Corporate social responsibility and supply agreements in the agricultural sector

Decreasing land and climate pressures

Working Paper No. 14

Gabrielle Kissinger

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Abstract

Corporate social responsibility (CSR) and supply agreements in the agricultural sector have a significant role to play to promote agricultural climate change mitigation and decrease pressure on the earth's land and climate. Private sector engagement can also promote food security and positively affect the livelihoods of smallholder agricultural producers in developing countries. Based on a comprehensive literature survey and 15 interviews with key organizations, companies and financiers or lenders, this report investigates: current private sector climate change mitigation activities in agriculture and food production, highlighting current innovations affecting production and supply chains of key commodities; explores how CSR and supply chain commitments can improve their contribution to reductions in agricultural GHG emissions; and surveys the role of governments, finance and investment in promoting sustainability in the agricultural sector. Key findings identify a strong need for harmonization among product standards, certification and by commodity roundtables, and the need to mainstream sustainability criteria in agricultural finance and lending activities.

Keywords

Corporate social responsibility; agriculture; commodities; supply chain; sustainability; producers; agribusiness; smallholders; climate change; mitigation.

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Gabrielle Kissinger is principal of Lexeme Consulting in Vancouver, Canada. Consulting services focus primarily on land-use and climate change, international forest carbon, REDD+, government affairs, and corporate social responsibility. She has almost 20 years of experience working at the interface between government policy and land use pressures. She has produced results working in partnership with various levels of government, companies ranging from start-ups to large timber companies, investors, major donors, and a full range of environmental NGOs.

Her research applies an interdisciplinary approach to find tenable solutions by drawing from ecological economics, ecology and conservation science, and public policy. Her work has served multiple geographic regions, from the Great Bear Rainforest in coastal British Columbia, Canada, to northern New England in the US and Lesotho, Southern Africa. She holds a M.A. in natural resources management and environmental policy from Tufts University and B.A. in philosophy and political science from University of California, Santa Barbara.

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Contents

Acronyms

AACF	African Agricultural Capital Fund
ADM Co	Archer Daniels Midland Company
BCI	Better Cotton Initiative
CDP	Carbon Disclosure Project
CDLI	Carbon Disclosure Leadership Index
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CFT	Cool Farm Tool
CGG	Chongqing Grain Group Co Ltd
COFCO	China National Cereals, Oils and Foodstuffs Corporation
COP	Conference of the Parties under the United Nations Framework Convention on Climate Change
CSO	Civil Society Organization
CSR	Corporate social responsibility
DEFRA	United Kingdom Department for Environment, Food and Rural Affairs
DFID	United Kingdom Department for International Development
EIA	Environmental impact assessment
EMBRAPA	Brazilian Agricultural Research Corporation
ESG	environmental, social, and corporate governance
EU ETS	European Union Emissions Trading Scheme
FDI	Foreign Direct Investment
FFD	Forest Footprint Disclosure Project
FSC	Forest Stewardship Council
GDAA	Global Dairy Agenda for Action
GIIN	Global Impact Investing Network
GHG	Greenhouse gas(es)
GM	Genetically modified
GRI	Global Reporting Initiative
Gt-	Gigatonnes
GTPS	Sustainable Beef Working Group
HCVF	High Value Conservation Forest
IDH	The Dutch Sustainable Trade Initiative
IFC	International Finance Corporation

IFC's BACP	International Finance Corporation Biodiversity and Agricultural Commodities Program
ILUC	Indirect land-use change
IPAM	Amazon Environmental Research Institute
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standards Organization
KfW	German Kreditanstalt für Wiederaufbau Bankengruppe
KNVKT	Royal Dutch Coffee and Tea Association
LCA	Lifecycle analysis
MVDS	Belgian Platform for Responsible Feed
MVO	Dutch Product Board for Margarine, Fats and Oils
N_2O	Nitrous oxide
NGO	Non-governmental organization
OECD	Organisation for Economic Co-operation and Development
PCF	Product carbon footprint
REDD+	Reductions in emissions from deforestation and forest degradation, and promote conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
RSB	Roundtable on Sustainable Biofuels
RSPO	Roundtable for Sustainable Palm Oil
RTRS	Roundtable on Responsible Soy
SAI	Sustainable Agriculture Initiative
SAN	Sustainable Agriculture Network
SEC	United States Securities and Exchange Commission
SFL	Sustainable Food Lab
SRI	Socially responsible investment
TSC	The Sustainability Consortium
UN PRI	United Nations Principles of Responsible Investment
WRI/WBCSD	World Resources Institute/World Business Council on Sustainable Development
WWF	World Wide Fund for Nature

Executive Summary

The private sector has a significant role to play to promote agricultural climate change mitigation and decrease pressures on the earth's climate. Corporate social responsibility (CSR) and supply agreements can offer a critical means to reduce or alter the impacts of global food and commodity production. At the same time, such private sector engagement can promote food security and affect the livelihoods of smallholder agricultural producers in developing countries. Based on a comprehensive literature survey and 15 interviews with key organizations, companies and financiers or lenders active in the area of reducing greenhouse gas (GHG) emissions from agricultural production or the agribusiness supply chain, this report provides a review of:

- private sector climate change mitigation activities in agriculture and food production, especially current innovations,
- how CSR and supply chain commitments can improve their contribution to reductions in agricultural GHG emissions, including:
    - the role of governments in catalysing change,
    - the role of finance and investment, exploring how to harness global financial resources to enable transformative change in the agricultural sector. This requires putting agricultural sustainability into business practices, lending and investment decisions, and mobilizing private sector investment and involvement on a scale unimaginable today.

Key Findings

1. The most innovative CSR and supply chain activities are those that hold potential to shift entire supply chains and value chains. In particular, innovators tend to:

- Look beyond risk management and see their role in the supply chain as a key motivator to **get the whole sector on board** and create transformative change.
- Recognize that **sustainability is a pre-competitive issue**, and should not be left to the consumer to make an informed choice about, but rather should underpin all products the consumer can choose from.

- Have made climate change and GHG reduction commitments have strong support at the Board and top executive level, and report on their progress publically.
- View their climate change commitments as key indicators within a broader sustainability framework that includes social and environmental dimensions—waste and water management, energy use, fair trade, fair working conditions, and other indicators of sustainability.
- Include sustainability as a key performance indicator and embed it in core business operations (i.e., giving equal weight to cost, quality, and sustainability).

2. Companies identifying high-risk agricultural raw materials in their supply chain, setting aggressive time-bound targets and goals for their sourcing and supply arrangements are at the forefront of corporate leadership in this area. However, the gap between the leaders and the rest of the industry may be great. For this reason, industry-led initiatives that directly link retailers, manufacturers and suppliers, such as the Consumer Goods Forum, can offer broad platforms for wider sectoral engagement around key commitments (such as zero net deforestation). Such initiatives are encouraged to seek input from other sectors (civil society, government) and report on their progress publicly.

3. Emissions along the value chain (indirect upstream emissions, identified in GHG Protocol Scope 3 assessments) often represent a company's biggest greenhouse gas impacts—in some cases representing as much as 90% of the emissions profile. As such, companies only quantifying Scope 1 and 2 emissions (corporate-level and direct emissions), are missing their largest areas for improvement. Based on the interviews and research, the following emerge as key lessons and areas for future attention:

- **Traceability**: Companies know how much they source, but understanding which country and where it came from is often difficult due to lack of traceability. One interviewee noted that only a small number of companies can actually set up traceability programmes. This is also where sector-based collaborations can be helpful.
- **Support systems throughout the supply chain**: Need to focus on the entire supply chain, while also simultaneously focusing on more high-emitting areas in agricultural production (which reinforces the synergy between private-sector supply chain engagement, standards, certification, roundtables, carbon disclosure, and footprint

disclosure). Need for credible third-parties that can work with suppliers, to inform them, to "lubricate the cogs", to provide solid, practical, sound advice. Further, need mechanisms to reinforce lines of communication between buyers and suppliers.

- **Engaging traders and processors**: The difficulty of engaging suppliers and traders is a concern to many companies.
- **Engaging growers**: For many interviewed, this is a critical need that is hard to achieve. Those sourcing raw materials from traders have no link to growers.
- **Accounting for permanence and considering leakage effects**: It is recommended that more corporate sourcing commitments consider how to include considerations of permanence and leakage in supply agreements seeking to reduce GHG emissions, as this is an essential attribute of viable climate change strategies.
- **Knowledge transfer**: Connecting academic and technical knowledge into information that suppliers and farmers can work with is a noted challenge and need.

4. The harmonization of methods and approaches is a critical challenge that deserves much more attention. For instance, life-cycle analyses (LCA) do not incorporate social considerations and do not focus company consideration on how to reduce company-wide emissions or identify emissions hot-spots. Measurement and reporting schemes focused on corporate emissions (Scope 1, 2 and 3) are done on a company basis, and do not provide specific insights on product-based emissions profiles. Most commodity roundtables are applying LCA approaches, whereas many businesses use corporate and supply chain-focused metrics. Sector specific guidance can be very different between the two approaches, depending on the circumstance. Product standards on their own may not be enough to shift farming practices when considering that many farmers farm multiple crops and these can change from year to year. However, some interviewees noted their farmers and suppliers found cost savings and increased efficiency with GHG reduction interventions, so it likely those farmers may retain the practice, even if their crop changes. This needs to be further evaluated. Sustainable management standards, such as UTZ certified, Sustainable Agriculture Network (SAN), commodity roundtables, and others, focus on practices (and increasingly GHG emissions) at the production level, yet do not consider GHG emissions related to processing, transport, consumption and ultimate disposal along the entire supply chain. The carbon footprint is increasingly being incorporated into standards such as GlobalGAP and organic standards, but this incorporation is nascent and the metrics for doing so are highly

inconsistent. This is a critical issue and leadership is needed to bring the best expertise together, convene a sensible approach, and recommend solutions. At a minimum, there is a strong need for definition of common metrics and rules, harmonization among approaches, guidance on when to apply different approaches and what margin of error or reliance on default values applies to each approach. This may result in a proposal for a meta-standard, or the integration of common metrics into existing standards and metrics.

5. While certification and compliance with standards can provide benefits for farmers via price premiums and negotiated supply agreements (or less formal arrangements providing market access), the capacity to complete necessary reporting and capital to cover the costs of certification can be an obstacle, especially for smallholder farmers. In many developing country contexts, smallholders may get squeezed out by the larger producers more able to serve the needs of manufacturers and retailers in their supply chain calling for certified raw materials. This issue demands much more attention, particularly in specific geographies and the context of different products.

6. While innovations exist to directly improve sustainability of agriculture and agricultural commodity production, while lowering GHG emissions, scaling up these innovations and bringing them into the mainstream is a challenge. It has been postulated that 100 companies control 25% of the trade of the fifteen most significant agricultural commodities (Clay 2010). Is it possible that if that 25% of demand made strong purchasing commitments, sourced 100% certified products and endorsed the work of commodity roundtables, that demand could leverage change, affecting 40-50% of production?

7. Governments have a strong role to play in shaping private sector supply chain commitments in order to ensure such approaches promote their own food security, comply with national greenhouse gas emission reduction commitments, and do not marginalize smallholder producers. Much of the work to define sustainability standards and metrics for GHG emission reduction for food production is being developed largely by the private sector, standards organizations and civil society, providing a road-tested basis for future mainstreaming by government regulation or legislation. On the supply and demand side, governments have at their disposal a range of tools, including promoting R&D and technology transfer, regulation, government-led sourcing commitments, accounting standards development, promoting market-based instruments (such as cap and trade, taxes), public-

private partnerships, subsidies, taxes and financial incentives. And of urgent importance for countries participating in reducing emissions from deforestation (REDD+), countries can address the appropriate siting of small- and large-scale agricultural expansion via their REDD+ strategies, promote new expansion onto already degraded lands, and identify ways for agricultural intensification to occur without increasing land-use pressures and GHG emissions.

8. The only way to increase agricultural production by 70% over the next 40 years—with a smaller land-based footprint, while increasing yields in the face of adaptation to climate change impacts—is to harness global financial resources to enable transformative change in how agriculture is financed. This requires mainstreaming sustainability criteria in agricultural finance and lending activities, and mobilizing private sector investment and involvement on a scale unimaginable today. If $83 billion yearly in agricultural investment will be required to feed 9 billion people in 2050, the challenge is not only to leverage and secure that funding, but to ensure the application of sustainability criteria to the bulk of that investment. Section V of this report skims criteria, metrics and incentives for dramatically scaling up investment and finance of agricultural activities that have GHG benefits, as well as steering investment away from high-emission and unsustainable agricultural activities, and ends with a brief set of recommendations, which may best be taken up by a strategic partnership between institutional investors, impact investors, banks and key entities tracking sustainability metrics in agricultural lending and finance, to craft a joint agenda for a more comprehensive assessment of how to apply a sustainable agriculture lens to investment planning and decisions, and transform the signals investors and lenders send to the agricultural sector. Recommendations include:

- **Applying a sustainable agriculture lens to investment planning and decisions**: Partnerships created between institutional investors, impact investors, banks (for instance, Rabobank and Triodos Bank in Europe) and key entities tracking sustainability metrics in agricultural lending and finance (including the Prince's Accounting for Sustainability Project, the Munden Project, and Forest Footprint Disclosure, and others). Goals of this partnership could include how to embed sustainable agriculture metrics into ESG indicators, further refine tools and metrics for investment and lending criteria to promote sustainable approaches in current

agriculture sector activities, and consider how to increase the scale of institutional investors seeking to engage in climate smart agricultural investments.

- **Assessment of what investment vehicles could serve different asset classes of investment** (private equities, public equities, etc.), how to minimize risks for investors, and strategies to scale up these investments.
- Consider how a Private Sector Facility could be created under the Green Climate Fund, which would provide a vehicle the for public-private partnerships that can increase access to private capital for climate-smart agriculture projects in less mature markets. Further, explore options for a sustainable agriculture bond as a means of aggregating investments.

I Introduction

Companies in the global food supply chain around the world are increasingly aware of the need to reduce their greenhouse gas (GHG) emissions. Their reasons for doing so range from preparing for emergent regulations and associated costs, risk management and ensuring sustainability of their supply chains, cost-savings, streamlining and efficiency. Other companies have made broad climate change commitments, and found the majority of emissions stem from upstream in the supply chain, driving them to work with suppliers, traders and producers in order to achieve reductions in emissions. This investigation aims to identify the existing and potential role of corporate social responsibility (CSR) and supply chain commitments to reducing GHG emissions at the producer level, in developing countries.

Agriculture and food consumption is recognized as one of the most important drivers of global environmental pressure, particularly habitat change, climate change, water use and toxic emissions. Globally, agriculture faces a triple challenge of needing to produce more food and fibre while reducing its carbon footprint and increasing its resilience in the face of climate change. Farms must produce 70% more food to feed at least 9 billion people by 2050 with nearly all that additional food needed for developing countries, based on population and living standard increases (Foresight 2011). Sub-Saharan Africa faces the greatest food needs as its population is projected to grow by 230%, and yet the continent is also expected to endure considerable adaptation challenges due to climate change (Searchinger 2011). One third of the global population lives in India and China, and both countries are expected to have increasingly scarce land and water resources for food production. Beyond population growth, a critical factor exponentially increasing the land- and carbon-footprint of global food production is increased consumption of meat, especially in developing countries. Meat requires considerable grain, soy and water inputs, and is a primary source of global methane emissions.

A major source of global GHG emissions

The industrialization of agriculture, intensification of production (often occurring with the increased use of agrochemicals, energy and water), expansion of crop and grazing lands and related direct and indirect land use changes have been the primary causes of GHG emissions.

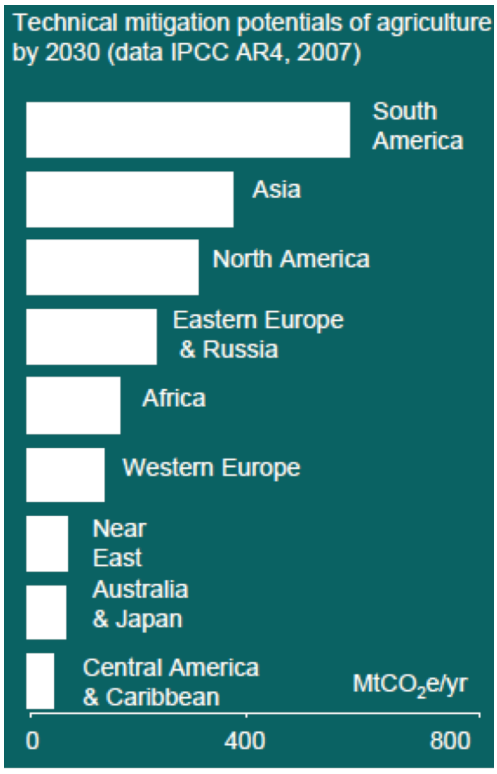
Agriculture contributes an estimated 12-14% of total anthropogenic GHG emissions globally, which increases to about 30% with the inclusion of land use change, largely driven by deforestation for agricultural expansion related to food, fibre, and fuel. It must be noted that these figures do not include GHG emissions from production of agricultural inputs, such as fertilizers, capital equipment, processing and trade of agricultural products.

The agricultural sector contributes 47% of the world's methane (CH_4) and 58% of its nitrous oxide (N_2O) emissions. In the UK, 75% of agricultural emissions result from nitrogen fertilizer use (Hillier 2009), however in developing countries this figure is estimated to be lower. Methane contributes 3.3 Gigatonnes (Gt) of carbon dioxide equivalent (CO_2e) per year, primarily from enteric fermentation in livestock, and nitrous oxide contributes 2.8 Gt CO_2e per year, mainly as emissions from soils as a result of application of nitrogen fertilizers and as nitrogen excreted in livestock faeces and urine (Meridian Institute 2011). Most agricultural carbon dioxide (CO_2) release occurs due to land conversion and agricultural expansion in carbon-rich landscapes.

