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Consumers faced with environmental labelling

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Title: Consumers faced with environmental labelling

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Abstract

Within the scope of the legislative commitments drawn up by the Grenelle "I" and "II" laws, the General Directorate for Sustainable Development is responsible for managing the implementation of environmental impact labels for consumer goods. Unlike labels that only target products with the best environmental characteristics, environmental labelling shall apply to all products, including those with bad environmental impacts, in all consumer fields.

This study presents a review of the statistic and economic literature on the consumer behaviour and expectations with regard to such a measure. Several major lessons can be learnt:

- market failures legitimise a public action on generalised labelling, complementing other tendering policies promoting sustainable production and consumption modes;

- French and European consumers are today looking for high-quality environmental information;

- providing information on the environmental impacts of products is likely to influence purchase and production behaviour in favour of a more environmentally-friendly approach;

- environmental information must be presented on the place of purchase as a general, clear summary that can be compared between products in order to be taken into account by consumers during their everyday purchases;

- the purchase of eco-labelled products currently mostly concerns the upper classes, however mandatory environmental labelling will promote the democratisation of environmentally-responsible consumer approaches, in particular via economies of scale connected to mass production to meet increased demand.

Introduction

Article 54 of the French law dated 3 August 2009, known as "Grenelle 1", establishes the consumer right to "*be given access to sincere, objective and complete environmental information concerning the overall characteristics of the product/packaging pairing*". The environmental labelling principle consists in providing consumers with information on the environmental impact of products, taking into account their life cycle and several environmental criteria (in particular not limited to their carbon footprint). Unlike labels that only target products with the best environmental characteristics, environmental labelling shall apply to all products, including those with bad environmental impacts, in all consumer fields.

Nationwide testing began for an environmental labelling device, according to article 228 of the "Grenelle II" law, on the 1st of July 2011, led by the Ministry of Ecology, Sustainable Development and Energy. It is presented in detail in Vergez (2012) for food products. This experiment must help prepare for the implementation of the legislative commitment by drawing up a first operational assessment of the device and its effects. In this perspective, this study summarises the statistic and economic studies conducted on consumer opinions and reactions to the environmental impact labelling of consumer products. It therefore focuses on consumer behavioural changes and only marginally covers the expected effects with regard to the product offer.

Today, French ambitions in terms of generalised, multi-level and multi-criteria environmental labelling are unprecedented. No direct equivalent exists and no results are available regarding consumer behaviour in this field. Therefore, the behavioural patterns analysed shall be derived from the wider scope of responsible or sustainable consumption and positive eco-labels, which contain the most similarities with the behaviour that can be expected in reaction to environmental labelling. However, green products or fair trade products within this perimeter must be differentiated from organic products. The purchase of the first two product categories is often viewed as a "citizen" act and motivated by a moral choice expressing a collective interest (reducing greenhouse gases, not using child labour, etc.). This essentially originates from allocentric motivations. On the other hand, the reasons driving the purchase of organic products are multiple: consumers may purchase these products as they are less harmful to the environment compared to traditional products (public benefits) as previously mentioned, however also because they are looking to consume products that they feel are better for their health (personal benefits) given their production conditions. These products therefore provide multiple benefits, both public and personal, and it is difficult to determine which of these two benefits is most influential on the consumer's choice. Drawing up an analogy between the consumption of organic products and behavioural patterns in environmental labelling situations is therefore more difficult.

This study firstly presents the opinions and behavioural patterns of French and European consumers and their expectations with regard to a labelling policy. The second chapter of this document provides a more in-depth analysis of the diversity of consumer behavioural patterns and presents the advantages of labelling policies to democratise the consumption of more environmentally-friendly products. The third chapter discusses the magnitude of the changes in consumption behaviour to be expected from consumers. The fourth and final chapter of this document covers the economic legitimacy of a state intervention in the field of environmental labelling and discusses its conditions.

1. French and European consumers are in favour of an environmental labelling policy

Further to the discussions held within the scope of the Grenelle de l'Environnement with representatives of the civil society, opinion surveys and rising trends in green product consumption show that French and European consumers are looking for an environmental impact labelling policy on consumer products. The annual Credoc indicator in particular enables us to study the level of declared sensitivity to environmental issues and its annual evolution within a representative sample of the French population. The European Commission indicator informs us of both the French and European opinion on green consumption. The OECD survey conducted in 2008 and 2010 provides information regarding green consumption in developed countries[1] (OECD, 2011). Finally, the Ethicity research firm conducts annual opinion surveys (more than 4,500 persons questioned), the results of which have been published since 2006.

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[1] The countries taking part in this survey, in addition to France, include Mexico, South Korea, etc.

1.1. Protecting the environment remains the focus of French and European concerns

Protecting the environment has become a major issue over the last few decades. Today, it plays an important role in public debates, whether during international summits such as the Rio summit (United Nations conference for sustainable development or "RIO +20") or during national public debates (environmental conference, public discussions on strategy for the marine environment, etc.). At the same time, the level of sensitivity of the French population to environmental problems has been constantly increasing since the early 90's. The results of an opinion survey conducted by Crédoc in 2011 show that nearly nine out of ten people are sensitive to the environmental issues at stake, regardless of the social groups studied and the available years of observation (Greffet and Morard, 2011). In 2011, 53 % of the French population declared being "very sensitive" to environmental issues, compared to a little more than one third in 1995 (graph 1).

Graph 1: proportion of the French population that declare being very sensitive to environmental issues[2]
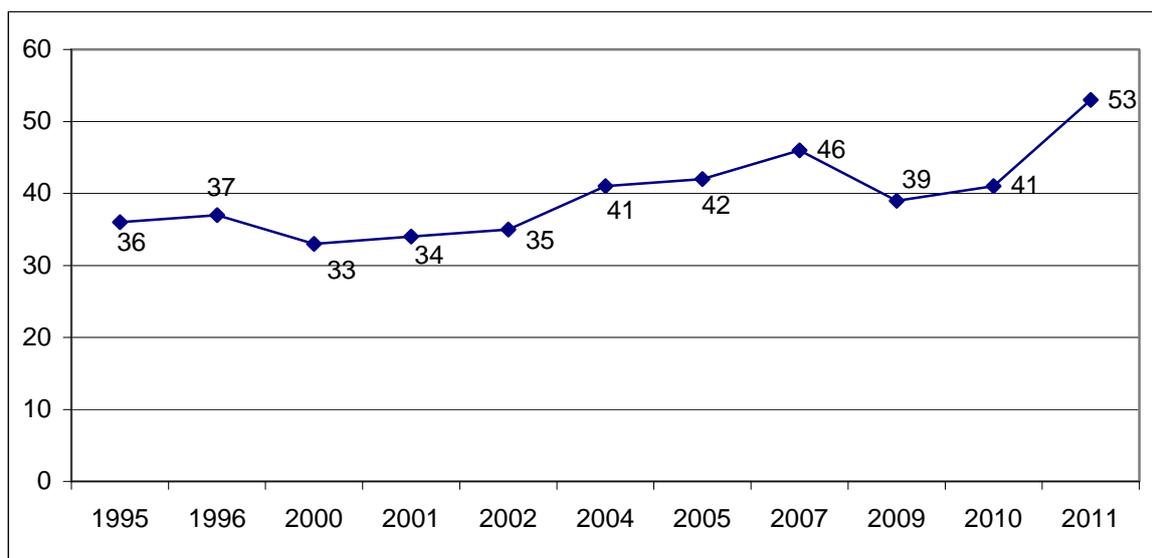
Source: Crédoc-SOeS, "Living conditions and French aspirations" (Conditions de vie et Aspirations des Français) surveys.

In 2009, according to the European Commission indicator, nearly half of all Europeans (47 %) classed the issue of climate change in 2nd place behind poverty but in front of global recession, (57 % average in France). Today, almost everyone is aware of the importance of individual behaviour in the pressure exerted by humanity on the environment. A survey conducted by the OECD (2008) concluded that more than 95 % of the population agrees with the idea that everyone must contribute to improve the state of the environment.

Despite the economic crisis, protecting the environment remains one of the top concerns expressed by European public opinion. Both the French and European populations seem convinced by the notion of green growth: not only do 70 % of the French (60 % average in Europe) refute the idea that protecting the environment could slow economic development, but nearly 80 % (66 % average in Europe) view protecting the environment as a motor driving growth (European Commission, 2009a). Climate change remained one of the top environmental concerns expressed by the French population from 2007 to 2010 according to the Eurobarometer, however was second to water and air pollution in 2011 (European Commission, 2009a). This inversion of priorities was confirmed by the Ethicity survey conducted in 2011 on "the French and responsible consumption" (*les français et la consommation responsable*), where pollution appeared as the environmental issue that most worried the French.

France's growing environmental concerns encourage behavioural patterns aiming at protecting the environment in all aspects of everyday life, including consumption habits. According to a survey conducted by SOeS on the environmental habits of households in 2010, 35 % of the French population declared paying attention to the quantity of waste generated by their purchases, at least with

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[2]   From 1995 to 2002, French sensitivity to environmental issues was graded from 1 to 4 (very sensitive). Since 2004, the grading system varies from 1 to 7. To ensure comparability, the "very sensitive" class is defined in the following manner: grade of 4 until 2002 and accumulation of grades 6 to 7 since 2004.

regard to some products. This percentage was only 17 % in 2005. Further to this declared attention, responsible consumption figures are used to verify that purchasing trends have indeed changed.

1.2. "Responsible" consumption is developing

The term "eco-product" or "green product" is used to describe products with an environmental impact below the average in their product range, according to the definition in the guide to environmental claims jointly drawn up by the French Ministry of Ecology, Sustainable Development and Energy and the Secretariat of State responsible for consumption. This definition obviously does not imply that these products have a beneficial effect on the environment, nor that they do not have any negative effect on the environment. The consumption of green products contributes to a type of "responsible consumption" in that it translates the social concerns felt by individuals. The consumption of fair trade products is another example of this type of approach. The growing interest for the environmental and social quality of products declared by consumers in opinion surveys is concretely represented in consumer behaviour. Responsible consumption is undergoing trend-based development.

A survey conducted by the SOeS on the environmental habits of households revealed that in 2010, 44 % of the French population declared having consumed organic products in the past month, compared to 21 % in 2005 (Greffet 2011). The organic market is therefore experiencing significant growth: with 3.38 billion Euros (inclusive of tax) of turnover in 2010 compared to the 1.6 billion Euros in 2005, the organic food market represents 2 % of the overall food turnover (graph 2).

