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ISSUE PAPERS

EASYPol Module xxx

Carbon footprinting across the food value chain: a new profitable low carbon initiative?

A review of the main benefits for
businesses, public bodies and issues
for developing countries



Carbon footprinting across the food value chain: a new profitable low carbon initiative?

A review of the main benefits for businesses, public bodies and issues for developing countries

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS



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ABBREVIATIONS

AEI	Agri-Environmental Indicators
AFOLU	Agriculture, Forestry, Land Use
C	Carbon
CC	Climate Change
CDP	Carbon Disclosure Project
CFP	Carbon Footprint
CO ₂ e	Carbon Dioxide Equivalent
CRL	Carbon Reduction Label
CSR	Corporate Social Responsibility
EX-ACT	Ex Ante Carbon Balance Tool
GHG	Green House Gases
ISO	International Organization for Standardization
LCA	Life Cycle Analysis
LDC	Least Developed Countries
LIC	Low Incomes Countries
PVS	Private Voluntary Standards
SSI	State of Sustainability Initiatives

1 SUMMARY

The business mantra “you cannot manage it if you cannot measure it” applies as much to carbon emissions as to resources and costs. Industries in Annex 1 countries have to calculate and report their emissions. In parallel to this obligation, a new type of carbon measurement has been developed these past 5 years: the carbon footprint of a product, which takes into account the emitted CO₂-emissions across the supply chain. The lifecycle assessment of GHG emissions of a good presents several benefits that can be classified into three main advantages: i) reduction of GHG emissions, ii) support to decision making and supply chain management, iii) differentiation on the market and trade advantages.

Carbon footprinting has two linked aspects: measurement and labelling, providing their advantages and drawbacks respectively. Since it is easier to calculate the emissions of a product that is made of little components and that undergoes few transformations, CFP of food products accounts for a large part of carbon footprinting schemes. Nonetheless, the development of such initiatives does not come without uncertainties concerning the impact upon exports trading in developing countries.

The first part of this document presents the concept of carbon footprint and gives a worldwide insight of current CFP initiatives. In a second part, the benefits of measuring the footprint and displaying it via a label are analyzed. Finally, the last chapter deals with the case of CFP for least developed countries.

2 INTRODUCTION

Objective: This paper aims at analyzing the advantages of carbon footprinting schemes of food products either developed by the private sector alone or following Governmental initiatives. Each benefit is illustrated with concrete examples taken from the principal CFP schemes currently in place or in development around the world. The paper also tackles the fact that CFP may become a trade barrier for low-income countries (LIC). Here, the terms supply chain and value chain are used without distinction, even if there are some differences between both concepts, the first one focusing on supply base, whilst the second is customer based (see *Value Chains Versus Supply Chains* by Andrew Feller, Dr. Dan Shunk, and Dr. Tom Callarman).

Target audience: This paper targets the national agriculture sector, forestry and food security policy makers, institution-based, agency and donor decision-makers.

Required background: In order to fully understand the content of this module the user must be familiar with:

- Concepts of climate change mitigation and adaptation
- Concepts of business management

- Elements of project economic analysis

Readers can follow links included in the text to other EASYPol modules or references¹. See also the list of EASYPol links included at the end of this module.

3 WHAT IS THE CARBON FOOTPRINT AND HOW IS IT MEASURED?

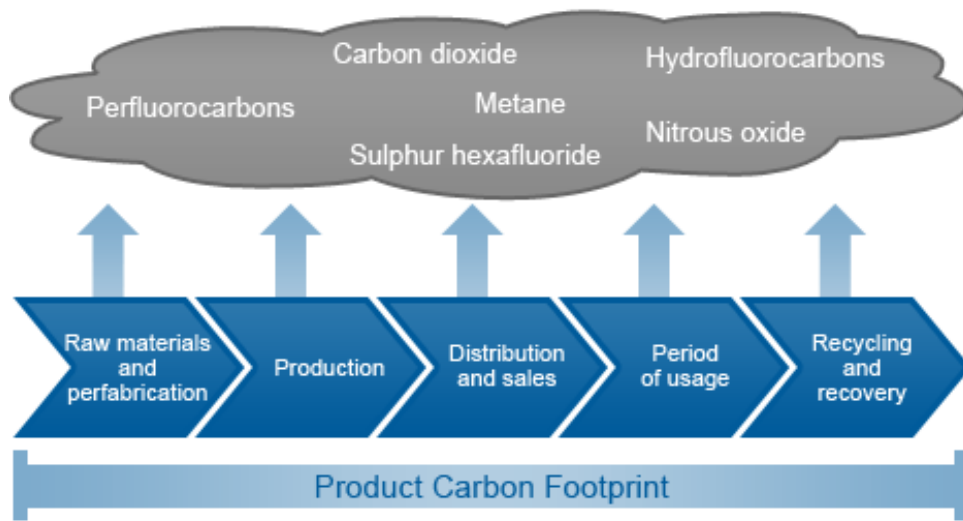
3.1 Definition of the carbon footprint of a product

The carbon footprint of a product is the quantity of green house gases (GHG), expressed in carbon dioxide equivalent (CO₂e), emitted across the supply chain for a single unit of that product. Each steps of the value chain are taken into account as shown in figure 1, from the production of raw materials, transportation and transformation to the final use and the disposal of the waste generated. However, some CFP accounting does not take into account the use phase and/or the disposal of waste, due to the uncertainty about these phases, where the main actor is the consumer. Depending on the methodology used to calculate the carbon footprint (CFP), the GHG taken into account could comprise the 6 gases highlighted in the Kyoto protocol (carbon dioxide CO₂, methane CH₄, nitrous oxide N₂O, hydrofluorocarbons HFCs, perfluorocarbons PFCs, sulphur hexafluoride SF₆) or some of them. Moreover, not all carbon footprint schemes include the end-use by the consumer.

¹ EASYPol hyperlinks are shown in blue, as follows:

- a) training paths are shown in **underlined bold font**
- b) other EASYPol modules or complementary EASYPol materials are in ***bold underlined italics***;
- c) links to the glossary are in **bold**; and
- d) external links are in *italics*.

Figure 1: the scope of a product carbon footprint



Source: <http://reclay-group.com/?id=267&L=1>

The product carbon footprint is usually expressed in t CO₂e/unit. The most common unit is per gram or kilogram of product, but in fact the choice of the functional unit is highly dependent on the aim of the study. Other qualities of the food product such as nutrient content, energy content, fat or protein content are possible units. Using an economic value as a basis for the functional unit would allow comparisons between ranges of different products. (Schau EM, Fet AM, 2008). The economic value is based upon a range of factors like energy, resources, work, transport. When the economic value is related to the environmental impact, the eco-efficiency of the product can be assessed, which is a measure of value performance compared with the related environmental impacts (Fet, 2003)

A product's carbon footprint is different from a company's as the former includes the carbon emitted by consumption and disposal of the product itself as well as of all inputs necessary to produce it. The product CFP is therefore also called an embedded (or embodied) footprint. On the contrary, an organisational or business carbon footprint measures the direct and indirect greenhouse gas emissions arising from all activities of an organisation, including buildings' energy use, industrial processes and company vehicles.

It is important not to mix up carbon footprint and carbon labelling: CFP does not always lead to carbon labelling. Carbon labelling is the display of the measurement of carbon footprints on a product. Except for a carbon label requiring a precise carbon footprint measurement, the drivers behind each can be quite different (see chapter 2 for more details).

3.2 Standards and methodology to calculate the CFP of a product

Because the CFP of a product measures the emissions through the lifecycle of that product, from cradle to grave, the general methodology used will be the LifeCycle Analysis (LCA). The carbon footprint is a common term for a LCA of GHG emissions. While CFP only focuses on GHG emissions, LCA equally analyses other environmental aspects such as water pollution, toxicity, waste production, eutrophication and energy consumption.

Currently, there is no international recognized methodology; each country is eager to implement a carbon footprint accounting and can develop its own methodology. The wide range of existing methodologies is one of the largest problems CFP is facing. Indeed, the multiplication of methodologies makes it difficult to compare the footprint of a similar category of products across countries. Moreover, this can have negative impact on trade; a company wanting to sell their products in different countries will have to comply with the national methodology in place, thus increasing the costs and lengthening the time of the calculations.

There are presently six worldwide initiatives underway developing carbon footprinting protocols:

- The **Publicly Available Specification (PAS) 2050** is a protocol for assessing the lifecycle carbon emissions of goods and services. It was developed in the UK by the Carbon Trust, the British Department for Environment, Food and Rural Affairs (DEFRA) and British Standards Institute (BSI). It was launched in October 2008. Based on an LCA approach, the PAS 2050 provides greater certainty around the requirements

for product specific GHG emissions assessment. The use-phase is now included into the boundaries of the calculations.²

- The **Japanese Ministry of Economy Trade and Industry (METI)** linking with the voluntary carbon labelling trial has released “*The General principles for the assessment and labelling of Carbon Footprint of Products*” in April 2009, based on the Product Category Rule (PCR)³
- In France, within the framework of the “**Affichage environmental des produits de grande consommation**” (Environmental labelling of consumer goods), including GHG emissions, a referential of good practices named **BP X30-323** has been developed by AFNOR and ADEME. It defines the general principles of the environmental labelling and the methodology for the calculations.⁴
- The **International Organization for Standardization (ISO)**, the recognised institute for international standards, is working on a new standard for “*Carbon Footprints of Products*” for the quantification and communication of GHG emissions associated with goods and services. The standard builds largely on the existing ISO standards for life cycle assessments (ISO 14040/44) and environmental labels and declarations (ISO 14025). The final publication of the standard is planned for 2012. In comparison to the existing LCA standards it contains further provisions for the uniform quantification of GHG emissions. The new standard, called **ISO 14067**, is composed of two parts: the first one is about quantification and the second deals with communication.⁵
- The **WRI** (World Resource Institute) and the **WBSCD** (World Council for Sustainable Development) in the USA have developed two standards under the *Green House Gas Protocol Product/Supply Chain Initiative*: a “Product Life Cycle Accounting and Reporting Standard” and a “Corporate accounting and reporting standard: Guidelines for Value Chain (scope 3) Accounting and Reporting”. The GHG Protocol Product Standard was adopted by the Sustainability Consortium in June 2011.⁶

The **European Union** (the Directorate-General for the Environment, the Joint Research Centre-Institute for Environment and Sustainability, other European Commissions) are working on the development of a harmonized methodology for the calculation of the environmental footprint of products, including the carbon footprint). The methodology will be developed building on the International Reference Life Cycle Data System as well as on other existing methodological

² Carbon Trust, October 2008, *Product carbon footprinting: the new business opportunity – experience from leading companies*

<http://www.carbontrust.co.uk/publications/pages/publicationdetail.aspx?id=CTC744>

³ Japanese Technical Specification TS Q 0010, April 2009, *General principles for the assessment and labelling of Carbon Footprint of Products*

<http://www.cfp-japan.jp/english/specifications/pdf/CFP%20TS%20Q%200010%20En.pdf>

⁴ <http://affichage-environnemental.afnor.org/>

⁵ ISO and its Carbon Footprint standardization work

http://www.wto.org/english/tratop_e/envir_e/events_feb10_e/radunskysteele_e.ppt

⁶ <http://www.wbcsd.org/plugins/DocSearch/details.asp?State=P&type=DocDet&ObjectId=Mzk4MzA> and

<http://www.wbcsd.org/plugins/docsearch/details.asp?DocTypeId=-1&ObjectId=Mzg4ODk&URLBack=result.asp%3FDocTypeId%3D-1%26SortOrder%3Dpubdate+asc%26CurPage%3D482>

standards and guidance documents such as PAS 2050, WRI/WBCSD GHG protocol, ISO and BP X30-323. The final methodological guide is planned for September 2012.⁷ These different standards are not implemented without inter connections with other initiatives; the organizations liaised with each other. For example, ISO is working with WRI/WBCSD to define its new carbon footprint standards, and also uses the British methodology (PAS 2050). The European Union based its standardization work on existing methodologies in France, the UK and the USA as well as the future ISO 14067.

