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Can Carbon Labeling Be Development Friendly? Recommendations on How to Improve Emerging Schemes

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Carbon accounting and labeling for products are new instruments of supply chain management that may affect developing country export opportunities. Most instruments in use today are private business management tools, although the underlying science and methodologies may spread to issues subject to public regulation. This note seeks to inform stakeholders involved in the design of carbon labeling schemes and in the making of carbon emission measurement methodologies about an overlooked issue: How can carbon labeling be made to be both development friendly and scientifically correct in its representation of developing-country agricultural sectors?

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Carbon accounting and labeling instruments analyze and present information on carbon emissions of products in an attempt to identify major sources of emissions in supply chains. Once the emissions from different parts of a supply chain have been identified, it is hoped that actions will be taken to reduce emissions in a timely and cost-effective manner. Within the food sector there are typically four forms of action that can be taken:

- Voluntary responses by companies to the challenge of climate change, which may also bring commercial advantages through enhanced marketing and public relations. UK retailer Tesco's labeling of products with estimates of greenhouse gas emissions is an example of a voluntary response.
- Action by governments to encourage companies to reduce their emissions; this could also help governments meet their international obligations for reductions in greenhouse gases (GHGs). For example, the French government is funding work to introduce carbon labels in France.
- Action by retailers to stock only products that achieve a certain standard in terms of their carbon footprint.
- Action by retailers to place a label on products that informs consumers about the carbon footprint of that product, thereby enabling consumers to make informed choices between products.

At least 16 different methodologies for calculating the carbon footprint of products have been developed since 2007. Some of these methodologies are publicly available and provide users with detailed advice on how to conduct a carbon footprinting exercise (for example, the British standard, PAS 2050), while others are confidential.

The designers of these schemes are caught in a dilemma: on the one hand they have to respond to policy and corporate agendas to create new ways of responding to climate change challenges; while on the other hand, designers rely on very rudimentary knowledge about actual emission patterns related to the varied production systems that occur around the globe. This is because the underlying scientific understanding of greenhouse gas (GHG) emissions from agriculture is only partially developed. Knowledge of the GHG emissions for production and processing activities is particularly low in developing countries.

As a result of the pressures placed on designers and users of carbon accounting and labeling instruments, there is a risk that

carbon accounting and labeling instruments will not properly represent the complexity of production systems in developing countries.

The Situation in Developing Countries

Developing countries tend to have characteristics that make it particularly difficult to introduce carbon accounting and/or food labeling relative to more developed countries. These characteristics are:

1. They tend to be distant from their markets and therefore have a high dependence on long distance transport to deliver their goods to market. Many products are transported by ships, which tend to emit few GHGs per ton per kilometer (ton/km).[1] However, some high-value, fresh products are transported by air, which emits large amounts of GHGs per ton/km.
2. Some crops in developing countries suffer from low and variable yields. This variation may be related to annual changes in weather, presence of pests, absence of key inputs, and/or insufficient technical knowledge. Regardless of the cause, low yields contribute to high carbon footprints of food items, which are expressed per unit weight.
3. One of the responses to increased demand for agricultural exports in developing countries has been the clearing of natural land for conversion to crop land and pasture. The availability of underused or unused land in developing countries has made this possible. This is in contrast to most of the nations in Europe and North America, which created their agricultural land many decades or centuries ago. The conversion of forest to grassland and cropland results in the loss of carbon from the forest trees, and also from the soil. Similarly, the conversion of grassland to cropland results in a loss of carbon from the soil. The amount of carbon lost during any land use change (LUC) depends upon the exact nature of the forest or grassland that is being converted. The science behind LUC is that typically tropical forests store a lot of carbon in their trees and soils, and thus these forest types release the most carbon when they are converted. Other forest types, like some of the patchy forest typical of the semi-arid areas of Africa, release less carbon than tropical forests when they are converted to agriculture. There is a similar variation in the amount of carbon released by different types of grassland when they are converted to cropland. The International Panel of Climate Change (IPCC) has derived methods of estimating the amount of carbon released from the conversion of different forests and grasslands, but these methods require good knowledge of the relevant ecosystems and carbon accounting techniques. Some carbon accounting methodologies do not consider the emissions from LUC, but many do. The carbon accounting methodology developed by British Standards, PAS 2050, is the most comprehensive methodology available today. The PAS 2050 methodology requires that emissions from all LUC that occurred after 1990 be included in the carbon footprint of a product. For example, if sugar is grown on land that was converted from forest to grassland in 1991, then the emissions from this conversion must be considered. If however, a neighboring farm had converted their land to sugar in 1989 then there would be no need to consider emissions from LUC. Typically the emissions from LUC are among the largest sources of emissions in the carbon footprint of crops produced in developing countries. Because of this it is important that these emissions are calculated correctly. This can be difficult in developing countries where relevant data relating to the distribution of current and historical land uses are scarce or absent. Not only are there technical issues surrounding the calculation of emissions from LUC, but in addition there is a fairness issue, because most developed countries do not need to include this source of emission because they cleared their forests decades or centuries ago.
4. Many tropical developing countries export goods derived from tree crops, such as coffee, cocoa, tea, fruit, and nuts. While trees themselves sequester carbon, the forest soils tend to sequester far more carbon than the above ground biomass. Currently, few carbon footprinting methodologies recognize the positive contribution made by carbon stored in trees used to produce food, or that sequestered in the soil. Thus many developing countries have to declare emissions from LUC, but cannot claim benefit from the management of tree crops.
5. There tends to be a deficiency in data and information for developing countries when compared to more developed countries. As a result, carbon accounting and footprinting analysts are required to use very imprecise and uncertain datasets that relate to very large geographic scales. These may mask important differences between different countries or regions within a country.
6. Some of the commodities produced by developing countries, such as sugar, can be delivered to the final market place in a blend of product derived from more than one country. This absence of clear country of origin labels on commodities can be a problem when calculating carbon footprints because the calculations require that certain country-specific data are utilized in the calculation. If the country of origin is not known, then some accounting methodologies require that data relating to the worst case scenario be utilized. These worst case scenario data can be quite different from the real data from the country of origin. For some variables, such as LUC, the worst case scenario relates to the conversion of tropical forest in Malaysia. It is debatable how relevant these figures are to crops produced in Africa, South America, or Central Asia.
7. Developing countries tend to engage in minimal processing of the food they produce. This means that not only do they

