Incorporating Agroforestry Approaches into Commodity Value Chains

Edward Millard

Abstract The productivity of tropical agricultural commodities is affected by the health of the ecosystem. Shade tolerant crops such as coffee and cocoa benefit from environmental services provided by forested landscapes, enabling landscape design that meets biodiversity conservation and economic needs. What can motivate farmers to apply and maintain such landscape approaches? Rather than rely on a proliferation of externally funded projects new opportunities are emerging through the international market that buys these commodities. As part of their growing commitment to sustainable supply chains, major companies are supporting agroforestry approaches and requiring producers and traders to demonstrate that the source of their commodities complies with a set of principles that conserves forested landscapes and improves local livelihoods. The paper presents examples of international companies that are moving in this direction, analyzes why and how they are doing it and discusses the impact that has been measured in coffee and cocoa communities in Latin America and Africa. It particularly considers the role of standards and certification systems as a driver of this commitment to promote profitable operations, environmental conservation and social responsibility throughout the coffee and cocoa value chains. Such approaches are already being taken to scale and are no longer operating only in small niches of the market but the paper also considers the limitations to growth in this market-based approach.

Keywords Agroforestry · Certification · Sustainability · Markets · Brands

A Market Mechanism for Agroforestry

Coffee and cocoa have been produced traditionally in agroforestry systems. These farming systems retain a diverse canopy of trees that provide shade, shelter, fuel sources, additional subsistence and cash crops, animal fodder and a range of environmental services that contribute to the farm’s economy (McNeeley and Schroth 2006; Gockowski and others 2010). Trees may also eventually be sold for timber. The environmental services provided to coffee and cocoa by planting or conserving trees include: maintaining soil fertility; providing natural mulch that protects the soil surface and may reduce the need for chemical fertilizers; improved pollination; and protecting new plants from extreme rain, sun and wind (Tscharntke and others 2010; Rice and Greenberg 2000). Research in cocoa farms in Panama found higher numbers of insects and spiders attacking the cocoa plants, and more leaf damage when native birds were prevented from visiting the plantation than it found in normal farms, illustrating that maintaining bird populations through forest cover plays an important role in controlling harmful insects (Van Bael and others 2008). These diverse economic functions make trees beneficial neighbours for coffee and cocoa on a farm (Bentley and others 2004).

Agroforestry systems also conserve biodiversity. The semi-forested structure in an agroforestry farm, as opposed to a monocrop plantation system without trees, provides habitat for migratory birds and secondary habitat for species that tolerate a certain level of disturbance (Rice 2010; Schroth and others 2004). Agroforestry systems situated...
close to natural forest or occurring in landscapes with high forest cover may have a greater diversity of forest birds, mammals and insects than those occurring in areas with little remaining forest biodiversity (Dahlquist and others 2006). Many coffee and cocoa farms are situated close to such natural areas.

However, coffee and cocoa farmers have increasingly moved away from traditional agroforestry systems in the last decades. In an effort to increase their production, farmers have removed shade trees from their farms. The trend is particularly evident in recently established farms, which are often created by clearing forest for new planting, and has often been encouraged by policies from governments anxious to increase rural incomes and generate foreign exchange (see Guillerme and others 2011). Many coffee and cocoa landscapes in Latin America and Africa now comprise fewer forest fragments on farm and much reduced expanses of conserved forest than some decades ago (see for example Gockowski and Sonwa 2010).

This practice of reducing the number of trees on farms can produce increased yields, and the introduction of new hybrid cocoa plants will increase productivity and income, especially as these may reach peak yield earlier (Obiri Darko and others 2007). However, the benefits can be sustained over the long term only with additions of chemical fertilizers, insecticides, herbicides and fungicides. These inputs, together with the new higher yielding hybrid plant varieties, may be out of reach of the typical small holder farmer with a small parcel of land and limited resources. Even for a better off farmer, or if inputs are provided under an agricultural support program, accessing them in a timely way may be difficult in certain regions. If trees are not incorporated in the farm, the costs of production cannot easily be reduced without substantial deterioration in yield potential in future years. A more intensive production system makes the coffee and cocoa plants more vulnerable to severe dry seasons and tends to reduce their economic life (Ruf and Zadi 1998). The removal of trees has caused problems of land degradation, soil erosion, deterioration of water quality and biodiversity loss, which in turn threaten long-term productivity (Leaky 2009). Hence, given the volatile prices for commodities, applying more intensive farming systems may contribute to greater economic vulnerability of small holders (Hagger and others 2009).

To put production onto a more sustainable footing requires rehabilitating farmland and adopting land management practices that conserve a healthy ecosystem and provide a viable livelihood for the millions of families who depend on these crops. Agroforestry, with its dual concern for a stable ecosystem and producing food and cash crops that provide more income security to farmers, can thus play a central role in the future production of tropical commodities.

The question examined in this paper is, how can international markets, where coffee and cocoa are mostly sold, provide incentives for farmers to apply agroforestry approaches and for public policy in the producing countries to promote them? In particular, it considers the growth of voluntary certification schemes as an increasingly important market mechanism enabling companies buying coffee and cocoa to put into effect and communicate to their customers a commitment to support agroforestry production systems. The reason that major companies are now making such commitments is to mitigate the risk of long term supply shortages of their raw materials through environmental degradation and declining productivity.

