, the company is working with the key international organisations involved with product carbon footprinting standards, including the Carbon Trust, in the hope of developing a single, universally-accepted method for measuring a product's life cycle greenhouse gas emissions.

Conscious Brands are currently piloting a methodology with a number of small companies in Canada. The label they are proposing goes beyond what is shown on many other carbon labels, such as that of the Carbon Trust (see Section 5.3.3) and breaks emissions down into life cycle stages as seen in Figure 6.5 that is for a ready to brew tea.

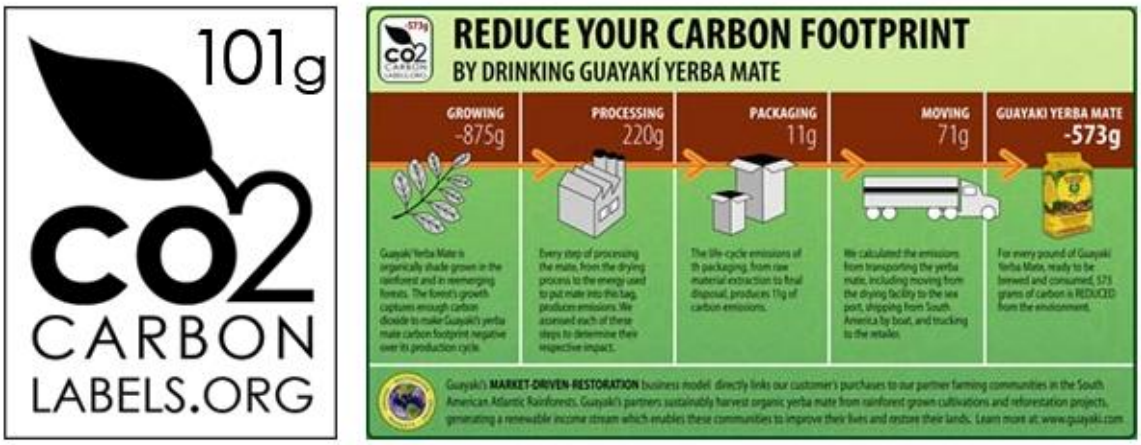


Figure 6.5: Conscious Brands Carbon label

6.9.3. ZeroFootprint

Zerofootprint is a socially responsible enterprise, based in Canada, whose mission is to apply technology, design and risk management to attain a large reduction in an individual or organisation's environmental footprint. The Zerofootprint organisation provides services to enterprises, organisations, governments, and individuals and provides tools and services to measure, manage, report on, and offset carbon production. The tools the organisation provides include:

- A personal Carbon Manager which is a tool that gathers information from the user to inform of the environmental impacts of their own activities such as transport, diet and personal behaviour etc. It also provides help to reduce the impact of individuals and allows benchmarking across individuals that participate in the companies' forums and discussion boards. A fee to access the tool is charged.
- On-line one minute calculators that enable individuals to get a quick measure of their carbon footprint. After they input basic lifestyle information, the calculator will provide an estimate of a user's carbon emissions in 60 seconds or less. These are free of charge.
- Simple tools and games for kids – children can calculate their unique footprint profiles and compare them with their classmates or with students living in other parts of the world. These tools are free of charge and available in a variety of languages.

6.9.4. Worldchanging.com

Worldchanging.com is a non-profit media organisation based in Seattle, USA, that comprises a global network of independent journalists, designers and thinkers who communicate their ideas via their website (www.worldchanging.com). Their recent discussions regarding eco-labels concluded that a lack of clear and informative labels was one of the major obstacles to buying green today and that information on food labels was essential for both consumer choice and consumer education. To demonstrate this with consumer help a theoretical "Environmental Facts" label was designed (Figure 6.6). The text gives quantitative details of production and a full list of ingredients. It is effectively a life-cycle analysis of the product, written in a compact summarised form. The optional graphic above the text is the product's eco-friendliness at a glance, summarising the categories whose data is written out below in a nutrition-label-like format (Worldchanging, 2007).

Figure 6.6: Worldchanging.com's ideas for eco-labelling

7.0. Discussion and findings

The review of literature and labelling schemes presented within this report forms the main output from Approach 1 for project FO0419. This evidence, along with outputs from Approaches 2 and 3, will be subject to analysis that will then be used to help formulate criteria and a framework for practical and effective environmental labelling of food products. However, this review has already revealed a number of issues and these are briefly discussed below.

