Rainforest Alliance

April 2017

Toward a Sustainable Cocoa Sector

Effects of SAN/Rainforest Alliance Certification on Farmer Livelihoods and the Environment

Deanna Newsom, Jeffrey C. Milder, and Matthew Bare

The Rainforest Alliance works to conserve biodiversity and ensure sustainable livelihoods by transforming land-use practices, business practices, and consumer behavior.

233 Broadway, 28th Floor
New York, NY 10279-2899
tel: +1.212.677.1900
fax: +1.212.677.2187
rainforest-alliance.org

Contents

Executive Summary

The SAN/Rainforest Alliance cocoa program has grown rapidly over the past five years, with just under 1 million hectares of cocoa farmland in 15 countries achieving SAN/Rainforest Alliance certification by the end of 2016. SAN/Rainforest Alliance Certified™ cocoa now composes 13.4 percent of the world's cocoa supply, with increasing numbers of commitments by large cocoa buyers to source sustainable cocoa.

The Rainforest Alliance and its partner the Sustainable Agriculture Network (SAN) started working to mainstream sustainable practices in the cocoa industry through the SAN/Rainforest Alliance certification program in the late 1990s. Our program establishes a norm for sustainable cocoa farming (the SAN Standard), evaluates attainment of this norm by participating farmers, and awards Rainforest Alliance Certified status to farms meeting this standard. The program also helps build consumer demand and market incentives for sustainable cocoa products while simultaneously supporting cocoa producers to farm more sustainably, productively, and profitably.

Now that the program has been in place for nearly two decades, it is critical to take stock of its results, reflect on successes and limitations, and consider how the program could be adjusted in the future to build on successes while addressing remaining challenges. This report answers the question: what have been the effects of the SAN/Rainforest Alliance cocoa program on cocoa-producing farms, households, and landscapes?

To make this assessment, we analyzed performance for a large sample of certified cocoa farms (186 out of 266 total certificates available at the close of 2015), representing just over 170,000 individual farms across five countries: Côte d'Ivoire, Ghana, Ecuador, Peru, and Indonesia. We also summarize results from recent independent scientific studies evaluating the effects of the SAN/Rainforest Alliance certification program.

The analysis focuses on four challenges of modern cocoa farming. The first challenge is the **loss of natural ecosystems** on and near cocoa farms, and the effects of this habitat loss on forest-dwelling animals and plants. Natural ecosystems are compromised when cocoa farmers expand their cocoa plots into neighboring forests or eliminate native tree species from their farms. The SAN Standard addresses this problem by requiring farmers to protect natural ecosystems and maintain adequate shade cover, tree species diversity, and connectivity in crop areas. Certified cocoa farms in all regions complied fully with mandatory requirements to protect on-farm and off-farm natural ecosystems. Farms in Ecuador and Peru complied fully with recommended shade cover parameters, but farms in Ghana, Côte d'Ivoire, and Indonesia had substantially lower compliance rates in this area. We expect that recent regulatory changes in West Africa to rectify ambiguous tree ownership laws, combined with ongoing farmer training on the benefits of shade cover in cocoa farms, will increase farmer interest and incentives to plant and tend canopy trees. Even with lower compliance rates, however, two independent studies in West Africa found that SAN/Rainforest Alliance Certified cocoa farms retained and/or replanted shade trees at a significantly higher rate than non-certified farms.[1]

A second challenge is **low farm productivity**, often caused by pests and disease, aging cocoa trees, and insufficient pruning. For low-income farmers, increasing farm productivity is a priority. The SAN Standard outlines productivity-boosting

1 Addae-Boadu 2014, Borg & Selmer 2012

Rows of cocoa beans dry in the sun on a farm in Ecuador.

practices, such as integrated pest management and fertilization based on soil and crop need. Managers of group certificates are tasked with providing training to all group members on these and other aspects of SAN Standard implementation. Data from the 188 certificates show that group training programs and systems are in place in all regions, with programs being tailored to workers' roles and suited to the local cultural context. Implementation of these training programs has increased over time. Despite these programs, adoption of good agronomic practices such as fertilization and pest control remained variable across the certified portfolio, with few distinct trends. This may be due, in part, to the constant influx of new farmers to the program, resulting in static program-wide averages even as individual farmers improved their practices. This interpretation is supported by several independent studies from West Africa, which found that cocoa yields[2], profitability[3], and optimism about the future[4] were higher on SAN/Rainforest Alliance Certified farms than non-certified farms.