Certification is a system in which individual farms or groups of small holder farmers may receive a certificate for complying with a set of principles and criteria defined in a standard. Certification systems have four main characteristics: (i) a published norm or standard that defines certified qualities within the system, (ii) an inspection process, carried out by third-party inspectors, that determines whether practices conform to the published standards, (iii) a quality label or seal that alerts consumers to the presence of certified qualities, and (vi) a network of institutions, both governmental and non-governmental, operating at local and transnational scales, that govern labels and inspections, and set standards for certification practices (Mutersbaugh and others 2005).

Several voluntary certification systems operate in the coffee and cocoa markets. They are concerned not so much with the quality of the commodities, which are covered by recognized trade norms, nor with their safety, which is the subject of legislation in most consuming countries; but rather with the benefits that production and trading systems provide to the people who grow the commodities and the natural environment where they are grown. They verify compliance with their principles and criteria through an independent audit. Companies that source coffee and cocoa from farms and groups that achieve a certificate may then use the certification seal in the market.

The four main voluntary certification systems present in the coffee and cocoa industries are: fair trade, organic, the Sustainable Agriculture Standard of the Rainforest Alliance, and Utz Certified. These are all accredited by the International Social and Environmental Accreditation and Labeling (ISEAL) Alliance. ISEAL is the recognized accreditation body for the voluntary certification systems. Its Code of Good Practice for Setting Social and Environmental Standards sets out the required consultation process for voluntary standards (ISEAL 2010). This accreditation provides companies engaging with the certification systems the security that they are credible. This credibility is critical for companies to avoid accusations of green-washing, a term that means making claims to be
environmentally responsible but without verifiable substance behind the claim. The value of a credible certification system to a company is that it provides objective, verifiable evidence of the company’s buying practices.

The fair trade, organic, Sustainable Agriculture and Utz Certified standards all have environmental criteria, as do other certifications operating in the coffee and cocoa sectors, including those managed by the Smithsonian Migratory Bird Center and Starbucks, respectively. An independent study of the four systems undertaken by the German technical agency GIZ found that the Sustainable Agriculture Standard of the Rainforest Alliance had the most elaborated environmental principles, which include several agroforestry practices; Utz Certified also requires farms to conserve the forest fragments on their farms (Heise 2010). Therefore, an analysis of Rainforest Alliance’s experience in promoting its certification scheme to the international market provides insight into the way that companies are supporting environmental principles and agroforestry in coffee and cocoa farming.

The Sustainable Agriculture Standard was developed by a group of nine non-profit organizations, all of which are based in tropical agricultural countries. Together, they form the Sustainable Agriculture Network, an independently registered organization, which owns the Standard. The criteria in the Standard relating to agroforestry are summarized in Table 1.

### Agroforestry Principles and Company Buying Behaviour

Companies make buying decisions in their supply chains according to traditional commercial criteria: notably, cost, quality and reliability of supply. To achieve market driven agroforestry practices requires the buyers to introduce additionally social and environmental criteria into those decisions. This inevitably makes their work more complex and may threaten achieving their commercial performance measurements, on which their annual bonuses may be based; so they may understandably feel uncomfortable about doing this. The process under which the change comes about in companies is usually in three stages. These can be explained through a brief review of a process that began 20 years ago—largely centered on the coffee industry—and is now gathering pace at an unprecedented rate in the wider food industry.

**Campaign Led**

At the end of the 1980s, activist non-government organizations (NGOs), spurred by the collapse of the International Coffee Agreement and the world price of coffee, brought fair trade coffee out of charity shops and church halls and into the high street. Led by Max Havelaar in the Netherlands, organizations in Europe and then North America and Australasia developed fair trade labeling initiatives that enabled coffee companies to place a seal on products that contained coffee bought at the required minimum price from producers on the fair trade register (Renard 2005). Fair trade is primarily a movement to improve prices paid to small-scale tropical agricultural producers and strengthen their organizations. Its impact on bringing additional income to small holder coffee farmers through improved trading arrangements has been significant (Ronchi 2002), as it has on raising awareness among companies and consumers of the difficult situation of small holders supplying their crops to international markets. The early adopters of fair trade were mostly smaller companies looking to gain competitive advantage from using the seal. For example, in UK, in 1992, the chocolate company, Green and Black’s (then independent and small; later acquired by Cadbury and now a much larger brand) was the first to acquire the fair trade seal. Persistent campaigning and the success of fair trade products gradually persuaded some mainstream coffee companies to introduce certification seals in a small way into their product portfolio, but this was initially kept in the margins of the business strategy, and was not necessarily an indicator of the companies’ overall brand positioning. Nestlé launched Nescafé Partners’ Blend in UK as a fair trade coffee but did not extend the seal to other Nescafé brands.

**Awareness Led**

From the middle of the 1990s and through the first decade of the 2000s, corporate interest in looking more closely at the social and environmental conditions where they sourced tropical commodities increased dramatically. Companies began to analyze the problems, identify opportunities for becoming involved in addressing them and the risks of not doing so (Millard 2010). Corporate social responsibility departments grew in strength, engaged with NGOs and provided the companies’ buyers with information about the situation at origin. This gradually caused a change in attitude from defensive response to assertive adoption of social and environmental initiatives, with companies evaluating their business risks from supply difficulties and their reputation risk if not perceived to be a responsible corporate citizen. In the light of persistent poverty in tropical agricultural communities and the emerging concerns of climate change and deforestation, companies depending on tropical commodities began to realize the need to secure the future of their raw materials by taking steps to ensure that the ecosystem in which they grow maintains its production capacity, and that the
farmers earn enough to make farming attractive to the next generation (Rosenberg and others 2009).