Other national initiatives exist, which all attempts to serve an increasing market demand for climate relevant information along supply chains and toward consumers.

The differences between certain methodological issues such as the scope of emissions (GHG of the Kyoto protocol or GHG of IPCC 2007), the system boundaries, the emission factors to use, the type of data (primary/secondary data), the allocation rule, the inclusion of land use change, end-of-life and use phase are factors preventing comparison between a similar category of products in different countries.

3.3 Benchmark of the current worldwide carbon footprinting initiatives in the food supply chain

In recent years, CFP has become a growing trend, initiating and communicating climate change awareness. 2007 became a boom year for discussions of carbon labelling, with a number of new initiatives emerging, often backed up by large commercial players or by governments. Product carbon footprinting does not only concern agricultural and food products, but also other manufacturing products. However, it is currently limited to “simple” products, with a limited transformation process, since it is easier to gather data to calculate the CFP.

The table 1 summarizes the main CFP initiatives for food products, being either carbon footprint accounting, carbon labelling or both. The list is not exhaustive; it just gives an insight on the numerous CFP projects launched in the world. It is worth noticing that most of the CFP initiatives take place in developed countries, while it is quite limited in developing countries. The issue of CFP in developing countries will be tackled in the third chapter. Another important remark is that most of the time, carbon footprinting is not only the indication of the amount of GHG emitted along the value chain, but it is also linked with the commitment to further reduce those emissions, either thanks to a second label (carbon reduction label, which states that the company has reduced the CFP of the product by x%) or included in the requirements of the CFP label.

⁷ http://ec.europa.eu/environment/eussd/product_footprint.htm

Table 1: examples of carbon footprinting initiatives around the world

Country	Name of the CFP initiative	Actor (government, retailer, agro-industry)	Date of implementation	C accounting	C labelling	Type of product concerned	Approximate number of products	Description
UK	Product Carbon Footprint	Government (The Carbon Trust) + retailers + industries	October 2008	×	×	Food and beverage, clothes, landscaping products, toiletries Food products labelled: crisps (Walker), smoothies (Innocent), potatoes and orange juice (Tesco)	20 leading companies, 75 product types	<p>The Carbon Trust is an independent company set up in 2001 with the support of the government. In 2008, it launched an initiative to measure, reduce and communicate the life cycle of GHG emissions of goods and services. It includes the development of <i>PAS 2050</i> (standards for CFP calculation, see part 1.2), the release of the <i>Code of Good Practice on Product GHG emissions and Reduction Claims</i> which gives requirements for communicating product CFP and reduction information as well as the creation of a subsidiary, the Carbon Label Company, that manages the <i>Carbon Reduction Label</i>.</p> <p>Within this framework, companies measured the CFP of their products and six of them chose to communicate their product CFP using the Carbon Reduction Label, which not only communicate the products emissions but also signals the commitment of the company to reduce life cycle emissions. http://www.carbontrust.co.uk/publications/pages/publicationdetail.aspx?id=CTC744</p>
France	Casino Carbon Index	Retailer (Casino)	2006	×	×	Essentially food products (only Casino brand)	>100 products by the end of 2008, eventually all Casino brand products (~3000)	<p>Casino was the first in France to display carbon footprint on its products. Life cycle stages included in the calculation are agricultural production, manufacture, transport to Casino warehouses, packaging, recycling and transport to consumers' houses. The use phase in the consumers' houses is not included due to difficulties in estimating what the consumer might do. However, Casino plans to adjust its methodology to bring it in line with PAS 2050. The label indicates the exact amount of GHG emissions as well as the environmental performance of the product: they print a scale of CFP across product categories, with the position of the present product sited along the scale indicating the impact of that particular product in comparison with other products.</p> <p>http://www.produits-casino.fr/developpement-durable/dd_indice-carbone-demarche.html</p>
France	Bilan	Retailer	Avril	×	×	Only food	All food	Leclerc launched a six month-trial, in two of his supermarkets in the region

	CO2	(Leclerc)	2008, for 6 months			(Leclerc + other brands),	products ~ 20 000 divided into 600 generic categories	Nord-Pas-de-Calais, where the client is informed on the total carbon footprint of his shopping basket with the amount of CO2 printed on his till receipt. The CFP of the products is not directly labelled on the packaging, but on the price ticket. Leclerc has labelled all its food products based on generic data on broad product categories. The method is simplified to allow mass labelling of almost all products in the food department. http://www.jeconomisemaplanete.fr/accueil.html
France	Affichage environnemental des produits de grande consommation	Government (ADEME and AFNOR) + retailer + industries/producers	July 2011	×	×	Food and beverage, textile, press, electronic equipments, toiletries, cleaning products	165 companies, of which 61 for food and beverage	Within the framework of the law Grenelle de l'Environnement 2, the French government decided to label the environmental impact (GHG, natural resources consumption, air/water/soil pollution, biodiversity) of goods. It is a voluntary scheme open to industries, producers, retailers. The one-year trial, which started on the 1 st July 2011, aims at testing different communication supports (product, shop, internet, mobile phones) and different indicators. http://www.developpement-durable.gouv.fr/-Consommation-durable.4303-.html
Japan	Carbon footprint of products	Government + retailers + industries	October 2009	×	×	Food, toiletries, cleaning products...	300 companies, about 350 products labelled	The Japanese Ministry of Economy, Trade and Industry (METI) has been developing the establishment of the Carbon Footprint of Products system since 2008 and launched the Pilot Project in April 2009. Then companies calculate their products' CFP pursuant to the approved Product Category Rule (PCR) and receive the third-party verification for the calculation results and labelling methods by the PCR Committee. If the results and methods are considered as appropriate, companies can market their product with the CFP label. CFP, including the communication of results to the consumer, forms part of the Japanese government's action plan in achieving a low-carbon society. http://www.cfp-japan.jp/english/
Switzerland	Climate Champion	Retailer (Migros)	2008	×	×	Food, toiletries, cleaning products	3 climate champions in the food: rice, sugar, cream	Migros do not label all products, instead, they label those products in product categories that are at least 20% more climate friendly than the other products analyzed: it is the "climate champion". The label does not display the exact carbon content, but illustrates that the product is more climate friendly compared to other products. It is expected to encourage companies to innovate and reduce GHG emissions in order to have as many climate champions as possible. The label is certified by Climatop. http://www.migros.ch/fr/supermarche/labels-de-durabilite/climatop.html
Sweden	Climate	Industries,	2007		×	Certified	4 certified	The purpose is to help consumers make climate conscious choices and to

	certificati on for the food chain	producers				products: milk from a dairy north of Stockholm, pork meat from a major producer in Västerås – Nibble, tomatoes from greenhouses, fish	products	support producers in increasing their competitiveness while at the same time become more climate friendly. The project is a joint initiative by the food chain in Sweden: The Federation of Swedish Farmers, dairies and meat co-operatives, and two labelling organizations for food products: Swedish Seal (Svenskt Sigill) and KRAV. The system was launched officially on June 15th 2010. The approach does not attempt to encompass full and precise carbon accounting. The final product of the project is a set of standards for climate marking of food that, on average, gives a 25% lower climate impact than the reference. The label will not inform consumers about the absolute GHG emissions from the life cycle of a product and there will be no absolute figure of CO ₂ e on the label. The aim of the label is to certify to the consumer that improvements have been made. Only the best products in each category will be labelled http://www.klimatmarkningen.se/in-english
Korea	Carbon footprint label	Government + industries	January 2009	×	×	Food, toiletries, cleaning products, electronic equipments, building materials, services (transport, water treatment)	77 non durable products (food + toiletries)	The Korea Carbon Footprint Label, which is a voluntary scheme, includes a commitment to further emission reductions. There are two steps of certification in the Carbon footprint labelling: (1) carbon footprint certification label and (2) low carbon product certificate. The first one indicates the GHG emitted along the life cycle of the product, while the second label certifies that the good satisfies the minimum reduction target presented by the government http://www.edp.or.kr/carbon/english/system/system_intro.asp
New Zealan d	GHG footprinti ng strategy	Government (Ministry of Agriculture) + producers	2007	×		Primary sector production	Almost 80% of the primary sector exports are covered	The aim is to help sectors measure, manage and mitigate GHG emissions across the supply chain. The initiative is a partnership between the Ministry of Agriculture and Forestry (MAF) and the primary sector. So far the initiative and project partners provided several case studies and sector specific methodology reports according to PAS 2050 or other international standards. The published studies cover the dairy sector, fruit production (kiwi and berries) and lamb meat production. Ongoing projects tackles, amongst others, the production of onions, venison or fertilizer. The assessment of CFP covers all life-cycle stages including transports (except the shopping trip) and emissions during the user-phase. Labelling of products in New Zealand supermarkets has not been officially announced. The initiative is on the one hand a response to CFP activities in export key markets like the UK, Japan or Germany and on the other hand is compatible for the New Zealand strategy of becoming carbon neutral by 2020. http://www.maf.govt.nz/environment-natural-resources/climate-