Cocoa farmers and farming communities face a third critical challenge of **entrenched poverty and, in some regions, child labor**. Child labor, in particular, must urgently be addressed, due to its long term negative impacts on children and its threat to the viability of the cocoa sector as a whole. The SAN Standard places strict limits on the amount of time that youth aged 15-18 can work and the tasks they can perform, and completely prohibits minors under 15 from farm work except on family farms in very restricted circumstances. Across the board, certified operations were found to comply fully with all requirements related to the employment of minors and youth. With the exception of one certificate in Ecuador, all certified farms complied with the SAN criterion addressing access to education for school-aged children, and nine out of ten certified farms provided access to medical services for farmers, workers, and their families.

Finally, **exposure to hazardous agrochemicals** can be a problem on cocoa farms, where a lack of protective equipment, insufficient knowledge of safe application and storage methods, and the use of banned pesticides can negatively affect the health of workers, their families, communities, and nearby natural areas. The SAN Standard guides farmers to minimize the need for agrochemicals by promoting integrated pest management and non-chemical control measures; to the extent that agrochemicals are applied, the standard includes numerous protective measures to minimize any associated risk. Cocoa farms are required to comply with numerous criteria related to the use of personal protective equipment and the avoidance of 99 prohibited substances. Adoption of non-mandatory agrochemical safety best practices varied by country, but generally improved over time especially with regard to the use of personal protective equipment, emergency procedures, safe handling of agrochemicals, and agrochemical storage locations. Improvements were especially pronounced in Ghana and Côte d'Ivoire. Independent research likewise found that SAN/Rainforest Alliance Certified cocoa farmers in West Africa used protective equipment and safe agrochemical storage practices at significantly higher rates than non-certified farmers.[5]

SAN/Rainforest Alliance cocoa farms around the globe are consistently implementing practices that address major environmental and socioeconomic challenges.

Taken together, the evidence in this report reveals that SAN/Rainforest Alliance cocoa farms around the globe are consistently implementing practices that address major environmental and socioeconomic challenges associated with cocoa farming. Where it exists, independent research supports these findings, with certified farms showing higher rates of sustainable practice implementation than non-certified farms, as well as higher yields and profitability. In addition, results show that a core concept of SAN/Rainforest Alliance—the promotion of continuous improvement toward sustainability—is being achieved in practice, with performance in many areas, such as agrochemical safety practices in West Africa, showing robust improvement over time.

The report also identifies a handful of sustainability topics in specific regions where performance was not as strong or consistent as desired. These findings point to the need for more concerted efforts to improve training and further support farmers to overcome barriers to progress. Changes introduced in the new 2017 SAN Standard (published in September 2016 and effective for audits as of July 1, 2017) will help better address many of these topics. For example, formerly non-mandatory criteria related to integrated pest management will become mandatory in the 2017 SAN Standard. In addition, the 2017 standard introduces the concepts of living wage and essential needs to help drive improvements in farmer livelihoods more systematically. The standard also codifies the concept of continuous improvement more formally to help drive quantitative improvements in performance over time, beginning with the highest priority sustainability topics. These changes, combined with ongoing efforts to increase market demand and market incentives for SAN/Rainforest Alliance Certified cocoa, are designed to drive increased uptake and impact of the program, benefiting cocoa farmers, communities, and landscapes in more than a dozen countries.

2 Deppeler et al 2014

3 Addae-Boadu 2014, Oseni and Adams 2013

4 Bennett et al 2012

5 Addae-Boadu 2014

I. INTRODUCTION

If they could glimpse two thousand years into the future, the Mexican farmers who first domesticated cocoa trees would likely be amazed at what they saw: a multi-billion-dollar industry built around the humble unsweetened chocolate made from trees like theirs. They would marvel at the variety of chocolate bars, drinks, syrups, and all manner of sweetened cocoa confections. They would perhaps be even more surprised to learn that, despite chocolate's popularity, most of the world's five million cocoa farmers live in poverty and struggle against damaging cocoa pests, climate change, and the frequent exploitation of children as laborers.

The vast majority of the cocoa farmers around the world today are smallholders who, along with their families, depend directly on cocoa farming for their livelihoods. But life can be difficult for these farmers. Productivity is often low due to a lack of agricultural training on productivity- and quality-boosting practices, and inadequate access to inputs such as fertilizers. Maintaining, let alone increasing, yields requires the time and knowledge to effectively prune cocoa trees, keep pests and weeds in check, and maintain soil fertility. Improper use and storage of agrochemicals can jeopardize the health of farm owners, workers, and their families, while child labor has long been widespread on cocoa farms in West Africa, denying children educational opportunities and putting their health and safety at risk. Cocoa farming can also have a negative environmental impact when production expands into nearby forests or other natural areas, pollutes local waterways, or degrades the soil. While cocoa can be grown in biodiverse agroforestry systems with a rich shade canopy of native tree species, in reality many cocoa farms have few shade trees, to the potential detriment of both environmental and agricultural outcomes.