A major mitigation opportunity

The Intergovernmental Panel on Climate Change (IPCC) estimates that 70% of technical mitigation potential from agricultural GHG emissions is in developing countries, as depicted in Figure 1 (Smith et al. 2007, Müller 2009). While the IPCC estimates the greatest mitigation potential lies with increased soil carbon sequestration via cropland and grazing land management, forestry and agroforestry initiatives, reduced tillage practices, improving efficiency of nutrient management and restoring degraded lands, it is clear that another critical mitigation strategy is to avoid carbon emissions from land

Figure 1 Technical mitigation potential from agriculture



Source: Muller 2009

conversion serving agricultural expansion. Two countries (Brazil and Indonesia) account for ~60% of total global land use and forestry GHG emissions, largely based on land use conversion and forest clearing. However, most estimates of Indonesia's emissions omit the emissions of carbon from peat fires (set to clear land, most notably oil palm plantation expansion), thus its emissions may be even higher (Houghton 2009). Therefore, the importance of reducing land use and land conversion GHG emissions becomes a critical strategy for mitigating GHG emissions, especially given future agricultural pressures on land.

Research objectives

The private sector has a significant role to play to promote agricultural climate change mitigation and decrease pressures on the earth's climate. CSR and supply agreements offer a critical means to affect the impact of global food and commodity production and smallholder agricultural producers in developing countries. This research seeks to provide:

1. Section II offers a consolidated picture of activities by the private sector in climate change mitigation, especially current innovations and assessment of the scale of these efforts as a proportion of other company activities (i.e., how mainstream are these activities).
2. Section III Identifies how CSR and supply chain commitments can improve their contribution to reductions in agricultural GHG emissions, including:
    a. How can life cycle assessment, standards, certification systems, and commodity roundtables guide and drive corporate practices? This section explores application of the World Resources Institute/World Business Council on Sustainable Development (WRI/WBCSD) Greenhouse Gas Protocol, life cycle assessments, innovations in assessing farm-scale GHG emissions and beyond, product standards, certification, and commodity roundtables.
    b. Monitoring, benchmarking and transparency, including carbon disclosure, impact disclosure, General CSR Reporting
    c. How to increase the scale needed to affect global GHG levels, and how to ensure permanence of commitments, and mechanisms for addressing leakage?

d. How to minimize transaction costs, ensuring the financial viability of CSR and supply chain commitments, both for producers and buyers?
e. What conditions or enabling factors are critical for success in CSR and supply chain commitments for all parties involved? Includes the role of retailers as innovators and supply chain drivers, bringing in the middlemen and traceability, streamlining of reporting and continuous Improvement, and effectively engaging the farm level.

3. Section IV explores the role of governments in catalysing change.
4. Section V explores the role of finance and investment, exploring how to harness global financial resources to enable transformative change in the agricultural sector. This requires putting agricultural sustainability into business practices, lending and investment decisions, and mobilizing private sector investment and involvement on a scale unimaginable today.

Methods

This research consisted of a comprehensive literature survey, 15 interviews with key organizations, companies and financiers or lenders active in the area of reducing GHG emissions from agricultural production or active in the agribusiness supply chain (see Annex 1 for list of those interviewed), and a synthesis based on gathered materials.

II. CSR and supply chain innovations

"While the next decade will be dominated by a battle for agri-commodity supply, we conclude that this is only the beginning of a profound transition in the global F&A [food and agriculture] sector. In the next 40 to 50 years, the F&A sector will need to double agri-commodity supply with access to only about half of the current land, water and mineral resources. Delivering this four-fold improvement in output is the over-riding challenge facing the incoming generation of F&A leaders."

--Rabobank (2011a)

Food product retailers and brand manufacturers drive innovation in CSR commitments to reducing climate impacts, driven by consumers concerned over the sourcing of their food. Of the eighteen people interviewed for this research, most consistently cited the following as key reasons for retail and brand manufacturer leadership: minimizing operational risk, maintaining a strong brand, and sustainability of their supply chains. Interviewees confirmed that companies publically disclosing their carbon performance realized that cutting their carbon footprint was also good for their bottom line, particularly in the area of minimizing energy consumption and unnecessary expenses (such as mobility). Furthermore, food and agribusiness companies are keenly aware of climate change impacts on the long-term sustainability of their raw materials and supply chains. Wholesalers, processors, traders, cooperatives, and farmers are largely driven towards sustainability by retailers (for more discussion on retailers, see Section III below). But sustainability in the food and agriculture supply chain means different things to different companies, and at different stages in the supply chain. Further, the lines between organic, fair-trade, sustainably harvested, and low-carbon products are blurry at best, based on the criteria applied and performance measured in each scheme.

This section focuses on those agribusinesses and retail companies recognized as leaders in reducing their GHG's at the production-level and beyond, highlights corporate commitments to reducing GHG emissions in key high-risk product areas, and highlights industry-led initiatives supporting sector engagement in reducing agricultural GHG emissions. Section III outlines how companies are measuring and reporting carbon reductions in food production, in

their supply chains and on farms, and proposes ideas for how to create convergence in key areas.

In summary, interviews with companies innovating and organizations promoting or tracking innovation in this area yield the following observations:

- The innovative companies are looking beyond risk management and see their role in the supply chain as a key motivator to get the whole sector on board and create transformative change. These companies recognize that **sustainability is a pre-competitive issue**, and should not be left to the consumer to make an informed choice about, but rather should underpin all products the consumer can choose from.
- The most innovative companies that have made climate change and GHG reduction commitments have strong support at the Board level and top executive level, report on their progress publically (even among leaders, however, there is reluctance to share the findings of their assessments), and share their tools and methods.
- The most innovative companies view their climate change commitments as key indicators within a broader sustainability framework that includes social and environmental dimensions—waste and water management, energy use, fair trade, fair working conditions, and other indicators of sustainability.
- Many companies share the same suppliers, so there's a need to share information and strategies within whole sectors and across entire supply chains. Interviewees mentioned a fundamental need to build trust between suppliers and buyers via shared procurement decisions and contract language.

In summary, the most innovative activities in this area are those that hold potential to shift entire supply chains and value chains. Jason Clay of the Market Transformation Initiative of the World Wide Fund for Nature (WWF) has observed, "A shift in 25% of demand leverages 40-50% of production." The innovations below hold potential to significantly shift demand for key commodities and the modalities of their production.

Corporate leaders in reducing direct and indirect GHG's at the production-level and beyond

Below are examples of model corporate commitments to reducing GHG emissions at producer levels. Unilever is recognized by its peers and industry groups as an innovator and

leader, particularly for its transparency, development of the Cool Farm Tool, and open-source tools and metrics. PepsiCo, Mars, Tesco and Walmart are also mentioned. Other CSR and supply chain commitments exist. Danone is noted as an innovator in this area, but could not be reached for an interview. Those included in this section were chosen for their potential global impact due to a) the scale of the supply chain being influenced by the interventions, b) clear link to reducing GHG emissions at the producer-level and by smallholders, and c) these corporate commitments establish a full suite of sustainability goals and criteria, incorporating all aspects of the business and supply chain.

Unilever's Sustainable Living Plan

The Unilever Sustainable Living Plan (2010a) is unique and referenced by many interviewees as a model of CSR commitments that is also backed up by strong internal leadership and capacity to achieve the goals it commits the company to. The Sustainable Living Plan commits to three significant outcomes by 2020:

- "To help more than one billion people take action to improve their health and well-being.
- To halve the environmental footprint of the making and use of our products.
- To source 100% of our agricultural raw materials sustainably."

To reach these goals, Unilever is focused on its top ten agricultural raw material groups, which account for nearly 70% of its agricultural raw material volumes. Interim goals are 10% of agricultural raw materials sustainably by 2010, with the goal of scaling up to 30% by 2012, 50% by 2015 and 100% sustainably sourced by 2020. The Sustainable Living Plan also includes the goal of linking more than 500,000 smallholder farmers and small-scale distributors into Unilever's supply chain, so they can benefit from working with Unilever, by 2020.

The sustainable sourcing programme

The cornerstone of Unilever's sustainable sourcing programme is the Sustainable Agriculture Code (Unilever 2010b) it developed to guide procurement decisions. Unilever applies external certification where possible or self-assessment and verification against the Unilever Sustainable Agriculture Code where no international standard exists. The Code is applicable to all agricultural raw materials, it details the standards required, emphasizes continuous

improvement, and is anticipated to evolve in the next few years to increase involvement of procurement staff. For suppliers who already have a sustainability standard in place, they are assessed against the Code.

The Code does include greenhouse gas reduction measurements or strategies in the areas of energy use, nutrient management, soil management and animal husbandry. However, GHG measurement and management approaches for land use and land conversion are less defined, occurring in the section encouraging biodiversity protection and enhancement (of which, one goal is to adhere to national legal obligations with respect to biodiversity, which may involve land use conversion and land use change aspects. Many developing countries lack such legal frameworks, so it is unclear how much effect this goal has). Further, Section 5.3.3.1.1 specifies that land use and land conversion MUST consider: "Before any major conversion of > 1 ha of purchased or rented land to agricultural use (such as converting low intensity grazed lands, savannah, woodlands or wetlands to intensive agriculture or processing facilities) a full Environmental Impact Assessment must be performed and recommendations followed." There is no further guideline defining what must be included in such an EIA, and it will be up to the assessor to include GHG considerations or not. Additionally, Unilever is developing scheme rules to define whether a raw material will contribute to the sustainable sourcing metric or not. These rules were published in early 2012.[1]

Unilever has also been very involved in the Roundtable for Responsible Soy and the Roundtable for Sustainable Palm Oil (Unilever is 3rd largest purchaser of palm oil globally), among other commodity efforts.

Cool Farm Tool

The Cool Farm Tool was commissioned from the University of Aberdeen by Unilever in 2009 as a user-focused decision-support tool, to support assessment of GHG emissions at the farm-level and farming practices to reduce emissions. A number of companies are now using the Cool Farm Tool, including PepsiCo, Marks & Spencer and Sysco, as part of a multi-company Cool Farming Options Initiative, an agricultural climate mitigation project coordinated by the Sustainable Food Lab (explained in further depth on page 39). While created initially as a GHG accounting tool, Unilever soon discovered the value of the Cool Farm Tool as a

[1] http://www.unilever.com/images/SchemeRules9Jan2012_tcm13-277688.pdf

decision support tool and in providing a focal point to get farmers engaged, and to build trust between the company and farmers.

Unilever's role in transforming production of tea

Unilever is the world's largest tea company, purchasing around 12% of the world's total tea production. Its tea operations are vertically integrated in the value chain, from farm-level to wholesale and trading, to blending and packaging. Three companies, Unilever, Sara Lee and Twinings (who together account for 40% of the Western market for black tea), the Ethical Tea Partnership, KNVKT, Solidaridad, UTZ Certified, Rainforest Alliance, Oxfam Novib and the Tropical Commodity Coalition have formed the Tea Improvement Program (TIP). The program is facilitated and co-funded by The Dutch Sustainable Trade Initiative (IDH). A challenge for TIP is to include the Chinese and Indian domestic tea markets in the sustainability programme, as they are the largest tea producing and consuming countries in the world. The **goal is to reach 22% of the tea export certified by 2013**, source 365,000 tons of certified tea from smallholders, and ensure 150,000 hectares of sustainable land use. It is unclear what direct GHG benefits will occur, but is likely primarily from changes in fertilizer use and soil health.

Pepsico's UK "50 in 5" goal

PepsiCo is one of the world's largest food and beverage businesses, with brands including Quaker, Tropicana, Gatorade, Pepsi-Cola and Frito-Lay being sold in 200 countries, and with annualized revenues of nearly $60 billion.

In 2010, PepsiCo UK set a goal of reducing 50% of their water use and carbon emissions in 5 years (by 2015)—called the "50 in 5" goal. That commitment also includes ensuring fossil fuel free operations by 2023, zero waste to landfill through the supply chain by 2018, and to drive change in the supply chain, the industry and policy via stakeholder engagement. PepsiCo UK was a key motivator in creating this company-wide commitment. As part of the "50 in 5" goal, PepsiCo UK will also trial low carbon fertilizers (fertilizers that use less natural gas in the production cycle, and some Yara experiments include calcium-based fertilizers that eliminate nitrous oxide emissions), promote more stable varieties of potatoes and encourage the development and uptake of low carbon and energy efficient machinery. PepsiCo UK's commitment to reducing production-level GHG emissions started when Walkers Crisps (a PepsiCo brand) conducted a life-cycle assessment of its operations, and

found that 50% of their carbon footprint was from raw materials upstream in their supply chain.

After their first year of implementing their carbon reduction plan, indications are they have surpassed thresholds already, simply by focusing on the "low-hanging fruit," such as using more stable varieties of potato and using drip irrigation, rather than rain guns (both interventions have also increased yields). Public reporting on progress is expected by spring 2012.

Cool Farm Tool and i-crop

PepsiCo is piloting the Cool Farm Tool with some of its suppliers. The Cool Farm Tool offered PepsiCo a low-cost (it is open-source) and reliable means of measuring farm-level GHG emissions. Data from the first growing season of its application are being analysed in fall 2011. The Cool Farm Tool was able to achieve the same farm-level GHG emissions estimates for potatoes and oats as a life-cycle assessment did, at a fraction of the cost. PepsiCo UK is also applying its i-crop farming technology on a global basis, rolling it out in Europe in 2011, followed by India, China, Mexico and Australia by 2012. The i-crop web-based tool is a crop management system that will enable PepsiCo's farmers around the world to monitor, manage and reduce their water use and carbon emissions, while also maximizing potential yield and quality.

Mars' commitments

Mars is the third largest food company in the world. Their CSR goals related to agricultural GHG's and sustainable food supplies is as follows: By 2040 eliminate fossil fuel energy use and greenhouse gas emissions, by 2020 all fish and seafood will be sustainably sourced, and by 2015, all black tea will come from certified sources (Mars 2011).

According to Mars' website, their 2010 performance is summarized as: 16,000 tonnes certified cocoa purchased (3 million tonnes are annually produced globally, according to the World Cocoa Foundation 2011), use of renewables has increased 395% and fossil fuel use decreased 6% from 2007 baseline, Scope 1 and 2 (direct) GHG emissions decreased 4% from 2007 baseline. No mention of performance of Scope 3 emissions, but Mars participates in the Sustainability Consortium, and it is anticipated Mars will engage on sustainability of their

supply chain over the coming years with The Sustainability Consortium (TSC) partnership (see page 37 for more info on TSC).

Tesco's commitments

Tesco recognised that their overall supply chain footprint was at least ten times greater than their direct footprint, so in October 2009 announced:

- A challenge to achieve a 30% reduction by 2020 in the carbon impact of the products in Tesco's supply chain, starting in the UK,
- Spreading green systems and technology pioneered by Tesco businesses in developed countries to its operations in developing countries,
- Commitment to being a zero-carbon business by 2050 without purchasing offsets.

To enable that commitment, Tesco created the Tesco Carbon Reduction Knowledge Hub, set up by the UK-based knowledge network and consultancy 2degrees, to encourage hundreds of its suppliers to engage and collaborate with each other more effectively to share best practice and find solutions to challenges. The sharing is exclusive to Tesco suppliers, which now numbers about 200, mostly in the UK.

Tesco is also committed to zero net deforestation by 2020, has performed very well on Carbon Disclosure Project (CDP) ratings, and in financial year 2010/2011, Tesco carbon footprinted over 1,000 and labelled over 500 everyday products in the UK. Tesco suspended its carbon labelling programme in early 2012, but will continue its partnership with the Carbon Trust. Tesco endowed the Sustainable Consumption Institute at the University of Manchester in the UK, and engages in the Consumer Goods Forum programme on sustainability.

Tesco is candid about its upcoming challenges:

- Involving international suppliers in their target of to reduce supply chain emissions by 30% by 2020,
- Finding solutions where carbon reduction is in conflict with wider sustainability issues,
- Increasing customer understanding and use of carbon labels,
- Bringing about positive change in responsible sourcing where Tesco does not have a strong own-brand presence,

- Getting responsible sourcing onto the global agenda,
- Tackling the water footprint of their supply chain (Tesco CSR report 2011).

Walmart's commitments and catalysing of the Sustainability Consortium

Walmart announced in February 2010 that as part of moves to cut 20 million metric tonnes of greenhouse gas from its supply chain by the end of 2015, it is demanding stricter quality and environmental standards from its Chinese suppliers. Walmart is also pressing suppliers of popular product categories with the highest embedded carbon, including milk, bread, meat, and clothing to apply life-cycle analyses to influence how they source, manufacture, package and transport these goods. The 20 million metric tonne commitment is 150% of Walmart's estimated global carbon footprint growth over the next 5 years. By the end of 2015, Walmart pledged to sell $1 billion in food sourced from 1 million small- and medium-sized farmers. Walmart also seeks to train 1 million farmers (half of them women) in sustainable farming techniques, with the hopes of increasing farmer incomes by 10-15%. Walmart is focusing on two of the major contributors to global deforestation—palm oil and beef production—by requiring sustainably sourced palm oil for all Walmart private brand products globally by the end of 2015, and extending Walmart Brazil's policy of sourcing only beef that does not contribute to deforestation of the Amazon to all Walmart companies worldwide by the end of 2015. These initiatives seem to be part of the Sustainability 360 and Sustainable Value Networks programmes, which seek to integrate these and other sustainability commitments into different levels of the business. Walmart's seed funding to launch The Sustainability Consortium (see page 37) is now helping to engage other companies in collaborative efforts on sustainability (Walmart 2011).

Commitments in key high-risk agricultural product areas

As mentioned above, a significant source of GHG emissions stems from commodity expansion into tropical forests and conversion of landscapes to support agricultural production. Companies identifying high-risk agricultural raw materials[2] in their supply chain,

[2] This report refers to "high-risk commodities or agricultural raw materials" as those agricultural commodities and raw materials that receive attention due to their impacts on greenhouse gas emissions at the production level and/or their impacts on land conversion and deforestation rates. It should be noted that agribusinesses sometimes refer to "high-risk commodities" as those experiencing price fluctuations and/or vulnerability to climate change impacts. Unrelated to the content of this paper, in the food safety context, "high-risk commodities" has been used to describe foods presenting food safety risks, such as contamination, most often dealt with via application of the Codex Alimentarius standards.

setting aggressive time-bound targets and goals for their sourcing and supply arrangements are at the forefront of corporate leadership in this area. These commitments can have large impacts on company supply chains and producers, especially when significant portions of the supply chain can be influenced by them. However, the degree to which these commitments can reduce overall agricultural-sector carbon emissions is still to be examined.