In this new climate of awareness, a number of companies responded not by transforming their buying practices but by investing in projects that addressed the issues in a particular location, while not committing the buying team to changing their traditional criteria. NGOs were usually partners in such projects which individual companies undertook, as were industry associations such as the World Cocoa Foundation, which adopted in 2008 a set of Sustainability Principles and Goals that include three principles of sound environmental stewardship.

At the same time, some companies began increasing their commitment to improving conditions at origin by committing some of their brands to a new sourcing policy. Sales of all certification systems rose strongly and they expanded into new sectors such as forestry and fisheries to meet industry and consumer concerns about sustainability (Potts and others 2010; Mutersbaugh and others 2005). Other types of initiatives came up. Industry-led standards were developed by multi-stakeholder round tables, such as the Common Code for the Coffee Community (4C), which introduced and tested its code from 2004 to 2006 and updated it in 2009. Other round tables have produced standards for palm oil and sugar. Some individual companies developed their own sustainable sourcing programs for the most important tropical agricultural commodities in their supply chains. Examples include: Unilever’s Sustainable Agriculture Programme, Starbucks C.A.F.E. (Coffee and Farmer Equity) Practices, and Nespresso’s AAA Sustainable Quality Programme.

### Table 1

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Details</th>
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<tbody>
<tr>
<td>2.1</td>
<td>All existing natural ecosystems, both aquatic and terrestrial, must be identified, protected and restored through a conservation program.</td>
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<td>2.4</td>
<td>The harvesting of threatened or endangered plants or species is not permitted. Cutting, extracting or harvesting trees, plants and other non-timber forest products is only allowed if the farm implements a sustainable management plan approved by the competent authorities, and has all the permits required by law.</td>
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<td>2.5</td>
<td>A vegetated protection zone must be established by planting or by natural regeneration between different permanent or semi-permanent crop production areas or systems.</td>
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<td>2.7</td>
<td>The farm must establish and maintain barriers of permanent native vegetation with trees, bushes or other types of plants, between the crop and areas of human activity, as well as between production areas and on the edges of roads.</td>
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<td>2.8</td>
<td>Farms with agroforestry crops located in areas where the original natural vegetative cover is forest must establish and maintain a permanent agroforestry system distributed homogeneously throughout the plantations, meeting the following requirements: a. The tree community consists of minimum 12 native species per hectare on average. b. The tree canopy comprises at least two strata or stories. c. The overall canopy density on the cultivated land is at least 40%. Farms in areas where the original natural vegetation is not forest—such as grasslands, savannas, scrublands or shrublands—must dedicate at least 30% of the farm area for conservation or recovery of the area’s typical ecosystems. These farms must implement a plan to establish or recover natural vegetation.</td>
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<tr>
<td>8.1</td>
<td>The farm must have an integrated pest-management program based on ecological principles for the control of harmful pests (insects, plants, animals and microbes). The program must give priority to the use of physical, mechanical, cultural and biological control methods, and the least possible use of agrochemicals.</td>
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<td>9.2</td>
<td>The farm must have a soil or crop fertilization program based on soil characteristics and properties, periodic soil or foliage sampling and analysis, and professional advice.</td>
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<td>9.3</td>
<td>The farm must use and expand its use of vegetative ground cover to reduce erosion and improve soil fertility; structure and organic material content, as well as minimize the use of herbicides. There must be a vegetative ground cover establishment and expansion plan, indicating the areas with existing cover and those where cover will be established.</td>
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<tr>
<td>9.5</td>
<td>The establishment of new production areas must be based on land use capacity studies that demonstrate long-term production capacity. The cutting of natural forest cover or burning to prepare new production areas is not permitted.</td>
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Business Strategy Led

As marketing teams began to put certification seals on their brands, so buyers began to align their behaviour to the messages from their corporate social responsibility teams, with new concern for environmental issues now fully alongside an interest to alleviate poverty. New alliances were formed that helped companies source coffee and cocoa farmed according to social and environmental best practices, such as Starbucks with Conservation International and Kraft Foods with Rainforest Alliance. Kraft brought mainstream coffee and chocolate brands to European and North American markets with the Rainforest Alliance Certified seal. Once a company aligns
a mainstream brand to social and environmental values, it has moved along the path from corporate social responsibility to business operations and the dynamic is now led by the marketing teams, from which the buyers take their lead, with other operational divisions in support (van Heuven 2009). The capacity of this new business paradigm to grow is illustrated by three leading companies. In 2008, Starbucks, which had already begun working with fair trade, made a public commitment that all its coffee would be “responsibly grown and ethically traded by 2015”. In 2009, Mars, Incorporated announced that it would “commit to fundamentally changing the way sustainable cocoa farming practices are advanced by aiming to certify its entire cocoa supply as being produced in a sustainable manner by 2020”. It launched its chocolate brand Galaxy in UK with the Rainforest Alliance seal in 2010 and its flagship Mars Bar in Australia with the same certification seal in 2011. In 2010, Unilever, which had already committed in 2007 to sourcing all of its tea sustainably, and to using Rainforest Alliance certification for all its Lipton tea bag products globally by 2015, extended this commitment by announcing its Sustainable Living plan, under which it commits to sourcing all its agricultural raw materials sustainably and helping more than a billion people take action to improve their health and well-being. Tea is mostly grown in tropical ecosystems where tea estates are often bordered by forest and make a direct impact on conservation and local livelihoods.