Graph 2: annual turnover for the organic food industry in France (in millions of Euros)
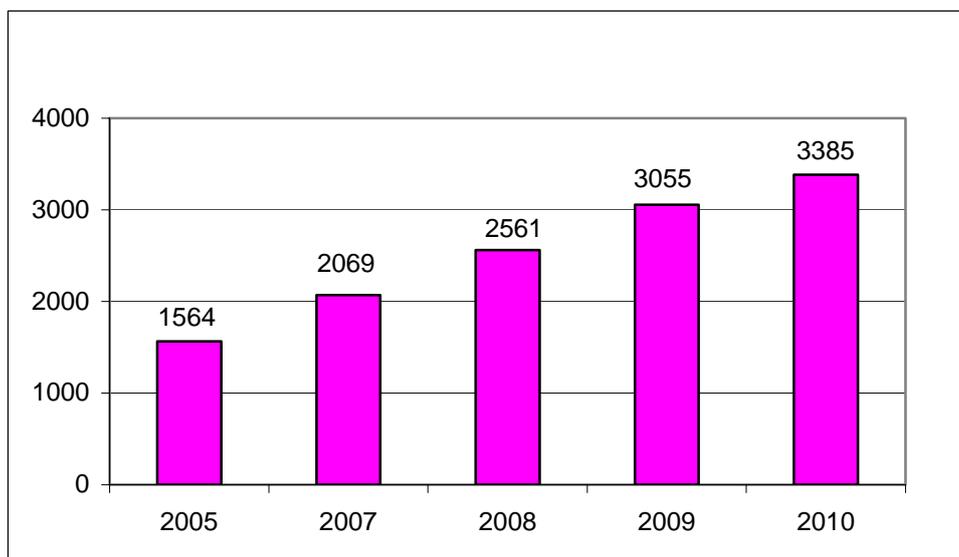
Source: Assessment of organic food consumption - AND-International / Agence BIO – 2011.

Furthermore, one third of the French population declared having purchased at least 4 fair trade products equalling a total of €15.90 over the year (TNS / KANTAR, January 2010). The turnover recorded for "fair trade products" by the Fairtrade/ Max Havelaar label has been increasing since 2001, despite seeing a drop in growth over the last few years (graph 3).

Graph 3: annual turnover for Max Havelaar products in France (in millions of Euros)
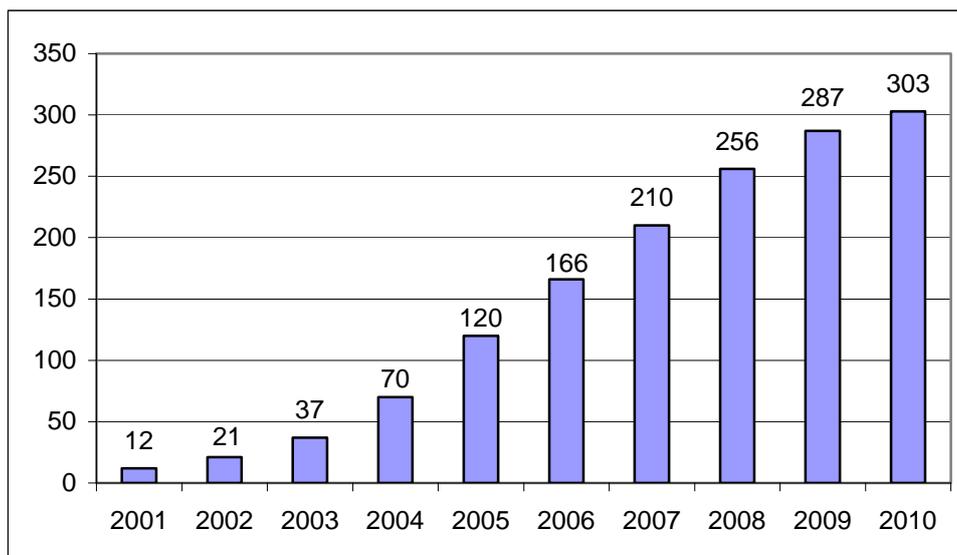
Source: Fairtrade / Max Havelaar

Developments in responsible consumption also involve eco-labels: according to the business outlook survey conducted among households (source: Insee), the proportion of households that declared purchasing at least one eco-labelled product per month has increased from 31 % in 2008 to 45 % in 2011 (graph 4). In France, the most well-known eco-labels are NF-Environnement and the European eco-label, which both involve consumer goods (clothing, hygiene products, etc.). Their sale in France experienced significant growth in the 2000's (graph 5). 54 % of French consumers would like to have a greater choice of environmentally-friendly products (Crédoc, 2010). Green products, which today are a niche market, should experience growth far exceeding that of traditional products.

Graph 4: proportion of French households that declared purchasing at least one eco-labelled product per month[3]
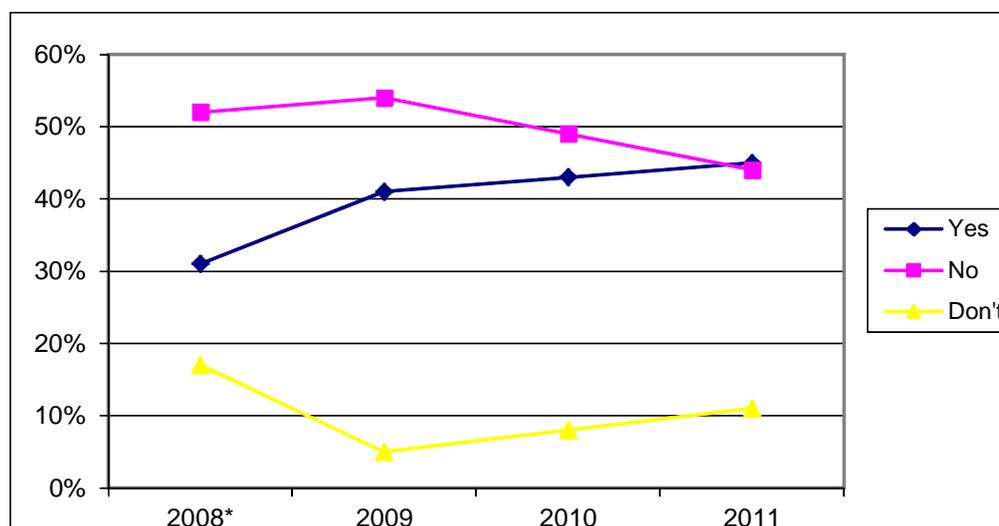
Source: Insee, business outlook survey conducted with households

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[3]   Answer to the question: "In the past month, have you or a member of your household purchased one or several products containing an eco-label (for example the NF Environnement label)?". In 2008, the question was slightly different: "In the past month, have you or a member of your household purchased one or several products containing the NF Environnement label?"

Graph 5: annual turnover for eco-labelled products (type I – see Inset 1) in France
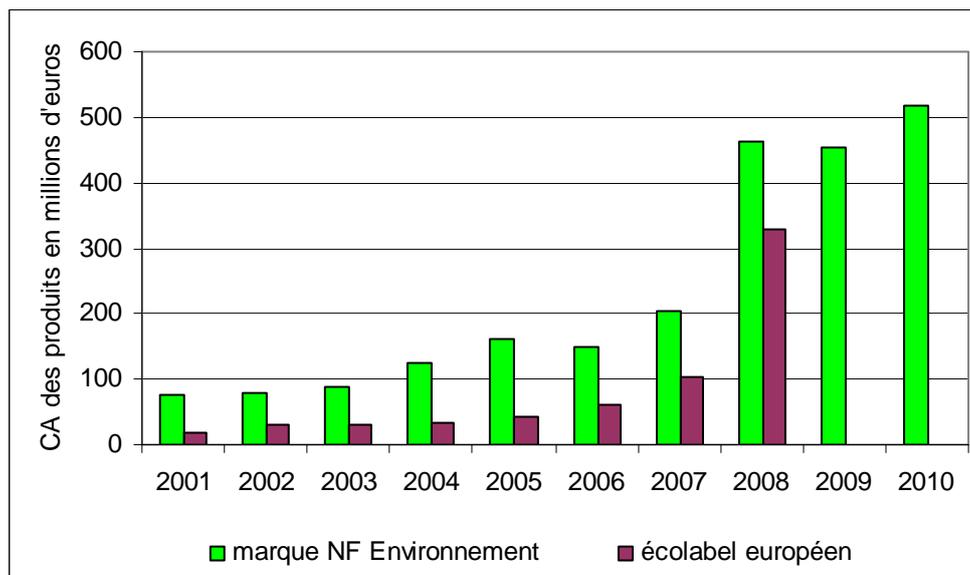
Source: ADEME/AFNOR.

1.3. Consumers are looking for clearer, more reliable environmental labelling

In the absence of any generalised labelling policy, consumer information regarding the environmental impact of products was until now limited for the most part to environmental positive labels (type I eco-labels) and producer claims (type II) (see Inset 1). In order to influence consumer choices, these devices must be known and recognised by consumers and be easy to understand and reliable.

Created in 1992, the European eco-label (flower logo) informs consumers on the environmental impact of the product. It is the only official European eco-label that can be used in all member countries of the European Union. According to the Eurobarometer No. 256, 45 % of the French population recognised this label in 2009 compared to the 35 % European average. Results also vary greatly between different countries: 50 % of the Danish population declared recognising this label compared to only 26 % of the British population. The NF environnement label, specific to France, was also recognised by 45 % of the French population in 2010 (Crédoc, 2010). The notoriety of eco-labels in France is however improving due to information campaigns and the rise in referencing. Finally, the organic label is recognised by half of those replying to the OECD survey conducted in 2008. However, the results again vary greatly between different countries: Sweden stands out from the rest with the highest level of recognition (97 %), followed by France (87 %) and Norway (75 %). The levels of recognition obtained for Mexico, Canada, Italy and Australia are much lower (10 %, 18 %, 25 % and 29 % respectively).

Inset 1: International standards and eco-labelling

The International Organization for Standardization has standardised the principles, practices and key characteristics of three main types of environmental labelling (ISO 14020 standards). These standards constitute an international reference in terms of good practices, however no organism is authorised to certify that such and such a label is compliant thereto.

ISO 14024 standard (introduced in 1999): **type I eco-labels** or environmental labelling. These identify products with environmental performance levels greater than the average in their category and thus impose requirement levels for multiple environmental criteria assessed throughout the product's life cycle (multi-criteria and LCA approach). They also guarantee a certain level of product quality. The different parties involved (state, producers, consumers, distributors, environmental protection associations) are consulted to define eco-label awarding criteria. In France, the "NF environnement" label and the European eco-label are examples of eco-labels according to the definition of the ISO 14024 standard. These two labels are awarded by Afnor Certification.

Figure 1.1: logos of the "NF Environnement" label and the European eco-label, examples of "type I" labels

ISO 14021 standard (introduced in 1999): **type II self-declaration of environmental claims** or environmental labelling. This standard describes sales arguments for which the producers are solely responsible. No selective character, multi-criteria approach or life cycle analysis is required.

ISO 14025 standard (introduced in 2006): **type III eco-profiles** or environmental labelling. These quantify the environmental impact of a product via a multi-criteria and life-cycle approach. Certification by a third party is optional and labelling is not selective.