This section highlights three commodities receiving significant global attention through supply agreements—palm oil, soy and cotton. As mentioned above, agriculture contributes an estimated 12-14% of total anthropogenic GHG emissions globally, which increases to about 30% with the inclusion of land use change, largely driven by deforestation for agricultural expansion related to food, fibre, and fuel. These commodity initiatives hold great potential to reduce the significant GHG emissions resulting from agriculture, land use, land use change, and forestry. Further, these initiatives are being pursued at scale, and are defined enough at the time of writing to offer critical insights and challenges to be further explored in Section III. The role of the Roundtable for Sustainable Palm Oil (RSPO) is an example of an innovative approach to how commodity certification can work, though the RSPO now has the unusual challenge of an abundance of certified supplies overwhelming demand. Soybeans and soymeal warrant investigation simply due to the scale of land conversion resulting from their cultivation and resultant GHG emissions. The cotton case study, below, offers an example of how to positively engage hundreds of thousands of smallholder farmers, in order to elevate living standards while promoting sustainable production, less pesticide use and a smaller GHG footprint.

Palm oil is the most robust example of a high-risk commodity receiving considerable attention by retailers, environmental NGOs, and governments, resulting in numerous supply chain and sourcing agreements, aided by the Roundtable for Sustainable Palm Oil commodity roundtable. A typical starting point is high-profile environmental campaigns that raise public awareness of the impacts of agricultural production, as recently evidenced by the Greenpeace International campaign against Nestlé. Greenpeace focused consumer pressure via social media to focus attention on the Kit Kat brand of candy bar, made by Nestlé, and containing palm oil likely from Sinar Mas plantations. In 2010, Sinar Mas was highly criticized for extensive palm oil plantation expansion in peat-rich areas. In 2011, Golden Agri Resources and its parent company, Sinar Mas, worked with Nestlé to meet its responsible sourcing

guidelines, one of which was establishment of a segregated supply chain, which was assessed, and traceability checked by an independent third-party auditing body, the TUV Rheinland Group (Baskoro 2011).

Without the motivation of a market campaign, Unilever sought to find an alternative to palm oil, and identified Allanblackia as a potential source of stearic and oleic fatty acids. The Allanblackia tree is endemic to the moist tropical forests stretching from Sierra Leone to Tanzania. Unilever promoted development of producer companies and supply chain development to meet a goal of linking 500,000 smallholder farmers into a supply network, stretching the previous wild harvest of 200 tonnes to 100,000 tonnes to meet new market demand it helped facilitate (Unilever 2011). This example is more unique than the Kit Kat/Nestlé example, above, as few companies yet demonstrate such innovation, and at the scale Unilever was able to engage.

There are other sustainable raw material and commodity commitments worth mention, which are summarized in the table below. This is not intended as an exhaustive list of all known commitments.

Table 1 Summary of some major corporate purchasing commitments

Initiative	Companies supporting and level of commitment to sustainable purchasing	Sector-based commodity roundtable or standard?
Palm Oil	Unilever: 100% by 2015 (Note: Unilever one of world's largest buyers at 3% of world palm oil production). McDonalds: 100% by 2015 Nestlé: (Note: Nestlé buys 0.7% of world palm oil production)	Roundtable on Sustainable Palm Oil (RSPO)
Soy	Unilever: 100% beans by 2014, 100% soy oils by 2020. The Belgian Platform for Responsible Feed (MVDS): 100% RTRS soy by 2015 Dutch Sustainable Trade Initiative (IDH) (Industry and Trade sectors): 100% responsible soy by 2015.	Roundtable on Responsible Soy (RTRS) RTRS RTRS; Volumes of 500,000 tonnes in 2012, 1,000,000 tonnes in 2013 and 1,500,000 tonnes in 2014.
Sugar	Coca-Cola: Purchased first 130,000 tonnes certified, in 2011.	Bonsucro (note: 130,000 tonnes sugar and 63,000 cubic meters certified so far. Global sugarcane production averages 1,683 million metric tonnes/year.
Beef	McDonalds: commitment to sustainably sourced beef in Brazil and on the board of GTPS.	Sustainable Beef Working Group (GTPS)

Cotton	Marks and Spencer: Announced in August 2011 commitment for 21,000 tonnes of BCI fibre (from 20,000 farmers over next 3.5 years).	Better Cotton Initiative (BCI) in Andhra Pradesh, India
Cocoa	Kraft Foods: Goal of increasing % within key brands. In 2010, Marabou and Cote d'Or = 11,000 metric tons Rainforest Alliance cert. and Cadbury's = 19,000 metric tons Fairtrade certified. Mars: All cocoa volume worldwide certified sustainable by 2020. Nestlé: Investing CHF 110 million over 10 years in Côte d'Ivoire to support farmers. Also promoting higher yielding cocoa plantlets.	Fairtrade and Rainforest Alliance Rainforest Alliance and UTZ Certified UTZ Certified. Nestlé buys 11% of global cocoa.
Raw commodity sourcing commitments	Sainsbury's: "20 by 20 Sustainability Plan:" By 2020, will source all key raw materials and commodities sustainably and must adhere to an independent standard. Unilever: Sustainably source 100% of agricultural raw materials by 2020.	Unclear at this time.
Zero Net Deforestation	Consumer Goods Forum: 350 companies commit to eliminate deforestation from their supply chains by 2020. Sainsbury's: Own brand products won't contribute to global deforestation	
Supply chain GHG reduction	Sainsbury's: Brand suppliers must reduce CO_2 emissions from their own brand products by 50% by 2020.	Sainsbury's developing carbon footprint tool for farmers.

Palm Oil

The Roundtable for Sustainable Palm Oil (RSPO) members have produced over 5.2 million tonnes of palm oil certified to RSPO standards. RSPO has certified 1 million hectares as of August 2011. As of 2011, 10 % of global palm oil is certified to the RSPO standard. However, only 2.2 million of the 5.5 million tonnes of RSPO-certified palm oil available was purchased last year, indicating a major gap between certified product availability and what the marketplace is actually purchasing from RSPO sources. RSPO membership has increased by 30% since early 2011, with over 650 member organizations (at all levels of the supply chain) in 50 countries (though most certified lands are in southeast Asia, and only 7 growers are certified in Africa, where considerable new expansion is expected).

The RSPO board recommended at their late November 2011 meeting in Malaysia that the RSPO's principals and criteria should include a "0 net carbon emission clause", which will set a new benchmark for companies that aim to produce palm oil in a responsible manner, and

overcome criticism RSPO faced recently over its lack of strong criteria (criteria on safeguarding HCVF, soils, impact assessments, and new plantings since 2005 not converting primary forest are not linked to indicators that measure GHG emissions from these activities (RSPO 2007)) related to carbon emissions.

There are three methods for sourcing RSPO-certified oil palm: Book and claim (certificate trading but has no traceability through supply chain), mass balance (mix of certified and non-certified) and segregated (certified product kept separate from others throughout supply chain). Segregated oil allows for easier traceability, and allows for a higher percentage of certified to be guaranteed in the mix. Most sourcing currently relies on book and claim, which is essentially palm oil certificate trading. With book and claim, RSPO certified palm oil producers register a quantity of their output with the GreenPalm programme, being awarded one GreenPalm certificate for each tonne of palm oil that has been sustainably produced. The Book and Claim system, which consists of buying certificates to cover the volume of palm oil used, is a way for retailers in particular to increase the quantity of RSPO-certified palm oil before traceable supply chains are in place.

One of the largest challenges facing RSPO palm oil is lack of transparency and limited efforts to implement proper traceability. Without adequate traceability systems in place, retailers and consumers do not know what they are buying. Transforming the market also requires strong support from traders, who wield considerable influence. Traders must ensure the traceability of the palm oil they are buying and supplying to their customers, which could act as a major catalyst for future market growth and offer the assurances currently lacking along the supply chain. Those interviewed for this research indicate that while the book and claim method has allowed for increased interest from retailers, it does not send the message right through the supply chain, as the traders and refineries don't see it (they are not called on to segregate their products). Thus, more retailers and manufacturers will need to push for traceable, segregated palm oil supplies.

Importantly, in late July, 2011, one of the largest processors and traders, Cargill, announced that its palm oil products supplied to customers in Europe, United States, Canada, Australia and New Zealand will be certified by the RSPO or sourced from smallholder growers by 2015 (excluding palm kernel oil products). This commitment will be extended across all Cargill's

oil and trading businesses to cover 100% of its palm oil products and all customers worldwide —including China and India—by 2020.

Meanwhile, increased segregation would benefit growers with increased transparency and better traceability, more control over their management units, and an overall increase of returns on their commitment to providing certified sustainable palm oil.

Duties and price premiums directly influence demand for sustainable palm oil and practices of producers. The Dutch Product Board for Margarine, Fats and Oils (MVO) has called on the EU to abolish import duty on RSPO certified sustainable Palm Oil. The current duty is 3.8% and removing this could make sustainable oil much more attractive to business customers, a potential boost in profits for producers. As for price premiums, RSPO has been criticized for not doing more to promote price premiums for certified oil palm. The Malaysian Palm Oil Association reports that while price premiums of US$50 per tonne in were possible in 2008, premiums have dropped to only US$.50 cents today.

WWF has updated its scorecard assessing 132 European, Australian and Japanese retailers and consumer goods manufacturers and their commitments to, and use of, RSPO certified palm oil. 87 of those 132 companies have committed to use sustainable palm oil by 2015. Of those, 26 retailers have committed to source 100% certified sustainable palm oil by 2015. The scorecard reports that those companies that have scored well (at least a score of eight out of nine, representing use of between 25-100% use of RSPO-certified palm oil) in the 2011 Scorecard include those dealing in very large volumes of palm oil, such as Nestlé and Unilever, as well as those using smaller volumes such as IKEA, Royal FrieslandCampina and United Biscuits. In the mid-range, manufacturers like Burton's, Cadbury, Premier, Remia and retailers such as ASDA, Carrefour, Morrisons, Sainsbury's and Tesco scored well. For retailers, reporting was based on their own brands, not all brands they carry on their shelves. Discouragingly, the results show that 12 out of the 44 retailers scored have yet to join the RSPO, and 15 of the 44 retailers were unwilling to share information on their volume of oil palm use. Manufacturers represent the fastest growing category of RSPO membership, a welcome sign that pressure from some leading retailers is having an effect. Multinational companies—including several companies in the Scorecard (Carrefour, Nestlé and Unilever)—that have made global commitments to, and reported on their global use of, RSPO-certified

palm oil have a large role to play in influencing RSPO uptake in India and China, predicted to surpass Europe in oil palm sourcing (WWF 2011).

A critical step in reducing oil palm expansion into carbon-rich forests and peat lands, and promote a sustainable supply of palm oil, is to encourage expansion onto already degraded lands. The World Resources Institute (WRI) has established Project POTICO to do just that on natural forests previously slated for conversion in Indonesia, using pilot land swaps, policy development via Indonesia's REDD+ strategy and building an online forest monitoring system for Kalimantan that provides timely and accurate spatial information on forest cover change and plantation establishment. The POTICO partnership is spearheaded by WRI, but also involves SEKALA, Indonesian Centre for Environmental Law, Rainforest Alliance, several oil palm companies, palm oil buyers, the RSPO, the Prince's Rainforest Project, the Indonesian REDD+ Task Force, and the Norwegian government. Funding was provided by New Page, with top-up funds from IFC's BACP, the Dutch government, Walmart, Johnson & Johnson, and Unilever.

Project SHARP in Indonesia, funded by Sime Darby, is a similar approach in that it emphasizes outreach with smallholder oil palm farmers to shift any expansion onto degraded lands, but also seeks to improve livelihoods among smallholders, increasing yields, minimizing environmental and social impacts, improving market links and greater clarity about land tenure and use rights.

Soy

Soy is a primary driver of deforestation, land conversion, and promoter of indirect land use change in the Latin American countries of Brazil, Argentina and Paraguay, with 134,600 thousand metric tonnes of bean being produced (USDA 2011). The US is also a major producer, with 82,887 thousand metric tonnes being produced (beans), however much of the production occurs on already cleared land, and a significant percentage is either sold to China or used domestically. However, Brazil and Argentina also produce large quantities of soy meal, used primarily for feedstock (59,470 thousand metric tonnes, compared to 35,230 thousand metric tonnes produced by the US, most of which is used domestically).

Since 2005, soy producers, traders, processors and non-governmental organizations including the Dutch Product Board for Margarine, Fats and Oils (MVO), Nevedi, Unilever, Nutreco,

Rabobank, Cargill, Solidaridad, and WWF have worked to create a responsible soy standard – the Round Table on Responsible Soy (RTRS). RTRS Standards were finalized in 2010, and have been implemented by soy producers in 2011. The RTRS now has 155 members in 25 countries. The first soy certificates were sold in 2011. Roughly 160,000 credits were purchased by RTRS members, including Läntmannen (Sweden), Unilever (Brazil), IDS (Initiative Sustainable Soy, The Netherlands), and Vandermoortele (Belgium). This is slightly over one third of the current production of certified material. Läntmannen's 30,000 tonne purchase commitment comprises about 18% of its total soy volume.

The responsible soy certificates that are currently on offer are based on production of RTRS certified soy in Brazil, Argentina and Paraguay. They are offered by the companies Grupo Maggi, SLC Agrícola, APDC producers from Brazil, Viluco S.A., Los Grobo, Aceitera General Deheza, Adecoagro and Cytasa and are based on part of their 2010/2011 harvest. Four companies in Argentina have obtained a Chain of Custody certification. The first Paraguayan producer has recently joined, Cytasa. According to the RTRS website, over 420,000 tons of soy has been certified in 2011, and certified producers account for 147,204 hectares in sustainable production.

Similar to palm oil, the RTRS has three ways of arriving on the market: Certificate trading, Mass Balance and Segregated.

Due to the considerable impact of soy expansion on global GHG emissions, the RTRS standard offers guidance on responsible expansion: Criterion 4.4 Expansion of soy cultivation is responsible, such that soy expansion after 2009 is only allowable if in alignment with an RTRS-approved map and system (expected to be complete before 31st December 2012 for Argentina, Brazil, Bolivia and Paraguay). If such a map and system is not available, expansion must occur on land already cleared and used for agriculture in the last 12 years, and no expansion should occur in native forests (defined as having canopy cover of more than 35%) (RTRS 2010).

Recent innovations related to soy:

- WWF is working with IDH on field demonstration projects to generate soy farmer support for certification and demonstrate links to the market.
- Rabobank, the largest banker to livestock farmers in the Netherlands, encourages use of sustainable raw materials, such as RTRS certified soy, responsible use of

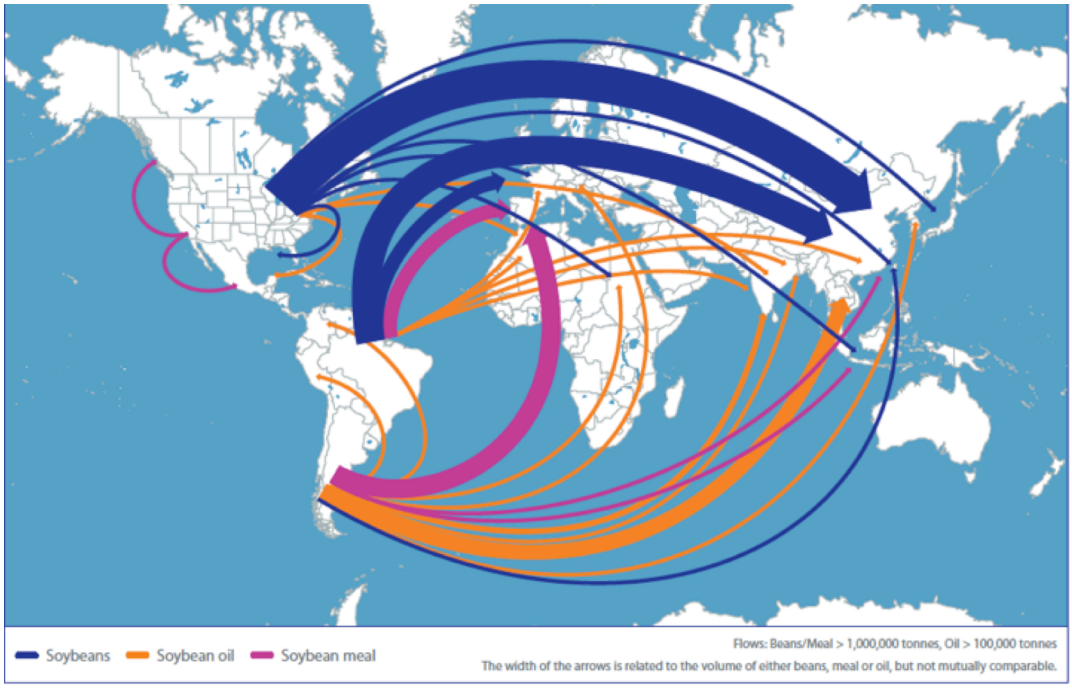
fertilizers, and reduced GHG emissions as part of its Livestock farming sector position paper (Rabobank 2007).

- The Dutch Soy Coalition recently assessed voluntary soy standards, including Basel Criteria, ProTerra, Roundtable on Responsible Soy (RTRS), the Brazilian soy moratorium, Aapresid, Organic (International Federation of Organic Agriculture Movements: IFOAM), Fairtrade, EcoSocial, Sustainable Agriculture Network: SAN/Rainforest Alliance, GlobalGAP, Roundtable on Sustainable Biofuels (RSB) and International Sustainability and Carbon Certification. Findings stress the standards and schemes have fundamental differences in the areas of: extent of stakeholder, local community, small farmer and civil society organization (CSO) engagement; third party certification or not; frequency and quality of verification audits; inclusion or exclusion of genetically modified (GM) soy; level of protection of biodiversity and cut-off dates with regard to deforestation; GHG reduction target; clear and transparent complaint mechanisms (CREM 2011).