Sustainability and Agroforestry

These commitments have placed sustainable sourcing at the center of modern business strategy. Because leading international companies are such large buyers of raw material, they have established a new norm for their industries and their competitors have little choice but to react, in order to avoid losing market share. Thus, sustainable sourcing, incorporating agroforestry practices on coffee and cocoa farms, enters a new phase where it becomes not only a viable mainstream market option but also starts to become a requirement for credible supply chain management.

While companies are increasingly committing to adjusting their buying policies to provide an incentive for farmers to apply agroforestry practices, it is not the concept of agroforestry itself that they communicate through their products. For one thing, most consumers would find it too complex. Detailed information about the farming practices can be provided on web sites and other supporting materials, but for communication through product labeling and point of sale, companies need simpler messages with more immediate resonance for the consumer. Moreover, most consumers and retail buyers do not—and cannot reasonably be asked to—understand the issues relating to land degradation and livelihood vulnerability in tropical countries. What they understand, and in increasing numbers want to support through their purchases, are the concepts of treating farmers decently and conserving the natural environment where they farm. Thus the agroforestry concept is being described to international markets in other terms, such as “sustainable land use” or “environmental sustainability”. Similarly, the standard promoted by Rainforest Alliance, which includes core agroforestry practices, especially in cocoa and coffee farming, is called the Sustainable Agriculture Standard.

Mainstreaming the Opportunity for Coffee and Cocoa Agroforestry in the Value Chain

While the incentive in mainstream markets to support agroforestry practices in coffee and cocoa farms is now established, the pace and scale at which farmers apply the practices and companies and consumers commit their buying budgets to them will depend on several factors, mainly their feasibility, complexity, cost, and perceived benefit compared to the risk of not making a change. These factors are now considered from the perspective of the main value chain participants.

Farmers

The factors influencing farmers to change their practices include: the applicability of the proposed change to the farm environment; farmers’ awareness and understanding of the change proposed; their estimates of the return on the investment in labour and land; their access to land, labour, and water; their access to social capital, particularly where group action is needed; the availability of essential inputs, particularly seed or seedlings; their access to financial capital; and the degree of risk and uncertainty (Denning 2001).

The new market interest in building a supply of certified coffee and cocoa has brought a new risk-mitigating factor to bear: premium payments. Companies have established the practice of paying a premium above the market price for certified coffee and cocoa. This premium aims to compensate farmers for their additional labour, input and planting costs, as well as the cost of the certification audit. In effect, the price premium pays the farmer to conserve and restore the ecosystem and as such is a payment for environmental services. In most cases, especially when dealing with small holders, as many coffee and most cocoa farmers are, companies wanting to buy certified product are also facilitating training and extension services for the
farmers and their associations in the practices required to achieve the certification. Thus, farmers increase both their interest and ability to manage such issues as shade, soil fertility and biological control of pests and diseases.

The importance of this market-driven support through price premiums and technical assistance for agroforestry practices is that it provides an economic bridge to the longer term benefits of improved farm performance that can result from agroforestry systems. The United States Agency for International Development found in a study of coffee farms applying the Sustainable Agriculture Standard and C.A.F.E. Practices that productivity increased on average by three times that of a control group (Romanoff 2008). In Côte d’Ivoire, a survey by GTZ of certified cocoa farmers who had received training in integrated crop and pest management, pruning of trees, seedling nurseries, and agroforestry, reported improved productivity by up to 30% and also increased awareness about post-harvest handling for quality (Krain and others 2011). This improved productivity will usually take some time to become evident but eventually is a more important incentive for farmers to apply agroforestry practices that lead to certification, because price premiums are volatile and likely to decline as the availability of certified coffee and cocoa grows. Moreover, farmers may not find a market for their product as certified, and therefore receive no premium; whereas the benefit on their farm has value in any market.

This present market trend of companies that buy tropical agricultural commodities making major commitments to certification and sustainable sourcing, and the accompanying investments in technical assistance, present an unprecedented opportunity to educate farmers in agroforestry systems and improve their access to services and inputs that they will need to develop and maintain them. However, even with strong market signals, there are many constraints for farmers to change their practices towards agroforestry systems, and achieve certification. Those constraints are of three broad types.

The first category of constraints is the difficulty for small-scale tropical farmers to access the inputs, financial and business services that they need in order to adopt new technologies, plant high-yielding material and apply appropriate fertilizers (De Schutter 2010). Most farmers live a long distance from training or service centres even if training courses and extension services are available. They have competing claims on their time from their farm, families and communities and lack cash to invest in farm improvements. There are shortages in most tropical rural communities of: storage facilities; rural infrastructure (roads, electricity, information and communication technologies) and therefore access to regional and local markets; credit; and insurance against weather-related risks.