Table 1.1: ISO standards on environmental labelling

Standard	ISO 14024	ISO 14021	ISO 14025
Name	Eco-labels	Self-declarations	Eco-profiles
Selective nature	Y	Y	N
Multi-criteria approach	Y	N	Y
Life cycle analysis	Y	N	Y
Five-stakeholder governance	Y	N	N
Mandatory certification by a third party	Y	N	N

Certain environmental labels adopt approaches similar to type I eco-labels (requirement levels, certification by third parties, multi-stakeholder governance) however target partial environmental objectives. These labels do not form part of the ISO 14024 standard due to the lack of any multi-criteria and LCA approach. Despite this, such labels cannot be compared to a self-declaration of environmental claims. This is in particular the case of sustainable resource management labels such as "Forest Stewardship Council" (FSC), "Program for the Endorsement of Forest Certification" (PEFC) (sustainable forestry management) or "Marine Stewardship Council" (MSC) (sustainable piscicultural resource management). These labels are however often called eco-labels by extension.

Furthermore, certain agricultural labels can be considered as belonging to a separate sphere and do not make any attempt to comply with the ISO 14020 standards. The French "Agriculture biologique" organic label, owned by the Ministry of agriculture, and the European "Organic Farming" label cannot strictly be considered as type I eco-labels as they do not comprise a life-cycle approach. However they do guarantee production modes that in a general manner contribute to reducing environmental impacts per hectare farmed. These two labels have been based on the same criteria since 2009 and are awarded via certification.

Figure 1.2: "Organic Farming" logos in their French and European versions

However, according to the Ethicity 2011 survey, 61 % of French consumers think that too many labels currently exist for sustainable development products and 62 % think that sustainable development products are not easy enough to identify. Furthermore, only one quarter of French consumers find the information given on green products sufficiently clear (Credoc 2010 survey).

Some also question the existence of a real environmental approach from companies using the environmental argument without solid scientific justification (suspected "green-washing"). The Ethicity 2011 survey also concluded that only 52 % of the French population believe the information provided on green products to be reliable. Some French consumers are wary: according to the Eurobarometer

2009, 38 % of French consumers do not believe the environmental claims made by companies on their products (graph 6). These results are heightened by the Credoc indicator according to which two thirds of French consumers do not believe that the information provided on green products in 2011 had any scientific grounding (graph 7).

Graph 6: proportion of the French population that declared believing the information provided on sustainable products (in %)
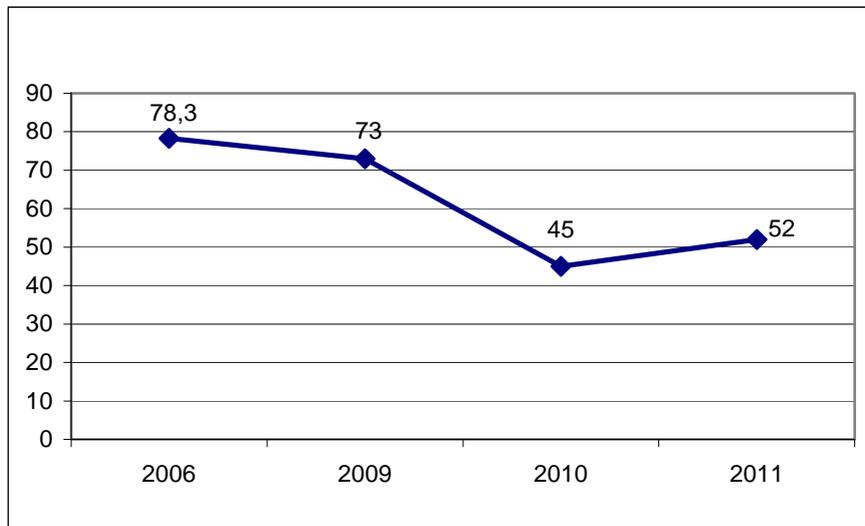
Source: Ethicity, survey on "The French and Responsible Consumption" (Les Français et la consommation responsable)

Graph 7: proportion of the French population that believes the information provided on environmentally-friendly products to be scientifically grounded (in %)
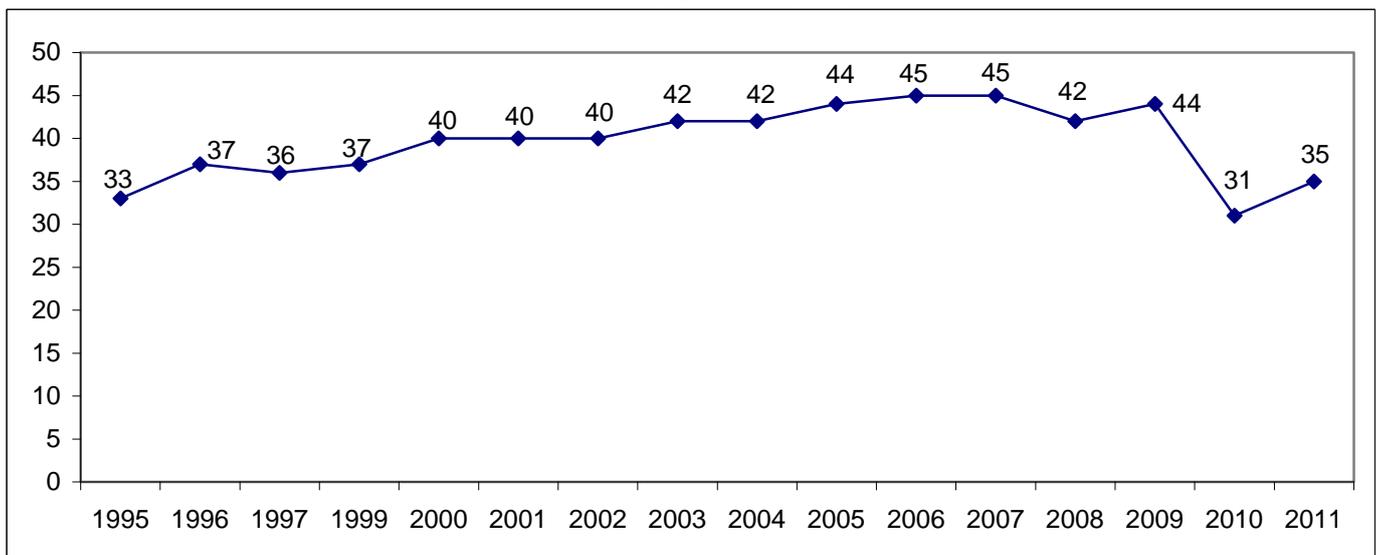
Source:
CREDOC, Survey on "Living Conditions and French Aspirations (Conditions de vie et Aspirations des Français)

In 2008, greater confidence in the certification, labelling and virtues of organic products was the number two factor given by consumers for increasing their consumption of organic products, second to more affordable prices and in front of product availability or appearance (OECD, 2011).

These elements show the desire of households for sincere, objective and comprehensive environmental information. According to the Eurobarometer 2009, 72 % of Europeans would vote for a mandatory carbon labelling measure for products (78 % in France and 80 % in the United Kingdom), whereas only 15 % believe that this should take place voluntarily. The Ethicity 2011 survey showed that 66 % of French consumers would like information regarding the environmental impact of their purchases made in 2011. The 2011 Crédoc survey confirmed this interest: 56 % of consumers declared that they would look at this information and that it would influence their product choice (graph 8).

Graph 8: French opinions regarding the utility of environmental labelling (in %)[4]
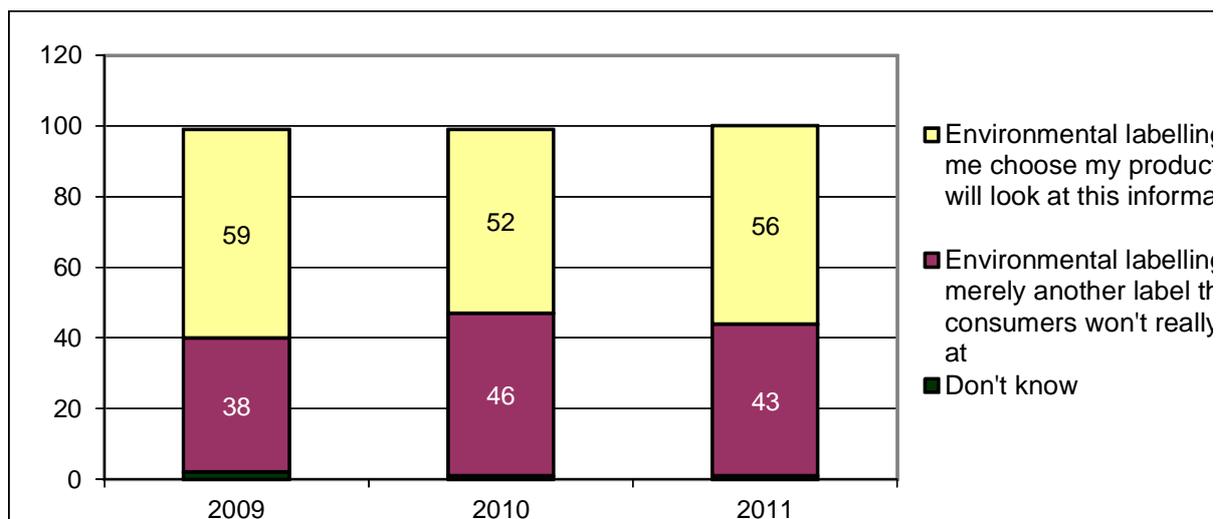
Source: Crédoc, survey on "Living Conditions and French Aspirations" (Conditions de vie et Aspirations des Français)

These French expectations with regard to environmental labelling prioritise food products: 54 % of French consumers would above all like to be able to read environmental information on food products. Maintenance products are second and are considered as a priority for 26 % of the French population (Crédoc, 2010).

2. Democratising environmentally-friendly consumption: a social issue

Consumption of the products identified as being the least harmful for the environment mostly remains limited to certain social classes (management and intellectual upper professions with higher than average income and education levels), although this is experiencing growth in the other classes. Green products are therefore associated with a niche market and high prices. However, the high cost of ecological products is not inevitable: reducing certain impact criteria sometimes goes hand-in-hand with reduced production costs. By extending environmental information to all consumer products, the (mandatory) generalisation of labelling would give all consumers (and not merely a marginal group) the opportunity to correctly assess the environmental consequences of their choices. Consumers could therefore systematically integrate the environmental criteria into their purchase decisions and privilege the most environmentally-friendly consumer products. Generalised labelling would constitute a major step forward in relation to the current market situation for eco-labels, as it would contribute to both the development and democratisation of responsible consumption.

2.1. The consumption of eco-labelled products above all concerns the upper classes

Although environmental concerns and green consumption are developing (see graph 4 hereinabove), consumer opinions and behaviour remain heterogeneous and are connected to certain socio-demographic characteristics. Sex, place of residence, age, education level, income and socio-professional category are all decisive factors in the consumption of eco-labelled products. These factors thus draw up a typical profile for green product consumers: relatively young, working, urban consumers with higher than average income and education levels. The results obtained from academic literature on the consumption of eco-labelled organic products in this field generally agree with those of the opinion surveys conducted.