Challenges ahead for soy

While considerable effort has been put into establishing the RTRS, and the largest European buyers of soybeans and soy meal (EU-27 total is 35,600 thousand metric tonnes) are making purchasing and certification commitments to RTRS, the largest buyer of soybeans is China (56,500 thousand metric tonnes) (USDA 2011). The scale of Chinese imports is displayed in

Figure 2 Worldwide Soy Trade Map, 2009



Source: Food & Agribusiness Research and Advisory, Rabobank International (2010)

Figure 2 and the weight of the lines is based on volume. China's dependence on soy imports is expected to increase, based on the need to feed an increasingly affluent population and projected lack of new arable lands to meet that demand. Thus, a major challenge ahead for promoting responsible soy may be to convince Chinese traders, wholesalers and retailers of the need to adopt RTRS. How possible it will be to apply sustainability screens to Chinese soy purchasing in unclear. The largest Chinese buyer of soy is COFCO, also China's largest trader of grains and edible oils by revenue. COFCO seeks to increase investment by more than $10 billion to fund overseas mergers and acquisitions over the next five years. In November 2011, Chongqing Grain Group Co Ltd (CGG), one of China's largest State-owned grain corporations, said it will invest $500 million to build a soybean industrial base in Brazil, which will be accompanied by financial support and services, including storage and logistics and seeks to plant 600,000 tons of soybeans on 200,000 hectares in Brazil annually. A CGG company spokesperson was quoted as saying, "Most Chinese companies import soybeans through the four largest international grain dealers – ADM Co, Cargill Inc, Bunge Ltd and Louis Dreyfus SAS. However, if importers can purchase from the producers, 18 to 24 percent of the profit could be saved" (Chang 2011).

Cotton

The Better Cotton Initiative (BCI) is a commodity roundtable launched by the Dutch Initiative for Sustainable Trade (IDH), Rabobank, IKEA, H&M, Marks & Spencer, Adidas, and Levi Strauss & Co., in order to create a model of sustainable cotton production. Cotton is recognized as the most-polluting agricultural commodity. About 10% of all agricultural chemicals used worldwide are processed by the cotton sector.

The Better Cotton Initiative involves 350,000 farmers and 900,000 ha of land, mostly in India, but is also active in Brazil, Pakistan, Benin, Burkina Faso, Cameroon, Mali, Senegal, and Togo. Of 30 million tonnes of cotton produced globally, the Initiative seeks to ensure production of 1 million tonnes sustainably by 2015, by significantly reducing the chemical and GHG footprint of cotton production and improve the lives of hundreds of thousands of very poor farmers. Rabobank has thus far been impressed with the results of the initiative, finding that farmers who produce 'better cotton' save up to 50% on their cost of raw materials, which leads to an instant increase in income for them while improving their well-being (Rabobank 2011c). The sustainability aspects put emphasis on sustainable production methods and less pesticide and chemical use. GHG reduction targets are less apparent, though it appears GHG reduction will occur via efforts to reduce use of manufactured nitrogen.

Industry-led initiatives supporting sectoral engagement in reducing agricultural GHG emission

While industry-led initiatives supporting agricultural sector development are not new, the number of ones focused on sustainability in the supply chain and reducing GHG emissions globally that have taken shape recently is hopefully indicative of sectoral partnership and innovation. Those listed below are highlighted for their present contributions in this area.

2°C Challenge Communiqué

On 20 October 2011, 249 global business leaders (members of the Corporate Leaders Network for Climate Action) issued a 2°C Challenge Communiqué urging a UN climate change agreement in Durban, South Africa, at COP 17. The Communiqué encouraged: "A holistic approach focusing on both production and consumption of resources is needed. Greater use of efficiency standards and labelling, as well as targets and actions to stimulate financing, is essential in all sectors." Signatories also called on governments to adopt an integrated approach to planning and policy development that takes climate risks into account

– delivering infrastructure that is both resilient and low-carbon. Signatories cite that adequate planning and government management of environmental risks are factors in business decisions to continue investing in any location. Noted agribusiness signatories include: Nestlé, Sainsbury's, Tesco, Unilever, Coca-Cola, and Brazil Foods. Specific requests related to land-based emissions and climate change adaptation:

- A carbon price sufficient to drive necessary emissions reductions
- Effective adaptation programs
- Increased funding for innovation, investment and low-carbon development
- Help for businesses and consumers to cut emissions by using energy more efficiently
- Targeted regulation and procurement, together with new thinking on intellectual property rights to encourage low-carbon innovation
- Action to conserve and increase forests and other land-based carbon sinks
- International agreement to establish and maintain strong institutions including a reformed Clean Development Mechanism and a Green Climate Fund that is operational
- An end to fossil fuel subsidies

The Sustainability Consortium

The Sustainability Consortium (TSC) was launched in 2009, with the Food, Beverage and Agriculture Sector programme launched shortly thereafter. TSC Represents 75 of the largest food companies in the world including their supply chains. TSC operates as a member-supported platform, with NGOs such as CARE and WWF engaging at the board or work group level. Retailers are particularly active in TSC, including: Marks and Spencer, Krogers, McDonalds, Walt Disney, Walmart, Tesco, Royal Ahold. Retailers are particularly aware of the need to minimize the information requests and questionnaires going through the supply chain.

TSC is administered by University of Arizona, University of Arkansas and Wageningen UR. TSC started in the US, but has an office in The Hague, Netherlands, that opened in the fall of 2011, and further expansion into Asia and Latin America is expected in 2012.

TSC goals include:

- Develop scientifically sound measurement methods of a product's environmental and social attributes. Applies a life cycle approach, but goes beyond LCA to incorporate biodiversity, water and social variables, as life cycle doesn't capture these as well.
- Make carbon, water, materials, biodiversity, toxicity and social impact results accessible and available.
- Design and provide transparent and easy to use IT tools for sharing data and reporting among TSC members.
- Build on existing lifecycle, supply chain & product data (farm-level product and hot spot information from developing countries is noted as an area requiring more data)

TSC is actively developing its Sustainability Measurement and Reporting System (SMRS):

- Right now at the stage of creating product category rules and LCA's for seven products, identifying product hot spots and creating product category dossiers for 100 product categories
- Hot spots: sugar, soy, corn, wheat, cotton, oil seeds, palm oil, pulses, coffee and tea. The goal is to ensure that at all levels in a product supply chain, information is available to members on those hot spots for a product lifecycle, what interventions can be applied, and how to harmonize approaches (standards, roundtables, etc.).
- The biodiversity assessment decision-support tool seeks to combine maps of commodity expansion and biodiversity, map key supply chains and highlight where issues are (such as biodiversity loss, land use change) and ultimately to recommend best practices such as certification or production criteria.

A clear need TSC has identified is the need for harmonization of on-farm tool metrics (whole-farm and landscape/regions, but also product standards and carbon footprinting). The TSC membership voted to adopt the Greenhouse Gas Protocol Product Accounting and Reporting Standard (WRI/WBCSD GHG Protocol), and intents to build on the product standard by providing methodologies that are specific to individual industry sectors, such as food and beverage, personal care, etc.

The Consumer Goods Forum

In November 2010, the Consumer Goods Forum announced its intention to mobilise its collective resources to help achieve zero net deforestation by 2020 (a second commitment was

made, phasing out hydrofluorocarbon refrigerants as of 2015). The Consumer Goods Forum brings together 400 international consumer goods manufacturers and retailers and their suppliers. Combined revenues are USD $2 trillion. The team of Forum member companies charged with delivering the pledges is co-chaired by Unilever and Tesco and includes Ahold, Barilla, Carrefour, Coca-Cola, Delhaize, General Mills, Henkel, Johnson & Johnson, Kellogg, Kraft, Kroger, L'Oréal, Metro, Nestlé, Pepsi Co, Procter & Gamble, Sara Lee, S.C. Johnson, Sobeys, Tesco, Unilever and Walmart.

The SAI Platform

The Sustainable Agriculture Initiative (SAI) Platform was created in 2002 by Nestlé, Unilever and Danone. The SAI Platform seeks to facilitate sharing, at precompetitive level, of knowledge and initiatives to support the development and implementation of sustainable agriculture practices involving the different stakeholders of the food chain SAI Platform today counts over 30 members globally. SAI Platform generally defers to the Sustainable Food Lab on farm-level GHG accounting, as a number of their members are piloting the Cool Farm Tool with the Sustainable Food Lab. Specific areas where SAI Platform is addressing agricultural mitigation potential:

- Global Dairy Agenda for Action (GDAA)[3]: SAI Platform is a founding member of the GDAA, comprised of world's dairy associations and companies. The GDAA contains an industry pledge to reduce carbon emissions by creating a standard methodology framework for assessing the carbon footprint of milk and dairy, and promoting best practices, and promoting improved farmer understanding of GHG emissions and opportunities for reduction, among other activities.
- The SAI Platform is convening a Working Group on coffee, focused on carbon footprints associated with green coffee production. Illycafe, Kraft, Nestlé, Sara Lee DE and Tchibo are SAI Platform's active members. Work is focused right now on developing product category rules for green coffee, and developing methodology for estimating GHG emissions in coffee production. This is expected to launch in early 2012.

[3] For more information, see: http://www.dairy-sustainability-initiative.org/Public/Menu.php?ID=36&language=eng

- Mainstreaming sustainability: The SAI Platform cites particular success with the partnership brokered between food chain stakeholders, local and national governments, and companies, in the DE Foundation Vietnam Coffee Sector Development pilot.[4] The pilot has now ended, and public information does not yield any insights on GHG reduction goals or best practices implemented. However, it is clear that the private-sector-driven initiative, comprised of manufacturers and traders (DE Foundation, funded by Sara Lee Corporation; Nestle; Kraft Foods) and also the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, motivated Vietnam's Ministry of Agriculture and Rural Development (MARD) to engage the approach in development of a national coffee sector development strategy.

The SAI Platform is revising its strategy, assessing new opportunities for mainstreaming sustainability, and looking to diversity its membership to bring in more key actors in supply chain beyond manufacturers (such as traders).

The Sustainable Food Lab

The Sustainable Food Lab is a consortium of business, non-profit and public organizations working together to accelerate the shift toward sustainability. The Lab's membership includes over 50 corporate and civil society members leading change in the global food and agriculture sector. The Sustainable Food Lab is a learning platform dedicated to market-based solutions to the key issues – including climate, soil, poverty, nutrition and water – that are necessary for a healthy and sustainable food system that can better feed a growing world. The SFL uses collaborative learning to incubate innovation at every stage along the supply chain from producing to distributing and selling food. Current areas of work include Agriculture and Climate Change, Sustainable Livelihoods in Global Value Chains, Sustainability Metrics, and Leadership Development.

At the core of the Food Lab's Agriculture and Climate Change workstream is the Cool Farming Options initiative, which has involved applying the Cool Farm Tool, in 14 countries, with crops ranging from pulses and wheat to sugar, tea, potatoes and coffee. All those interviewed who piloted or worked with the Cool Farm Tool emphasized the strength of this

[4] For more information, see: http://www.defoundation.com/vietnam-sector-development-ended/

tool for promoting partnerships between producers and purchasers, overcoming obstacles in farm-level data, and supporting increased understanding of impacts and benefits of farming practices. In the Carbon Disclosure Project Agriculture Pilot (see Carbon Disclosure Project section, below), the only farmers that completed the reports to CDP on their emissions were those that had applied the Cool Farm Tool, which speaks to its ease in use. The Sustainable Food Lab creates a venue for industry members to share information and innovation, including exploring options for low-carbon agriculture, addressing poverty through new approaches to connect small-scale producers to formal markets, and piloting sustainability metrics.

Summary and key lessons

The CSR and supply chain innovations above demonstrate the great potential for companies to have substantial impact on reducing GHG emissions in the agricultural supply chain when sustainability is a key performance indicator and is embedded in core business operations (i.e., giving equal weight to cost, quality and sustainability). Companies identifying high-risk agricultural raw materials in their supply chain, setting aggressive time-bound targets and goals for their sourcing and supply arrangements are at the forefront of corporate leadership in this area. However the gap between the leaders and the rest of the industry may be great. Indications from the Forest Footprint Disclosure Project (see below) are that while the first 50 of the most progressive companies, such as Nike, Unilever, Nestlé, that Forest Footprint Disclosure Project (FFD) worked with on high-risk commodities knew their supply chain, could make sourcing commitments and alter their purchasing, the rest of the industry offers a different picture. That is where the industry-led initiatives, such as Consumer Goods Forum and others mentioned above, can offer broad platforms for wider sectoral engagement.

Based on the interviews and research, the following emerge as key lessons and areas for future attention:

- **Traceability**: Companies know how much they source, but understanding which country and where it came from is often difficult due to lack of traceability. One interviewee noted that only a small number of companies can actually set up traceability programmes. This is also where sector-based collaborations can be helpful.

- **Support systems throughout the supply chain**: Need to focus on the entire supply chain, while also simultaneously focusing on more high-emitting areas in agricultural production (which reinforces the synergy between private-sector supply chain engagement, standards, certification, roundtables, carbon disclosure and footprint disclosure). Need for credible third-parties that can work with suppliers, to inform them, to "lubricate the cogs", to provide solid, practical, sound advice. Further, need mechanisms to reinforce lines of communication between buyers and suppliers.
- **Engaging traders and processors**: The difficulty of engaging suppliers and traders is a concern to many companies (but Cargill's RSPO commitment is promising). This is further explored on page 60.
- **Engaging growers**: For many interviewed, this is a critical need that is hard to achieve. Those sourcing raw materials from traders have no link to growers. Pepsico stands out as an exceptional example of a company with long-standing relationships with its farmers (40 year relationships with some UK farmers), however is challenged engaging farmer associations and cooperatives, noting that many are not as attuned to the urgency to respond to climate change.
- **Knowledge transfer**: Connecting academic and technical knowledge into information that suppliers and farmers can work with is a noted challenge and need.

III. Measurement, performance and transparency

This section seeks to identify how CSR and supply chain commitments can improve their contribution to reductions in agricultural GHG emissions, exploring:

1. How can life cycle assessment, standards, certification systems, and commodity roundtables guide and drive corporate practices?
2. Monitoring, benchmarking and transparency
3. How to increase the scale needed to affect global GHG levels, and how to ensure permanence of commitments, and mechanisms for addressing leakage?
4. How to minimize transaction costs, ensuring the financial viability of CSR and supply chain commitments, both for producers and buyers?
5. What conditions or enabling factors are critical for success in CSR and supply chain commitments for each party involved (small- and large-scale producers, wholesalers, retailers, certification bodies, civil society, governments) in the "farm-to-fork continuum"?

Price volatility of raw materials has driven many companies to assess sustainability of their raw material supply chain. The price of soybeans has tripled since 2002 (Rabobank 2010), and cocoa has quadrupled. Mars announced in 2010 that unless more was done to promote sustainability, there would be a shortfall in cocoa production of 1 million tonnes by the end of the decade. Some suggest that the volatility of food and commodity prices seen a few years ago will continue and this volatility will increase in frequency over the next 5 to 10 years. When agricultural commodity prices are depressed, horizontal integration of supply chains and sourcing products on an as-needed basis is preferable by agribusiness. However, the food industry is increasingly rethinking its sourcing strategy, seeking vertical integration and guaranteeing stock (longer-term supply contracts and also storing foodstocks) more than previously. For those companies that have also made sustainable sourcing commitments and factor that into sourcing decisions, the focus on a more reliable supply chain can have the added benefit of delivering on climate reduction goals at the same time.

While most agriculture is produced and consumed within national boundaries, the portion of agricultural products passing over national boundaries is expected to increase in the future, and for some regions will increase substantially due to climate change impacts.

Approximately 8.5% of the worldwide goods trade consists of agricultural commodities, while their share in the total trade in primary products accounted for 27.5% in 2008. An average of approximately 16% of global agricultural production (in volume) enters international trade. Of that 16%, oilseeds account for 57%, fish 37%, sugar 31%, cassava 19% and grains 15%. South-south trade is increasing, as food demand outstrips regional supply in Asia while the Latin American food supply has increased, largely in Brazil (Rabobank 2011b).

An agricultural trade study using spatially explicit mapping of land use patterns and greenhouse gas emissions in order to estimate impacts of trade liberalization out to the year 2045 projects that deforestation, mainly in Latin America, leads to significant amounts of additional carbon emissions due to trade liberalization, while non-CO_2 emissions mostly shift to China due to comparative advantages in livestock production and rising livestock demand in the region (Schmitz et al. 2012).

Agribusiness is addressing control over supply through the following strategies: 1) increasing control of physical sourcing, 2) focusing on market power to align the supply chain and 3) adapting business strategies to reduce and possibly circumvent supply risks (Rabobank 2010). The last point, adapting business strategies, can involve substituting ingredients but also 'tolling', which is 'cost-plus' pricing agreements where price fluctuations are passed along the supply chain (whoever has the greater market power gets to pass the costs on).

In summary, while raw materials and commodities are only a portion of agricultural products sold and consumed globally, the standards by which they are produced, secured and sold has never been more important. This section explores the various measurement, performance and transparency tools, metrics and initiatives that are being applied and hold potential to increase sustainability in global food supply chains.

How can life cycle assessment, standards, certification systems, and commodity roundtables guide and drive corporate practices?

In order for companies to take action in reducing GHG emissions in their supply chain and at producer levels, they need to know where the emissions hot spots are, measure the emissions, and develop strategies to mitigate those emissions. For many companies, their entry into this activity is by carbon disclosure reporting, responding to pressure from forces outside the company to not purchase high-risk products, pressure from investors to fulfil disclosure

requirements or meet standards, or pressure from their customers. Companies often engage a lifecycle analysis (LCA) or product carbon footprint (PCF) to identify emissions hotspots.

Other companies approach it from a company basis, and those companies disclosing their direct and indirect greenhouse gas emissions are taking the most comprehensive approach, in terms of quantifying the carbon impacts of their business operations. Developing a full GHG emissions inventory – incorporating corporate-level scope 1, scope 2 (direct), and scope 3 (indirect) emissions – enables companies to understand their full value chain emissions and to focus their efforts on the greatest GHG reduction opportunities (see Figure 3 on page 41 for description of scope emission sources). The most globally-applied tool for assessing company direct and indirect emissions is the World Resources Institute/World Business Council on Sustainable Development GHG Protocol (referenced below as GHG Protocol or WBCSD & WRI protocols), discussed in more detail below, and the primary tool promoted by the Carbon Disclosure Standards Board[5].