							change/greenhouse-gas-footprinting-strategy.aspx
Thailand	Carbon Reduction label and carbon footprint	Government + retailers + industries	2008	×	×	Dried/dehydrated foods, cement, wood substitute, packaged white rice, condom, floor tiles, ceramic tiles, cooking oil, milk cartons	In March 2009, 25 products from 9 product categories are registered within the CRL – 20 products are concerned by the CFP label The Thailand Green House Gas Management Organization, a public organization, has decided to sensitize consumers and industries to reduce their emissions, through a carbon reduction Label and a CFP label. The Carbon Reduction Label (CRL) stands for significant reductions of GHG emissions during the production process: (1) 10 % CO ₂ -eq reduction (baseline 2002), (2) exclusive use of energy from biomass or (3) adoption of innovative technology. At present, 26 firms are road-testing the new Carbon Footprint Label by applying the national guidelines for products' CFP. The label is planned to be mainly awarded to export goods to the EU and the US. http://www.tgo.or.th/english/index.php?option=com_content&task=blogcategory&id=30&Itemid=33
Austria	Zurück zum Ursprung (back to the roots)	Retailer (Hofer)	May 2009	×	×	Organic vs conventional products	79 organic products The label compares emissions of organic food production with average values from conventional agriculture, disclosing the difference in CO ₂ eq emissions as a percentage. The basic conditions in transport, processing, packaging and warehousing were assumed to be the same for most of the assessed organic and conventional products. The differences in total GHG emissions are (mostly) directly due to the different farming methods. The label also includes water footprint and biodiversity impact. http://www.zurueckzumursprung.at/
USA	Carbonfree Label	companies	2007	×	×	Food, stationery, clothes, bedding	Certified food products: coffee, organic and conventional sugar Carbonfund.org, a leading non-profit provider of climate solutions for individuals and businesses, has developed the CarbonFree® Product Certification as a carbon neutral product label. After having determined the CFP, reducing the footprint where possible, and offsetting the remaining carbon emissions associated with the product, the label is displayed on the packaging, enabling businesses to provide carbon-neutral products to their customers. http://www.carbonfund.org/site/business/carbonfree_products/

4 WHAT ARE THE ADVANTAGES OF CALCULATING AND LABELLING THE CARBON FOOTPRINT ACROSS THE SUPPLY CHAIN?

4.1 A necessary collaboration between the public and private sector

From the examples of CFP in table 1, it appears that in most cases, the initiative has been launched by the government in cooperation with companies and producers. Indeed, CFP is a mean for the government to sensitize citizens and industrials to climate change and to reach its GHG reduction target. Moreover, it has a significant advantage for private companies to label their product with the government support since they increase their credibility. Indeed, when labels are launched/used from voluntary initiatives, which are not based on the same methodology, a lack of coherence and clarity towards the consumer is created, since they are unable to compare and differentiate products from one brand to another. Furthermore, the multiplication of environmental labels is a source of confusion for consumers. The lack of transparency of labels drives to a lack of confidence from consumers, making them suspicious and sceptical towards the allegation of the product. The suspicion in question may be well-founded since according to TerraChoice⁸, an increasing number of misleading labels are being found more and more in the food sector. In the USA, almost 25% of labels' allegations could not be verified or were not certified, and another 25% make vague promises. A 2007 British pool discloses that almost 60% of the individuals surveyed remain sceptical of the green claims currently being made by companies, with respectively 46% and 11% thinking that the claims are not very or not at all credible.⁹

Numerous studies demonstrate that consumers trust more independent organisms, consumers' organization, environmental organization or public authorities than retailers or industries. The intervention of the government or organisms such as ISO seems to have a positive impact on ecological allegations of labels and on consumers' confidence.¹⁰

As a result, it is in companies' best interest to follow a national CFP initiative instead of implementing their own labelling system, since they will profit from a recognized and standardized methodology, giving confidence to the consumer. The Carbon Reduction Label, implemented in the UK by the Carbon Trust, might be the pre-eminent example of the collaboration between private companies and the public sector (represented by the Carbon Trust) for reducing GHG emissions while at the same time displaying this information to the consumer (box 1).

Another reason why the collaboration between public and private sector is necessary is that it enables governments to have an open dialogue with the private sector and to work together towards a low-carbon economy on a voluntary basis, in place of e.g. taxes and GHG reductions obligations for companies. Furthermore, the cost of adjusting towards a low emissions economy may be reduced when

⁸ TerraChoice, April 2009, *The seven sins of greenwashing – environmental claims in consumer markets – summary report: North America*

<http://sinsofgreenwashing.org/findings/greenwashing-report-2009/>


⁹ LEK Consulting Carbon Footprint Report 2007; research conducted by YouGov, representative sample of 2,039 UK consumers

http://www.lek.com/sites/default/files/Volume_IX_Issue_6.pdf

¹⁰ Thøgersen, J., Journal of Consumer Policy, 23(3) : 285-313, 2000, *Psychological Determinants of Paying Attention to Ecolabels in Purchase Decisions : Model Development and Multinational Validation*

both price and non-price, i.e. carbon footprint accounting and labelling, are used to reduce demand for relatively carbon intensive products.

Box 1: Consumers' confidence in the carbon footprint label: the case of the Carbon Reduction Label in the UK

	<p>The Carbon trust is an independent company set up in 2001 with the support of the UK government. Its mission is to accelerate the transition to a low carbon economy. Since 2006, the Carbon Trust has worked with companies to measure, reduce and communicate carbon emissions across the supply chain. Within this framework, the Carbon Trust has created the Carbon Reduction Label in 2008. It is an effective way of not only communicating the carbon footprint of the company's product (using PAS 2050 standards), but also signalling their commitment to reduce life cycle emissions. Indeed, once the carbon footprint of the product has been measured and certified, the brand then has the obligation to reduce the product's emissions. Every two years, the product must be reassessed, a reduction is required and independently certified – or the label is removed. So the consumer knows that when a product has got this Carbon Reduction Label, the company has effectively reduced its GHG emissions, thus it is not just a declaration without real actions. However, there is no minimal reduction amount that needs to be achieved.</p>
<p><i>For more information on the Carbon reduction label and Kingsmill, see http://www.carbon-label.com/the-label/guide-to-the-carbon-reduction-label and http://www.kingsmillbread.com/carbon-footprint/our-carbon-footprint</i></p>	

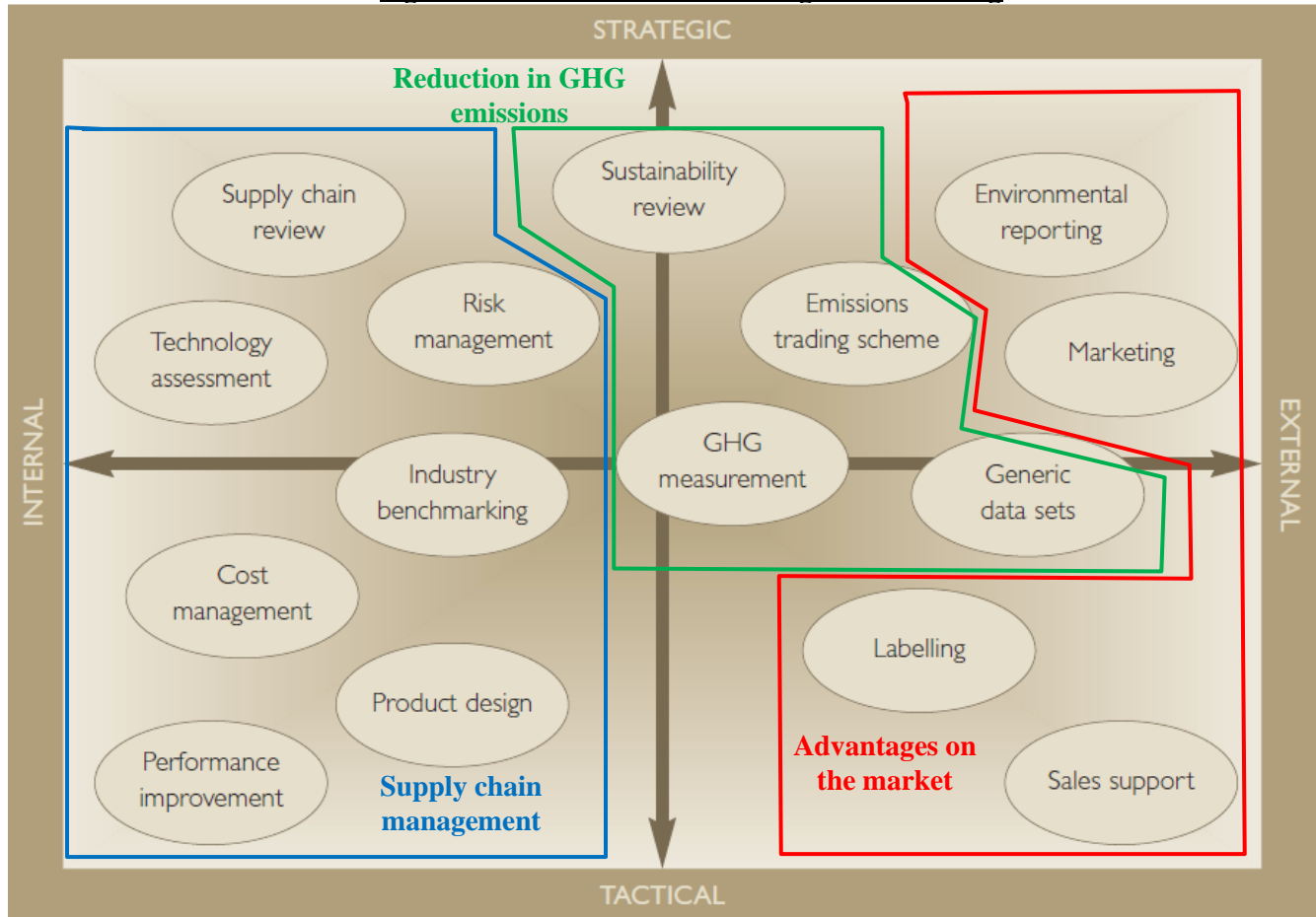
The diagram below identifies ways in which the outcomes of CFP accounting and/or labelling can be used by public or private bodies. This is presented in the context of whether the issue is strategic or tactical, internal or external to the organization/industry. Internal actions such as cost management, product design, technology assessment, focus on the functioning of the organization. External actions are directed mainly towards communication: marketing, environmental reporting, labeling, sales support. The external orientation is useful both for the private and public sector; it enables them to gain the citizens' and consumers' recognition, trust and support by disclosing their commitment towards a low-carbon economy. The strategic thinking sets the vision and long-term goals for an entire organization, it is a macro-view and visionary thinking that covers many functional areas.