The review has shown that the amount of work that is ongoing regarding environmental labelling is very considerable and interest is growing worldwide. However, the amount of work focussing on labelling for food products is relatively small and especially with respect to communicating multiple environmental issues on products. This is due to a number of factors including:

- The diversity of food products;
- The diversity of different production systems possible for any one crop. Many of these variations may have significant implications for environmental impacts. For example, just a few of the variations possible in strawberry production include (Warner, 2005):
    - Production approach - field, under cover, in raised beds, organic;
    - Geographical location, soil type and climate;
    - Sensitivity of the local environment e.g. presence of water bodies, forests, designated environmental areas;
    - Nutrient and crop protection regimes;
    - Cultivation and tillage system including tractor size and number of field passes;
    - Type and amount of energy used;
    - Irrigation practices.
- The complexities of determining emissions and environmental damage which may require site specific environmental fate and impact studies. This is complicated further by the need to convert the impact data to indices and determining what constitutes good and bad performance.
- The complexities of communicating environmental information to consumers. As discussed in Section 3, there are number of complex issues that need to be considered when communicating to consumers via product labels including issues of trust, preferences and motivations. All these have an influence on the effectiveness of labelling on driving consumer purchasing behaviour. For example some evidence suggests that consumers prefer single issue labels, yet other evidence shows that approaches like the traffic light system for nutritional labelling work well at conveying a range of information 'at a glance'.
- The lack of evidence showing that labels can help deliver environmental benefits (as it is difficult to differentiate the influence of labels amongst many other drivers, such as regulatory or other market influences).

In the UK, the majority of food 'eco-labels' that are available at the moment (e.g. LEAF Marque, Soil Association etc.) are a Type IV and do not quantify emissions or impacts. They rely on a 'best practice' approach to deliver environmental benefits. Whilst Type IV labels have played a significant role in improving standards in the UK, mainly with respect to food safety, quality and animal welfare issues (Lewis *et al.*, in press) they are practice-based and work on the basis of a link between practices and environmental benefits. As such, the labels that are placed on food produce from farms achieving certification under these schemes do not directly infer that any environmental benefits have been achieved or realised. It only infers that certain practices have been followed and as such those practices should lead to desired benefits. This is not necessarily a bad thing, as for reasons of practicality and cost this is currently a viable approach for an assurance scheme, but it is

important that this is noted with respect to what is being communicated on a label in the context of environmental impact.

In the last two or three years interest in developing environment labels for food products has grown and a number of new initiatives have started to appear. Perhaps disappointingly, from the scientific view point, many of the new initiatives are of Type IV (e.g. new Swedish initiative, see Section 6.4). The main exception to this is Earthsure (see Section 5.3.2) in the USA which is based on Life Cycle Assessment and utilises Environmental Product Declarations.

One could conclude from the proliferation of existing labels and the huge amount of activity ongoing related to environmental labelling, that eco-labels are successful in encouraging green purchasing and driving up environmental standards. However, sound evidence that this is the case is scant. Scientific studies related to this are few and far between and the evidence that does exist is inconclusive. However, proving their effectiveness is very difficult due to the many variables that affect consumer purchasing habits (e.g. product choice, advertising, trust, financial security, etc.) and the constantly changing environment in which the industry works (e.g. improving technology, more stringent regulations, competition, etc.). However, they are one weapon in an armoury available to policy makers and in this respect they have their place.

Harmonisation and normalisation of eco-labelling is another area that needs to be considered. With an increasing number of labels and schemes, most of which are operating independently, there is an increasing potential to increase confusion both within industry and consumers. Therefore there is a need for harmonisation and this has been recognised by the industry (Edser, 2009; Schenck, 2009). Some work is ongoing in this area, for example AFNOR in France are undertaking normalisation activities (see Section 6.3) and revision of the EU Eco-label includes introducing measures to encourage harmonisation with other eco-label schemes (where eco-label criteria are in place, national schemes developing the same product group for the first time must use them as a standard) (Europa, 2010b).

Finally, a crucial point is the credibility and transparency of an eco-label to consumers and industry. Evaluation and certification must be based on a sound scientific foundation using the most advanced techniques and must keep pace with developments. Consequently, it is essential to establish scientifically reliable and uniform environmental assessment methodologies for food and drink products and to identify of suitable tools for the communication of the environmental credentials of the labelled products to consumers and other stakeholders. Many of the eco-labelling schemes reviewed in this document rely on LCA as a technique to underpin them and other labelling schemes base their approach on practice-based measures. From the literature provided by schemes one could be forgiven for thinking that the underlying techniques are robust and well established. However, as discussed in section 1.2, the methods for environmental impact or performance assessment are not perfect and in some instances may not be very robust. Additionally, with respect to some impact areas, adequate impact assessment techniques do not exist and consequently such impacts are excluded from the scheme and thus not reflected in the eco-label. This is a critical issue, as the absence of any significant impacts from any eco or omni-label could not only be misleading to consumers, but can also externalise that impact from the market. Consequently it may not be addressed unless market interventions are made, such as government regulation. Approach 2 in project FO0419 is examining a range of impact areas to clarify the impact assessment approaches used and assess their relative strengths and weaknesses in the context of developing a framework for practical and effective environmental labelling of food products. The work undertaken in Approach 2 will be reported upon separately later in the project.