Emissions along the value chain (found in GHG Protocol Scope 3 assessments) often represent a company's biggest greenhouse gas impacts, which means companies only quantifying Scope 1 and 2 are missing their largest areas for improvement. One interviewee said, "An LCA was done on our business. We found that over half of the footprint was from upstream—from the raw materials! That was our "Aha!" moment!" Kraft Foods road tested the GHG Protocol Corporate Value Chain (Scope 3) Standard, and found that value chain emissions comprise more than 90% of the company's total emissions.

Most other standards, protocols, and reporting and disclosure initiatives rely on or reference the GHG Protocol and its various components and modules, currently being developed and refined to cover increasing specificity in measuring GHG emissions of business, corporate, supply chain, and sectoral activities.

There is a distinction to be made between measuring and reporting schemes based on life-cycle analyses versus those that track and measure corporate emissions. Most commodity

[5] The Climate Disclosure Standards Board (CDSB) is international reporting framework for companies, helping them disclose information about their climate change-related risks and opportunities, carbon footprints, carbon reduction strategies, and their implications for shareholder value. The CDSB consortium is comprised of CERES, Carbon Disclosure Project (CDP), The Climate Group, The Climate Registry (TCR), The International Emissions Trading Association (IETA), World Council for Business and Sustainable Development (WCBSD), World Economic Forum (WEF), and the World Resources Institute (WRI).

roundtables are applying LCA approaches, whereas many businesses use corporate and supply chain-focused metrics. Sector specific guidance can be very different between the two approaches, depending on the circumstance.

Companies focused on high-risk product areas (coffee, tea, cocoa, sugar, soy, oil palm are examples) have either 1) identified the product areas as GHG emission 'hot spots' in their Scope 3 assessment, or 2) may be less concerned with estimating their company direct and indirect emissions, and more concerned with not purchasing products promoting unsustainable or high-emission production practices.

Sustainable management standards, such as UTZ certified, Sustainable Agriculture Network (SAN), commodity roundtables, and others, focus on practices (and increasingly GHG emissions) at the production level, yet do not consider GHG emissions related to processing, transport, consumption and ultimate disposal along the entire supply chain. The carbon footprint is increasingly being incorporated into standards such as GlobalGAP and organic standards, but this incorporation is nascent and the metrics for doing so are highly inconsistent. Product GHG footprint standards, such as PAS 2050, apply a life-cycle approach.

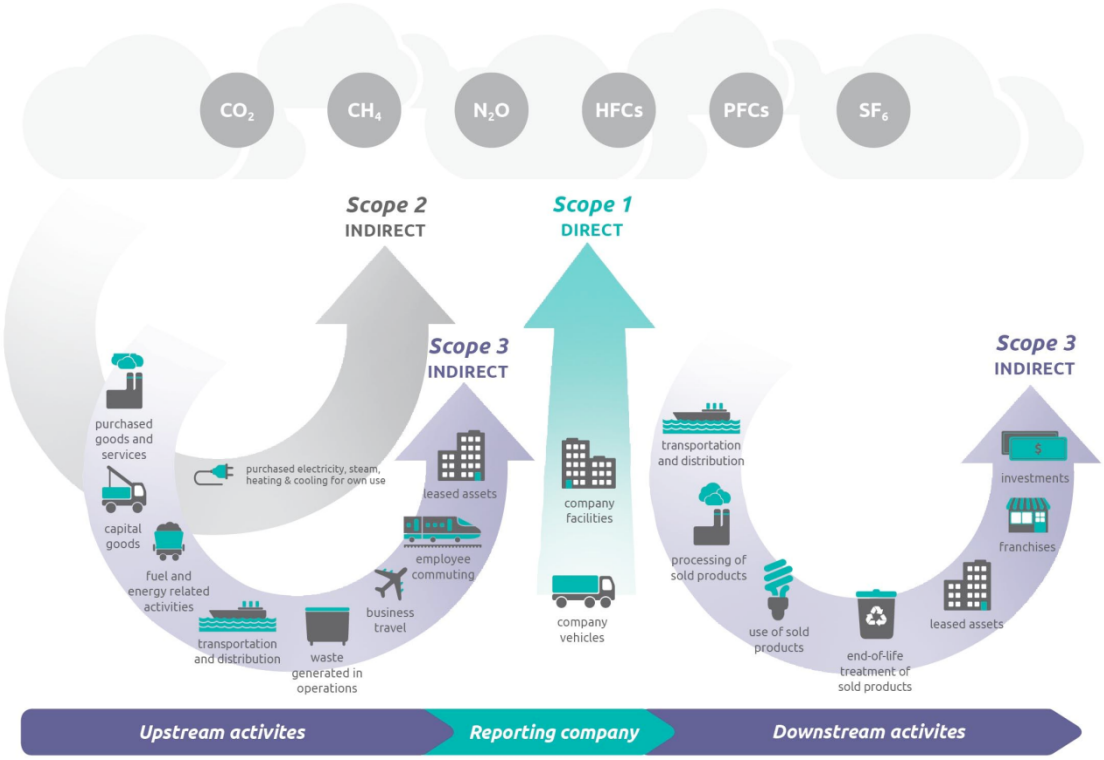
Hence, there is a strong need for harmonization among approaches, definition of common metrics and rules, guidance on when to apply different approaches and what margin of error or reliance on default values applies to each approach.

WRI/WBCSD Greenhouse Gas Protocol

The GHG Protocol established 10 years ago to estimate carbon emissions within a company's organizational boundaries. Only within the last year have supply chain modules been added the Protocol. The first GHG Protocol developed was the Corporate Standard, to report direct and indirect emissions (scopes 1 and 2). It provided thin guidance, but was successful, and eventually used by about 75% of Fortune 500 companies. As companies have progressed in their GHG emission measurement activities, it increasingly became apparent that an average of 50% of company' GHG emissions comes from their supply chain (scope 3). The WRI/WBCSD GHG Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard was developed over 3 years, and released in October 2011 (Greenhouse Gas Protocol 2011). Of note:

- The Consumer Goods Forum, representing over 400 consumer goods companies and retailers with a combined UD$3 trillion dollars in sales, has recommended the new standards be used by members who choose to measure and report scope 3 and product greenhouse gas emissions;
- The Sustainability Consortium has adopted the Product Life Cycle Standard as the GHG methodology used in their tools to promote product sustainability.

Figure 3 Overview of GHG Protocol scopes and emissions across the value chain



Source: Corporate Value Chain (Scope 3) Accounting and Reporting Standard, Greenhouse Gas Protocol, http://www.ghgprotocol.org/standards/scope-3-standard

By 2010, it was recognized that Scope 3 measurements omitted significant specific issues particular to the agriculture sector, such as setting boundaries, which suppliers to include in inventories, rules for defining whether an agricultural emissions source is scope 1 or 3 (such as how to categorize land leases, production contracts, etc.). Thus, the overarching goal of the Agricultural Protocol is to provide guidance on incorporating the GHG emissions from agricultural production into the inventories of producers (for whom these sources are primarily scope 1, thus supplementing the Corporate Standard) and their customers or supply-

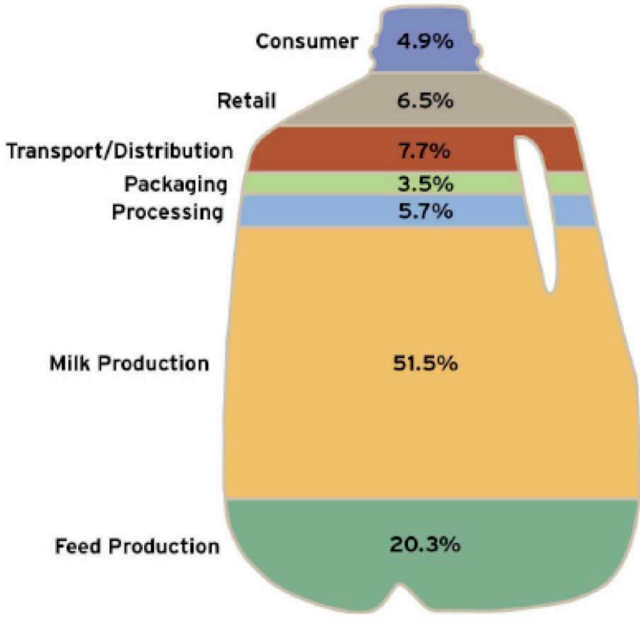
chain partners (for whom, these sources are primarily scope 3, thus supplementing the Scope 3 Supply Chain standard) (Russell 2011).

The Agricultural Protocol is being developed and has not been piloted yet. The first results are expected in May 2012. WRI is focusing road testing in Brazil, and are working with EMBRAPA to pull out data and methods that will work for producers, given concerns over adequacy of farm-level data in Brazil. WRI anticipates the protocol will be used with larger producers, already used to tracking, and with more capacity to respond to requests for supplier information. With smallholders, it may be easier to simply follow best practices, rather than go through reporting and data tracking, or to aggregate smallholders.

Life Cycle Assessment

LCA is a compilation and evaluation of the inputs, outputs and other interventions and the current or potential environmental aspects and impacts (e.g., use of resources and the environmental consequences of releases) throughout a product's life cycle – from raw material acquisition through production, use, end-of-life treatment, recycling and final disposal (i.e., "cradle to grave") (UNEP 2009). LCA is commonly applied by businesses and corporations, and is the primary approach underpinning the SAI Platform, the Consumer Goods Forum, and the Sustainability Consortium. LCA underpins the new International Standards Organization (ISO) international carbon footprint standard for products (ISO 14067), just released.[6]

Figure 4 Life cycle analysis of GHG emissions in a gallon of milk in the US



Source: Innovation Centre for US Dairy.

http://www.usdairy.com/Sustainability/Science/Pages/Science-Layout-2.aspx

[6] http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=59521

Companies interviewed note one drawback of LCA is that it does not account for biodiversity or social aspects, so new metrics are being developed to add those onto LCA's.

The Innovation Center for US Dairy conducted a GHG LCA for milk in 2007 and identified priority areas for reducing emissions across the value chain. Based on the analysis, the industry established a voluntary goal to reduce GHG emissions for milk by 25% by 2020, and launched ten projects estimated to reach nearly halfway to that goal while delivering $238 billion of value to the industry.

Key relevant findings from the Innovation Centre for US Dairy GHG LCA for fluid milk research (Thoma et al. 2010), which provides a baseline measure of US dairy emissions across the supply chain:

- Management practices matter: The use of best management practices, rather than the size or location of the farm or processing facility, makes the biggest difference in reducing GHG emissions — and they also deliver economic benefits.
- Opportunities for improvement across the supply chain: Opportunities exist to be more efficient and further reduce GHG emissions along the entire dairy supply chain. For example, on the farm, feed efficiency (how effectively a cow's diet helps the cow produce milk) and manure management (manure storage), represent the greatest opportunities to further reduce GHG emissions. Businesses across the value chain have opportunities to lower costs and emissions from the use of fossil fuels and electricity.

Innovations in assessing farm-scale GHG emissions and beyond

Critical inputs to Scope 3 assessments (and other measures of supply chain and producer-level GHG emissions) are the tools and methods that can be applied to quantify farm-level GHG emissions. Most methods rely on country-and region-specific tools developed in Europe and North America, which contain refined data on soils and biomass that can yield fairly accurate results compared to parts of the world where such information is not easily obtainable by farmers, and IPCC default values must be applied. A critical aspect of farm-level tools applied in developing countries is how the tool (or standard) measures land conversion and resultant GHG impacts. As mentioned above, GHG emissions from land conversion will likely be the largest source of emissions, if land conversion has occurred. A PAS 2050 case study of sugar cane plantations in Mauritius and Zambia demonstrates that when emissions from land use

change were dropped, the carbon footprint of sugar was reduced 70 to 80% (Brenton et al. 2010). The Cool Farm Tool applies a simple and effective cut-off date, such that land converted to arable land more than 20 years ago is not considered, but lands cleared since then are assessed for management changes (tillage practices and change; cover cropping, compost, manure addition, and residue incorporation), and annual biomass for trees and bushes (Sustainable Food Lab et al. 2011). For a more complete assessment of whole-farm GHG emission methods and tools, please refer to the forthcoming CCAFS report, "Whole-farm GHG Emission Methods and Tools," by Unique Forestry. Below are three tools commonly referenced and applied by interviewees:

The Cool Farm Tool has been explored elsewhere in this paper. Due to the geographic extent of pilot activities with the Cool Farm Tool around the world, we should gain much more understanding in 2012 of its applicability as a GHG accounting and decision-support tool.

The COMET Farm VR tool and database is being developed by the USDA Climate Change Programme. It has been likened a robust Cool Farm Tool to assess GHG emissions at farm scales. Some interviewees viewed the development of the tool as a useful contribution, but question how easily it will be adopted by farmers. It links a large set of databases containing information on soils, climate and management practices to dynamically run the Century ecosystem simulation model as well as empirical models for soil N_2O emissions and CO_2 from fuel usage for field operations.

FAO's EX-ACT, developed in 2009, is meant to be applied at scales broader than farm-scale, for larger regions, projects or value-chains and seeks to define GHG reduction potential of management and decision alternatives. It was developed to apply in developing country contexts, and uses IPCC default values. It has been applied in Burkina Faso to assess carbon footprint of cashew nut processing of 42,000 households and plants and in Madagascar is being applied to assess carbon footprint of a value chain of rice 1 million small-scale rice producers.

Product standards and Certification

Product GHG footprint standards exist and are widely used, the most universal of which is the UK's National Standards Body, BSI Group, 'PAS 2050', a publicly available specification that provides a method for assessing the life cycle greenhouse gas (GHG) emissions of goods and services. The PAS 2050 was revised and updated in 2011 in order to align its

methodology and use with other internationally recognized footprint methods, such as WRI/WBCSD and ISO.

Options for combining product carbon footprints with other environmental and sustainability indicators should be explored in greater depth. Many of those interviewed during the course of this research indicated the need for a meta standard or approach. Many interviewed noted that product standards on their own are not enough when considering that many farmers farm multiple crops and these can change from year to year. There is a need to link farm management changes with information gleaned from product foot printing. Application of the Cool Farm Tool with a product standard is one approach. An analysis of green coffee standards for the SAI Platform promotes combining foot printing (requiring a common approach and well defined system boundaries to allow for comparison) with farm management relevance (definition of the system boundary in such a way as to designate the sphere of influence of the farmer, which may involve some off-farm processes, such as residue treatment. The SAI Platform analysis also recommended creating an overview of global coffee production systems, establishing key parameters influencing the carbon balance, in order to then develop management and specific farming system emission factors in different biophysical contexts to reflect the global diversity of coffee production (and emissions) (Sevenster and Verhagen 2010). The amount of coffee certified as sustainable increased fivefold between 2004 and 2009, but it is very unclear what GHG reductions occurred as a result of changed practices. Echoing the recommendation of the SAI Platform green coffee emissions and standards investigation, many interviewees noted that the lack of published studies from developing countries on emissions estimates related to land use change, agriculture and pasture change is pushing some to consider how to create emission factors based on farming practices, biogeographic attributes, commodity types and other factors, that could be plugged into farm-level GHG accounting approaches and standards. Consideration should also be given to developing data sets that report the worst-case situation for regions rather than globally, in order to more accurately determine the carbon footprints of food products derived from developing countries (Brenton et al. 2010).

Commodity Roundtables

The Roundtable for Sustainable Palm Oil and Roundtable for Responsible Soy are discussed in the previous section on innovations. There are other roundtables for most of the key

commodities, including beef, which is the most recent roundtable. See table on page 28 for some high-profile commodity roundtable commitments.

Summary of obstacles and opportunities

Measurement and monitoring performance at the farm-scale

Obstacles

1. A critical aspect of farm-level tools applied in developing countries is how the tool (or standard) measures land conversion and resultant GHG impacts—likely the largest source of emissions, if land conversion has occurred.
2. While there are many tools to estimate GHG emissions at the farm-scale, the challenge is that very few of these tools provide the link between GHG emissions estimates and decision-support to consider changes in management and offer recommendations for best practices, based on the farms' unique emissions profile.

Opportunities

1. The lack of published studies from developing countries on emissions estimates related to land use change, agriculture and pasture change is pushing some to consider how to create emission factors based on farming practices, biogeographic attributes, commodity types and other factors, that could be plugged into farm-level GHG accounting approaches and standards.
2. The Cool Farm Tool stands out as having greater potential as a decision-support tool to provide a platform for evaluation of best practices, based on a farm's unique emissions profile. Application of the CFT should be further explored, and may provide a basis for insights on best practices and sharing of knowledge and lessons learned at the farm-scale.
3. There is a need to link farm management changes with information gleaned from product foot printing. Application of the Cool Farm Tool with a product standard is one approach.

Beyond the farm-scale: Measurement, monitoring and reporting

Obstacles

1. Life-cycle analyses do not incorporate social considerations and do not focus company consideration on how to reduce company-wide emissions or identify emissions hot-spots.
2. Measurement and reporting schemes focused on corporate emissions (Scope 1, 2 and 3) are done on a company basis, and do not provide specific insights on product-based emissions profiles.
3. Most commodity roundtables are applying LCA approaches, whereas many businesses use corporate and supply chain-focused metrics. Sector specific guidance can be very different between the two approaches, depending on the circumstance.
4. Product standards on their own may not be enough to shift farming practices when considering that many farmers farm multiple crops and these can change from year to year. However, some interviewees noted their farmers and suppliers found cost savings and increased efficiency with GHG reduction interventions, so it likely those farmers may retain the practice, even if their crop changes. This needs to be further evaluated.
5. Sustainable management standards, such as UTZ certified, Sustainable Agriculture Network (SAN), commodity roundtables, and others, focus on practices (and increasingly GHG emissions) at the production level, yet do not consider GHG emissions related to processing, transport, consumption and ultimate disposal along the entire supply chain.
6. The carbon footprint is increasingly being incorporated into standards such as GlobalGAP and organic standards, but this incorporation is nascent and the metrics for doing so are highly inconsistent. Product GHG footprint standards, such as PAS 2050, apply a life-cycle approach.