Sustainability review, emissions trading scheme, GHG measurement are initiatives that enable governments and businesses to plan on the long-term, to “do the right thing”. A tactical thinking focuses almost exclusively on achieving specific tangible objectives; it covers shorter period and fewer functional areas. Labeling and sales support are tools to achieve a short term goal, through day-to-day actions. This narrower vision, more common in businesses, enable them to “do the things right”.

Finally, these advantages can be gathered into three main benefits:

- Reduction of GHG emissions, to achieve sectorial/national targets and respect international engagements
- Support decision making and supply chain management
- Differentiation on the market and trade advantages

Figure 2: Benefits of CFP accounting and/or labelling



Source: Australian Government (Climate Change Research Strategy for Primary Industries, Rural Industries Research and Development Corporation), 2009, *Life Cycle Assessments: A useful tool for Australian agriculture*

4.2 Achieving GHG emissions' reduction target for both public and private sectors

4.2.1 Meeting national and international legislation on GHG emissions by involving the food industry

The Kyoto Protocol has set up national targets for each signatory country in Annex 1. The food industry, which includes at the same time the primary and the agro-industrial sector, is a major contributor to climate change. Carbon footprinting of food products can thus be a mean of achieving these reductions' targets. CFP must be seen as a component of a broader GHG reduction policy. The

government acts as a major catalyst for change, providing the structure and impetus for companies to act; it leads the way towards a low-carbon economy.

Accurate knowledge about emissions from food is important in order to ensure efficient policy instruments at the governmental level and to assess the food industry's potential for GHG reduction. In most cases, the government has been at the origin of the CFP initiative, encouraging the private sector to voluntary action commitments. Certain companies suggest that voluntary involvement in carbon footprinting is better than being forced into CFP under mandatory terms.¹¹

The CFP of products will enable companies to identify at which step of the value chain a greater and cost-effective opportunity for carbon reduction exists. Moreover, carbon footprint accounting often does not come alone: in many initiatives, it is linked with a mandatory or voluntary emissions reduction initiative (box 1 and 2). The voluntary scheme is also a mean for industries to prepare themselves for future national legislation on GHG emissions' reduction. The French carbon footprint labelling scheme is a prelude to the planned introduction of compulsory carbon-labelling rules, possibly as soon as 2012, which will apply to imported goods as well as to those made in France. Carbon footprinting labelling regulation, rather than just the production of low carbon products, can help facilitate the transition to a market-friendly, carbon reducing economy. The private sector often responds positively to such governmental initiatives; for example, in Japan, a large part of the retailers are participating in the scheme, emphasizing the significant role the Japanese government role as an agent for change.¹⁰

The OECD acknowledges that data on the environmental performance of agriculture and policies provides important information for policy makers and in policy analysis. The OECD work on developing Agri-Environmental Indicators (AEI) started in 1993; since then, numerous workshops on the subject have been organized. The most recent one, entitled *Agri-Environmental Indicators (AEI) : Lessons Learned and Future Directions*¹² took place in March 2010, with the objectives to (i) review recent country experiences and future plans in using AEIs as a tool for policy monitoring, evaluation and analysis, (ii) assess recent uses and future directions for AEIs in integrated analytical systems and models and (iii) communicate the results and recommendations of the Workshop, to help identify possible future directions and priorities for work on AEIs to meet the demands of policy makers, with emphasis on recommendations for the future direction of the OECD AEI work.

11 Victorian Government (Department of Primary Industries, Farm Services Victoria), May 2009, How will climate change impact market requirements for Victoria's agrifood exports?, p.7

http://new.dpi.vic.gov.au/_data/assets/pdf_file/0014/33512/Climate-change-and-agrifood-exports-report-8.pdf

¹² <http://www.oecd.org/dataoecd/10/44/45449155.pdf>

Box 2: GHG reduction through product carbon footprint: the examples of the Thai and Korean government

Korea has launched its carbon footprinting labelling system in 2009, with the purpose of “promoting a consumer-led purchasing pattern of low carbon goods and encouraging enterprises to develop technologies towards low-carbon goods, thus ultimately contributing to the international efforts to reduce greenhouse gases”. (In Young Lee, Promoting Carbon Footprint labelling in regard to climate change in Korea). Carbon labelling is the essential tool for Green Innovation of living, 8th policy among 10 policies for “Low Carbon Green Growth”. In parallel to a carbon emission certificate presenting the amount of CO₂e emitted across the value chain, there will be a low carbon certificate, which confirms that the good satisfies the minimum reduction target presented by the government. A reasonable minimum reduction target per each product will be developed with companies participating in the certification program.

Thailand is promoting CFP in order to support the Thai industrial sector in implementing low carbon trend. It should increase the competitiveness of Thai industries in the world market. Similarly as in **Korea**, there is a carbon footprint label and a carbon reduction label.

These products are certified as having lowered their carbon emissions during the production process. With the Carbon Reduction Label, the government foresees the opportunity to motivate producers to emit less greenhouse gases by using more efficient processes. The Carbon Reduction Label tells the consumer that the producer has fulfilled one of the following criteria regarding its greenhouse gas emissions:

1. Decreased emissions by 10% according to the 2002 baseline

Or

2. The firm uses energy from biomass or waste sources.

Or

3. Adoption of high-energy efficient technology for each industrial sector.

Carbon Emissions Certificate

Producers and purchasers are acting in response in climate change



Product's carbon footprint

The mark signifies CO₂

Low-Carbon Product Certificate

Product concerned is a low-carbon product



Product's carbon footprint

Means that a GHG reduction is made from the baseline



Carbon reduction label



Carbon footprint label

- 4.2.2 **Korea** http://www.greengrowth.org/download/2008/singg_cebu/Session%207/%5B7-3%5DCarbon_label_activities_UNESCAP_Kim%201K%5B7%5D.pdf and http://www.nodai.ac.jp/cip/iss/english/9th_iss/fullpaper/3-2-1knu-lee.pdf and http://www.ftis.org.tw/active/download/1_6.pdf

Thailand http://www.tgo.or.th/index.php?option=com_content&task=section&id=8&Itemid=53 and <http://www.tei.or.th/carbonreductionlabel/namelist.html>

4.2.3 Implementation of a more effective GHG reduction strategy

The product carbon footprint enables to calculate the emissions across the value chain as a whole, from the production of raw materials to the disposal of waste. Therefore, the company can identify where the largest emissions sources are and focus on those steps of the value chain. It can then develop and prioritize emission reduction opportunities with positive financial impacts. By revealing true sources and drivers of emissions, the CFP leads to a more effective carbon reduction strategy. Some companies who have used the PAS 2050 method in the UK with the Carbon Trust have already reduced product-level GHG emissions by 15-20%. These results were only achieved through a full and complete understanding of emission sources and collaboration across the supply chain.¹³ Another example at a broader scale is presented in box 3. Two LCA of GHG across the dairy value chain have been conducted, one by FAO and one in the USA. They focus on the entire dairy production, from the production and transport of inputs (fertilizer, pesticide, and feed), transportation of milk off-farm, dairy processing, production of packages to the distribution of products to retailers. The scan level footprint will enable to define what strategies are worth investigating more closely to decrease GHG and to identify where opportunities for innovation are.

Box 3: Evaluation of the GHG emissions across the dairy sector: a study from FAO and an analysis from the US fluid milk value chain

A life cycle assessment of the GHG emissions from the dairy sector has been conducted by **FAO** in 2010. The goal was to develop a methodology based on a Life Cycle Assessment (LCA) approach applicable to the dairy sector and to analyze the results of the GHG emissions' accounting in the dairy cattle sector. Emissions, including those taking place after the farm-gate are all reported in per kg of fat and protein corrected milk units (FPCM). The average global emissions are estimated to be 2.4 CO₂e per kg of FPCM [$\pm 26\%$]. Along the entire dairy food chain, cradle-to-farm gate emissions contribute to the highest proportion of emissions, by 93% on average. It is therefore during the production stage that principal efforts should be made. These findings are the first product of a wider program implemented by FAO and aiming at identifying low emission development pathways for the livestock sector. The development of mitigation strategies, tailored to different development priorities and agro-ecological conditions, is the ultimate objective of this undertaking.

In the **USA**, the University of Arkansas conducted a peer review LCA of GHG for the fluid milk value chain. Findings about improvement opportunities are shown, in the graph opposite.

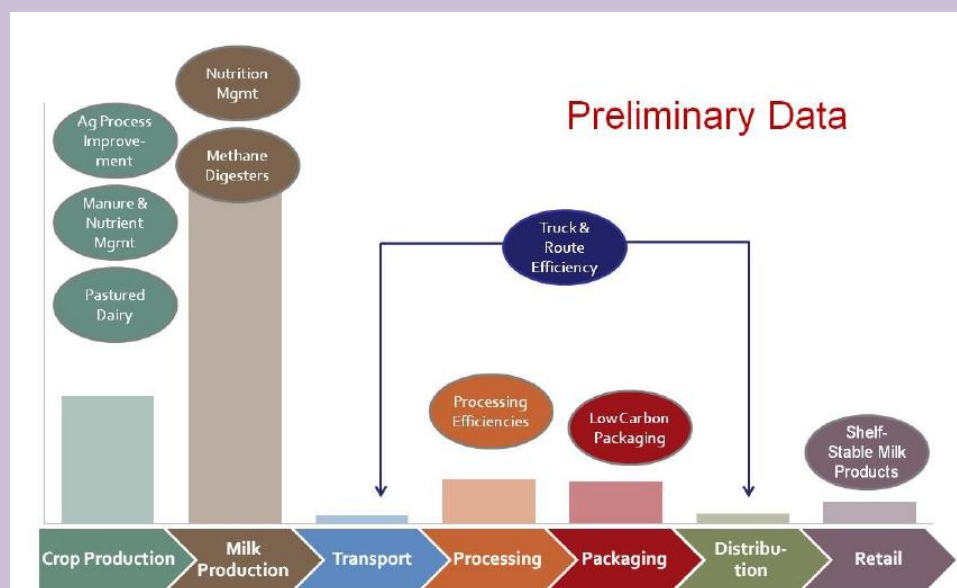


Figure 2: Estimated Relative GHG Emissions (bar) and reduction opportunities (square) by value-chain step

¹³ Carbon Trust, October 2008, *Product carbon footprinting: the new business opportunity – experience from leading companies*, p.4 and 20

<http://www.carbontrust.co.uk/publications/pages/publicationdetail.aspx?id=CTC744>

FAO, 2010, *Green House Gases emissions from the dairy sector – a Life Cycle Assessment*

<http://www.fao.org/docrep/012/k7930e/k7930e00.pdf>

Sustainability Summit: Creating Value through Dairy Innovation, June 2008, Greenhouse Gas Reduction Opportunities in the U.S. Fluid Milk Value-Chain <http://www.usdairy.com/Sustainability/GHGReduction/Science/Documents/SustainabilitySummitBriefingPaper.pdf>

4.2.4 Greater emissions reduction by encouraging changes in consumers' behaviour

Product level information increases the informational channels that reach consumers, in their role in mitigating climate change. It empowers the consumers to select products on the basis of GHG emissions, and also to change behaviours to further reduce their impact on climate change.