The degree to which new market opportunities can stimulate economic benefits for small-scale tropical farmers is being extensively researched and discussed in a growing body of literature around value chain governance. It has been demonstrated that standards tend to exclude smallholders by making market demands more complex (Borot de Battisti and others 2009). As a result, measures for their inclusion are required. Rainforest Alliance’s experience to date is that, with sufficient training, smallholders can attain certification. Over 50,000 smallholders in Africa and Latin America have done so. Nevertheless, it requires a high level of organization and investment so that local trainers can reach individual farmers. Yet many producer associations are weak and the level of rural entrepreneurship is generally low. If producers do not fulfill an order, it removes the confidence of companies to invest in them. Moreover, most coffee and cocoa farmers are not organized in any kind of association. Because of such constraints, more time is needed to assess the real growth potential of the certification model.

The second category of constraints relates to public policy and investment. Many coffee and cocoa farmers do not own their land and this may completely remove any incentive for them to invest in the farm’s long term improvement. Lack of ownership of not just the land but also of any trees that are conserved by the farmer has been a constraint in, for example, Ghana, the world’s second largest cocoa producer (Ruf and others 2006). Insufficient government investment in agricultural research and development, and in support to farmer’s organizations and cooperatives further limits access of farmers to technical knowledge.

The third category of constraints is the diversity of opinion on the benefits of different production systems. There is debate about and ongoing research into the benefits of shade, in terms of its value to both coffee and cocoa and also to the farmer for supplementary income, either from other crops or timber. One study found that these represented only 2.5% of income for cocoa farmers (Bentley and others 2004). As coffee and cocoa plants evolve, with new hybrid varieties, farmers need to adapt their choice of trees, not returning to the traditional agroforestry systems but rather selecting commercially oriented species, often in lesser density than in the past (Ruf and others 2006).

Certification’s major long term value to farmers depends on the extent to which it catalyzes the flow of information, technology, inputs and services to farmers that enable them to improve their returns from the farm and motivate them to pass their farms on to the next generation. What certification is achieving is a new stimulus to investment, particularly from the value chain. Its long term impact will depend on its demonstrating...
how these investments have helped unlock the constraints to improved farm performance.

Traders and Processors

A commodity trader buys from the producers when they need to sell, finances the stocks as required, processes and/or classifies the commodity as needed, and delivers to the customers, according to their requirements, managing the risks involved in this process (Rosenberg and others 2009). Most of the large trading companies in coffee and cocoa operate across the ocean and manage both export and import. They are powerful in the value chains because the coffee roasters and chocolate manufacturers need to source their raw materials from them: there are no substitutes for coffee and cocoa. The business model of traders is based on as high volumes as possible and competitive, low margins to cover the buying, financing, transport, storage and handling costs. This model cannot absorb a significant amount of extra cost when trading certified product. Trading certified coffee and cocoa may incur three types of cost: paying a price premium to the farmers, providing training to the farmers; and adapting storage and handling operations to the requirements of a certification system, such as maintaining traceability.

Traders need the farmers and groups to fulfill buying contracts in a timely way and according to specification. Certification impacts the power relationships in the value chain because certificates are held by the producers. This is especially so in the early stages of a certification market when supply is short. Traders have increasingly acquired capacity to manage certification now that it has become mainstream business strategy, in order to position themselves more competitively for selling into the new differentiated markets and thereby increase their market share as brands move towards sustainable sourcing policies. Training farmers enables them to build stronger relations and secure supply.

Traders and processors are affected if there is a requirement to segregate coffee and cocoa that has been produced according to social and environmental criteria. Segregation permits tracing the material to its farm or group origin and has increasing business value as food regulations tighten and concerns about food safety grow. Some certification schemes require full traceability of certified coffee and cocoa, but this is not applied equally. The mass balance system of matching the quantity of material used in factories to the total quantity of certified material bought without actually preserving the identity of the material through processing and manufacture is more widespread than is realized by consumers because it saves cost of altering operations. Traders normally look to recover additional costs involved in certification from their clients through an additional payment or margin. Some cost is usually also pushed back upstream to the producers, with a trader advancing the funds for training and recovering them once they buy the commodity.

Roasters and Brand Manufacturers

These are usually the main market drivers of farmers adopting agroforestry practices. If a brand places a certification seal on its product, then it has a means of communicating to consumers about the practices in its supply chain. One of the key reasons that companies sign up to third party certification systems, as opposed to developing their own codes of practice, is that they can then talk about their work more credibly, because it has been objectively endorsed by the certification body that is in turn accredited by the ISEAL Alliance. Consumers are skeptical of companies talking about themselves with no independent verification. The manufacturers hope to turn this additional brand value into market advantage. This market value, combined with the supply risk management value of an agroforestry approach, leads companies to accept the cost and complexity of certification and send messages down the supply chain to farmers to become certified and to traders to supply certified material. For example, soon after certifying the UK tea brand leader PG Tips with Rainforest Alliance, Unilever won the account to supply tea to McDonald’s, which had already committed its coffee to Rainforest Alliance Certified from Kraft. These are the type of key buying decisions that work back to creating demand for agroforestry practices on farms.

In seeking differentiation from their competitors, companies still have to safeguard their core commercial concerns—cost, quality, reliability of supply. The social and environmental criteria can only be added to those requirements; they cannot substitute for them, except in insignificant niche markets. Moreover, the taste profile of brands has to be maintained at all costs. Once a company has committed a brand to carrying a certification seal, it is assuming supply risk. It has little flexibility in interchanging supplies, because different origins have different taste profiles. There is often a large gap between the supply requirements of a large brand manufacturer and the supply capacity of a certified group of small holder coffee or cocoa producers. This may require additional holding of inventory to reduce risk but in turn adding cost.