Opportunities

1. Based on the inconsistencies identified above, there is a strong need for harmonization among approaches, definition of common principles and criteria, guidance on when to apply different approaches and what margin of error or reliance on default values applies to each approach.

2. Options for combining product carbon footprints with other environmental and sustainability indicators should be explored in greater depth. Many of those interviewed during the course of this research indicated the need for a meta standard or approach.
3. Broader sustainability indicators can be very effective in evaluating performance across social and environmental indicators, which may include corporate emissions profiles and life-cycle analyses.
4. The issue of chain of custody and traceability is a large hurdle for sustainable commodities, and increasingly of importance for certified products, standards, and roundtables. Can a standard be developed that goes through the entire supply chain?
5. The experiences encountered with GHG emissions accounting, data collection, reporting, boundary definition and methodology use can provide key lessons and inform emerging efforts in the water arena, agricultural water footprinting (for instance via the Water Footprint Network) and biodiversity.

Monitoring, benchmarking and transparency

As mentioned above, companies are increasingly being required to disclose the impacts of their businesses on the climate, increasingly including supply chain emissions. While the UK government debates mandatory carbon emission reporting rules, a report[7] from KPMG revealed that all of the UK's 100 largest companies now produce corporate responsibility reports, many of which contain carbon emissions data. Promoting disclosure, setting benchmarks, monitoring performance, and shining a light on poor performers offer essential means for consumers, civil society, governments, lenders, financiers and investors to measure a company's performance on reducing climate impacts.

Carbon disclosure

The Carbon Disclosure Project (CDP) is an independent not-for-profit organization holding the largest database of primary corporate climate change information in the world, based on company submitted information. Over 3,000 organizations in about 60 countries globally now measure and disclose their greenhouse gas emissions, water management and climate change strategies through CDP, which for many acts as a benchmark, promoting continuous

[7] http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/corporate-responsibility/Pages/2011-survey.aspx

improvement in measurement and performance. Very few of these are organizations engaged in food or agricultural activities however.

The Carbon Disclosure Project is now looking beyond disclosure to identify the companies that are taking active steps toward a low-carbon economy. In 2010, CDP (backed by 534 institutional investors representing more than US$64 trillion of assets under management) sent questionnaires to more than 4,700 of the world's largest corporations, and then focused on the world's 500 largest public companies in the FTSE Global Equity Index Series (Global 500), which account for 11% of global direct GHG emissions. The results suggest that there has been a shift in emphasis from an approach dominated by risk, to one that also embraces potential opportunities. 86% of respondents reported that they see 'significant opportunities' arising from climate change (PriceWaterhouseCoopers 2010).

CDP's Supply Chain Programme: As over 50% of an average corporation's carbon emissions are from within their supply chain, rather than directly within the company, CDP engaged 57 global corporations in its Supply Chain Programme. Scopes 1, 2 and 3 emissions are terms used under the GHG Protocol, with Scope 3 emissions referring to those in a companies' supply chain. The supply chain is identified as a key area of risk, opportunity, and mitigation potential, yet only one third of responding suppliers have a target for carbon reduction and even the targets that are in place are not sufficient. Should this status continue, this would mean global emissions by 2015 will increase by 6% instead of the necessary 20% reduction. 56% of those reporting to CDP expect to deselect suppliers in the future for failing to meet formal carbon management criteria (ATKearney 2011).

CDP's Agriculture Pilot (US-based): In 2011, CDP began a pilot with a food and beverage sector subset of the 50 companies in the CDP Supply Chain programme. Few of these companies reported on their supply chain's agricultural emissions, as there was not a sector-specific CDP questionnaire for agriculture. The program focused on two crops – tomatoes and potatoes – purchased by Con Agra and HJ Heinz. By requesting primary GHG emissions data from farmers on behalf of their largest corporate customers, CDP strove to field-test existing and developing tools, expand disclosure, road test metrics, and facilitate reductions. Eleven US growers were selected (7 tomato and 4 potato growers) to receive the pilot questionnaire by ConAgra Foods and H.J. Heinz, and these growers all had direct relationships with the buyers. In addition to the growers, ConAgra Foods, H.J. Heinz, and

three other CDP Supply Chain members (Kraft, PepsiCo, and Walmart) shared their input through interviews on their current initiatives and best practices for engaging with their agricultural supply chains.

An Information Request For Agricultural Suppliers was designed to allow agricultural suppliers to demonstrate an understanding of their direct and indirect impact on climate change and to explain the innovative activities they have implemented in their growing practices. It also offers the opportunity to plan actions for future growing cycles and to explain the reasons for choosing not to implement other practices. Finally, it requests a detailed breakdown of GHG emissions sources as well as the sequestration realized at the farm level.

Results: Of the eleven growers who received the request for information, seven completed a questionnaire, and one provided relevant materials. Responses varied considerably, CDP was surprised by the low response rate, and those farmers that were able to complete the reports had applied the Cool Farm Tool. Some farmers pursue water and soil management changes that also have climate impacts, as demonstrated by tomato growers that installed drip irrigation, reducing the amount of farm equipment fuel, fertilizer and water required as fewer passes need to be made by tractors and fertilizer can be delivered more precisely. One tomato grower who applied the Cool Farm Tool was unable to attribute any decreases in emissions to any of the named improvement initiatives because of a lack of established baseline data. Further, CDP reports that based on interviews with growers and food processors, indications are that until the value chain shares more of the measurement and reporting burden with farmers, their engagement will remain limited (Carbon Disclosure Project 2011; interview).

Impact disclosure

Disclosing companies' impacts on deforestation, fisheries and other indicators is of increasing interest for brand manufacturers concerned about their companies' reputational risk. The Forest Footprint Disclosure (FFD) initiative recognizes that the key commodities driving deforestation and land conversion (roughly 16% of current global GHG emissions) are timber, beef, soy, palm oil, and biofuels. FFD engages with private sector companies, asking them to disclose their current understanding of their 'forest footprint' based on exposure to these five key commodities in their operations and/or their supply chains.

FFD applies leverage from the 69 financial institutions with nearly $7 trillion in collective assets under management that put their names on a letter requesting disclosure of companies' forest footprints (Campbell 2011).

FFD chooses which companies it asks to disclose through a process of research and analysis. Major equity indices such as the MSCI World Index are used to identify the largest public companies worldwide and these are filtered according to their known or anticipated impact on the value chain of the five Forest Risk Commodities. Additional major players in key markets are added, together with privately owned companies known to have a high impact through growing, trading or buying commodities. FFD also has additional voluntary participants who wish to highlight their sustainability strategy to investors. Their third report was released in February 2012.[8]

General CSR Reporting

Global Reporting Initiative (GRI) is an industry standard for CSR reporting. Eighty percent of the world's 250 largest companies use GRI's framework for their sustainability reports, according to consultancy KPMG (Weise 2011). The GRI does contain a food processing environmental indicator protocol (GRI 2010) which references the WRI/WBCSD GHG Protocol standards and focuses on GHG emissions related to energy use in processing, with little guidance on how to incorporate or account for land use impacts and emissions.

How to increase the scale needed to affect global GHG levels, ensure permanence and address leakage?

As outlined in Section II, innovations exist seeking to directly improve sustainability of agriculture and agricultural commodity production while lowering GHG emissions. However, scaling up these innovations and bringing them into the mainstream is a challenge. It has been postulated that 100 companies control 25% of the trade of the fifteen most significant agricultural commodities (Clay 2010). Is it possible that if that 25% of demand made strong purchasing commitments, sourced 100% certified products, and endorsed the work of commodity roundtables, that demand could leverage change affecting 40-50% of production?

[8] http://www.forestdisclosure.com/annualreview

While it is too early to answer that, work is underway to assess the potential impact commodity roundtables can have in stemming land conversion and resultant GHG emissions. The Amazon Environmental Research Institute (IPAM) is beginning a project to: (a) conduct research to determine the global potential of commodity roundtables linked with Reducing Emissions from Deforestation and Degradation (REDD+) to reduce greenhouse gas emissions; (b) develop innovative financial instruments for linking REDD+ interim finance and national agricultural/forestry finance with groups of smallholder farmers seeking certification under one of the roundtables; (c) establish 5 to 10 REDD+ pilots in existing projects of the Schokland "producer support program" that is helping 80,000 smallholders around the world to certify their farms; (d) design and implement 2 or 3 large-scale regional programs (Brazil, Indonesia) that link REDD+ finance with large groups of soy, palm oil, or sugar growers.

While the IPAM research will offer critical insights on the potential for roundtables to curb deforestation and help support national (and international) REDD+ goals, it will not answer the question of how CSR and supply chain commitments can be brought to scale to effectively reduce global GHG levels. This will require coordinated effort within the entire sector, likely aided by supportive government policies and financial incentives that direct investment and lending to progressive practices.

Two attributes of climate change mitigation activity deserves mention, as it is unclear how many CSR and supply chain commitments account for permanence of the commitment to reduce GHG emissions and minimize leakage of GHG emission activity to other areas. For instance, sourcing commitments that seek to reach a certain percentage of certified raw products, which are then reversed by future management decisions or lack of ability to source the percentage of certified materials committed to will contribute to non-permanence of the original climate commitment. Leakage occurs when mitigation activity in one area displaces activities that create emissions outside the boundaries of a project, region or even country, thus resulting in fewer emissions mitigated than original climate commitments intend (For further discussion, refer to Coalition on Agricultural Greenhouse Gases (C-AGG) 2010). Mitigation activities in voluntary and regulated CO_2 markets are scrutinized for non-permanence and leakage risks, and are often discounted to account for leakage risks, and cannot receive validation or attract investors if the benefits of the emissions reductions are

reversible (project-level forest carbon permanence commitments range between 30-100 years). It is recommended that more corporate sourcing commitments consider how to include considerations of permanence and leakage in supply agreements seeking to reduce GHG emissions, as this is an essential attribute of viable climate change strategies.

How to minimize transaction costs

While certification and compliance with standards can provide benefits for farmers via price premiums and negotiated supply agreements (or less formal arrangements providing market access), the capacity to complete necessary reporting and capital to cover the costs of certification can be an obstacle, especially for smallholder farmers. In many developing country contexts, smallholders may get squeezed out by the larger producers more able to serve the needs of manufacturers and retailers in their supply chain calling for certified raw materials.

The experiences in application of the GlobalGAP trade standards, by a group of primarily UK and Dutch retailers, was criticized for marginalizing small farmers from horticultural export markets, due to cost of this standard (Brenton et al. 2009).

The more corporate supply and purchase agreements, corporate commitment to certified raw materials, and stronger relationships between buyers and producers can include direct support to farmers for engaging in certification, the more successful the outcomes will be. Further consideration should be given to developing group certification systems that aggregate smallholders or small-scale activities into landscape-level certification schemes, similar to what has been achieved with Forest Stewardship Council group certification for small woodlot owners.

Critical enabling factors

Role of retailers as innovators and supply chain drivers

The global food supply chain has undergone fundamental change in the last ten years, with the emergence of large and powerful multinational agribusiness companies as well as the powerful role supermarkets now play in the supply chain. For many companies, reaching economies of scale and the ability to strengthen bargaining power in the supply chain are critical for survival and profitability. This consolidation of power and leverage in the supply

chain means that companies well-positioned in the supply chain that make climate change commitments are more likely now than ever before to have impact.

This investigation highlights the role of retailers, as they are the drivers of GHG reductions in the global food supply chain. Retailers are at the interface with the consumer. And consumers around the world are increasingly concerned about the climate impacts of their food, particularly with products that have made headlines in the news over their impact on land-based emissions, such as palm oil. A recent global survey of 17,000 consumers in 24 countries conducted for Fairtrade International by international research consultancy GlobeScan, found a majority of consumers feel their shopping choices can make a positive difference for farmers and workers in developing countries. Six out of ten consumers (59%) feel empowered to make a difference through their shopping choices. This conviction remains as strong as or stronger than at the outset of the global economic downturn in 2008 when the survey was first conducted (GreenConduct.com 2011).

Further, all indications are that global retailers will continue to influence ever larger proportions of domestic and international food systems. Global retailers may soon change the second largest food market in the world, as the Indian government announced in late November 2011 that foreign retailers may now open stores in India. Walmart, Tesco, Carrefour, Ikea and the German Metro are readying themselves for investment into India, with some already establishing wholesale networks. Estimates are that up to 35% of Indian fruits and vegetables spoil before they get to market, largely as a result of an antiquated supply system that includes many wholesale markets and middlemen. Inflation in food prices runs about 10 percent. It is anticipated that food supply chains will take a few years to develop (Bajaj 2011). It will be critical to monitor how these progressive retailers incorporate sustainability goals, supply chain efficiency and farm-level best practices into their emergent Indian operations, in order to influence food security and mainstream GHG emissions mitigation and adaptation in this large growing economy.

Bringing in the middlemen and traceability

While retailers and brand manufacturers are critical drivers of CSR and supply chain commitments seeking GHG reductions in the global food supply chain, they cannot achieve change at scale without the engagement of traders and processors. A critical cog in the agri-food supply chain that links farmers and producers to manufacturers and retailers are the

middlemen—traders and processors such as Archer Daniels Midland (ADM), Bunge, Cargill and Louis Dreyfus. It is noted that ADM is one of the largest non-respondents to the CDP. Cargill's CDP submission for 2011[9] is candid in its Scope 1 and 2 emissions, but avoids disclosing Scope 3 emissions, stating, "The majority of Cargill's raw materials are commodity agricultural products. The calculation of Scope 3 emissions on such materials is ambiguous and does not seem to yield actionable information. As a result, Cargill has chosen not to pursue development of a Scope 3 inventory at this time" (Cargill 2011). However, Cargill has made a commitment to source oil palm from the RSPO, and this can have a profound effect, if a significant quantity of the oil palm they supply to global markets (especially China) is certified, but not necessarily demanded by the manufacturer or retailer. A useful example of the demand side driving engagement of traders and processors in the availability of certified cocoa is described in more detail on page 61.

The issue of chain of custody and traceability is a large hurdle for sustainable commodities, and increasingly of importance for certified products, standards, and roundtables. Can a standard be developed that goes through the entire supply chain? RSPO palm oil is coming closer to achieving this with chain of custody but this is a small portion of certified palm oil. Sustainable coffee standards (perhaps the best example is UTZ certified) have achieved this (without inclusion of GHG emission reduction criteria), but coffee is a specialty product, and quite different from raw materials and commodities such as sugar or palm oil. Sainsbury's has recently set goals to achieve 100% traceability of key raw materials within their supply chains and will establish a sustainable sourcing code for raw materials drawing on existing independent standards or creating their own Sainsbury's specific standard where none exist (Sainsbury's 2011). It may be that partnerships between retailers, working with manufacturers and traders/processors, can achieve greater traceability. Any such efforts should consider how traceability systems can be accessed by third-party verifiers of standards and certification systems, and thus not be limited to proprietary uses.

Streamlining of reporting and Continuous Improvement

Even the most innovative retailers and brand manufacturers cite the amount of internal and external reporting as being of concern, and many interviewees stressed the need to consider

[9] http://www.cargill.com/wcm/groups/public/@ccom/documents/document/na3049741.pdf

streamlining at all levels. Further, they stress the need for their reporting demands on suppliers to be further streamlined. The streamlining of reporting and emphasis on continuous improvement is a central component of the Unilever Sustainable Living Plan, of UN Principles of Responsible Investment (discussed in Section V) and the Carbon Disclosure Project, and is a key factor in growing the number of companies disclosing performance on sustainability indicators.

Effectively engaging the farm level

Measuring emissions and promoting best practices: While there are many tools to estimate GHG emissions at the farm-scale, the challenge is that very few of these tools provide the link between GHG emissions estimates and decision-support to consider changes in management and offer recommendations for best practices, based on the farms' unique emissions profile. The Cool Farm Tool stands out as having greater potential as a decision-support tool to provide such a platform for evaluation (See section, *Innovations in assessing farm-scale GHG emissions and beyond*, on page 48 for more). This is an area that deserves far more attention by researchers, farmers, standards organizations, and supply chain actors.

Sustainable purchasing links between buyers and farmers: Cocoa offers a robust example of tighter engagement between farmers and buyers yielding positive results for both sides. The promotion of sustainable farming practices by chocolate manufacturers and other players in the cocoa supply chain might have originated as a tactic to secure long-term supply of high quality cocoa, but resulted in agreement that the most viable option was to promote sustainably certified cocoa production. The cocoa supply chain had been characterized by outsourcing of trading and processing, with many branded chocolate manufacturers having no direct link to their supply. Linking opposite levels of the cocoa processing and marketing chain involved Mars getting involved at the farm level, and creating partnerships with cocoa traders and processors such as ECOM and Olam, in order to guarantee supply and quality, and improve labour conditions. Mars engagement was preceded by Cadbury's (now part of Kraft Foods) decision to start sourcing fair trade cocoa in March 2009, and a month later Mars committed to buy only cocoa certified as sustainable by 2020, using Rainforest Alliance and UTZ certification programmes. Similarly, Nestlé plans to improve the supply chain in partnerships with cocoa processors such as Cargill and Olam by buying cocoa beans from farms and cooperatives using sustainable practices.

What is important to note in these examples is the power of scale brought by Mars and Nestlé to working directly with farmers, and engaging the traders and processors in certification to promote higher quality cocoa produced in a sustainable manner. Despite the scale Mars and Nestlé bring to influencing sustainable production of cocoa, it is unclear what effect both companies are having in influencing the practices of 5-6 million cocoa farmers producing an average of 3 million tonnes per year globally (World Cocoa Foundation, 2011).

Direct access to farmers also has strategic importance to traders and processors looking to consolidate positions of power or guarantee amounts of supply at negotiated prices. Chinese traders foiled in the attempts to secure production in Latin America through foreign direct investment (due to Brazilian and Argentinian limits on foreign ownership of land), are attempting a new strategy of providing financing for inputs (such as herbicide glyphosate, imported from China) and infrastructure in exchange for crop harvests, securing their relationship with the farmer.

IV Government roles in catalysing change

Governments have a strong role to play in creating and facilitating the conditions for sustainable food systems, promoting innovation and overseeing results. As food insecurity and price volatility increases due to climate change impacts (FAO 2011), the role of government intervention and responsibility will only increase. Further, much of the work to define sustainability standards and metrics for GHG emission reduction for food production is being developed largely by the private sector, standards organizations and civil society, providing a road-tested basis for future mainstreaming by government regulation or legislation.