Income level
The business outlook survey conducted among households by the Insee (CAMME) noted a positive relationship between income and the declared purchase of eco-labelled products. In 2011, from among the households of the 1st income decile group (income not

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4   The question was posed as follows: "Environmental labelling should be mandatory by 2011 and will inform you of the impact each product has on the environment. Personally, which of the following proposals best corresponds to your opinion?"

exceeding €752 per consumption unit[5]), only 40 % declared consuming at least one eco-labelled product per month, whereas 60 % of households with an income exceeding the 9th decile group (income exceeding €2,024 per consumption unit) made such a declaration. Similar results are obtained with regard to recognising the European eco-label: this concerns only 25 % of individuals with an income not exceeding €900 per month compared to 37 % of individuals with an income exceeding €3,100 according to the Crédoc 2011 indicator. According to these results, individuals with high income are more in favour of environmental labelling than individuals with low income (63 % and 48 % of favourable opinions respectively). Opinion studies (OECD, European Commission) and academic literature confirm that the standard of living is an essential factor influencing the consumption of eco-labelled products.

Education and socio-professional category

According to the CAMME survey, the level of education is essential in explaining purchasing behaviour for eco-labelled products, even if this gap has been shrinking over the years between further education graduates and non-graduates. In 2011, only 30 % of those having obtained only primary study certificates or not having studied at all, declared having purchased at least one eco-labelled product per month, compared to 62 % of those with higher education degrees.

This difference is also shown when the individuals are broken down according to their socio-professional category. In 2011, only 35 % of working-class labourers declared having purchased at least one eco-labelled product per month, compared to 64 % of management employees. Furthermore, according to the Crédoc indicator, these social classes are also more in favour of environmental labelling: 63 % of management executives are in favour of environmental labelling compared to 44 % of working-class labourers and 64 % of those with higher education degrees compared to 40 % for non-graduates. These observations partially conceal the aforementioned income effect and are confirmed by the typologies produced by Crédoc and Ethicity.

Age

Age is also a decisive factor in the consumption of eco-labelled products. The CAMME survey shows that this consumption is increasing for the below-40 age group and decreasing thereafter. In 2011, 48 % of the under 30s declared having purchased at least one eco-labelled product per month, compared to 63 % of 30-49 years olds and only 30 % of the over 70s.

Despite these figures, this does not take into account the fact that youths have below average income levels and may have greater budget restrictions. Along the reasoning of "all things being equal", and in particular with identical income, academic literature does highlight a positive "youth" effect on the purchase of eco-labelled products. This result is better understood after reading the Crédoc indicator, which shows that eco-label recognition steadily decreases with age (57 % of 18-24 years olds declared recognising the "NF environnement" label compared to 33 % of the over 70s) and that youths are more convinced than the average population on the scientific grounding of the environmental information provided by companies: 41 % of 18-24 year olds believe the information provided on green products to be scientifically grounded, compared to an average of 31 %.

Gender

In 2011, 48 % of women declared to have purchased at least one eco-labelled product per month, compared to 44 % of men (CAMME survey). Other sources (OECD opinion surveys, academic studies) confirm these results and draw up a relatively female portrait of the average green product consumer.

Opinions and representations

The act of purchasing eco-labelled products declared in the surveys finally appears to be strongly connected to levels of sensitivity to environmental issues: all things being equal, a person declaring themselves as very sensitive to environment issues is twice more likely to practice this type of purchase than a person declaring themselves as only fairly sensitive (Credoc, 2010). OECD works also

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[5] The consumption unit compares the standard of living and thus the income of households of different sizes and compositions. In order to take into account the size and composition of the household, the OECD recommends a consumer unit scale:
  ➢ The 1st adult is worth 1 consumption unit (CU)
  ➢ Any other individual over the age of 14 is worth 0.5 CU
  ➢ Any individual under the age of 14 is worth 0.3 CU

confirm that individuals declaring themselves as more sensitive to environmental issues are also those who more often declare purchasing green products (OECD, 2008b).

It is no surprise that the examination of the decisive factors determining the level of sensitivity to environmental issues highlights the same factors as those identified for purchase behaviour. Nonetheless, comparing the degrees of sensitivity declared can be difficult due to the different references used according to the generation: for example, youths could consider sorting waste as normal behaviour not representing high sensitivity to environmental issues, whereas the elderly would consider sorting waste as a sign of their environmental commitment. In a general manner, the results available per age group are all obtained from cross-sectional data and do not differentiate between the age and generation effects.

Further to environmental opinions, academic literature shows that the consumption of green products is also connected to a belief in their superior quality, to a trust in eco-labels and to health concerns. Credoc and Ethicity typologies suggest that eco-consumers like having a choice and will check the proof and efficiency of their actions in favour of sustainable development. They are also looking for more transparency and guides for better understanding the positive impacts of their consumption choices.

2.2. Are green products more expensive? A well-anchored image but not the rule

The price factor is given by French consumers as one of the main obstacles reducing their consumption of green products: it was cited by 53 % of households in the Crédoc survey conducted in 2011 (Crédoc, 2012) and by 64 % in a survey conducted by the Mouvement Vraiment Durable (French sustainable movement) in 2008. This phenomenon is even greater for organic food products: according to the Agence Bio indicator (Agence Bio 2011), three out of four French consumers not having purchased organic products in the month preceding the survey stated that prices were the factor reducing their consumption (stable proposition since 2004). Similarly, Dekhili and Tagbata (2010) show that for food products, price is the number one obstacle hindering the purchase of ecological products. These results show a well-anchored image of the high cost of ecological products.

Although the price differences are gradually dropping for all product categories (see Linéaires 2011 survey and its comparison with the 2009 survey), this image is nonetheless justified for most products derived from organic farming: according to a UFC-Que Choisir study conducted in January 2010, a basketful of organic own brand products is 22% more expensive than a basketful of national classic brand products and 57 % more expensive than a basketful of non-organic own brand products[6]. Green products are also more expensive in household appliances: data provided by the GIFAM (French interprofessional grouping of household appliance manufacturers) shows that the price of a class A++ refrigerator or freezer in 2009 was on average two and a half times more expensive than that of its class D equivalent (Ademe 2011). This additional cost exceeds the savings made on energy consumption.

The observation of raised prices for ecological products doesn't however apply to all product categories: pricing data collected in 2011 by the CLCV (French consumer association) show that own brand eco-labelled products are on average less expensive than branded non-eco-labelled products for five everyday consumption products (CLCV 2011). Detailed results even show that eco-labelled washing powders are less expensive for both own brands and brand name products (graph 10).

Therefore, the production of more ecological products does not systematically lead to additional costs but depends on the products considered. Additional costs generally apply to food products derived from organic farming as the specifications involve production rates lower than those of traditional farming methods, with this drop not always being covered by the savings made on inputs. In the household appliances sector, the existence of additional costs associated with the design of new, energy-saving models is also likely. However, for other products, production modes reducing environmental impacts are also sources of saving money and thus lower the price paid by the consumer: this is more particularly the case for material and energy-saving approaches in the production, recycling, or packaging process. A study conducted by the Ademe shows that a household can save approximately € 500 per person per year by systematically choosing products generating less waste (Ademe 2009).

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[6] This comparison is based on the assumption that an organic basket is similar to the traditional consumer basket, which is generally not the case as organic consumers modify their type of food in relation to traditional consumers.

The high notoriety of food products derived from organic farming and energy labels for household products certainly contributes to creating an expensive image for green products, however this reputation is not warranted for all current or future products.

Graph 9: average prices of five everyday consumer products according to the type of brand and presence of eco-labels (European ecological label or "NF environnement" label only)
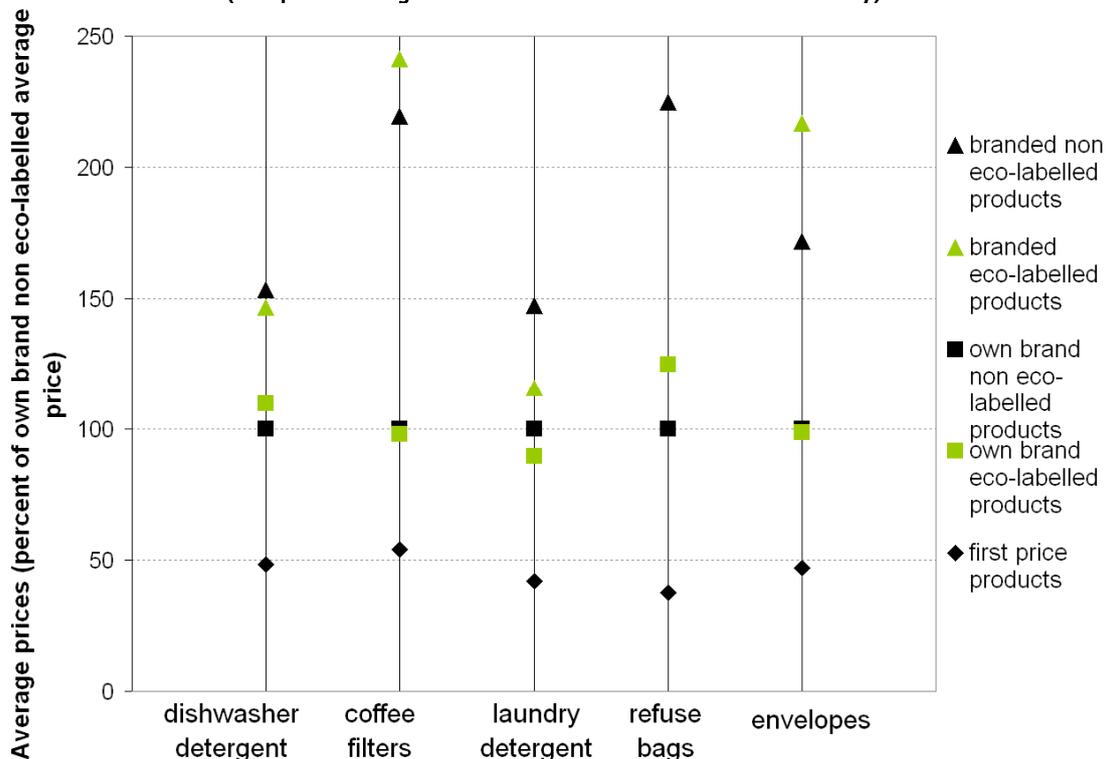
Source: CLCV (2011), CGDD calculations

2.3. *Leaving behind niche strategy to move towards democratising eco-consumption via environmental labelling*

Consumer heterogeneity promotes the implementation of niche strategies by eco-labelled product producers and distributors. These, manufactured in small volumes to meet a specific customer segment, can have higher prices to guarantee their profitability. Indeed, large sales volumes generally tend to reduce production and distribution costs (economies of scale). Furthermore, the social profile of the eco-label target consumer affects producer and distributor pricing strategies for these products as the upper classes are less sensitive to prices, which favours greater margins. The preference shown by certain well-off consumers towards green products enables the practice of high prices. In 2010, the UFC-Que Choisir consumer association denounced the margins practised by distributors on organic food prices, which were deemed to exceed the margins practised on non-organic products. Producer and distributor pricing strategies therefore have the tendency to reserve eco-labelled product consumption to a small, well-off consumer group prepared to pay a high price, where the majority of consumers are in practice excluded from this form of sustainable consumption.