Carbon footprint labelling helps consumer to choose more environmentally friendly products; it orientates their choice either by comparing a product footprint with others from the same category (Casino, Tesco) or by labelling only the best products (Migros, Stop Climate Change, Svenskt Sigill and Krav). In Sweden and Switzerland, only the best products in each category are labelled, hence when a consumer chooses a climate certified product in the store, the consumer can be certain that the producer has done what is possible and feasible to lower the climate impact for the whole food chain. The goal is not only to inform the customer, but also to orientate the choice towards a more environmentally friendly product of the same category. Some examples are provided in box 4.

In some cases, the CFP accounting reveals that the major emissions come from the use phase. Companies inform their clients about their role in climate change, where they even go further by advising them on how to reduce their impact (see box 5).

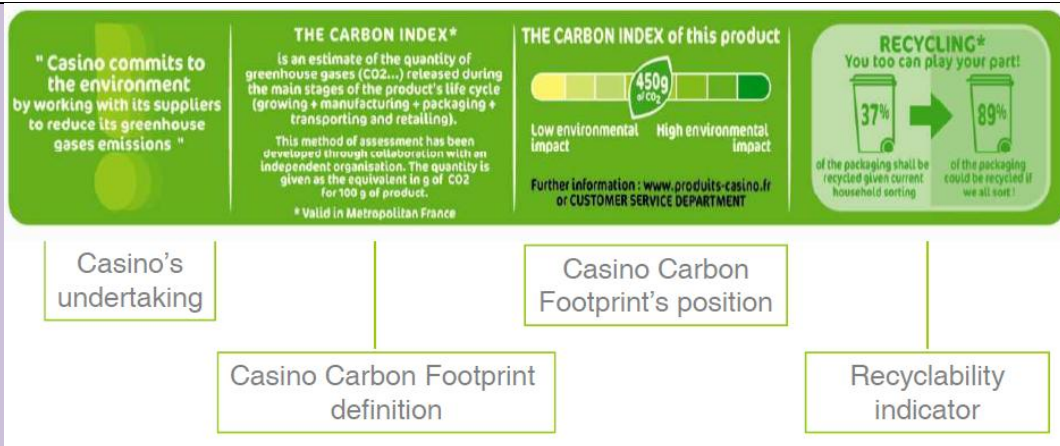
Box 4: Orientating consumers toward “greener” products

Working with the Carbon Trust, **Tesco**, a UK retailer, has calculated and displayed the CFP of its orange juices. It also compares the CFP of chilled fresh juice against juice made from concentrate, enabling the consumer to know which one has the smallest carbon impact and why. “We want to give our customers the power to make informed green choices for their weekly shop, and enlist their help in working towards a revolution in green consumption.” said Sir Terry Leahy, CEO of Tesco.

Casino, a French retailer, is operating similarly, even though the format of presentation is slightly different. Each product is positioned on a scale in terms of GHG emissions, to compare it against other products in the same category.



A review of the main benefits for businesses, public bodies and issues for developing countries?



In Sweden, instead of creating a new label that consumers will not acknowledge before a certain time, two labelling organizations have been working together with producers to include a new parameter on the already existing labels. The approach is to produce a certification scheme that can be used as a plug-in-module for existing sustainability labels or standards for food production in order to insure quick introduction and impact on the market. The plug-in-module guarantees substantial reductions in climate impact. No carbon footprint is presented; the criteria are based on a scientific scan of climate impact in the food chain. Svenskt Sigill offers producers who have voluntarily climate certified their production a label communicating to consumers that improvements have been made. KRAV integrates the climate criteria in the existing standards for organic production. Therefore KRAV certified products will be, within a few years, climate certified.



1. In Germany, the **Stop Climate Change Seals** shows products that are carbon neutral. It implies that not only efforts have been made to reduce the emissions across the value chain but also that offsetting measures have been taken in order to reach carbon neutrality, i.e. emissions rights have been purchased. The company Biotropic GmbH was the first one to get the label for its organic bananas from Ecuador and The Dominican Republic. They found that they were working with a partner who uses a lot of energy for the ripening; about three times more than with modern techniques. They therefore decided to construct their own ripening facility. They offset the remaining emissions by buying credits from a power plant in Russia using wood.

2.

3. Tesco: http://www.tesco.com/greenerliving/greener_tesco/what_tesco_is_doing/carbon_labelling.page?

Casino: http://www.produits-casino.fr/developpement-durable/dd_indice-carbone-demarche.html

Sweden: <http://www.klimatmarkningen.se/in-english>

Stop Climate Change: <http://www.stop-climate-change.de/en/Siegel.htm> and <http://www.dradio.de/dlf/sendungen/umwelt/673905/> and <http://www.biotropic.com/?mm=24&lang=de>

Box 5: Advising consumers on how they can reduce their footprint

Tesco uses the Carbon Reduction Label to inform consumers on the impact that their behaviour has on emissions. How food is cooked may have a significant impact on the carbon footprint. Baking potatoes causes much higher emissions during consumer use (1.025 g CO₂e/kg) than boiling (240g CO₂e/kg) or microwaving (280 g CO₂e/kg). Therefore, Tesco advises to boil or microwave the potatoes rather than baking them.



Source: Carbon Trust, October 2008, *Product carbon footprinting: the new business opportunity – experience from leading companies*, p.25

<http://www.carbontrust.co.uk/publications/pages/publicationdetail.aspx?id=CTC744>

4.3 Carbon footprint as a support to management and decision making in value chains

4.3.1 Better management practices in general

Companies can use a supply chain approach to search for new ways of reducing carbon emissions, just as they have been using supply chain analysis to deliver financial benefits. Measuring the carbon footprint of a value chain allows companies to make enhanced, more informed decisions about how to run their own operations. Particular benefits are; improved productivity, increased efficiency, reduced waste, lower capital requirements, and enhanced product development.

For example, in the UK, with the Carbon Trust pilot program, Innocent, a smoothie manufacturer, is incorporating its carbon footprint calculation models into sourcing decisions. Now, when deciding where to source fruit from, Innocent can compare the cost and the carbon impact of various options.¹⁴

¹⁴ Carbon Trust, October 2008, *Product carbon footprinting: the new business opportunity – experience from leading companies*, p.23

<http://www.carbontrust.co.uk/publications/pages/publicationdetail.aspx?id=CTC744>

CFP is a way to manage risk along the supply chain since it provides a better understanding of the environmental impacts of products provided by suppliers and identifies where risks lie given consumer preferences. The new service offered by FLO-CERT illustrates this (see box 6)

Box 6: Carbon credits to finance adaptation measures in agriculture: FLO-CERT leads the way

FLO-CERT
Certification

opportunity to
the retail shelf.
this service
emissions, FLO-
specifically. The
could generate



supply chain. Retailers in Northern countries are given the opportunity to contribute to the lowering of the carbon footprint of their Fairtrade certified products by purchasing carbon credits from the Fairtrade certified farmers responsible for cultivating their products. It is expected that projects might create additional income streams for producers to fund their adaptation work, thus reducing the risks of climate change on yields.

<http://www.fairtradeafrica.net/en/uncategorized/measuring-producers%E2%80%99-carbon-footprint-flo-cert-offers-a-new-service/>

4.3.2 Cost savings and performance

Reducing GHG can lead to cost savings through a better efficiency. These savings typically come from identifying efficiencies that enhances energy and/or waste reduction across the supply chain. For some products, the greatest cost savings opportunities are further up the supply chain, at the supplier level. In that case, it can lead to the strengthening of the relationships between the industrial and its suppliers. The advantage will be tackled in the next part.

Box 7: Costs saving by correcting a market failure: the example of Walkers



Walkers is a parent company of PepsiCo and UK's largest snack food manufacturer.. In 2006 Walkers became the first company to team up with the Carbon Trust to map a product's carbon content. The Cheese & Onion crisps were the first product to have their product journey scrutinised, from fertilizer to field, shop to home and disposal. The carbon accounting results illustrates that 36% of the emissions occur at the production level (potatoes, sunflowers and seasoning), 17% at the manufacturing stage (producing crisps from potatoes), 34% for the packaging, 10% during distribution to shops and 3% for the disposal of the empty packs. Overall, the study identified opportunities to achieve savings of 18 000 t CO₂e per annum, equivalent to 8% of the

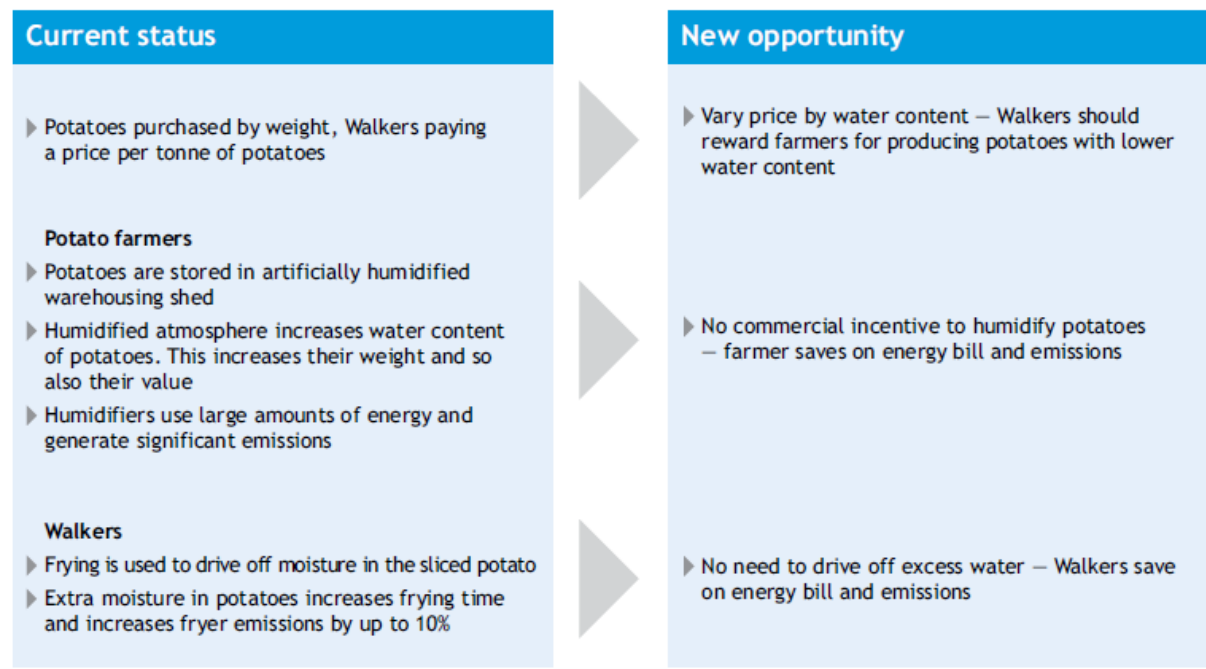
total emissions across the supply chain.