Governments have at their disposal a range of tools they can apply to mitigate GHG emissions in the agri-food sector and promote climate-smart agriculture. This section does not offer a full inventory of tools and interventions, but does explore the following:

- Information provision, voluntary measures, R&D and technology transfer
- Regulation
- Establishing clear linkages between agriculture and REDD+
- Government-led sourcing commitments

- Carbon labelling, footprint and accounting standards development
- Market-based instruments (cap and trade, taxes)
- Public-private partnerships
- Subsidies, taxes and financial incentives
- Sector-specific climate policies (EU Renewable Energy Directive, which promotes biofuels)

These tools and incentives are expanded upon below. The information presented is not meant as a comprehensive compilation of all known government activities in this area, but rather is meant to highlight innovations, approaches, and share known constraints.

Information provision, voluntary measures, R&D and technology transfer

Governments can use the provision of information in a variety of ways. The EU just released "A renewed EU strategy 2011-2014 for Corporate Social Responsibility[10]," in which the Commission proposes a new definition for CSR as "the responsibility of enterprises for their impacts on society" according to which, in addition to complying with legislation and collective agreements negotiated between social partners, enterprises should have a process in place to integrate social, environmental, ethical human rights and consumer concerns into their business operations and core strategy, in close cooperation with their stakeholders to identify, prevent and mitigate possible adverse impacts on society and the environment.11

Publically funded initiatives for information dissemination, R&D, emissions measurement tools, and technology transfer have been particularly robust in the UK and Netherlands. The UK National Standards Body's 'PAS 2050' tool for assessing the life cycle GHG emissions of goods and services is a critical contribution (connected, of course, to the UK government's carbon labelling regulation). The Dutch Sustainable Trade Initiative (IDH) is a robust

[10] http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/1238&format=HTML&aged=0&language=EN&guiLanguage=en

[11] The Commission puts forward a CSR action agenda for the period 2011-2014, covering eight areas, including: leveraging EU policies in the fields of consumption, investment and public procurement to promote market rewards for responsible business conduct; improving company disclosure of social and environmental information; and better alignment with global approaches to CSR, such as the Organization for Economic Co-operation and Development's (OECD) Guidelines for Multinational Enterprises, the UN Global Compact, the UN Guiding Principles on Business and Human Rights, the International Labour Organization's (ILO) Tri-partite Declaration of Principles on Multinational Enterprises and Social Policy, and the ISO 26000 Guidance Standard on Social Responsibility. The Commission aims to monitor the commitments of large European enterprises through a system of Country-by-Country Reporting, focused primarily on improving transparency of extractive industries.

example of government initiative and support for leveraging partnerships to promote sustainable agricultural production and trade. IDH leverages company investments in sustainable production and trade with its five year matching fund capacity of € 100 million.

Regulation

The UK Climate Change Act of 2008 made Britain the first country in the world to set legally binding 'carbon budgets', aiming to cut UK emissions by at least 80% by 2050. This regulation provides the basis for the UK's Department for Environment, Food and Rural Affairs (DEFRA) to pursue a Farming for the Future Programme, as well as establish sectoral adaptation and mitigation goals.

As for producer-country regulatory commitments, the importance of the Brazilian moratorium on soy deriving from land cleared in the Amazon in 2006 or after is uncontested. In September 2011, it was announced that the Soy Moratorium, signed on 24 July 2006, will be renewed for another year, until 31 January 2013. The moratorium is supported by the Brazilian soy processing and trading industry via the Brazil Soy Working Group (GTS), ABIOVE -The Brazilian Vegetable Oils Industry Association, ANEC - the Brazilian National Grain Exporters Association, their members, the Brazilian Ministry of the Environment, the Bank of Brazil and civil society organizations including Conservation International, Greenpeace, IPAM, The Nature Conservancy and WWF-Brazil.

Producer-countries are also regulating Foreign Direct Investment (FDI) to stem outside investment in domestic farmland, most notably in Argentina, Brazil, Kenya, Tanzania and Vietnam. China and the Gulf States have been criticized for their scale of Foreign Direct Investment, raising issues of tenure and smallholder displacement. China and the Gulf States are pursuing investment in farmland to safeguard their own good security. Kenya reformed its constitution to limit FDI, and other countries are considering regulation.

Lastly, government regulation is a tool that can be applied in supply management of tropical commodities. Prices of tropical products (accounting for inflation) are only about one seventh of what they were in 1980, as less income is earned as more commodities are produced. Simultaneously, retail prices of products made with primary commodities produced by developing countries (coffee, cocoa, sugar, cotton, maize, spices) increased substantially over the same period (IAASTD 2009). In the OECD, supply management approaches have been

applied. There is potential to explore how this tool can be used to benefit smallholders in developing countries producing commodities, while also applying production criteria benefitting climate and environmental attributes.

Clear linkages between agriculture and REDD+

REDD+ is a set of policy approaches and positive incentives to reduce emissions from deforestation and forest degradation, and promote conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries. REDD+ readiness strategies must respond to and incorporate agricultural drivers of forest clearing in order to meet land-use sector mitigation goals (Kissinger 2010). Countries can address the appropriate siting of small- and large-scale agricultural expansion via their REDD+ strategies, promote new expansion onto already degraded lands, and identify ways for agricultural intensification to occur without increasing land-use pressures and GHG emissions.

Government-led sourcing commitments

On 1 November 2011 the Dutch Minister of Agriculture reinforced the Dutch governments' support for the RSPO in a letter to the Dutch Parliament, describing the activity of the Dutch Task Force of Palm Oil and the commitment that all palm oil in the Netherlands should be sustainable by 2015 (Bleker 2011). The UK government has taken a leadership role, through its Department for International Development (DFID) and Department for Environment, Food and Rural Affairs (DEFRA), to encourage sustainable production and consumption of palm oil by launching a project to map UK supply chains in 2010 (Proforest 2011a,b). Also in 2010, a project supported by DEFRA, DFID, and the Chinese Ministry of Commerce was announced to develop the case for sustainable sourcing in China, the world's largest country consumer of palm oil, and explore options for the Chinese government to encourage sustainable sourcing. The Belgian government appears to be supporting its feed industry to source responsible soy. Germany, France, Spain and Portugal may be starting processes to encourage sustainably sourced soy.

Carbon labelling, footprint and accounting standards development

Based on the need to implement the UK Climate Change Act of 2008, the UK government may make a decision in late 2011 on mandatory carbon emission reporting rules. The UK government's Department for Environment, Food and Rural Affairs (DEFRA) already

provides considerable resources and guidelines to help businesses report their GHG emissions[12]. There has been considerable attention over the last few months on the potential impact of mandatory carbon emissions reporting rules. DEFRA recently published a draft impact assessment of the proposed rule, which faced strong criticism of overestimating the costs and underestimating the benefits in a report commissioned by the Aldersgate Group of businesses.

To support business and private sector commitment to the UK Climate Change Act, the Carbon Trust and the Carbon Trust Footprinting Company have developed a toolkit, Footprint Expert, that allows organisations to produce a reliable, consistent and certifiable carbon footprint in accordance with the published product carbon footprinting standard PAS 2050. In the UK, the work to adapt and develop the ISO standards is already taking place. The British open standard PAS 2050 may provide the basis for development of an international standard for the carbon footprinting of products, and it may simply become a global standard by default as companies continue to use and refine it.

Carbon labelling is based on the simple premise that consumers should have the ability to choose low-carbon products, and thus manufacturers and retailers provide information on the label of the product. There is no universally accepted methodology for measuring the carbon footprint of a product, however most approaches are based on calculating emissions during a product's life (Life Cycle Analysis). Carbon labelling has been promoted by government legislation and target-setting, and by food retailers. It is noted that many of the companies highlighted in Section II as innovators sell products into markets that have carbon labelling initiatives, such as the UK. However, carbon labelling and food miles initiatives have been criticized as ineffective, inefficient and unfair to developing country exporters (Kasterine 2011).

Sweden created an initiative in 2009 to mandate that labels listing the carbon dioxide emissions associated with the production of foods be applied to food packages. Forty percent of Sweden's food is imported (Minx et al. 2008). KRAV, Scandinavia's main organic certification program, requires dairy farms to obtain at least 70 % of the food for their herds

[12] See http://www.defra.gov.uk/environment/economy/business-efficiency/reporting/

locally, in order to replace imported cheaper soy from Brazil, generating transport emissions and emissions from rainforest conversion.

Market-based instruments

Greenhouse gas emissions trading schemes and carbon taxes are the two primary market-based instruments for pricing GHGs, with most focus on carbon and CO_2. The most comprehensive alternative national governments have is to include agriculture as a mitigation activity under the United Nations Framework Convention on Climate Change (UNFCCC). Agriculture is not considered a mitigation activity under the largest emissions cap-and-trade system in the world, the EU Emissions Trading Scheme (ETS), and also will not be included in the emergent California and Western Climate Initiative system, expected to rival the EU ETS in volume.

Some national governments are taking broader steps to create sector-specific market-based schemes. Brazil is a good example, having established aggressive goals: Law no. 12.187 (29 December 2009) establishes federal government sectoral plans, stipulates several tax measures ranging from different rates to tax-free programmes, and also includes mechanisms of compensation and various incentives, plus new rural credit schemes. Brazil's Low Carbon Agricultural Plan, specifically, seeks to:

1. Restore 15 million hectares of degraded pastures through proper management and fertilization, which corresponds to a reduction of between 83 to 104 million tonnes CO_2e by 2020,
2. Increase the area of integrated Crop-Livestock-Forest systems to 4 million hectares, reducing 18 to 22 million tonnes CO_2e,
3. Expand the use of the system of direct planting on 8 million hectares, corresponding to the reduction of 16 to 20 million tonnes CO_2e,
4. Increase biological fixation in 5.5 million hectares, corresponding to a reduction of 16 to 20 million tonnes CO_2e[13]

Carbon taxes create a cost for carbon and have been introduced by a number of countries, including Costa Rica, Denmark, Finland, Germany, Ireland, Italy, the Netherlands, Norway,

[13] http://www.theredddesk.org/countries/brazil/info/plan/low_carbon_agriculture_plan_of_brazil

Slovenia, Sweden, Switzerland, UK, and the province of British Columbia, Canada. Carbon taxes generally tend to be nominal taxes levied on energy products and motor vehicles, rather than on direct CO_2 emissions. Carbon taxes could have the effect of decreasing reliance on fossil fuel inputs and energy use in agricultural production.

Public-private partnerships

Perhaps the most recent and robust example of public-private partnerships is the Dutch Ministry of Foreign Affairs provision of financial support[14] to Solidaridad's work with the business community to make production chains more sustainable. Solidaridad's existing programmes in the global cultivation, trade and processing of soy, palm oil, sugar and cotton are being expanded and a new programme will be developed in the livestock sector. Together these sectors lay claim to more than 60% of all the available agricultural land (including rangelands) in the world. Solidaridad will receive a total of 29.5 million euros over the next four years. This amount will be doubled by contributions from the relevant industrial sectors. The Norwegian government has already pledged funding and other foreign donors are also expected to contribute, making this one of the biggest programmes for public-private development cooperation. This is unprecedented, as it is global, cuts across most commodity roundtables, is aimed at smallholders, and explicitly seeks to support actions to reduce GHG's at the producer level in developing countries. Coca-Cola, Unilever and other companies are involved.

The Dutch are also promoting public-private partnerships through the Dutch Sustainable Trade Initiative (IDH), leveraging partnerships to promote sustainable agricultural production and trade in key product and commodity areas, and investing € 525 million between 2011-2015 in the sustainability of major commodity supply chains (Dutch Sustainable Trade Initiative 2010).

Subsidies, taxes, financial incentives

Governments can draw on existing tools and channels to reorient and stimulate private sector investments towards climate-smart agricultural production. This includes redirecting existing subsidy and credit lines or using fiscal incentives. For example, the BNDES (Brazilian

[14] http://solidaridadnetwork.org/news/ministry-foreign-affairs-invests-solidaridads-producer-programme

National Development Bank) spends approximately US$10 billion annually within the agricultural value chains. Government can also play a crucial role in creating risk-sharing facilities to encourage private sector investments into sustainable agricultural development.

Argentina placed a 35% export tax on soybean exportation, and its deforestation programme, carried out as part of its commitments defined in the National Forest law of 2007, is funded via a 2% tax imposed on export agriculture commodities.

As mentioned above in Section 2 on palm oil, The Dutch Product Board for Margarine, Fats and Oils (MVO) has called on the EU to abolish import duty on RSPO certified sustainable Palm Oil. The current duty is 3.8% and removing this could make sustainable oil much more attractive to business customers, a potential boost in profits for producers.

Sector-specific climate policies

The European Commission has required that its member countries supply 20% of their total energy use in 2020 from renewable sources, and several countries project that bioenergy will provide half of this renewable energy. Performance in meeting the targets is displayed openly on the European Energy Commission website. Recognizing that unsustainable biomass production could erode the climate-related advantages of bioenergy, in 2007 the European Parliament requested the Commission take action and create a mandatory certification system for biofuels (in the Roadmap for Renewable Energy in Europe) (Vis et al. 2008). On 25 February 2010, the Commission adopted a biomass sustainability report which contains general criteria for member countries to follow, including a general prohibition on the use of biomass from land converted from forest, other high carbon stock areas and highly biodiverse areas. It is expected that mandatory sustainability criteria will be introduced as part of the EU Renewable Energy Directive.

A new study by the International Food Policy Research Institute (IFPRI), analyses the question of indirect land-use change (ILUC) in relation to the EU's Renewable Energy Directive. It finds that ILUC issues are a valid concern, but that the impact depends on the type of feedstock crop used as well as other factors such liberalization of international trade in biofuels. The study follows an earlier assessment that had already found that ILUC issues are valid, but could not determine their degree of magnitude with certainty. The study draws a number of policy-relevant conclusions, including: land-use related emissions could eliminate

more than two-thirds of direct emissions savings; mitigation strategies must be consistent across a wide range of policy areas and emissions from biofuel production should not be treated differently than emissions from other types of agricultural production with regard to trade rules; a differentiated emission coefficient by crop can be difficult to use since factors are sensitive to leakages across different markets; ethanol produces less land-use change related emissions than biodiesel and trade liberalization in ethanol can lead to overall lower emissions; and available technologies to increase yield and low carbon agricultural practices should be promoted to reduce demand for land.

It should be noted that there are huge differences in land use and GHG emission impacts between the various bioenergy supply chains. Some crops (such as corn in the US) require far more acreage and inputs per litre of biofuel than others (such as Brazilian sugar cane).

V The role of finance and investment

The only way to increase agricultural production by 70% over the next 40 years—with a smaller land-based footprint, while increasing yields in the face of adaptation to climate change impacts—is to harness global financial resources to enable transformative change in how agriculture is financed. This requires putting agricultural sustainability into business practices, lending and investment decisions, and mobilizing private sector investment and involvement on a scale unimaginable today.

The Global Harvest Initiative[15] estimated the private sector will need to help bridge an estimated $90 billion annual agricultural investment gap in the agricultural sector of developing countries in order to address food security needs up to 2050 (Motes 2011). The FAO's estimate is slightly lower, at $83 billion in agricultural investment required annually to feed 9 billion people in 2050.

[15] The Global Harvest Initiative was established in 2009 by Archer Daniels Midland Company, DuPont, John Deere, Monsanto and was joined in 2011 by IBM. Consultative Partners include the Congressional Hunger Centre, International Conservation Caucus Foundation, Conservation International, The Nature Conservancy, TransFarm Africa, and WWF.

David Nabarro, UN Special Representative on Food Security and Nutrition[16], has stated that structural defects in the world food system stem from decades of underinvestment. From 1980 to 2000, the share of official development assistance dedicated to food and agriculture fell from 18% to 3%. Given that over 50 of the world's poorest nations have economies almost 100% based on agriculture, the consequences for development have been serious (Imbert and Knoepfel 2011).

Most financial institutions do not yet systematically assess social and environmental impacts across all projects, but many institutions recognize the urgency and are reviewing options. An increasing number of investors have embraced the UN Principles for Responsible Investment, Equator Principles and other sustainability screens. Of those, an even smaller portion has potential interest in agriculture and promoting GHG emission reduction.

This section explores the criteria, metrics and incentives for dramatically scaling up investment and finance of agricultural activities that have GHG benefits, as well as steering investment away from high-emission and unsustainable agricultural activities, while reducing risk for investors, including:

1. Embedding environmental, social, governance (ESG) into investment decisions
2. Socially responsible investment
3. Managing risk
4. International Financial Institutions and Private Financing Affiliates
5. Bilateral Banks
6. An innovative private bank: Rabobank
7. Regional funds and innovative partnerships
8. Investors call for government action on climate change

What is offered below is a start to what needs to be a more comprehensive assessment and programme of work between key partners in the future (see recommendations section).

[16] Dr Nabarro is Coordinator of the High-Level Task Force (HLTF) on the Global Food Security Crisis, which was created by the United Nations Chief Executives Board in April 2008.

Embedding environmental, social, governance (ESG) into investment decisions

The most progressive investors are seeking to imbed environmental, social, governance (ESG) integration into all their investment decisions. Below are examples of how this is taking place, and what it means for investment in low-carbon agriculture.