As long as certain sources for reducing environmental impacts are also sources of saving money (by increasing the efficiency, for example, of material flows in production methods), production costs should drop for at least part of the green product range and, with equivalent margins, consumer prices should also drop. A mandatory eco-labelling policy could force produces to leave behind niche strategies, encourage eco-design and democratise eco-consumption. Eco-labels by definition quantify the environmental characteristics of a limited number of products and are thus seen as a sign of quality involving additional costs. They characterise a form of ecological excellence targeting a small number of consumers very sensitive to ecological aspects and belonging to the "upper" social classes. Mandatory environmental labelling would, on the other hand, enable all products to be compared, and in particular identify the least virtuous. Impact reduction efforts made by producers could therefore create value, not only for a few niche products, but also for products intended for mass consumption, which could have a significant impact on the environment, all the more so as environmental impact calculations can highlight sources for easily reducing these impacts. In sectors benefiting from economies of scale, democratising eco-consumption would also create a virtuous circle: the large-scale development of ecological production processes would make them more economical, thus reducing costs and prices and increasing the democratisation of green products.

3. Eco-labelling at the place of purchase would affect consumer behavioural patterns

Consumer opinions in favour of eco-labelling are not enough to foresee its efficiency in terms of reducing the environmental impact of the products consumed. Indeed, household declarations do not always coincide with their behaviour in a real purchasing situation: consumer habits can be difficult to change, all the more so as consumers have a limited amount of time to make their purchases.

Furthermore, the development seen with organic products is not enough to prove that consumers will naturally be inclined to purchase more environmentally-friendly products: organic consumption, by reducing consumer exposure to pesticides, may reflect health-based concerns rather than environmental concerns. The commercial success of more environmentally-friendly products is therefore not guaranteed by the success encountered for organic products.

In this respect, the consumption of green products must be compared to the consumption of fair trade products, as the latter is born from responsible consumption behaviour: the direct personal benefits that the consumer may acquire from reducing the environmental impact of his/her own consumption actions are extremely limited and green consumption can only affect the quality of a person's environment if a large number of consumers adopt responsible behavioural patterns. From a strictly personal point of view, consumers can therefore count on others to invest in responsible products without making any personal effort to change his/her own consumption behaviour (free-riding behaviour). The development of fair trade in France is an encouraging sign for an eco-labelling policy as it proves the existence of collaborative behaviour which could also apply to the environmental sector. However, personal citizen concerns could result in different consumer behaviour patterns according to whether they concern the social or environmental fields.

For more robust information with regard to the effect of eco-labelling on consumer behaviour, we must refer to economic literature. The French project for generalised multi-criteria display is innovative and has not been subject to studies as such, however academic results are abundant in terms of labels. In particular, many authors have measured the average cost that consumers are willing to pay for more environmentally-friendly products and these studies tend to confirm a positive consumer willingness-to-pay.

3.1. Consumer "willingness to pay" for products with low ecological footprints

Sustainable production modes do not systematically induce extra costs for the producer or lead to higher prices: on the contrary, reducing certain environmental impacts actually creates savings (see chapter 2). Such money-saving production modes should theoretically develop spontaneously, even in the absence of any eco-labelling policy. If this is not the case, this may partly be due to the fact that these production choices currently have a negative impact on sales. For example, reducing packaging limits the possibilities for attractive presentations. Social standards and consumer preferences may be encouraged in the long term to lean towards simpler products, however these can be considered as stable in the short term. Consequently, eco-labelling will confront consumers with arbitration situations: in exchange for reduced environmental impacts, consumers must accept different characteristics or occasionally higher prices.

Consumer "willingness to pay" for more ecological products is a theoretical concept associated with standard consumer choice models (inset 2). It provides a single measurement unit for measuring the impact of different product characteristics on buyer decisions. It quantifies, in monetary terms, the willingness of consumers to pay for reduced environmental impacts, even if in practice this reduction may require arbitration with regard to product characteristics rather than with regard to prices. Consumer willingness to pay for an eco-label describes the additional cost that the consumer is willing to pay when buying a product containing the label in relation to a strictly identical product not containing such a label. The adjustments that consumers are prepared to accept with regard to product characteristics are integrated into the willingness-to-pay calculation in the form of monetary equivalents.

Concretely, a positive willingness-to-pay translates the fact that the consumer is prepared to change his/her consumer behaviour (in terms of product characteristics or in terms of prices) to take into account the environmental impacts of products.

Inset 2: the willingness-to-pay concept in consumer choice models

This paragraph presents an example of a very simple consumer choice model illustrating the willingness-to-pay concept. This aims at modelling consumer choices between K orange juices, which differ from each other by only three characteristics: the price p_k, measured in Euros, the environmental footprint e_k, measured using a specific unit, and the type of packaging b_k, where b_k is equal to 1 if the product is packaged in 250 mL cans or equal to 0 if it is packaged in 1 L bottles.

It is assumed that the consumer i has a utility function U_i which he/she maximises when purchasing a product. This takes the value U_{ik} when the consumer chooses to purchase the product k. These values are modelled in the following manner: $U_{ik} = c_1.p_k+c_2.e_k+c_3.b_k+v_{ik}$, where c_1, c_2 and c_3 are coefficients common to all individuals and measure the effects of each characteristic on consumer utility. The residue v_{ik}, has a positive value if the consumer has a strong personal preference for the product k, a negative value if the consumer has a personal dislike of the product k, and a zero average for all consumers. These personal preferences can in particular result from product characteristics not taken into account in the model or even from the consumer's mood at the time of the purchase. If we assume that the residues v_{ik} are independent from each other, independent from the characteristics taken into account in the model and follow a type I law of extremes (conditional logit model), the probability that a consumer should choose the product k from among the K products is equal to:

$$P(k) = \frac{e^{c_1.p_k+c_2.e_k+c_3.b_k}}{\displaystyle\sum_{l=1}^{K} e^{c_1.p_l+c_2.e_l+c_3.b_l}} \ .$$

When the products show sufficient variability in the characteristics p_k, e_k and b_k and consumer choices are known, the model can be estimated using the method of maximum likelihood. Price is expected to have a negative effect on consumer utility (a strictly negative coefficient c_1). Willingness to pay to reduce a product's environmental footprint is therefore expressed in the following manner:

$$WTP_{e/p} = \frac{\partial U_{ik}/\partial e_k}{\partial U_{ik}/\partial p_k} = \frac{c_2}{c_1} \ .$$

It is expressed in Euros per unit of environmental footprint and is strictly positive when the environmental footprint affects consumer choices (strictly negative coefficient c_2, which only translates the fact that, because the footprint e_k increases with the product's environmental impact, consumer utility decreases as e_k increases). This formula applies even if real arbitration takes place with the packaging characteristic rather than with the price. Furthermore, a willingness-to-pollute measurement can also be calculated in a similar manner (expressed in units of environmental footprint) for canned packaging:

$$WTPollute_{b/e} = \frac{U_{ik}(b_k=1)-U_{ik}(b_k=0)}{\partial U_{ik}/\partial e_k} = \frac{c_3}{c_2} \ .$$

One of the main limits to this model is that it assumes that consumer preferences are homogenous for the characteristics studied[7]. If information is available on the consumers, the fact that certain individual characteristics influence willingness-to-pay can be taken into account. However if this information is not available, an "average" willingness-to-pay is measured, corresponding to that of a virtual representative consumer purchasing all of the products himself/herself.

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[7]   Another important limit to this type of modelling is that arbitration taking place between two products is assumed to be independent from other available options. This in particular implies that when a new product is introduced onto the market, it takes market shares from all of its rivals in a proportional manner, which is not very realistic. More complex models may overcome this problem.

3.2. Literature shows a positive willingness to pay for "responsible" products in developed countries

Different methods exist (inset 3) for measuring consumer willingness to pay for more environmentally-friendly or more ethical products (i.e. for estimating the value of the coefficients in inset 2). The choice in methodology is important in assessing average consumer reactions to eco-labelling. The Murphy et al. (2005) meta-analysis for example mentions certain studies where the average willingness-to-pay differs by a factor of ten according to the method selected. The least reliable method is that based on direct consumer declarations, as consumers tend to declare a willingness-to-pay that is higher than their purchase reality. In ascending order according to reliability, the next on the list are hypothetical choice experiments and laboratory experiments with real payments. Finally, in-store experiments allow for the observation of behavioural patterns under normal purchasing conditions, however are few in number.

Inset 3: limits and relevance of the different willingness-to-pay measurement methods in economic literature

This inset summarises the main characteristics of the most commonly used methods in economic literature for measuring consumer willingness to pay for green or fair trade consumer products.

Direct declaration methods

These methods, also known as "contingent valuations", consist in directly questioning individuals on their willingness-to-pay. For example, the following question can be asked: "Would you be prepared to pay a 2 % additional cost for cleaning products that are biodegradable and therefore more environmentally-friendly?". These methods have the disadvantage of not taking into account the possible arbitrations with other non-price-related characteristics. Furthermore, they are known to overestimate willingness-to-pay due to several different forms of declarative bias:

- strategic bias: if the subject is sensitive to environmental issues and predicts that their response will contribute to the development of more environmentally-friendly products, he/she is incited to over-declare his/her willingness-to-pay.

- social judgement bias: the subject knows that society values the notion of contributing to preserving the environment and his/her response may be influenced by this social pressure.

- hypothetical bias: the subject may be mistaken on his/her attitudes in a real situation, for example due to the fact that the survey is attracting his/her attention to environmental aspects that he/she would not necessarily have noticed in a real purchase situation. The subject may also answer without thinking or answer randomly as his/her response will have no effective financial outcome.

- contextual bias: the answers may be modified due to the fact that the subject is not in a real purchase situation at the time of the survey. For example, the subject may be less restricted by time or be more attentive.

Hypothetical choice experiments

Subjects are provided with a questionnaire asking them if they would purchase virtual products. They can also be asked to choose between several products with different characteristics. Based on their answers, consumer demand models can be created to show consumer willingness to pay for different product characteristics, including environmental characteristics.

This method is still subject to the aforementioned biases, however to a lesser degree than direct declaration methods (Murphy et al., 2005, Florax, Travisi and Nijkamp, 2005). The purpose of the survey can be concealed so as to remove strategic bias: consumers are encouraged to reveal their true preferences within the scope of real market enquiries. Environmental assets can be presented as one of several characteristics to reduce social judgement bias. A series of binary choices can also be provided to subjects (purchase or not purchase a product) for which no obvious social desirability exists. Contextual bias can also be reduced by questioning subjects at a place of purchase.

The choices made by consumers remain hypothetical, however studies comparing declaration results with real behaviour show that declaration bias is very limited when the choice-based experiment is conducted under good conditions (Mahé 2009, chap. 2, List et al. 2006). Murphy et al. (2005) also show that declaration bias is proportionally lower for products with low prices, in relation to products with high financial consequences under real conditions.

Laboratory experiments with real payments

Subjects are given the opportunity of purchasing real products in exchange for real money. Conducting these experiments in a laboratory enables the information provided on the products to be controlled so as to isolate the impact of a given characteristic on consumer willingness-to-pay. For example, an orange juice can be proposed without specifying that it is derived from environmentally-friendly farming methods, then this information can be revealed, thus showing how this affects the proportion of consumers willing to purchase the product.