A key opportunity relates to the water content of the potatoes that Walkers purchases. In this example, commercial incentives had become misaligned resulting in a situation where both the potato farmers and Walkers are using more energy than what is required. Indeed, potato producers were paid by weight and stored the potatoes in humid sheds to increase the water content and thus the weight of their produce. The potato chip manufacturer, Walkers, then had to fry potatoes longer because of the greater water content. Both humidifying and desiccating processes are energy expensive. By varying the pricing structure according to water content both the potato producers and Walkers could

save energy and costs. The opportunity is summarized in the figure below.

Over the last 2 years Walkers has reduced the carbon footprint of its product by 7% (from 80 to 75g CO₂e per pack) which is an overall saving of 4,800 tons of CO₂ compared to the 2007 footprint. On a standard bag of Walkers Crisps the saving is equal to 6g of CO₂. These carbon emission reductions enable Walkers to save an estimated £400,000.

Figure 8: Opportunity to reduce water content of potatoes



Carbon Trust, October 2008, *Product carbon footprinting: the new business opportunity – experience from leading companies*, p.21
<http://www.carbontrust.co.uk/publications/pages/publicationdetail.aspx?id=CTC744>

4. Carbon Trust, November 2006, *Carbon footprints in the supply chain: the next step for business*, p.11-13
<http://www.carbontrust.co.uk/Publications/pages/publicationdetail.aspx?id=CTC616>

Walkers http://www.walkerscarbonfootprint.co.uk/walkers_carbon_trust.html

4.3.3 Strengthen relationships with suppliers

Product carbon footprints can help companies strengthen relationships with suppliers, especially if it reveals cost saving opportunities, i.e. in the case of Walkers (box 7) that initiated “the suppliers summit” to discuss the product CFP and identify joint ways to reduce emissions. Companies will increasingly investigate for suppliers that have sound environmental results, thus selecting only the more environmentally efficient ones, as Wal-Mart is already doing (see box 8). Environmental criteria’s are becoming one of the main selection points. Industries can also oblige their current suppliers to improve their environmental performances and to respect their brand environmental requirements.

After having measured the CFP across the supply chain, companies such as PepsiCo (see box 8) have identified improvement opportunities at the supplier stage and are working with them to improve at the same time their environmental and economical performances. Companies build stronger supplier relationships by showing a willingness to cooperate, responding to supplier feedback and creating coordinated solutions to reduce carbon emissions.

Box 8: Interactions with suppliers to reduce the global CFP of a product: two different approaches from Wal-Mart and PepsiCo

Wal-Mart has been one of the most active US retail chains in encouraging food producers and manufacturers to measure and manage their emissions. They have implemented a “supplier scorecard”; it is a set of questions and the answer to each of them provides a relative score for key sustainability metrics, such as material efficiency, natural resources, energy and climate. The questions asked for the climate part is shown in the figure below. “*We have publicly stated that preference will be given to suppliers with strong and improving environmental performance. These considerations include the carbon and energy impacts of the products we sell*” (CDP-Wal-Mart, 2008). The purpose of this scheme is to encourage energy use reporting from suppliers, with the specific aim of reducing energy use and removing non renewable energy from products.

Energy and Climate

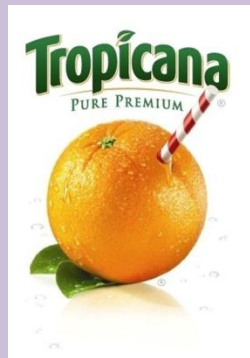
Reduce energy costs and greenhouse gas emissions



- 1. Have you measured and taken steps to reduce your corporate greenhouse gas emissions (Y/N)
- 2. Have you opted to report your greenhouse gas emissions and climate change strategy to the Carbon Disclosure Project (CDP)? (Y/N)
- 3. What are your total annual greenhouse gas emissions in the most recent year measured? (Enter total metric tons CO₂e, e.g. CDP 2009 Questionnaire, Questions 7-11, Scope 1 and 2 emissions)
- 4. Have you set publicly available greenhouse gas reduction targets? If yes, what are those targets? (Enter total metric tons and target date, e.g. CDP 2009 Questionnaire, Question 23)

PepsiCo measured the CFP of its Tropicana Pure Premium® orange juice with the help of the Carbon Trust. Giving that 35% of the emissions comes from the growing process and more precisely from the use of fertilizers, Tropicana launched in 2010 a pilot program that could reduce the life cycle CFP and have an impact on the broader agricultural landscape for orange growers. PepsiCo and their supplier in Florida are testing two alternative reduced-carbon fertilizers that have a lower environmental impact because of their technology manufacturing process, which reduces nitrous oxide emissions by up to 90%. It could reduce the total CFP of Tropicana Pure Premium® juice by 15%. It is however uncertain whether the reduced-carbon fertilizers emit less GHG during their production or during the application (N₂O emissions from soils)

5. *"This pilot program is an example of how PepsiCo is working hand-in-hand with our suppliers to find innovative ways to make our agricultural practices more environmentally sustainable"* said Indra Nooyi, chairman and CEO of PepsiCo. Moreover, the company established a formal Sustainable Agriculture Policy that guides growing practices across the business and its supply chain globally. PepsiCo is also participating in a comprehensive global climate project managed by The Sustainable Food Lab, in conjunction with Sustainable Agriculture Initiative (SAI) Platform, to evaluate the greenhouse gas footprint of specific farming systems and identify and implement the reduction potential from alternative practices.



Wal-Mart: <http://walmartstores.com/download/4055.pdf>

Pepsico: <http://www.pepsico.com/PressRelease/PepsiCo-Launches-Groundbreaking-Pilot-Program-to-Reduce-Carbon-Footprint-of-Trop03182010.html>

4.4 Market and trade advantages

4.4.1 Enhanced brand image and reputation

By displaying their commitment to reduce their emissions as demonstrated in the UK, Korea or Thailand (boxes 1 and 2), private companies can improve their brand image. CFP accounting is part of a broader corporate social responsibility strategy (CSR). Nowadays, all firms are trying to “green” their image and products, even in some cases incurring in green washing. By engaging themselves in the

wake of the government carbon-labelling scheme, firms ensure certain credibility to their environmental declarations. Enhancing their brand image has consequent benefits: increasing customer loyalty, attracting new customers that are sensitive to environmental issues, conveying stability in the business, .

The explanation of a spokesperson for the French retail chain Carrefour illustrates this fact: “*Over and above the opportunities to reduce costs and improve efficiency, the Group sees its active engagement as a means of meeting growing consumer and societal demand for companies to act responsibly and to contribute to sustainable development*” (CDP – Carrefour, 2008).¹⁵

Box 9: Walkers’ reputation enhancement with the Carbon Reduction Label

Walkers found consumers’ perceptions of the company improved after introducing the Carbon Reduction Label on its crisps. When asked how much this label changed their opinion of Walkers, 44% of consumers and 63% of “social influencers” (people who are interested in companies/brands and who talk about them with others) said the Carbon Reduction Label makes them more positive about Walkers. A majority of social influencers now believe Walkers “is honest and open about its environmental impact and cares for the environment”.. The positive reaction appears to be driven by the commitment Walkers has revealed towards the environment – by making the effort to measure product-level GHG emissions as well as the commitment to reduce those emissions over time, plus providing information to help consumers make more informed choices.

Carbon Trust, October 2008, Product carbon footprinting: the new business opportunity – experience from leading companies, p. 30
<http://www.carbontrust.co.uk/publications/pages/publicationdetail.aspx?id=CTC744>

4.4.2 Products’ differentiation and access to niched segments

Labelling the carbon footprint of their products may enable companies to differentiate their products based on their commitment to reduce emissions and general willingness to pioneer credible carbon labelling. By doing so, they can advertise a green trend and gain market shares, especially in niched segments concerning individuals who are certainly aware of climate issues and are looking for more environmentally products, regardless the price. Retailers derive competitive advantage from selling non-standardised products that are not generally available in the market and which compete on more than price alone (Dolan & Humphrey, 2000). The motivation for launching carbon labelling schemes is to give the company a green profile and to target environmentally sensitive market segments (Brenton et al. 2008; Butner et al. 2008).

A research carried out for the Carbon Trust by the Centre for Retail Research showed that nine out of ten households in the UK bought a carbon labelled product in the last year, albeit almost unwittingly, and total sales of such products exceeded £2 billion in just three years. This exceeded the total sales of organic products (£1.5 billion) or Fairtrade products (£800m) and is essentially due to the addition by Tesco, Britain’s largest retailer, of carbon labels to more than 100 of its own-brand products, including pasta, milk, orange juice and toilet paper. The Centre for Retail Research predicted sales of carbon labelled products to double in two years, by the end of 2012 and to reach £15.2 billion by 2015.¹⁶

¹⁵ Victorian Government (Department of Primary Industries, Farm Services Victoria), May 2009, *How will climate change impact market requirements for Victoria’s agrifood exports?*, p.10

http://new.dpi.vic.gov.au/_data/assets/pdf_file/0014/33512/Climate-change-and-agrifood-exports-report-8.pdf

¹⁶ PepsiCo, October 2010, <http://www.pepsico.co.uk/news-and-comment/carbon-labelling>

Researches confirms that regardless of the product's actual CFP, consumers prefer products that are carbon labelled: 49% are more likely to purchase a product if the label is displayed on the pack¹⁷, and 65% declared a label indicating suppliers commitment to reduce a product's emissions would increase that chances of purchasing the product¹⁸. Another survey in the UK indicates that 56% of UK consumers would value information regarding a product's carbon footprint when deciding to buy a product. Only 27% felt that it would not be of use. The study also found that close to half of the consumers (44%) would switch to a product or service with a lower carbon footprint, even if it was not their first preference, and 20% would travel to a less convenient retailer in order to obtain such products¹⁹. Consumers offered similar products with different carbon credentials, may therefore opt for the less carbon intensive choice (Garnett, 2008). Even so, how consumers will trade off between price, quality, or carbon footprint is still unclear (Deurer, 2008). Only 15% of the British consumers asked in the LEK survey are ready to pay more for a product with a lower CFP and 57% of them are not prepared to incur into additional costs over the course of a year to minimize their CFP.¹⁷

Strong support for product carbon labelling was nevertheless identified as a result of a European study²⁰. Hence, 72% of EU citizens thought that a label indicating a product's carbon footprint should be mandatory in the future, ranging from 90% in Greece and Croatia to 47% in the Czech Republic. In France, 78% of respondents were in favour of mandatory product carbon labelling, and in the UK this figure was 80%. Fifteen per cent mentioned that such labelling should be voluntary, and only 8% expressed no interest in a product's carbon footprint.