The UNEP Finance Initiative and United Nations Global Compact launched the Principles for Responsible Investment (UNPRI) Initiative as a partnership between the United Nations and global investors, which are now recognized as the largest global force mainstreaming responsible investment practices. UNPRI's goal is to grow investor interest in environmental, social and corporate governance (ESG) issues, share best practice and support signatories in their fulfilment of the six PRI Principles. Assets under management now total US $30 trillion. Recent UNPRI innovations:

- A synergy between the UNPRI and Carbon Disclosure Leadership Index demonstrates how carbon disclosure can inform investment decisions, and motivate increased carbon disclosure ratings. In 2010, 14 investors targeted 204 companies that rated poorly against their peers on climate reporting. Results listed in the 2010 Carbon Disclosure Leadership Index (CDLI), showed that 72 target companies have now moved up from the lowest quartile. In total, 61 companies improved their CDLI score by more than 15 points in 2010 (UNPRI 2011).
- UNPRI created a sustainable palm oil working group, which chose to support the Roundtable for Sustainable Palm Oil.
- The UNPRI has recently pushed to provide practical guidelines for specific asset classes. Of those, UNPRI has looked at practices relating to investment in commodities, and PRI has working groups developing practical asset-specific principles for property and private equity.
- Related to the above point, interest in farmland investment as a new asset class is growing, so PRI promoted a PRI working group to develop implementation of the Farmland Principles, comprised of European and US investors representing $1.3 trillion in assets (all are signatories to the UNPRI). The principles were designed and endorsed by Swedish buffer fund AP2, Dutch investors PGGM, ABP and APG, Danish fund ATP, UK investors BT Pension Scheme and Hermes EOS, and US insurer and asset owner TIAA-CREF (Riley 2011). It is noted that estimates of

current investment in agricultural land ranges between US $5 and $15 billion. US pension fund TIAA-CREF has around US $2 billion invested in farmland of the $426 billion it has under management and is looking to expand its farmland holdings (McFarlane 2010).

Equator Principles: The Equator Principles are a credit risk management framework for determining, assessing and managing environmental and social risk in project finance transactions, based on International Finance Corporation performance standards on social and environmental sustainability and on the World Bank Group Environmental, Health, and Safety Guidelines. The Principles can be applied a full range of projects, and is often applied to project finance for the development and construction of major infrastructure and industrial projects. The Principles are adopted voluntarily by financial institutions and are applied where total project capital costs exceed US$10 million. The Equator Principles are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. Currently 72 adopting financial institutions in 27 countries have officially adopted the Equator Principles, covering over 70% of international project finance debt in emerging markets.[17]

Hard-wiring ESG into financial institution policies, process and business practices can be challenging, especially for large institutions (HSBC Investments is noted for doing so by creating training programmes for its 500 front office investment professionals in 18 countries and applying HSBC Investments' proprietary SRI rating system (the ESG/CRO methodology), analysts identify sector leaders which are raising the bar by demonstrating industry best practice, and then working with those leaders to leaders to define a sector benchmark).

While the process of understanding ESG issues related to commodities investments (including land) and developing appropriate strategies for responsible investors is nascent, the increased demand for commodity investments carries risks that ESG-motivated investors must consider: a) diverting scarce commodities away from the real economy and run the risk of constraining economic growth and hurting equity returns and b) the need for establishing global standards

[17] See http://www.equator-principles.com/

for specific commodities, industries and geographies to guide sound investment decisions (Knoepfel 2011).

Socially Responsible Investment

Socially responsible investment (SRI) funds have experienced remarkable growth since the mid-1990s, and the total market size of SRI initiatives in Europe reached €5 trillion in 2009, according to the European Social Investment Forum. European SRI investors tend to be institutional investors, representing 92% of the total assets under management, and bonds are the favoured asset class among SRI investors (53% of total SRI assets), while equities have dropped down to 33% (Eurosif 2010). In the US, an estimated US$3.07 trillion out of US$25.2 trillion in the US investment marketplace today, according to the US Forum for Sustainable and Responsible Investment.

Managing risk

Investors are also increasingly asking companies to identify carbon risks in financial disclosures (see UNPRI example, above), and see carbon disclosure and performance as an indicator of the quality of management and corporate governance. The US Securities and Exchange Commission (SEC) has made it clear that management teams have a duty to disclose the risks for the company from potential climate change, and the UK the Department for the Environment, Food and Rural Affairs (DEFRA) is contemplating whether mandatory carbon reporting should be brought into mainstream annual filings from April 2012.

Capital markets increasingly need broad metrics with which to measure carbon performance, rather than completing company-by-company due diligence. One means of achieving this is the S&P/IFCI Carbon Efficient Index. After the launch of the S&P US Carbon Efficient Index in March 2009, Standard & Poor's, under sponsorship of the International Finance Corp. focused on emerging markets, seeking to replicate the risk return profile of the S&P/IFCI LargeMidCap for emerging markets, but with an emphasis on carbon emissions. The resulting S&P/IFCI Carbon Efficient Index, launched in 2009, tracks the investment performance of the parent index, while the index constituents provide a 24% reduced exposure to carbon emissions.

- A key motivating factor for a company is the price of its stock. While indices do not drive stock market prices, they do bring attention to a specific theme, in this case

investing in a reduced-carbon exposure portfolio, by giving investors insight into how to achieve their goal of balancing environmental and financial factors.

- The S&P/IFCI Carbon Efficient Index includes 21 emerging markets and more than 800 stocks. Companies are ranked within their respective sector, incorporating their carbon footprint, calculated by Trucost PLC (S&P Indices 2009).

The sensitivity of major asset classes to investment risks, such as climate change impacts, is of increasing concern. Listed equities, government bonds, and investment grade credit all have high sensitivity to fundamental risk factors but not to climate change factors. In contrast, real estate, infrastructure, private equity, sustainable equities, efficiency/renewables and commodities are highly sensitive to climate change factors. Further, climate policy uncertainty is a notable source of risk for investors over the coming 20 years, contributing to as much as 10% to risk for a representative portfolio. Thus, analysts advise allocation to sustainable equities, efficiency or renewable assets, timberland and agriculture land, which could improve portfolio resilience (Mercer LLC et al. 2011).

International Financial Institutions and Private Financing Affiliates

The World Bank and International Finance Corporation (IFC) finalized a strategy in April 2011 to guide investment in the palm oil sector, largely driven by public concern over their role in financing oil palm plantations. In its assessment of new palm oil investments, IFC will utilize a new tailored country, sector and project risk assessment framework (via the Risk Screening and Assessment Tool) that takes into account the issues highlighted in the stakeholder engagement process. Projects in the palm oil value chain are likely to be categorized such that a higher degree of due diligence and environmental and social requirements will be required where risks are identified (World Bank and International Finance Corporation 2011).

The International Finance Corporation houses the recently launched the 10-year Biodiversity and Agricultural Commodities Program (BACP), which seeks to reduce GHG emission and biodiversity impacts of major commodities by leveraging market forces at all levels of the value chain and mainstream use of better management practices that decrease the impact of production on biodiversity. BACP will work in partnership with major players in four commodity markets who are willing to adopt more sustainable practices. The BACP is a multi-donor initiative with contributions from the Global Environment Facility (GEF), Japan,

the International Finance Corporation (IFC), the Netherlands, Norway, Luxembourg, Italy and New Zealand.

The commodities BACP focuses on are palm oil, soy, cocoa and sugarcane, which cover approximately 144 million hectares globally.[18] BACP now works in Indonesia, Malaysia, Brazil, Ghana and Côte d'Ivoire, which are major producers and exporters of these commodities. Projects have been approved for funding in the soy and palm oil sectors. EcoAgriculture Partners is in charge of the Monitoring and Evaluation Unit of the BACP, and as of June 2011, reports that BACP grantees have trained more than 700 soy and oil palm producers, traders, and other supply chain actors in improved production practices and certification systems; activities have led to the adoption of more sustainable production practices on nearly 1 million hectares of land; and grantees have addressed policy-related barriers to the wider adoption of biodiversity-friendly management practices by facilitating the adoption of six new or improved policies or regulations, with additional supportive policies now under consideration.

Bilateral banks

The German KfW Bankengruppe, as of 1 January 2011, now mandates that all funding activities of KfW Entwicklungsbank must be subject to an environmental and social impact assessment and a climate change assessment as defined in published guidelines (KfW 2011). This practice seems to be a principle increasingly adopted by bilateral banks and bilateral and multilateral donors.

An innovative private bank

Rabobank is the leading global agribusiness bank. Its International division focuses on food and agribusiness, while it focuses more broadly on financial services in the Netherlands. The Rabobank Group has approximately 59,400 employees, who serve about 10 million customers in 48 countries. On the lending and project finance side, Rabobank International broadened its foreign retail branch network and was granted a banking licence in India in 2011, providing increased leverage in in a key food and agribusiness market. Rabobank also has non-

[18] According to IFC website: http://www1.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/sustainable+business+advisory+services/biodiversity_bacp?presentationtemplate=ifc_ext_design/AlternatePresentationTemplate

controlling interests in seven partner banks with a highly agricultural profile. Loans to the food and agricultural sector last year amounted to €80.4 billion, €55.8 billion of which was issued to the primary agricultural sector (18% of their loan portfolio) (Rabobank 2011c.).

Because of its position as market leader, Rabobank expects to have to get even more actively involved over the next few years in discussions about food security and creating a more sustainable supply chain. Rabobank is capitalising on these developments by defining an integrated vision of themes such as the bio-based economy, water, energy and crop protection, supply chain integration, scale increases and food supply.

Rabo Development acquired an equity interest in Brazilian-based Banco Sicredi, and thus spread Rabobank's ability to engage in several initiatives to make food and agricultural chains more sustainable.

Rabobank has been on the Executive Board of the Roundtable on Sustainable Palm Oil for a few years and took a seat on the Board of the Round Table for Responsible Soy in June 2011. The bank is also involved in other sector impulses, such as Bonsucro (sugar) and the Better Cotton Initiative.

Rabobank's own CO_2 reduction commitment: 20% reduction per FTE between 2008 and 2013 – has been largely achieved by 2011 (mostly by reduced energy use and mobility) (Rabobank 2011c).

Regional funds and innovative partnerships

Impact investing occurring on a project-by-project scale is important to demonstrate feasibility of investment in projects reducing agricultural GHG's. Three examples are highlighted below:

EcoEnterprise Fund: Currently raising capital for EcoEnterprises Fund II, structured as a 10-year, closed-end fund. The fund is seeking to raise $30 million in capital, with an initial closing of $20 million to take place by June 2011, and has partnered with Root Capital, foundations and socially responsible investors to capitalize sustainable agriculture projects. The EcoEnterprise Fund was started in 2000 by the Nature Conservancy. Over ten years, $6.3 million was invested in 23 sustainable businesses that offer a wide range of innovative products: from organic shrimp to organic spices, Forest Stewardship Council (FSC)-certified furniture to biodynamic flowers, and acai. That investment produced impressive positive

benefits – 3,513 jobs, gains for 293 communities and conservation groups; $281 million in sales; $138 million in additional capital leveraged; and 860,773 hectares of land directly conserved.

African Agricultural Capital Fund: Four members of the Global Impact Investing Network (GIIN) Investors' Council – J.P. Morgan, The Bill & Melinda Gates Foundation, The Gatsby Charitable Foundation, and The Rockefeller Foundation – with support from the US Agency for International Development (USAID), announced in late 2011 their intention to invest $25 million of commercial capital that will launch the African Agricultural Capital Fund (AACF), managed by Pearl Capital Partners (PCP), a specialist African agricultural investment fund manager based in Kampala, Uganda. Over the next five years, PCP will invest the new Fund's $25 million in at least 20 agriculture-related businesses in East Africa, infusing equity and expertise into a sector that has suffered from under-investment, and paving the way for raising the productivity and incomes of at least a quarter of a million households. New investments will need to demonstrate that they can create positive financial returns for the Fund's investors, benefit large numbers of local farmers, and have an environmentally benign footprint.

The Schokland Fund is an initiative of Project 2015, which is part of the portfolio of the Dutch Minister for Development Cooperation and aims to make up for the delays encountered in achieving the Millennium Development Goals. The Schokland Fund has total assets of 50 million euros. The goal is to foster social and environmental business opportunities in Central America and Dominican Republic through access to innovative financial resources and technical assistance.

Investors call for government action

Investors motivating government action: In a joint statement issued on 19 October 2011, the Global Investor Statement on Climate Change[19] was released by a group of 285 investors representing more than $20 trillion in assets, stressed the urgent need for policy action which stimulates private sector investment into climate change solutions, creates jobs, and is essential for ensuring the long-term sustainability and stability of the world economic system.

[19] http://investorsonclimatechange.com/

The statement encourages governments to define a pathway towards a high ambition, multilateral, rules-based regime that builds on the work of the past two decades, and in particular:

- Continues to work towards a binding international treaty that includes all major emitters and that sets short-, mid-, and long-term greenhouse gas emission reduction targets.
- Supports the development of robust carbon markets that provide strong and sustained price signals on carbon, hence sending economic signals that will facilitate the flow of private capital.
- Supports the development of the Green Climate Fund and other comparable funding mechanisms as part of broader efforts to scale up climate-relevant financial flows, from both public and, in particular, private sources, to developing countries.
- Accelerates efforts to reduce emissions from deforestation and forest degradation (REDD+).

In summary

In summary, the importance of altering how agriculture is financed is now being recognized, and the beginnings of criteria, metrics and incentives to guide progressive engagement is taking shape. The most progressive institutions and investors are working to imbed environmental, social, governance (ESG) integration into all their investment decisions. Multilateral and bilateral banks are adopting frameworks for risk and climate assessments that could be applied by other financial institutions. Rabobank offers a robust example of how private banks can make financing sustainable agriculture a viable component of their business. Regional funds and innovative partnerships are demonstrating, at smaller scales, what investment vehicles work to support the financing of agricultural activities that have GHG benefits, while lowering risk and providing adequate returns.

The challenge, however, is how to create a broader interest in adoption of risk assessments and screens and lending criteria. As one interviewee said, "It is not mainstream yet, and until Fidelity and other mainstream players endorse this approach, it will continue to be a niche activity." Another interviewee noted that much of the activity in this area is occurring at policy and conceptual levels, but it is not yet clear how investors can engage, stating, "Investors feel they should know about this, but they don't know what do with the

information." Many investors interested in this area need to develop their own due diligence mechanisms, and there are not yet enough platforms that aggregate private equity and debt investors. At a minimum, based on the literature review and interview responses, the following is needed:

1. **Applying a sustainable agriculture lens to investment planning and decisions**: Partnerships created between institutional investors, impact investors, banks (Rabobank and Triodos Bank in Europe, which has a strong track record lending to organic food producers in Europe) and key entities tracking sustainability metrics in agricultural lending and finance that impacts agricultural commodities and land use (including the Prince's Accounting for Sustainability Project, the Munden Project, and Forest Footprint Disclosure). Goals of this partnership could include how to embed sustainable agriculture metrics into ESG indicators, further refine tools and metrics for investment and lending criteria to promote sustainable approaches in current agriculture sector activities, and consider how to increase the scale of institutional investors seeking to engage in climate smart agricultural investments. Consideration should be given to assembling compatible financial entities, and perhaps smaller, focused work-groups, for instance pension funds and global asset managers as one group, sovereign wealth funds and private sector partners, and finally private sector financial institutions involved in microfinance (McNellis 2009).
2. **Assessment of what investment vehicles could serve different asset classes of investment** (private equities, public equities, etc.), how to minimize risks for investors, and strategies to scale up these investments.
3. Consider how a Private Sector Facility (Sierra 2011) could be created under the Green Climate Fund, which would provide a vehicle the for public-private partnerships that can increase access to private capital for climate-smart agriculture projects in less mature markets. Further, explore options for a sustainable agriculture bond as a means of aggregating investments.

VI Areas for exploration

Based on this review, two themes emerge as ones important to consider as a basis for further research and partnerships. These topics were either stressed by many interviewees, or naturally emerged as critical enabling conditions in order to scale up corporate sector commitments to reducing GHG's at producer levels in developing countries. There are many other insights, opportunities and recommendations mentioned in the paper that are not reflected in this section.

1. Streamlining of methods and approaches. This is a critical issue and leadership is needed to bring the best expertise together, convene a sensible approach, and recommend solutions. At a minimum, there is a strong need for definition of common metrics and rules, understanding of how different approaches relate to the common metrics so they can be compared, harmonization among approaches, guidance on when to apply different approaches and what margin of error or reliance on default values applies to each approach. This may result in a proposal for a meta-standard, or the integration of common metrics into existing standards and metrics.
2. Mainstreaming sustainability criteria in agricultural finance and lending activities.
3. If $83 billion yearly in agricultural investment will be required to feed 9 billion people in 2050, the challenge is not only to leverage and secure that funding, but to ensure the application of sustainability criteria to the bulk of that investment. Section V above skims criteria, metrics and incentives for dramatically scaling up investment and finance of agricultural activities that have GHG benefits, as well as steering investment away from high-emission and unsustainable agricultural activities. Section V ends with a brief set of recommendations, which may best be taken up by a strategic partnership between institutional investors, impact investors, banks and key entities tracking sustainability metrics in agricultural lending and finance, to craft a joint agenda for a more comprehensive assessment of how to apply a sustainable agriculture lens to investment planning and decisions, and transform the signals investors and lenders send to the agricultural sector.

Finally, underpinning all of the above is the need to more clearly assess the impacts CSR and supply agreements have in promoting sustainability and reducing GHG emissions at producer levels and across agricultural supply chains. It is recommended that more corporate sourcing

commitments consider how to include considerations of permanence and leakage in supply agreements seeking to reduce GHG emissions, as this is an essential attribute of viable climate change strategies. CSR and supply commitments must strive for transparency of metrics and reporting on sustainability indicators and GHG emission performance publically, with continuous improvement, and industry-led initiatives will be important vehicles to achieve that. Lastly, further consideration should be given to the interaction between private sector, public sector and government-led interventions, and finance/lending in order to leverage substantial change in sustainability of agri-food chains and raw material sourcing, to decrease land and climate pressures.

Annex 1

List of Interviewees

Name	Organization
Betty Cremmins	Carbon Disclosure Project
James Hulse	Forest Footprint Disclosure
Katie McCoy	Forest Footprint Disclosure
Mark Pettigrew	Pepsico
Andréanne Grimard	Prince's Charities International Sustainability Unit
Thomas Ursem	Rabobank
Emeline Fellus	SAI Platform
Don Seville	Sustainable Food Lab
Daniela Malin	Sustainable Food Lab
Stephanie Daniels	Sustainable Food Lab
Christy Slay	The Sustainability Consortium
Sarah Elaine Lewis	The Sustainability Consortium
Sapna Shah	The Global Impact Investing Network
Emma Keller	Unilever
Jon Hillier	University of Aberdeen
Peter Dewees	The World Bank
Gerhard Dieterle	The World Bank
Stephen Russell	World Resources Institute

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