A set budget is often allocated to individuals at the beginning of the experiment to encourage them to take part, and they can choose to spend or not to spend this budget to purchase the products offered. Given a relatively high experiment cost per individual, the number of persons questioned is generally limited to one or two hundred individuals at most.

The purpose of the existence of real payments is to remove any hypothetical bias. However, individuals are not in their normal purchasing situation and know they are being observed, so much so that the other biases can still have effect. Bougherara (2003, part 3) finds that consumer willingness-to-pay results obtained under these conditions fall short of the price actually paid in store as the individuals are not there with the intention of purchasing the products offered. However, willingness to pay (differential) for environmental characteristics can nonetheless be overestimated due to the fact that individuals are paying more attention to their choices, knowing that they are being observed.

In-store experiments

This method consists in observing real product sales at real points of sale. One experimental protocol aims at isolating the impact of the environmental characteristics of products. For example, market shares are observed before and after the addition of environmental impact labels on a product range. Green product prices can also be progressively increased to assess how this affects market shares.

By definition, the behavioural patterns observed during these experiments are real behavioural patterns. However, the results obtained generally only concern a limited number of products, and are only representative of the clientele of the point of sale where this experiment was conducted.

Several hypothetical choice-based experiments conducted in developed countries show a positive average willingness to pay for the environmental or social characteristics of consumer products (Johnston and Roheim 2006, Arana and Leon 2009, Mahé 2009, chap. 2, Devinney, Auger and Eckhardt 2010). However, significant variability can be observed in these results according to consumer populations (Johnston et al. 2001, Devinney, Auger and Eckhardt 2010) or the products (Johnston et al. 2001, Arana and Leon 2009). Experiment conditions can also highly affect results, providing different magnitudes from one study to the next. The results of hypothetical choice based experiments are based on fictive choices and do not financially bind consumers, which leads certain researchers to question their validity (inset 3). However, the result of a positive willingness to pay for social aspects, at least for some consumers, is confirmed by numerous studies based on experiments conducted with real payments in laboratories (Rode, Hogarth and Le Menestrel 2008, Mahé 2009 chap. 3, Hustvedt and Bernard 2010) or in-store (Prasad, Kimeldorf, Meyer and Robinson 2004, Arnot, Boxall and S. Cash 2006, Hiscox and Smyth 2008).

Furthermore, in the environmental field, multiple studies on real purchasing data confirm the existence of positive willingness-to-pay. In the United States, Teisl, Roe and Hicks (2002) showed that the "dolphin-safe" label increased market sales for tinned tuna. In Denmark, Bjorner et al. (2004) showed a willingness to pay + 13 % to + 18 % of the price for toilet paper containing the "Nordic Swan" environmental label. However, no significant results were obtained for paper towels. In New Zealand, Harris (2007) showed a 52 % rise in the sale of seven detergent products one year after their environmental certification by life-cycle analysis. In Australia, Vanclay *et al.* (2011) checked the high impact on market shares of eco-labelling under real conditions when the product with the lowest carbon footprint is also the least expensive (consumption changes of approximately 20 %), however a limited impact under reverse conditions.

The results of academic literature on consumer willingness to pay for eco-labelled or organic products globally agree with those of opinion surveys in terms of the green product consumer profile (see chapter 2.1)[8]. Bougherara (2003, pp 326-331) drew up a profile for green products consumers based on 25 different studies (all measurement methods combined) and similar results were obtained more recently by Laroche, Bergeron and Barbaro-Forleo (2001), Grankvist and Biel (2007), Mahé (2009), Brécard et al. (2009, 2012) and Schumacher (2010). Bias connected to the declaration method does not therefore seem very important when studying consumer diversity. Furthermore, labelling experiments confirm consumer heterogeneity in relation to consumer willingness to pay for responsible products. A rise in the price of the responsible product dissuades an increasing number of consumers from choosing it: Prasad et al. (2004) therefore showed that half of all consumers choose socks produced in good working conditions when they cost the same as ordinary socks, whereas only 28 % of consumers continue to choose these socks under a 40 % price difference.

Despite consumer heterogeneity, the results available do not question the existence of positive willingness to pay for ethical products by low-income consumers. It can in particular be noted that laboratory experiments are often conducted using a student-based public, which still does not prevent them from obtaining positive willingness-to-pay results (Rode, Hogarth and Le Menestrel 2008 for a production process guaranteed without child labour, Hustvedt and Bernard 2010 for producer corporate responsibility with regard to its employees). Furthermore, the effect that income has on consumer willingness to pay it is less important than the age factor (Johnston and Roheim 2006 for the sustainable seafood label, Mahé 2009-chapter 2 for the fair trade banana label, Brécard et al. 2011 for an eco-label and a fair trade label on seafood products).

The motivations that result in a positive willingness to pay for "responsible" products are not necessarily entirely allocentric. In the food industry, the consumption of organic products can result from a search for personal benefits associated with environmental benefits (taste and health). However, Bougherara and Combris (2009) showed that individual willingness to pay for less polluting food products does not change after having specified that they will not necessarily personally benefit in terms of taste and health. Moreover, impure allocentric behaviour is also spoken of when the consumer is looking to "buy their conscience" by consuming green products. In this case, an eco-labelling policy could have significant "rebound" effects (for example, consumers using more detergent if they know that the product is less harmful for the environment). Mahé (2009, chap. 4) however showed that individual willingness to pay for an eco-label is positively correlated with a psychometric scale for measuring allocentric behaviour. Finally, social conformism can also drive green consumption (Carlsson et al. 2010).

3.3. Generalised eco-labelling will affect purchasing behavioural patterns in France

The studies conducted in France confirm the existence of a positive average willingness to pay for reduced environmental impacts by French consumers. Combris, Disdier and Marette (2011) summarised the results obtained by Inra using laboratory experiments. Overall, "percentage rises in average willingness to pay connected to the presence of a [sustainable] characteristic are relatively high, which means that a significant development potential exists for these markets". Bougherara and Combris (2009) recorded an average willingness to pay of + €0.25 (+ 29 %) for an eco-label on orange juice. Disdier and Marette (2011) recorded + €0.57 (+ 26 %) for a fair trade label on prawns. Disdier and Marette (2012) recorded + €0.58 (+ 24 %) for locally produced gherkins. Finally, Bazoche et al. (2012) recorded + €0.44 to + €0.56 (+ 43 % to + 55 %) for pesticide limitations on apples. These studies only involved the food products for which environmental characteristics are often perceived as being associated with personal benefits (nutritional, taste or health-related benefits). Furthermore, these were only conducted in laboratories and involved small samples without any guarantee regarding the even representation of French consumers. However, the magnitude of the willingness-to-pay results obtained leaves room for high real-scale impacts, even though these may be lower than the study results obtained.

In the presence of a positive average willingness-to-pay, generalising eco-labelling will lead to changes in consumption habits in favour of products with reduced environmental footprints. The extent of these changes will depend on the products and the eco-labelling implementation conditions. In this respect, the communication campaign on labelling is important as this must be recognised and seen as reliable. Mahé (2009, chap. 3) showed that the willingness to pay for "fair trade" and similar labels increases when information is published regarding these labels prior to the laboratory experiment, which illustrates the need to explain the social plus value to be expected from a responsible purchase.

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[8]   Not all academic studies show significant impacts for all criteria. For example, Auger, Devinney and Louviere (2010) question the fact that socio-demographic characteristics are connected to willingness-to-pay. However, the small size and lack of representivity of the samples used in some studies may explain this type of results.

Furthermore, much more significant consumption changes can be expected for mandatory labelling as opposed to voluntary labelling for various reasons. Firstly, Bernard, Bertrandias and Elgaaïed (2012) showed that the presence of negative labels adds credibility to the environmental labelling system and that the difference in harmfulness perceived is more significant between a positive-labelled product and a negative-labelled product than between a positive-labelled product and a non-labelled product. Mandatory labelling should therefore increase changes in consumption habits towards the purchase of green products. Moreover, mandatory labelling would enable consumers to not only identify virtuous products but also those with the highest environmental impacts. This would therefore not only result in consumption changes in favour of green products, but also consumption changes from the most harmful products to products with average environmental impacts in their category.

Finally, mandatory labelling would lead to the democratisation of eco-consumption and reduced margins on green products (see chapter 2). Literature tends to confirm the existence of higher margins for ethical products than for normal products. Rode, Hogarth and Le Menestrel (2008) found, during a laboratory experiment, that a producer working in partnership with an NGO fighting against child labour could almost double its unit margin compared to an ordinary producer, resulting in it making more profit despite a slightly lower market share. Arnot et al. (2006) found that demand for fair trade coffee is less price-elastic than demand for ordinary coffee. In this case, optimising coffee producer profits involves a higher margin on fair trade coffee than ordinary coffee. Within the scope of a mandatory eco-labelling policy, eco-design and environmental communication would no longer be reserved to a small customer segment with top-of-the-range positioning and raised margins, and would instead extend to everyday consumer goods.

The difference between the percentage of subjects declaring themselves as sensitive to environmental issues and the current eco-label market shares could lead certain authors to believe that individuals over-declare their sensitivity to environmental issues and that the act of consumption is disconnected from citizen declarations (see Devinney, Auger and Eckhardt 2010). The review of the economic results presented hereinabove instead tends to strengthen the development potential for behavioural patterns with regard to sustainable consumption. In order to bring together these observations, other explanations may explain the limited success of eco-labels: consumer heterogeneity and niche strategy (see chapter 2), lack of notoriety, low visibility of logos on packaging, low availability of eco-labelled products, consumer confusion when faced with multiple environmental messages and doubts concerning their reliability. A governmental policy for generalising eco-labelling would reduce some of these obstacles hindering responsible consumption.

3.4. Focus on an Australian eco-labelling experiment involving comprehensive product ranges

In 2008, Vanclay et al. (2010) conducted a carbon footprint labelling experiment involving five comprehensive product ranges in a local store in the town of Ballina, Australia. This is the closest experiment to a mandatory eco-labelling policy: quantified environmental footprints were displayed on comprehensive product ranges, thus enabling all substitute products to be compared to each other. This experiment calculated the effect of this type of measurement in terms of democratised eco-consumption.

In this experiment, displays were set up in the aisles, in immediate proximity of the products, in the form of signs measuring 6×12 cm containing the number of grams of CO_2 produced and a footprint, the colour of which informed the consumer of the product's class in its range: green for products with a low carbon footprint, yellow for products with an average carbon footprint and black for products with a high carbon footprint (figure 11).