4.4.3 Product CFP: a possible new necessity to maintain a presence on global markets

As increasingly countries are launching products CFP labelling scheme, and as some of them are even thinking of making it mandatory, economic actors that are exporting goods to such countries will have to meet these requirements. Exporters may soon have to adhere to these new rules, but the main problem will concern which methodology to adopt. Indeed, currently, each country with a CFP scheme has its own CFP measurements' standards. How will exporters be able to calculate and bear the costs of calculating CFP with different methodologies if they export to different countries? As such, it is not conceivable. It is therefore critical that international standards are developed in a fair and transparent manner based on robust science and measurement methodologies, and that such standards are applied equitably across products, producers and countries. Some countries have implemented or are investigating the implementation of a CFP scheme in order to maintain their presence on the global market (box 10)

The Economist, June 2011, Following the footprints, <http://www.economist.com/node/18750670>

GovToday, March 2011, <http://www.govtoday.co.uk/index.php/Low-Carbon-Technologies/uk-carbon-label-goods-sales-pass-p2bn-a-year-mark.html>

¹⁷ Populus Concerned Consumers Survey July 2007; 1,063 adults aged 18+.

¹⁸ Boots internal market research; 1,029 Advantage Card users September 2007

¹⁹ LEK Consulting Carbon Footprint Report 2007; research conducted by YouGov, representative sample of 2,039 UK consumers http://www.lek.com/sites/default/files/Volume_IX_Issue_6.pdf

²⁰ European Commission, 2009, European attitudes towards the issue of sustainable consumption and production, research conducted by Gallup Organisation on 26 500 randomly-selected citizens, aged 15 and over, in the 27 EU Member States and Croatia http://ec.europa.eu/public_opinion/flash/fl_256_en.pdf

Box 10: The need to know the CFP of the goods to overcome future market barriers: the examples of Australia and New-Zealand

The **government of Australia** is working on several studies to analyze the impact of carbon footprint labelling on the export market, as well as solutions to overcome it. The Department of Primary Industries and Farm Services in the State of Victoria has launched a three-year project aimed at i) increasing understanding and awareness of the risks and opportunities for the Victorian agrifood sector related to new demand associated with climate change (CC) and ii) developing opportunities for government and industry to address the risks and capture opportunities resulting from new customer demands associated with CC. It provides an analysis of emerging market requirements. One of its findings is that *“Japan’s pursuit of carbon footprinting and carbon labelling is of particular interest for Australian agrifood exporters for whom Japan is the largest agrifood export market. If carbon labelling of food products becomes mainstream in Japan, it presents a potential market access barrier for exporters if they are unable to verify their product’s carbon emission characteristics.”*

Australian Rural Research and Development Corporations (RDCs) are currently collaborating in a number of areas to tailor the LCA approach for the domestic agricultural sector. RDCs state that *“it is now vitally important that Australian primary industries understand and use LCAs so they can maintain their presence in global markets.”*

The **New Zealand Greenhouse Gas Footprinting Strategy** for the Land-Based Primary Sectors is a partnership approach, involving government, industry and research providers, to assist the primary sector in responding to increasing international attention on the environmental impacts of production and consumption. It focuses on building capacity to measure and manage environmental performance, as well as driving efficiency across supply chains. The Strategy focuses on three main areas: (1) international engagement to contribute to the development of international standards; (2) sector-led initiatives to establish GHG footprints for primary sector supply chains and; (3) building capability in the primary sector to measure and monitor environmental and business performance across supply chains. The carbon footprint of the dairy, kiwifruit, apples, wine and lamb value chains have already been done, others are on their way.

In **Uruguay**, there is a public policy to promote CFP. A **wide work done by the Ministry of Agriculture on the carbon footprint, of the meat, milk and rice value chain is currently on-going.**

Australia: Victorian Government (Department of Primary Industries, Farm Services Victoria), May 2009, *How will climate change impact market requirements for Victoria’s agrifood exports?*, p. 3 and 6

http://new.dpi.vic.gov.au/_data/assets/pdf_file/0014/33512/Climate-change-and-agrifood-exports-report-8.pdf

Australian Government (Climate Change Research Strategy for Primary Industries, Rural Industries Research and Development Corporation), 2009, *Life Cycle Assessments: A useful tool for Australian agriculture*, p.5

http://www.australianpork.com.au/pages/images/CCRSP1%20090909%20LCA%20Brochure_final.pdf

New Zealand <http://mfat.govt.nz/Trade-and-Economic-Relations/1-Market-access/0-Sustainable-exports.php>

http://www.fao.org/es/esc/common/ecg/576/en/Alison_Watson_New_Zealand_.pdf

5 WHAT ARE THE IMPACTS OF THE DEVELOPMENT OF CARBON FOOTPRINTING SCHEME FOR THE TRADE OF DEVELOPING COUNTRIES?

5.1 The revalorization of small producers in developing countries

Certain consumers may be facing a dilemma: on the one hand, they are eager to consume fairly, i.e. they want to contribute to poverty reduction in developing countries through every day shopping and by e.g. purchasing fair trade products. Fairtrade is an alternative approach to conventional trade and is based on a partnership between producers and consumers. Fairtrade offers producers a better deal and improved terms of trade, resulting in improving the livelihoods of these farmers.

On the other hand, consumers also want to consume green and climate friendly; for the majority of them, it implies buying local products with short transportation distances. The belief that local products are more environmentally friendly than imported products has been conveyed essentially through the food miles concept. The concept appears in the 1990's in the UK and refers to the distance the food travel from its production place to where it is ultimately purchased or consumed by the end user. Since transportation consumes a large number of fossil fuels, imported goods, especially those that are air-freighted, are seen as an bad environmental choice for the climate according to the food miles approach. A food miles label in the distinctive shape of an airplane (Figure 3) was drawn and marked those vegetables or fruits that have travelled long to reach the shelves of retailers and thus have contributed greatly to carbon emissions. (Tesco, Marks and Spencer). The label, as well as the food miles concept, by giving consumer a false and incomplete information on the real impact of a product on the climate and the environment, threatened least developed countries' trade (LDC) (Brenton et al., 2009). Now, there are fierce critics against the validity of the food mileage idea. It is accused of not always taking into account the type of transport, e.g. boat freight emits few GHG, or the efficiency of the transports and of being protectionist (Paulavets, 2008).

Figure 3: the food miles' label of Tesco and Mark & Spencer, UK



Source:
http://www.med.govt.nz/templates/EcoLabel_41289.aspx

Carbon footprint accounting enables to put an end to the food miles myth. Indeed, agriculture in LDC uses far less inputs (e.g. synthetic fertilizers, pesticides, tractors and thus fuels); therefore its carbon footprint is often lower than goods produced in developed countries with conventional agriculture. Moreover, the warm climate of low income countries (LIC) is beneficial for the growth of vegetables; there is no need to use artificial energy-consuming means to grow tomatoes, lettuce, zucchini ... on the contrary to developed countries of the Northern hemisphere. As a result, CFP proves that importing food could be better than consuming it locally; it revalorizes the small producers of developing countries. Maybe the most famous example is the Kenya roses; it is presented in box 11. Another example concerning sugar is described in box 12.

Box 11: Roses from Kenya are greener than the flowers from Amsterdam

An LCA of Kenyan roses and Dutch roses was conducted by Cranfield University in 2007 and commissioned by Sainsbury's and World Flower. The results show that carbon emissions for importing Kenyan roses, including air freight, were almost six times lower as compared to the roses from the Netherlands. The study found that 6 tons of CO₂ was released per batch of Kenyan roses, as opposed to 35 tons for production in the Netherlands.

Whereas 99% of the Dutch emissions are caused by producing the roses, only 7.3% of Kenyan flowers' emissions are caused by growing them. 91% of these emissions come from the 4 000 air miles transport from Kenya to the UK. Less than 1% of the Dutch grower's emissions are caused by transport.

The explanation behind the Kenyan roses producing less carbon emissions are:

- The yield of roses in Kenya is approximately double that in Holland
- The main Kenyan energy source is geothermal, whereas the Dutch is mainly fossil fuel
- Roses grown in Kenya have the advantage of natural heat and light
- Roses are packed and transported in specially designed boxes which are very efficient to air freight and are densely packed

Thanks to this study and in response to the air freighted label used by Tesco and M&S retailers, the Kenyan

horticulture industry launched in 2007 an initiative called “Grown under the Sun” which aims at educating UK consumers and supply chain actors on the development and climate change benefits of importing flowers, fruits and vegetables from Kenya. Kenya is now campaigning to have the “Grown under the Sun” symbol to be used as a rallying call to understanding the competitive edge Kenyan products have. British retailers have stop using the air freighted label.

<http://www.j-sainsbury.co.uk/index.asp?PageID=424&Year=2007&NewsID=858>

<http://www.timesonline.co.uk/tol/news/world/europe/article1362750.ece>

<http://grownunderthesun.com/index.html>

Box 12: The Fairtrade sugar is the Climate Champion (Migros, Switzerland)

The retailer Migros labeled only the products that have the lowest climate impact within a category of product. For sugar, the Bio Max Havelaar cane sugar from Paraguay is the champion, compared with cane sugar from Colombia and beet sugar from Switzerland/Germany (bio and conventional). Emissions were calculated on the all life cycle of the sugar, from production to transport and waste disposal. The main reason is that sugar cane growing requires less fertilizers and pesticides than sugar beet growing. Heat and electricity necessary for extracting the sugar come from sugar cane waste whereas in the case of beet sugar, they come from fossil fuels. Maritime transport of the Paraguayan sugar is responsible for almost one third of the total emissions; nonetheless the bio Max Havelaar cane sugar has a CFP of 0.45 kg CO₂/kg sugar against ≈0.7 kg CO₂e/kg sugar for the Swiss/German beet sugar.

Therefore, Migros indicates to consumer that the bio fairtrade sugar is the most environmentally friendly sugar offered in the supermarket; it valorizes small producers of developing countries both on an environmental and socio-economical aspect.