The brand manufacturers tend to absorb the additional costs passed on by traders and processors. However, whereas in niche markets, the manufacturers can often increase the retail price of the differentiated product, this is usually not possible in mainstream markets. Most roasters and brand manufacturers sell a significant percentage of their products to large retailers, which often do not accept
price increases for certified product. As demand for certified coffee increases in the high street from supermarkets and coffee shop chains, roasters need to offer it to protect or grow their market. This is how the costs of promoting agroforestry practices are gradually being absorbed into the value chain. However, the additional costs implicit in the certification model directly impact the scale of take up by brand manufacturers. Several have told Rainforest Alliance that while they would like to buy more certified coffee and cocoa, their flexibility on price is very limited and for purely cost reasons brands have decided against or delayed decisions on using the certification seal.

Consumers

No company would make the type of commitments to certification occurring now in the international market without the confidence that consumers will respond positively. The soaring sales of certified products are evidence that the confidence is justified. Figure 1 shows the growth in hectares certified on coffee and cocoa farms in compliance with the Sustainable Agriculture Standard.

While fair trade and later on other certification systems undoubtedly raised consumer awareness of the economic, social and environmental difficulties faced by small-scale tropical producers, the recent dramatic growth is due less to new consumer pressure and more to the companies that have become informed, concerned and responsive to the threat to their long term supplies of raw materials, and are taking the message to responsive consumers. Most consumers are not well informed about the farming practices of the products they consume. They are primarily concerned about the health, safety and quality of food products. This concern does drive demand for organic agriculture because an important part of the proposition of organic certification is health benefits for consumers. Many organically certified products derive from the consumer countries. The other main voluntary certifications are focused on tropical countries and promote the benefits for producers, their communities and landscapes. Consumers are responding in increasingly large numbers when companies take a sustainability initiative because they are increasingly informed, affluent and concerned about the well bring of producers and their natural environment (Byers and others 2008). The LOHAS (Lifestyles of Health and Sustainability) movement, which runs a web platform, claims from its research that 19% of US consumers belong to the segment and spends an estimated $209 billion on goods and services focused on health, the environment, social justice, personal development and sustainable living. These are the consumers who read labels, understand certification seals, check out companies on their web sites and introduce social and environmental criteria into their choices of products to buy (www.lohas.com). The growth of this segment makes a clear contribution to the market forces for farmers adopting agroforestry practices.

Analyzing Costs and Benefits

An increase in traditional costs is inherent in the concept of introducing environmental management practices into a commodity value chain. The coffee and cocoa industries have benefited for many years from free forest services, such as nutrient and water cycling and carbon sequestration, which may be lost or reduced in intensive agricultural systems (Schroth and Sinclair 2003). The mainstream market agroforestry proposition aims to internalize that rent in the value chain by investing in conserving and restoring the landscape. Whatever the long term benefits in terms of sustaining productivity, farmers and companies have to live for today as well, achieving sufficient profitability to meet their goals and those of other key stakeholders—the producer’s family, the company’s shareholders. As certification provides an increasing opportunity for mainstreaming agroforestry in international markets, it will be important to research how much it costs and whether those costs outweigh the economic benefits.

Research is taking place at the farm level. The Committee on Sustainability Assessment (COSA) is a multi-organizational initiative to gather and analyze data to assess and predict what sort of social, economic and environmental outcomes farms may have by implementing different certification standards on small holder coffee and cocoa farms. Its first published study found that 60% of certified coffee farms reported an improved overall economic situation due to certification and generally superior net incomes as compared with conventional farms, but it could not make any conclusions about environmental benefits as the time between data sets is too small still.
Ascertaining the costs at the trader, processor and brand manufacturer end is difficult because although companies calculate and monitor their costs in great detail, they do not readily share this information because it is confidential and competitive. It is clear, though, that company attitudes to additional costs from handling, transporting and processing differentiated raw materials will be influenced by what benefits they perceive accruing to the farmers and the natural environment and whether sales increase. Companies view certification costs as an investment to manage supply and reputation risks. Table 2 shows the categories of costs and benefits for each value chain participant.

**Integrated Value Chain Approach**

What we see in the review of how companies are stepping up to the new market trend is a willingness to invest because sustainability has become a competitive business strategy and a means of managing risk. It adds a set of process standards about how coffee and cocoa should be produced that now become part of the product’s properties, along with its physical properties, such as taste, bean quality and defect level, and can generate additional value for the farmer (Humphrey and Schmitz 2001). The investments that companies are making support a range of activities that will create a more favorable enabling environment for the market to operate. Companies have accepted certification systems as part of the market and in return demand that they are credible, efficient and deliver beneficial results in tropical countries (ISEAL 2011).

Companies are also partnering with NGOs and development agencies to develop a more comprehensive investment package. There are many examples of Public-Private Partnerships in coffee and cocoa, in which a company, development agency, NGO and groups of farmers work together to change land use practices and take products with these new intangible qualities to the market. Rainforest Alliance began its work in cocoa with two such partnerships with Kraft Foods and GTZ in Côte d’Ivoire and Ecuador.

The seven-step integrated investment approach that will support large-scale application of agroforestry approaches is presented in Table 3. It is beyond the scope of most companies to cover the whole range, although an enlightened few international companies that incorporate their own science departments are coming very close. By creating a market mechanism for agroforestry, the private sector will drive progress faster and further than the public sector development agencies could ever do through a conventional project mechanism.