Figure 2: Format of the carbon footprints in the Vanclay et al. experiment (2010)
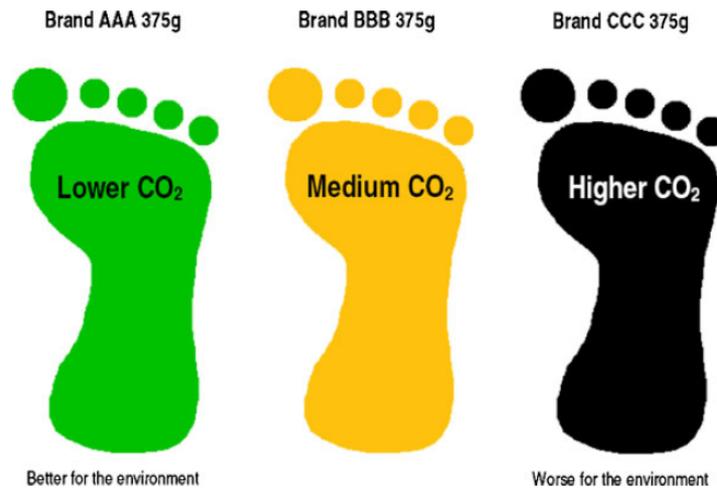
Labelling was introduced on the 25th of August 2008, with high local media coverage during its first week, so much so that the store's sales soared by 12 % on the first day of the experiment. During the two months following the introduction of the labelling system, the store's sales were an average 4 % above their normal level. This media cover could have affected the results of the experiment by attracting consumers that are particularly sensitive to environmental issues, however such a composition bias should have decreased over time. However, the consumption changes observed on the contrary increased over time, which demonstrates both the low bias and the slow rate involved in changing purchase behaviour.

The sales for 37 products involved in the labelling experiment were recorded over a period of four weeks before the introduction of carbon footprints and over a period of eight weeks afterwards. Between the month preceding the experiment and the second month of the experiment, the market share for products with green footprints had improved by four points (in volume) and that for products with yellow footprints by two points, whereas the market share for products with black footprints dropped by six points. This overall result varies greatly between different product categories. For "spreadable butter in tubes" and for "tinned tomato" product ranges, products with green footprints were also the least expensive, and changes in consumer habits from black products towards green products equalled approximately 20 points. For "bottled water" and "long-life animal food" product ranges, consumers had to arbitrate between a reduced carbon footprint and product prices, and changes in consumer habits ranged from five to ten points. For fresh whole milk, labelling fully depended on the packaging and no changes were observed in market shares. All milks originated from the same producer and the carbon footprint per unit of content was at its most for small bottles and at its least for large bottles.

This experiment confirmed that generalised eco-labelling increasingly influences consumer behavioural patterns over time. Moreover, it shows that in the presence of eco-labels on all products, consumption changes mainly occur to the detriment of the products more harmful to the environment (products marked with a black footprint in the experiment), whereas the market shares of products with intermediary impacts (yellow footprint) changed very little. A mandatory eco-labelling policy would therefore lead to greater reductions in environmental impacts than a label simply informing the consumer of the greener products (type I eco-label logic).

Finally, the experiment demonstrated that changes in consumer habits in favour of green products are more significant when these products are also the least expensive: see above for the case of spreadable butter and tinned tomatoes. This result confirms that niche strategies with high prices are not the only possibility, as green product ranges at accessible prices can result in high increases in demand. This shows that there is room for democratised eco-consumption.

3.5. Energy labels in the European household appliance industry: one example of successful mandatory labelling

The implementation of European energy labels on household appliances is a precedent for the use of large-scale environmental eco-labelling in France. This mandatory labelling system in place in Europe since 1995, displays the energy consumed by household appliances during their use (fridges, freezers, washing machines, tumble dryers, dishwashers, electric ovens and air-conditioning units). These labels contain the annual energy consumption figure (for an average frequency of use), accompanied by a score between

A and G, a cursor and a colour code which enables consumers to quickly assess the energy performance of the product in relation to appliances of similar capacity. For some products, labels also display the quantity of water consumed and the amount of noise emitted during use. The environment and energy management agency (ADEME) drew up a detailed report on the implementation of energy labelling in France (Ademe 2011, 2012).

Ademe demonstrated a widespread change in consumption habits in favour of more energy-saving products following the introduction of a labelling system. When implementing the very first energy labelling system on washing machines in 1996, almost 100 % of sales involved classes B to G. In 2009, more than 90 % of sales involved class A appliances. 70 % of consumers declared in 2008 that energy labelling was a major influence in their purchase decision. This upheaval in purchasing behaviour is partly due to the fact that reducing energy consumption constitutes a means for saving money in households that invest in efficient equipment. However, Ademe (2011) has shown that the additional costs connected to purchasing more efficient appliances are not fully compensated by the savings may during the product's life (for example for freezers). Consumers could therefore have taken into account environmental impacts when making their decision.

The change in consumption habits favouring more energy-saving products has taken place in a gradual manner, in parallel to a development in label notoriety: only 20 % of consumers recognised the label in 1997, one year after its launch, compared to 84 % in 2009. However the energy classes of the products bought have significantly improved with knowledge of the label (Ademe 2012). This device's rise to power demonstrates the importance of communication around the labelling policy and the slow rate of behavioural changes. This shows that the effects of a labelling policy must be assessed over time.

The changes in consumer behaviour observed do not only depend on consumer behaviour but also on the product offer, which has evolved to propose a wide range of energy-saving appliances. The existence of a competitive market offering multiple levels of energy consumption according to the product's given characteristics, was one of the factors of the device's success, enabling consumers to express their preference for more energy-saving products. The fact that energy labelling was set up not only on a national scale but on a European scale certainly contributed to this positive reaction from producers. Indeed, a large-scale market helps amortise the investments made for developing new, more environmentally-friendly products. The technological innovation possibilities were proven to be significant, with the development of products achieving an A+++ score.

Although energy labelling coincided with a widespread change in consumer habits in favour of more efficient products, the amount of energy consumed by households has not dropped since the 1990s. On the contrary, specific electricity consumption (excluding heating, domestic hot water and cooking) was multiplied by two between 1985 and 2008 due to increased home equipment rates and their increase in capacity (larger appliances) (General Directorate for Sustainable Development, 2011). The energy saved by improved appliance performances was therefore more than compensated by consumption rises associated with societal behavioural changes. The rise in household equipment applies to all domestic electrical appliances and not only those concerned by energy labelling (more particularly multimedia equipment, which is not subject to labelling). However, energy labelling may have encouraged households to invest in household appliances and promoted more intensive use by reducing the operating costs and by the corresponding rise in purchasing power. This pernicious effect of energy labelling is known as the "rebound effect". It reduces the environmental benefits of energy labelling, however creates a positive economic impact on the household appliance sector, all the more so as technological innovations have promoted a higher appliance renewal rate.

The evolution of household appliances towards increasingly low energy consumption rates required modifications to the energy labelling system. Classes A+ and A++ were introduced in 2003 for refrigeration appliances and class A+++ appeared in 2010, accompanied by the risk of reduced readability for consumers. This example shows the difficulties of developing environmental quality criteria in line with the technological progress made: producers are not ready to accept the downgrading of energy efficiency grades for identical appliances, whereas this is compulsory to enable consumers to make simple product comparisons. This example shows that label modification conditions should be provided for from the system's launch date.

4.   Public intervention in eco-labelling is legitimate in an economic respect

From the point of view of neoclassical economics theory and its teachings in terms of public economy, any state intervention must be justified either by redistribution objectives or by the existence of "market failures". With regard to environmental information, these market failures do exist and are a result of informational asymmetries between producers and consumers: although producers can

assess the environmental impact of the activity, consumers cannot access this information in a reliable manner and cannot therefore satisfy their preference for more environmentally-friendly products.

4.1. Eco-labels are not enough to guarantee optimal market functioning

Eco-labels already exist and certify the environmental impacts of products (see § 1.3), however these are simply not enough.

The environmental impacts of consumer products can be considered as a product "trust-based characteristic". Consumers do not have the technical skills required to assess and check the environmental quality of goods either at the time of purchase or during later product use (unlike for other quality characteristics). Furthermore, the cost of acquiring the information necessary for assessing this quality is too high for consumers. Consumers therefore find themselves in a situation of informational asymmetry: consumers are not aware of the environmental quality of products in advance whereas the producer has this information. Akerlof (1970) founding works showed that in the absence of any reliable control mechanism, no viable market can exist for trust-based characteristics. Consumers are wary of producer claims in such a way that they are not prepared to take into account their environmental impact reduction efforts in purchasing decisions. In response to this, producers stay within standard production modes. In equilibrium, all stakeholders lose and overall social well-being is reduced. These theoretical results have been verified by laboratory experiments (Cason and Gangadharan 2002, Bougherara 2003, Combris, Disdier and Marette 2011).

In order to restore economic efficiency, the environmental impacts displayed must be credible for the consumer, and thus enable the latter to satisfy his/her preference for reduced environmental impacts. The large amount of eco-labels in existence today attempt to meet this need for a third party intervention guaranteeing the credibility of the declarations made. According to Ecolabel Index, 431 eco-labels exist throughout the world, distributed in 246 countries. Approximately 8 % of these are government-managed, 18 % privately-managed and 58 % managed by non-profit organisations (Big Room Inc. and World Resource Institute 2010). This profusion calls for the implementation of regulations, as it can comprise limits in several respects: lack of neutrality with regard to producers, too limited assessment of environmental impacts, lack of effective impact checks, lack of credibility, widespread scattering and lack of readability.

The ISO 14024 standard, which provides the framework for eco-labels known as "type I" eco-labels, requires the inclusion of all environmental impacts throughout the product's life-cycle, and comprises governance criteria aiming at preventing collusion behaviour between producers and the labelling body. The two most widespread purely environmental labels in France (NR Environnement label and the European eco-label) both comply with this standard. Furthermore, self-attributed environmental claims made by producers (type II labelling) are increasingly monitored by the public authorities to avoid consumer confusion. A state intervention is legitimate as eco-labelling will only improve economic efficiency if it provides consumers with access to credible information.

The policy in place for supervising claims and eco-labels is however not enough to restore the full economic efficiency of the markets. Indeed, the labels make up part of a voluntary certified quality approach, where only the best products of a given category are differentiated from the others. Eco-labelling does not enable the consumer to acquire information on all products, and in particular does not differentiate between products with high environmental impacts and products with average environmental impacts. Only a mandatory labelling policy would force producers to reveal their environmental impacts when the latter are negative, and thus provide comprehensive, unambiguous information to the consumer. Moreover, the environmental characteristics should be shown at the place of purchase and at immediate proximity to the products to enable consumers to take these characteristics into account when making their choice.

4.2. A balance must be found between comprehensive information and simplicity

The methodologies used to calculate the environmental footprint of products must be standardised to enable product comparisons to be made. Similarly, environmental impact communication formats should also be standardised to prevent consumer confusion when faced with heterogeneous presentations. Defining an optimal display format can however be difficult: education and transparency with regard to consumers requires detailed labelling, whereas efficiency in terms of modifying consumer behaviour requires simplified labelling.