lose the potential of creating added economic value, but they also lose the potential "carbon advantages" related to the use of renewable energy, low capital inputs, and a shift from air to ship as means of transport (for example, fresh fruit and preserved fruit).

8. Relatively few farms and processing plants situated in developing countries will be visited by the analysts who calculate the carbon footprint of the food items they produce. Rather the farmers will be required to complete a questionnaire on their agricultural practices and the consultants will use these alongside standard databases to calculate the carbon footprint. This approach brings two problems: first, the analyst may have an incomplete understanding of the system of analysis; and second, the databases may contain poor data on many developing countries.

Recomendations for Development-Friendly Carbon Footprinting

Given the situation observed in developing countries, several recommendations can be made that may improve the utility of carbon footprints of food products from developing countries. These are grouped into four categories, outlined in the following sections.

Land use change

1. *Work toward an equitable solution for the inclusion of emissions from LUC in carbon footprints*. Science shows that the conversion of forest and natural grassland to agriculture does cause an increase in the emission of GHGs. Science also shows that the amount of emissions vary with location. However, there are ethical issues surrounding the date at which such conversions should be included in carbon footprints. While in many ways 1990 is a sensible baseline year because it ties in with other international agreements, it also disadvantages those developing countries that have converted land since 1990. Because many developing countries had relatively little land that was not forest or natural grassland until recent times, the requirement to include LUC in carbon footprints may seem inequitable to them. One option may be to require all footprints to declare what the emissions from land LUC would have been if the conversion occurred today. This would remove some of the arbitrariness of using 1990 as the baseline year. These emissions would not necessarily be included in any final product label, but they could be accounted for and communicated via Web sites and other materials. Thus products from Europe and North America would have to declare the GHG emissions that converting native forest to agriculture would emit if it happened today.
2. *Develop better databases of land use and emission factors for developing countries*. If emissions from LUC are to be included in product footprints, then these emissions need to be calculated correctly for each parcel of land. This can only happen if the levels of precision and certainty are increased in the databases that provide emissions data and the historical and current distribution of land cover and land use.
3. *Develop regional worst case databases*. To prevent countries from having to use data from the global worst case, which may be irrelevant, it would be useful if data for regional worst case situations could be identified and made publicly available.
4. *Consider including benefits derived from tree and bush crops in footprints*. Tree crops can sequester carbon, and the soil under tree crops and agroforestry systems typically contain more carbon than other forms of cropland. It would be useful to find a way of providing some credit for the carbon sequestered by these agroforestry systems, and thereby reward their owners and promote the future development of such systems. The agroforestry system should find a way to reduce deforestation by letting the market or other parties pay a rental to the land owner in return for the avoidance of carbon releases into the atmosphere.