**Landscape Value**

Further research is also required into the potential landscape impacts of certification systems that promote agroforestry practices in order to test the claim that they improve production capacity and ecosystem health over the long term. The landscape scale is the scale at which ecological processes such as the presence and dispersal of fauna and flora, water and nutrient flows, microclimate, and pest and disease dynamics are significantly influenced by trees. In many fragmented agricultural landscapes, trees on farms, including those shading tree crops or that occur as remnants in crop fields or pastures or in riparian corridors, provide key elements of the tree cover that determine landscape characteristics (Schroth and Sinclair 2003).

One study in Brazil measured the results of adopting the Sustainable Agriculture Standard on land use, social practices, biodiversity conservation and farmer income in the southern region and cerrado (i.e., savanna) areas of the State of Minas Gerais. It found that certification resulted in positive impacts on the preservation of native vegetation, conservation of water resources, conservation of areas with native forests and reforestation with native species. In the cerrado areas of Minas Gerais, certified operations

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**Table 2** Sustainability costs and benefits in the value chain from agroforestry systems

<table>
<thead>
<tr>
<th>Value chain participant</th>
<th>Investment</th>
<th>Benefit</th>
<th>Sustainability factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers</td>
<td>Farm management; labour</td>
<td>Improved farm performance; stronger producer groups</td>
<td>Land use sustainability; livelihood sustainability</td>
</tr>
<tr>
<td>Farmer groups</td>
<td>Management systems</td>
<td>Traceability</td>
<td>Organizational sustainability</td>
</tr>
<tr>
<td>Traders &amp; processors</td>
<td>Training farmers; handling and operating differentiated product</td>
<td>Traceability</td>
<td>Operational sustainability</td>
</tr>
<tr>
<td>Roasters &amp; brand manufacturers</td>
<td>Price premiums</td>
<td>Increased security of supply; enhanced brand value; food safety monitoring</td>
<td>Market sustainability; commercial sustainability; reputational sustainability</td>
</tr>
<tr>
<td>Consumer</td>
<td>Maybe price premium</td>
<td>Informed choice of product</td>
<td>Demand sustainability</td>
</tr>
</tbody>
</table>
Table 3 The integrated value chain approach for agroforestry

<table>
<thead>
<tr>
<th>Area</th>
<th>Illustrative activities</th>
<th>Investment types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>Continued investigation is required into areas that critically affect productivity, such as shade systems and optimal shade density, plant varieties, pest and disease control, climate patterns, etc. The cocoa industry invests in a lot of this research collaboratively through the World Cocoa Foundation, supporting local research institutions and scientists.</td>
<td>Funding of research institutions; scholarships; internships; conferences.</td>
</tr>
<tr>
<td>Training and extension</td>
<td>Millions of remote, small holder coffee and cocoa farmers lack access to learning about agroforestry practices. Only a few countries have national systems to support farmers, such as the National Federation of Coffee Growers of Colombia, and for the most part farmers depend on under-resourced local programmes or externally supported initiatives, such as the Sustainable Tree Crops Program, which works in West African cocoa producing countries. Large coffee and cocoa companies have specialists on staff spending a lot of their time in origin countries advising local organizations, and some companies have established technical offices in producing countries, such as Starbucks Farmer Support Center in Costa Rica.</td>
<td>Funding of local agencies; transfer of knowledge.</td>
</tr>
<tr>
<td>Business services</td>
<td>Companies may take initiatives such as installing quality control equipment and training producer representatives in their use; or assisting them to improve their quality by testing and reporting on samples; they may support developing service centres, which have considerable potential for distributing inputs and knowledge. Ethical investors such as Root Capital and Verde Ventures have provided loans to many coffee and some cocoa farmer organizations because they have contracts for product certified by Rainforest Alliance, C.A.F.E. Practices or other certification schemes.</td>
<td>Technology transfer; information services; introductions to service agencies; establishing local resource hubs.</td>
</tr>
<tr>
<td>Buying policy</td>
<td>Normally, coffee or cocoa differentiated by its growing method commands a premium in the market, which adds cost for a buyer. Commodity prices fluctuate daily, and companies are usually less concerned with actual cost than with comparative cost to their competitors. If a company invests in buying raw material at a premium, then this affects the profit and loss account, unless it can achieve compensating benefit from increased sales or market share. Support is needed from the highest levels of the company to make this commitment.</td>
<td>Commitment to source from agroforestry sites; buying certified products.</td>
</tr>
<tr>
<td>Brand development and promotion</td>
<td>Mainstream brands invest a great deal in establishing their personality and key values. These are defined in consumer terms, according to the target market segment, and supported by market research that studies closely how that segment behaves in its product purchasing. For these brands to incorporate agroforestry messages into their consumer proposition is unlikely, because it is too technical for the consumer and may confuse the consumers' perception of the brand. Such product promotion is more likely in niche markets. Mainstream market brands will talk about sustainability or maybe the local farmers and community and a more detailed message about the growing practices on the farm would be at best a short reference on pack to the origin, perhaps supported by a certification seal, and more detail on off-pack literature and the company’s web site.</td>
<td>Promoting agroforestry through brand values; using certification seal.</td>
</tr>
<tr>
<td>Community benefit</td>
<td>Agroforestry criteria inherently benefit communities through, for example, protecting communal water sources from waste products from the farm or farm dwelling, and conserving forest and wildlife, as well as the longer term anticipated benefits of improving soil fertility, and stabilizing climate. Additionally, companies have invested in community development projects, designed to improve conditions of life in communities that supply them with coffee or cocoa. Examples are the Cadbury Cocoa Partnership in Ghana and the Mars Partnership for African Cocoa Communities of Tomorrow.</td>
<td>Health, education and gender projects; commitment to Sustainable Agriculture Standard</td>
</tr>
<tr>
<td>Public policy engagement</td>
<td>Companies want coffee and cocoa farmers to thrive, so that their children do not turn their backs on farming, and so that their own activities do not have negative social and environmental consequences. They maintain regular dialogue with the governments of producing countries to promote legislation and government action that can support this interest. Numerous regional and national governments have now made commitments to developing their agricultural commodities in a sustainable way.</td>
<td>Membership of representative bodies; dialogue with governments.</td>
</tr>
</tbody>
</table>
followed the proportion of native forests of their water basin, whereas non-certified operations showed a decrease in the proportion of native forests: an indication that in certified areas the conversion of native vegetation for agricultural or ranching purposes was discouraged (de Lima and others 2008).