In the psychological sector, the Yerkes-Dodson law predicts that a maximum information threshold exists, beyond which additional information deteriorates the quality of the consumer decision-making process instead of improving it, due to the complexity involved in processing the information (Bougherara 2003, 2007). However, from an economic optimality point of view, it is not the information

available that is important but the information that can be used by consumers. Indeed, packaging that is overloaded with information runs the risk of repelling consumers due to the label reading efforts required. Bougherara and Piguet (2008) experimentally demonstrated that the costs for the consumer to understand and summarise the information provided significantly reduce the benefits of eco-labelling in terms of consumer well-being and effects on market shares, all the more so as consumers dedicate a limited amount of time to their purchase. This is why these authors recommend reserving detailed labelling to products, the purchase of which is rare and well thought-out (for example cars). The same type of considerations can result in recommending simplified in-store labelling and more detailed online or catalogue labelling.

The search for a balance between comprehensive information and simplicity can be shown as follows: is it better to display the different types of product impacts individually (for example: exhaustion of natural resources, greenhouse effect, water quality) or present an approved, overall environmental indicator? In technical terms, the construction of an overall indicator requires the allocation of a weighting system to the different environmental impacts, which is a difficult procedure. However, isn't the difficulty all the greater for the consumer, who has little time and information to understand and take in all of the different environmental criteria? A criteria-by-criteria presentation would make it more difficult for the consumer to process the information provided, and possibly create confusion when the different types of impacts lead to different product classes. On the other hand, the two following elements promote labelling on a criteria-by-criteria basis: firstly, presenting the different impacts of a given product can result in educating consumers and raising their awareness to all environmental issues. Secondly, multiple labels may enable consumers to express different environmental concerns, with each person being more or less sensitive to such and such an impact.

A second repetitive question involving the impact information format is that of a relative or absolute indicator. A relative indicator (such as a grade from A to G or a red/orange/green colour code) obtained by comparing products with reference values, provides consumers pressed for time with immediately useable information to make their decision within a given product category. An expert analysis conducted by INRA on nutritional labelling showed that the type of labelling that appears the most effective for food products is that which associates colour codes and statistical precisions with regard to the proportion of daily allowances recommended by the product. However, a relative indicator does not enable products of different categories to be compared with each other and thus promotes rebound effects, as is the case for the European energy label. Indeed, a large refrigerator is not any less likely to qualify for the class A+++ grade than a small refrigerator, despite the fact that it consumes more energy. The use of a single criterion grading a given refrigerated volume therefore does not provide consumers with relevant information enabling them to arbitrate between different capacities. The opposite choice was made for cars: greenhouse gas emissions are compared with each other for all models, without differentiating between capacities, so that smaller vehicles tend to be better classed than larger vehicles (despite the fact that they can transport fewer people).

In the end, optimal restitution formats could combine different approaches (summarised indicator and detailed impacts, absolute impact measurements and relative grades within a given product category) and vary according to the product categories or according to the display means (on product packaging, checkout receipt, in-store signs, via codes and smartphones, on business websites, on public internet sites grouping together information). However, it is important that too much diversity is not made available with regard to information formats so as to improve readability and coherency. This is why Hogan and Thorpe (2009) recommend performing prior tests and organising operations for monitoring the way in which consumers use the informational displays provided.

4.3. Communication, inseparable from labelling policy

Campaigns designed to raise consumer awareness to environmental issues are capable of playing a role in the development of sustainable consumption. Surveys conducted by the OECD and Credoc showed that the more a household declared itself to be sensitive to environmental issues, the more it adopted more sustainable purchasing habits (OECD 2011, Crédoc 2010). Public authorities can legitimately look to develop this "sensitivity to environmental issues" expressed by individuals. Arana and Leon (2009) demonstrated that from among the different responsible consumption modes, consumers preferred the environment and social and cultural patronage for pharmaceutical products, whereas labour conditions were preferred for sports shoes. These consumer behavioural patterns could translate the impact of the information campaign conducted against child labour in the manufacture of sports footwear, thus proving its efficiency.

Many laboratory studies determine that the information issued regarding labels has an effect on consumer willingness-to-pay (for example: Bougherara 2003, Mahé 2009 chap. 3). Campaigns for raising awareness to environmental issues and providing information on labelling systems complement each other and target different steps in the consumer's route towards sustainable consumption. A

panel survey conducted by Grankvist (2002) showed that awareness to environmental issues is an important factor in a first step in the move towards the occasional purchase of organic products. Secondly, consumer belief in the advantages of organic products is a decisive factor determining their frequency of purchase. A communication campaign on eco-labelling, raising awareness and making information credible, would therefore improve its visibility and effectiveness.

Finally, communication on eco-label measures should help fight against the expensive nature of green products and highlight the responsible and money-saving approaches made to promote the spiralling democratisation of eco-consumption (see paragraph 2.3). It should also lead to reassessing product and packaging simplicity.

Inset 4: A labelling policy complementing other policies conducted in favour of sustainable consumption

Eco-labelling is one possible public policy that could be implemented to promote sustainable consumption and production modes. Different reports tackle a wider range of possibilities by comparing the advantages and disadvantages of these policies and sometimes by taking inspiration from international examples (literature review led by the Environment and Energy Management Agency (ADEME), in press, the report of the Strategic Analysis Centre (SAC) published in 2011, the report drawn up for the Australian government by Hogan and Thorpe in 2009, the report of the Organisation for Economic Cooperation and Development in 2008, the report by the United Nations Environment Programme in 2004, the ESCo "dietary behaviour" of Inra, 2010, the DuALIne report of Inra and Cirad in 2011). These studies plead in favour of an eco-labelling system complemented by other types of policies. This document is limited to briefly presenting its complementarity with the main economic measures.

Eco-labelling alone doesn't fully overcome the issues of sustainable consumption. Indeed, even in the presence of reliable, accessible information on the environmental impacts of products, environmental quality remains a public asset that is not easily financed for two reasons. The first is that each consumer, taken individually, has no interest in making efforts to reduce his/her environmental impacts as the personal benefits perceived from this contribution are very low, or in any case less than the collective benefits (free-riding behaviour). Free-riding is an opportunistic form of behaviour consisting in consuming the public asset without contributing to it. This boils down to benefiting from environmental improvements while leaving others to pay for green products. The second reason is due to the fact that even when the individual has allocentric beliefs encouraging him/her to take into account all environmental benefits, the consumer may still doubt the effectiveness of his/her contribution as this will only have an effect if other consumers adopt the same behaviour. Therefore, a potential green product buyer is capable of not making his/her purchase in the anticipation that his/her contribution will not have any positive effect on the environment if a large enough number of individuals do not also adopt this type of behaviour. His/her fear revolves around contributing to a public asset when others do not (assurance problem). This risk encourages a more selfish consumption mode, yet is not based on uncertainties. These two problems lead to predictions that consumer reactions to eco-labelling will be insufficient in limiting pollution at an optimal level. Although eco-labelling is necessary, as it provides consumers with the opportunity to assess the environmental consequences of their choices, it must be complemented by other policies in view of reducing the environmental footprint of consumption. Eco-labelling can thus be viewed as an instrument complementing an offer policy such as emissions control, eco-tax or emissions trading scheme (Bougherara 2003, Hogan and Thorpe 2009, Disdier and Marette 2011, Ibanez and Grolleau 2007). Eco-labelling is a useful addition to these policies as it does not involve reduced purchasing power for households (unlike eco-taxes), or reduced national competitiveness in relation to countries not adopting environmental measures. It therefore limits pollution leaks abroad. Moreover, eco-labelling is not merely an informational economic tool, but also a tool for raising consumer awareness to environmental issues.

Furthermore, eco-labelling complements environmental innovation support policies. Research is sometimes necessary to market products with reduced ecological footprints, which will provide the labelling policy with its relevance and impact. Reciprocally, the labelling policy increases the sales perspectives of more environmentally-friendly products and thus promotes their development.

Finally, an eco-labelling policy is complementary to a state responsible procurement policy. Labelling provides an official criterion on which public procurement can be based. Reciprocally, public procurement has a history of playing an important role in the development of eco-labels in certain countries (OECD 1997), and can also promote the display of environmental impacts.

Conclusion

The review of the strategic and economic literature presented herein is based on the opinions and reactions of consumers when faced with environmental impact labels for consumer products. It draws the following conclusions:

➢ French and European sensitivity to environmental issues has been constantly growing since the early 1990's. This is being increasingly shown in their purchasing behaviour. On the one hand, responsible consumption figures show underlying development over the past years in France. On the other hand, many opinion surveys confirm the attraction of French and European consumers to environmentally-friendly products. Finally, many economic studies highlight positive willingness to pay for products with reduced ecological footprints.

➢ Consistent with their growing interest for the environmental and social quality of products, opinion surveys show that French consumers are looking for clearer, more reliable forms of environmental information than is currently available.

➢ The eco-labels already present on the markets maintain a certain level of opaqueness with regard to the environmental characteristics of a product (product environmental impacts). Consumers are little aware of the environmental quality of products, whereas the producer has this information available (informational asymmetry). Under these conditions, the markets cannot operate in an efficient manner as consumers cannot make their choices with full knowledge of the facts.

➢ Only the best products of a given category can currently be differentiated using eco-labels, which promotes niche strategies and raised margins on eco-labelled products. This system contributes to reserving the consumption of sustainable products to upper classes, whereas production costs are not necessarily higher for green products.

➢ A state intervention would correct these market "failures" are would therefore be legitimate. Providing more transparency on product impacts for more credibility, developing eco-labels for all products, launching information campaigns and easy-to-understand, operational display formats are required conditions for the success of such an information policy.

➢ For increased effectiveness, the eco-labelling policy must complement other policies in favour of sustainable consumption and production currently conducted in France and Europe.

➢ Literature shows that information on the environmental impacts of products is likely to influence purchase and production behaviour in favour of a more environmentally-friendly approach. The effect of this on market shares would be relatively mild in the short-term, however would rise in power in line with the notoriety of the display format subject to good communication regarding this measure. Moreover, encouraging consumers to take into account environmental information in their everyday purchases involves providing information on the place of purchase and using a standardised, summarised and clear display format that enables product comparisons.

➢ These elements plead in favour of a compulsory labelling policy in the long-term for all products and available at the place of purchase: this device would promote the development and democratisation of a more environmentally-friendly form of consumption (eco-consumption).

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Summary

Within the scope of the legislative commitments drawn up by the Grenelle "I" and "II" laws, the General Directorate for Sustainable Development is responsible for managing the implementation of environmental impact labels for consumer goods. Unlike labels that only target products with the best environmental characteristics, environmental labelling shall apply to all products, including those with bad environmental impacts, in all consumer fields.

This study presents a review of the statistic and economic literature on the consumer behaviour and expectations with regard to such a measure. Several major lessons can be learnt:

-   market failures legitimise a public action on generalised labelling, complementing other tendering policies promoting sustainable production and consumption modes;

-   French and European consumers are today looking for high-quality environmental information;

-   providing information on the environmental impacts of products is likely to influence purchase and production behaviour in favour of a more environmentally-friendly approach;

-   environmental information must be presented on the place of purchase as a general, clear summary that can be compared between products in order to be taken into account by consumers during their everyday purchases;

-   the purchase of eco-labelled products currently mostly concerns the upper classes, however mandatory environmental labelling will promote the democratisation of environmentally-responsible consumer approaches, in particular via economies of scale connected to mass production to meet increased demand.