6. http://www.migros.ch/mediaObject/migros_ch/supermarkt/nachhaltige_labels/climatop/co2_champion/fr/F-Fact Sheet Migros Sugar b1/original/F-Fact Sheet Migros Sugar b1.pdf

5.2 Development issue of CFP scheme in low income countries

It is necessary to prevent carbon standards from becoming a technical barrier to trade, especially for LDCs. Small firms and tiny firms in developing countries will find it difficult to participate in complex carbon labelling scheme for numerous reasons.

First, producers and industries do not have the capacity to bear with the high cost of measuring and certifying the carbon footprint. Not only do they lack the financial resources but also the technical ones (i.e. experts trained in CFP). It will translate into a heavy burden on the competitiveness of such small players. They could increase the price of their products to overcome this additional cost; however this will require that consumers are willing to pay more to buy those products with a low CFP.

Secondly, the deficiency in data and information is quite important in developing countries as compared to developed countries. The carbon accounting uses extremely imprecise and uncertain datasets, i.e. emission factors that relate to large geographical scales, hiding important differences between countries and/or regions. The lack of precise and adapted data can lead to an over (or under) estimation of the CFP. It will discriminate imported products if the carbon emissions are indirectly derived using parameters based on data in the importing country (Deere, 1999). The absence of up-to-date and locally specific emission factors introduces a degree of uncertainty into the magnitude of the estimated carbon emissions for a product or process. Hence, when standardized emission factors are

used it would be appropriate to present the variation in published emission factors to derive upper and lower bounds for any carbon footprint. But this further complicates the task of presenting information to consumers in a clear and simple way.

Thirdly, another critical data issue concerns the choice of baseline year(s) for data collection, which will tend to have an impact on the outcome, particularly if that year was not typical of long term conditions. It is especially true in LDC where yields are less regular than in developed countries. Consider for example the variation in both inputs to crops between years (e.g. more fungicides on wheat in wet years) and also differences in crop yields due to annual variation in weather.

Fourthly, the boundaries of the analysis have a huge impact on the results. For example, PAS 2050, the British standards for CFP measurements, takes into account land use changes that occurred after 1990. On the contrary to developed countries, where principal land use changes happened a long time ago, developing countries have cleared previous natural lands such as forest more recently. The incorporation of GHG emissions from land use change clearly disadvantages food products of LDC.²¹ Moreover, the inclusion or not of manufacture of capital goods such as tractors, buildings, transport equipment, transport of employees and consumers, routine maintenance machinery, has an impact on the CFP results. The PAS 2050 excludes emissions from the production of capital equipment which will tend to favour capital-intensive techniques over labour-intensive processes and hence will be to the disadvantage of LICs.²²

5.3 Participation of LIC in the definition of accounting standards to overcome this issue

Low income countries have been extremely poorly represented in the standard setting processes so far, even for standards developed in an open structured manner with broad invitations to provide comments going out to stakeholders. The technical capacity and the resources needed to participate in standard development are considerable and may be the main cause for the lack of involvement so far. It is however crucial for developing countries to get more involved in the setting of an international protocol for CFP accounting. It will enable them to have a say in the matter, to make developed countries acknowledge their specificities and thus define the standard in that sense.

Main recommendations on value chains in developing countries focus on (Plassmann, 2010):

- increase yields and reduce variability
- encourage processing in developing countries
- think hard about how to include land use change in food labels (e.g. develop regional worst case scenarios)
- consider how to include agro forestry and tree crops in carbon footprints
- research and consider soil carbon losses (organic soils) and sequestration
- develop good data and easily accessible databases for tropical regions / countries
- explicitly recognise uncertainty and subjectivity
- have retailers and industry declare their calculations
- develop low cost approaches to calculation and certification

²¹ Plassman and al, May 2010, Methodological complexities of product carbon footprinting: a sensitivity analysis of key variables in developing country context, *Environmental Science and Policy* 13 (2010) 393-404

²² Brenton P, Edwards-Jones G, Friis Jensen M, 2009, Carbon labeling and Low-income Country Exports: a review of the development issues, *Development Policy Review*

- consider combining carbon footprints with other environmental and/or sustainability indicators

Particular ongoing projects aim at increasing the participation of LDC in standard settings, such as the one of the Swedish Standards Institute (SSI) which assists East African and Arab countries in actively participating in the development of the future ISO 14067. Or the European Commission, which has called for stakeholders involvement to consider how LIC can be involved in the further development of methods (Pavel Misiga, Directorate-General for Environment, European Commission, speaking at the PCF World Forum, Berlin, 27 February 2009).

TSPN (Trade Standards Practitioners Network), an international network established in 2005, is another major contributor in helping developing countries to adapt to new standards. Their mission is to improve the effectiveness of initiatives that support developing country capacity and participation in the development and implementation of trade-related social, environmental, and food safety standards and associated measures in agriculture, forestry and fisheries, with a focus on voluntary standards. In doing so, the TSPN seeks to foster more sustainable, competitive and equitable developing country value chains by improving their ability to respond to different commercial, safety, social, and environmental requirements. TSPN held a conference on “Standards for a Sustainable Agriculture and the Mitigation of Climate Change” in November 2010 which focused on the issue of CFP in LIC²³. They also implemented a working group on “*Private sector incentives and constraints to mainstreaming private voluntary standards (PVS) in developing countries*” whose aim is to provide a platform for cross-sectoral dialogue, information exchange and learning across LIC firms on a range of PVS related topics, including CFP.²⁴

The development community can play a positive role on three fronts. First, with regard to knowledge, it can support the expansion of the scientific base and dialogue upon which the standards are being built. Second, on the advocacy front, the development community needs to ensure that the interests of low income countries are properly represented in the debate and design of carbon labelling standards. Finally, on the operational front, the development community should assess the capacity of developing countries to participate in carbon labelled trade and help ensure that new opportunities for exports are exploited. Effective participation in carbon labelled trade will require the infrastructure and institutions that provide the necessary measurement and certification mechanisms that are often lacking in low income countries.²⁵

The role of international organizations such as FAO is also important to provide technical support to ensure market access for developing countries and implementation of mitigation measures. As an example, FAO has conducted two studies on the carbon footprint of the rice value chain in Madagascar and the cashew nuts value chain in Burkina Faso. The analysis of the CFP was done with the EX-ACT tool, an excel-based tool that calculates the carbon balance of an AFOLU project or policy compared to a baseline scenario. The second study underlines the worthiness of developing the cashew nuts value chain, especially the transformation stage, in Burkina against having the nuts transformed in India. Indeed, the construction of four transformation units in Burkina using wood and nutshell as an energy source, and the decrease of slash and burn practices will enable to avoid the emissions of 0.56 t CO₂e/t cashew nuts/year during five years compared to the situation where nuts are sent to India to be

²³ Standards for a Sustainable Agriculture and the Mitigation of Climate Change, November 17-18, 2010, *TSPN Annual Conference Report*

²⁴ TSPN Working Group 3: Private Sector Actors Mainstreaming - Sustainable Production in Developing Countries through Private Voluntary Standards <http://tradestandards.org/en/Article.232.aspx>

²⁵ Brenton P, Edwards-Jones G, Friis Jensen M, May 2008, Carbon Labelling and Low Income Country Exports: An Issues Paper, *Munich Personal RePEc Archives, Paper No. 8971*

transformed. The report concludes that the support for the Burkinabe value chain would allow the development of the cashew tree in the country, which will have a mitigation impact by storing carbon in the biomass and the soil, as well as allowing local socio-economical development, by considering the possibility of implementing a carbon certification to differentiate the Burkinabe cashew nuts on the market and the implementation of Payment for Environmental Services (PES) to reward and encourage farmers to continue their mitigation practices.²⁶

6 CONCLUSION

Measuring the carbon footprint of a product across the supply chain is a recent trend that has several benefits. It is an opportunity for businesses to reduce their emissions in a more effective way, after having identified the main GHG sources; it can save them money as well and become a tool for supply chain decision making and management. When CFP accounting is associated with the display of a CFP or carbon reduction label, it provides further advantages for both public and private sector, whose interaction and collaboration is essential for the success of carbon labelling's objectives. Companies find in carbon labelling a way to differentiate themselves on the market as well as gaining new market shares and a better brand image. By giving consumers the choice to turn toward more carbon effective products and by advising them on their own reduction opportunities, CFP labels sensitize the population in order to switch to a low carbon economy. Thus, standards systems such as carbon footprinting, contribute to a low carbon economy through (i) market differentiation, (ii) driving performance and (iii) platforms for discussion & synergies (Bottriel, 2010).

However, product carbon footprinting currently faces some major drawbacks that drive some experts to see CFP as a “wasteful distraction” (McKinnon, 2009). Amongst others is the lack of harmonization between accounting methodologies, the variability of the supply chain (in terms of agricultural production, raw material sources, season of production) and so the variability of the CFP results, its cost, the lack of specific data, the confusion of consumers among a multiplication of labels and the real impact of CFP labels on consumers' behaviour. To answer these limits, works and researches are ongoing for the development of an international methodology, to look for solutions, to minimize the costs and to educate people on the meanings of carbon labels.

Carbon is not the only criteria to assess the environmental impact of a product, and limiting environmental information to GHG emissions is a bit simplistic (Øresund Food Network, 2008). Hopefully, some initiatives now include other indicators, such as in France and at the European Union level. Being either voluntary or mandatory, such schemes will enable consumers to be well equipped to make greener choices and will increase companies' responsibility and efforts in the fight against climate change.

²⁶ Tinlot M, 2010, Intégration des filières dans la mitigation au changement climatique - Cas de la filière anacarde au Burkina Faso, FAO, GTZ http://www.fao.org/fileadmin/templates/ex_act/pdf/RAPPORT_BURKINA_aout.pdf
Tinlot M, July 2010, Evaluation ex-ante du bilan carbone des dynamiques de développement agricole et forestier – application sur le filière anacarde au Burkina Faso, Master thesis
http://www.fao.org/fileadmin/templates/ex_act/pdf/master_thesis/MFE_TINLOT_M_210610.pdf

7 EASYPOL LINKS

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[Evaluation ex-ante du bilan carbone des dynamiques de développement agricole et forestier. Application sur la filière anacarde au Burkina Faso](#), Master thesis, Institut Supérieur d'Agriculture (ISA), Lille, France

[Intégration des filières dans la mitigation au changement climatique - Evaluation carbone sur la filière anacarde au Burkina Faso](#)

[Carbon Balance of Rice Value Chain Strategic Scenarios in Madagascar towards 2020](#)

[Commodity Chain Analysis - Constructing the Commodity Chain Functional Analysis and Flow Charts](#)

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