The Landscape Measures Resource Center established by Ecoagriculture Partners and Cornell University Ecoagriculture Working Group, has developed an approach to assess the performance of multi functional landscapes for their contribution to the three outcomes of production, livelihoods and biodiversity conservation. Because biodiversity and ecosystem services function at this scale, the initiative aims to learn how agriculture can be practiced and natural resources managed to enable all three of these outcomes to be realized in a common geographic area.

**Carbon Markets**

One area of increasing interest for value chain participants is the potential that agroforestry systems may have to generate additional carbon through new tree-planting. This could present an additional opportunity to create a new financial incentive for planting trees through measuring the carbon that they store on farms. Carbon stored could be measured and generate a payment for environmental services by either marketing it through one of the established carbon market systems or by the commodity buyer, adding a climate premium to the price paid and using the credit to offset its own carbon emissions.

A number of organizations are developing and testing systems to verify and monitor carbon storage on coffee farms, to provide a financial incentive to farmers for planting and maintaining trees. Some of these have strong participation by companies, for example: investments by Starbucks through its Shared Planet programme in partnership with Conservation International; and an initiative in East Africa by the Common Code for the Coffee Community, in partnership with GTZ.

Carbon measurement systems, which are already established in forestry, and are just coming onto the research agenda for coffee and cocoa farms as well, will need to be credible, transparent, scalable, adapted for use in the specific value chain and inexpensive enough that the cost of monitoring does not outweigh the value of the carbon. A system must conform to accepted international approaches to carbon accounting such as the Voluntary Carbon Standard (VCS), Climate, Community, and Biodiversity Alliance (CCBA) and Plan Vivo. Key characteristics are: a baseline that is accurate and conservative; additional activities that go beyond business as usual; a long-term commitment to sequestration; and provisions to guard against causing losses in sequestration elsewhere.

Carbon may best be measured at a landscape scale, providing an extensive land area that may comprise agroforestry and forested land. The economic potential could be to divide the market revenue among the wider community as an incentive to manage the entire area according to sustainable practices. In farms that have forest patches and existing threats of deforestation for other land uses, an additional option may be credits for avoided deforestation—a further type of carbon market. Bringing these markets to bear in coffee and cocoa agroforestry could provide a significant incentive that adds a second value to the farm—commodity + carbon—and spreads the risk of commodity markets financing the adoption of agroforestry practices.

**Climate Change**

The reduction of carbon emissions by storing and sequestering carbon in ecosystems may be crucial in slowing current climate change (Wade and others 2010). Companies become more interested in agroforestry when it is related to concepts and business risks that they are thinking about, such as water shortages and climate change. Agroforestry systems contribute to mitigating climate change, both by increasing carbon sinks in soil organic matter and above-ground biomass, and by avoiding carbon dioxide or other greenhouse gas emissions from farms by reducing direct and indirect energy use (De Schutter 2010). In 2010, the Sustainable Agriculture Network published, after due public consultation, a set of additional criteria for its Standard that are specifically designed for climate change mitigation and adaptation. Rainforest Alliance anticipates that companies will be interested in continuously upgrading their supply chain management to take account of learning about sustainable production landscapes.

**Conclusion**

Sustainability is now a mainstream market concept that has moved from a corporate social responsibility to a strategic business issue. To a greater or lesser extent, it has penetrated the strategy of most major companies, changing the terms of reference for the marketers who manage their coffee and chocolate brands and the buyers who negotiate to buy an adequate supply of raw materials. Business operations now need to take account of the intangible, beneficial qualities of the coffee and cocoa for the tropical producers, as well as the conventional physical quality properties of the commodities. Certification has leveraged new company investments in agroforestry systems and provided companies with a tool to be recognized for their commitments to these production practices. For this new
market environment to drive large scale application of agroforestry practices, coffee and cocoa farmers, traders and processors must become efficient and reliable suppliers of the volumes required by the roasters and brand manufacturers. Yet there are organizational, technical and public policy constraints to overcome, and further research is required into the costs and benefits for all the participants in the value chain. There may be new potential for carbon markets to generate further income for farmers planting trees. As the constraints are lessened, so agroforestry can become an increasing part of a production and marketing system for coffee and cocoa that is sustained by the value chain participants.

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principles-and-goals/