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Glossary of Terms

Term	Explanation
Accreditation	Procedure by which a competent authority gives formal recognition that a qualified body or person is competent to carry out specific tasks.
Accreditation body	Body that conducts and administers an accreditation system and grants accreditation.
Auditing	A process to measure and verify the practices of a business.
Benchmarking	Process of comparing performance and activities among similar organisations either against an agreed standard or against those that are recognised as being among the best.
Brand	A brand is a product, service, or concept that is publicly distinguished from other products, services, or concepts so that it can be easily communicated and usually marketed. Brands are often expressed in the form of logos, or consistency in product packaging. These logos or product packaging are used to convey a potentially wide range of product attributes in terms of provenance/source, quality, history, price, desirability and social aspirations.
Branding	Branding is the process of creating and disseminating the brand name. Branding may involve advertising and other marketing campaigns.
Carbon dioxide equivalent (CO_2e)	This is a unit used to compare the climatic effect of various gases expressed as the quantity of carbon dioxide with the same climatic effect.
Certification	Procedure by which a third party gives written or equivalent assurance that a product, process or service conforms to specified requirements. Certification may be, as appropriate, based on a range of inspection activities which may include continuous inspection in the production chain.
Certification body	Competent and recognised body that conducts certification. A certification body may oversee certification activities carried out on its behalf by other bodies.
Chain of custody (CoC)	The set of measures which are designed to guarantee that the product put on the market and bearing the eco-label logo is really a product coming from the certified organisation concerned. These measures should thus cover both the tracking/traceability of the product all along the processing, distribution and marketing chain, as well as the proper tracking of the documentation (and control of the quantity concerned).
Conformity testing	Evaluation by means of testing that the product or service fulfils the specified requirements.
Eco-design	Also referred to as Sustainable Design, Environmental Design, Environmentally Sustainable Design or Environmentally-Conscious Design. It is the philosophy of designing objects or buildings according to the principles of economic, social, and environmental sustainability.
Eco-labelling	Eco-labelling schemes entitle a product to bear a distinctive logo or statement which certifies that the meets the criteria and standards of the labeling scheme and/or product category. The logo or statement is intended to make provision for informed decisions of purchasers whose choice can be relied upon to promote and stimulate the sustainable use of fishery resources.
EMAS	EMAS (European Eco-Management and Audit Scheme) A voluntary environmental management system for companies and organisations, applicable in Europe and based on EU regulations. This standard requires public reporting on progress towards environmental targets, and rigorous environmental management.

Term	Explanation
Environmental Product Declaration (EPD)	An environmental product declaration is defined as quantified environmental data for a product with pre-set categories of parameters based on the ISO 14040 series of standards, but not excluding additional environmental information.
Full assessment	The process by which a product undergoes a detailed assessment against the principles and criteria of a particular labelling scheme. A full assessment will result in a decision whether or not to award a compliance certificate.
Green claim	Information appearing on a product, its packaging, or in related literature or advertising material, which can be taken as saying something about its environmental aspect.
Green-washing	The practice of making an unsubstantiated or misleading claim about the environmental benefits of a product, service or technology.
ISO 14001	The International Environmental Management Standard. It specifies the actual requirements for an environmental management system. It applies to those environmental aspects, over which the organisation has control and can be expected to have an influence.
Life Cycle Assessment (LCA)	A technique to systematically evaluate environmental problems. The ISO (International Standards Organisation) divides LCA into four phases: a) General guidelines and principles and scope of an LCA are described in ISO 14040-14041. b) Inventory and material/energy analysis in ISO14041. c) Environmental impact assessment in ISO 14042 and d) Interpretation of results in ISO14043. The main object of an LCA is to create a basis for environmental improvement so that decisions made lead to minimal environmental impact.
LCI & LCIA	Life Cycle Inventory and Life Cycle Impact Assessment
Omni-label	An environmental label that integrates various environmental impacts in an easy to understand format.
Pre-assessment	The process by which a product undergoes a broad assessment against the principles and criteria of a particular labelling scheme. The purpose of the pre-assessment is to identify the weaknesses of a product or process in order to judge whether to invest in a full assessment (see above).
Product criteria	Criteria (or standards) with which the product or service seeking label certification must comply with.
Product group	In Type I eco-labels similar products are placed in Product Groups and Product criteria is established for the specific group.
Suppliers declaration	Procedure by which a supplier gives written assurance that a product, process or service conforms to specified requirements.
Standard (for certification)	The standard for certification includes requirements, criteria and performance elements in a hierarchical arrangement. For each requirement, one or more substantive criteria are usually defined. For each criterion, one or more performance elements are usually provided for use in assessment.
Third-party	Person or body that is recognised as being independent of the parties involved, as concerns the issue in question.
UNEP	The United Nations Environment Programme coordinates United Nations environmental activities.
World Trade Organisation (WTO)	The international body that oversees the General Agreement on Tariffs and Trade (GATT) and related international trade agreements. The requirements of the WTO must be considered when designing policies that affect international trade.