Information and data

1. *Develop emissions databases for agri-ecological zones*. There is an urgent requirement for databases of emission factors and LUC to be developed for tropical and subtropical areas. These databases would normally be developed at the country level, however given the size and biophysical variability of some developing countries, one set of data may not be suitable to represent the whole country, so there is a need to develop data for several regions in a country. Such an exercise will be resource intensive, however, as many countries share similar biophysical characteristics, there could be merit in developing databases for particular agri-ecological zones.
2. *Make relevant data more accessible*. All information needed for carbon footprinting of agricultural products should be located in one easily accessible and user-friendly database. Although there are several Web sites that provide some of the relevant data, none of the current sites are complete, and they are not easily located by inexperienced Internet users.
3. *Provide training and support in recordkeeping*. If small-scale producers, producer cooperatives, and traders do not maintain accurate records of inputs and yields, then there may be a need to make more assumptions when calculating footprints. It may be necessary to train such farmers in recordkeeping to ensure that they are not disadvantaged in comparison with large-scale producers/traders, who may have better recordkeeping and access to experts to help with footprinting.

Calculation and communication

1. *All calculations of carbon footprints should be published in a public database.* It should not be permissible for retailers or others to declare carbon footprints on consumer facing labels or Web sites unless the details of the calculation are

publicly disclosed. These sites should also clearly state all the assumptions made when calculating the carbon footprint. Such publication would allow governments, NGOs, journalists, producers, and the public to scrutinize the data and the methodology to judge the accuracy of the results.

2. *Declare the intensity of data collection.* When publishing information on carbon footprints, it should be stated whether or not the consultants actually visited the countries and farms analyzed. This is important because carbon footprints based on primary data are likely to be more accurate than those based on secondary data.
3. *Recognize the subjectivity and uncertainty in carbon footprints.* Footprinting methodologies need to reduce the level of inherent subjectivity. Hardly any footprints present information on the uncertainty that surrounds their calculations. There is also a need for footprinting analysts to recognize and communicate the level of subjectivity that is inherent in calculating any carbon footprint. Carbon footprints are intended to be used as tools to inform business, governments, and consumers so that they can take relevant action to reduce climate change. Unfortunately, there is currently a tendency to utilize carbon footprints simply as a means to gain commercial advantage and/or market access.
4. *Provide more disaggregated consumer information.* Some carbon footprints require that emissions from the use phase of the product be included in the overall calculation. For food items, the main emissions relating to use are from cooking and refrigeration. In products like coffee, the use phase is so large that it may mask carbon efficiencies in production. In this case, the footprint should be broken down to demonstrate the proportion of the overall emissions derived from the different phases of the life cycle (for example, on the farm, LUC, processing, transport, and use). This may enable consumers to realize that even though the footprint of a particular product is relatively high, it was not the farmers in developing countries who were responsible for the majority of emissions.
5. *Encourage innovation in the food chain*. Few footprinting methods actually provide a direct incentive to the individual business people in the supply chain to reduce their component of the overall carbon footprint. If footprints are presented at an aggregate level, such as when multinational companies report the footprints for their final products from a region as if it were one uniform good (for example, sugar from Zambia, beans from Kenya, grapes from Chile), then there is little incentive for the individual businesses who contribute to the production of these products to reduce their own emissions. If individual businesses could be provided with direct incentives for reducing their emissions, then innovation in the food chain would be encouraged.

In-country and general development

1. *Enhance yields.* If crop yields could be increased and yield variability decreased, then the overall carbon footprint of that crop would be reduced.
2. *Encourage processing in developing countries.* If the shelf life of a product can be extended through processing, then it may be possible to transport that product to the final market by ship, thereby reducing emissions. Thus well designed carbon accounting schemes could encourage the processing of goods in developing countries in cases where the processing sector has the potential to be competitive in international markets.
3. *Locate carbon footprints in the wider sustainability debate.* Carbon footprints can be good indicators of the amount of GHGs emitted during the production of a product. They are not good indicators of overall sustainable development. A more rounded picture of development could be obtained by utilizing carbon footprints as part of indicators of wider sustainable development, such as carbon emitted per person employed in the production phase or carbon emitted per dollar generated in households with incomes under a certain threshold.

Note

1. GHG emissions from transport are expressed as kilogram (kg) of carbon dioxide equivalent (CO2e) per ton km. This is the total amount of GHGs emitted when 1 ton of product is transported 1 km. All GHGs are expressed as CO2e.

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Further Reading

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