Abel Yaranga spreads cocoa beans over a drying table on his farm in Peru. Photographer: David Dudenhoefer

The Rainforest Alliance, together with the Sustainable Agriculture Network (SAN), has been addressing these challenges in the cocoa sector since the late 1990s, when it broadened the scope of its sustainable agriculture program from coffee and bananas to cocoa. As with all crops, the core of the SAN/Rainforest Alliance cocoa certification program is the SAN Standard, which defines a norm of sustainable agriculture with which all participating farms must comply. Compliance with the standard is assessed through a rigorous set of audit procedures, and successful farms are awarded Rainforest Alliance Certified status and afforded use of a market label that helps promote consumer choice of sustainable products. A key complement to the certification process is farmer training, conducted by Rainforest Alliance agronomists or local partners, to help prepare farmers to become certified or support further improvement once certified. These hands-on training programs teach farmers about practices to increase farm productivity, improve cocoa bean quality, prevent pest outbreaks, protect and restore natural ecosystems, eliminate child labor, and address other social and environmental challenges.

In the late 1990s, the first group of cocoa farmers achieved SAN/Rainforest Alliance certification after auditors determined it was in compliance with the SAN standard. In 2006, seeing a need to support cocoa farmers prior to the certification process, the Rainforest Alliance began training cocoa farmers on sustainable agronomic practices that would improve farm productivity while conserving natural ecosystems both on and off the farm. Since then, the reach of certification and associated training has expanded rapidly. By the end of 2016, 247 cocoa producing groups—consisting of more than 200,000 individual farms in 15 countries—had become Rainforest Alliance Certified. These farms produce 13.4 percent of the world's cocoa. The demand for certified cocoa is likely to increase since large chocolate companies and retailers such as Mars, Hershey's, Ferrero, Unilever, Tesco and others have made commitments to source 100 percent sustainable cocoa in the years ahead.

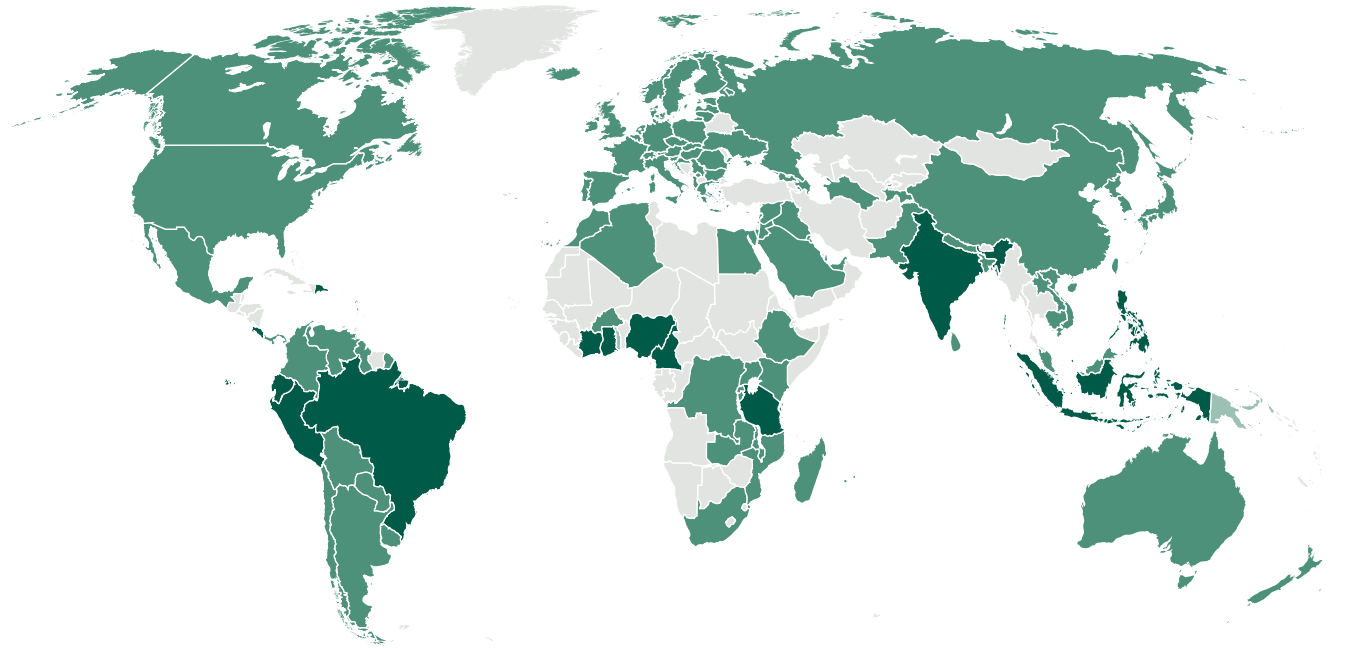
Given the rapid spread of SAN/Rainforest Alliance certification and associated training programs, and the growing demand for certified cocoa, now is an important time to assess the available evidence on the results of these programs. Doing so can help document progress made to date while also highlighting areas in which further improvements are needed. In this report, we present results of the Rainforest Alliance's cocoa sustainability programs by addressing three evaluation questions:

1. **What are the extent of these programs, and what are the characteristics of the farmers and landscapes they reach?** Answers to this question demonstrate the market penetration of cocoa certification and the potential magnitude of field-level results based on the number of participating farmers and the land area under certification.

2. **To what extent are certified cocoa farmers adopting sustainability best practices, and how does this change over time in association with certification?** This information reveals whether farmers are taking steps toward more sustainable production, as well as how patterns and trends differ between West Africa, South America, and Indonesia, the world's three largest cocoa-growing areas.

3. **What additional information on impacts of Rainforest Alliance certification or training is available from independent scientific studies?** Such studies can provide highly credible information on the attributable effects of certification on farm productivity, farmer and family livelihoods and wellbeing, and the environment.

Figure 1. *Rainforest Alliance Certified cocoa production and consumption*



In addressing these questions, we focus on five countries that collectively account for about 90 percent of Rainforest Alliance Certified cocoa: Cote d'Ivoire, Ghana, Indonesia, Ecuador, and Peru.

This report first describes the Rainforest Alliance's certification and training programs in greater detail. It then addresses each of the three sets of evaluation questions in sequence. Finally, it concludes with a summary of key opportunities and needs for improving the outcomes of cocoa sustainability initiatives and the evaluation thereof.

II. HOW RAINFOREST ALLIANCE SUPPORTS SUSTAINABLE COCOA FARMS, LIVELIHOODS, AND LANDSCAPES

At the core of the SAN/Rainforest Alliance system is the SAN Sustainable Agriculture Standard (SAN Standard), which outlines the requirements for cocoa farms to become certified. Developed by the SAN[6] through a multi-stakeholder process that includes farmers, scientists, civil society groups, and industry, the 2010 SAN Standard contains 100 criteria that, together, define sustainable agriculture and farm management. These criteria cover topics ranging from ecosystem conservation to fair treatment of workers to alternative pest control measures. Farms that wish to become certified as part of a cooperative or other group structure must also address the 23 criteria of the SAN Group Certification standard, which cover topics such as internal inspections and group governance. The SAN Sustainable Agriculture Standard and supporting SAN standards and policies are revised periodically. The newest version of the standard, called the 2017 SAN Standard, was published in September 2016 and will become effective for audits starting in July 2017.

To achieve certification, farms must undergo annual audits by SAN-accredited certification bodies, which determine whether farms or farm groups are in compliance with the SAN Standard. During the audit, compliance to each SAN criterion is carefully assessed, with farms scored as "fully compliant," "partially compliant," or "non-compliant" with each applicable criterion. These compliance levels are given numerical values (100 for full compliance, 50 for partial compliance, 0 for non-compliance) that are rolled up into a final score. Applicants may attain

Principles of the 2010 SAN Standard

1. Social and environmental management system
2. Ecosystem conservation
3. Wildlife protection
4. Water conservation
5. Fair treatment and good working conditions for workers
6. Occupational health and safety
7. Community relations
8. Integrated crop management
9. Soil management and conservation
10. Integrated waste management

6 Sustainable Agriculture Network, http://san.ag/web/

Cocoa and the SAN/Rainforest Alliance Theory of Change

As mission-driven organizations, the SAN and the Rainforest Alliance have developed a "Theory of Change"* for their jointly run certification program to specify how the program's activities—including training, certification, and improved farmer access to critical farm inputs—are expected to deliver key social, environmental, and economic benefits for farmers, communities, and natural ecosystems. In addition to clearly defining the program's objectives, the Theory of Change also provides a framework for evaluating the extent to which the program has delivered its anticipated direct, indirect, and broader results.

In relation to cocoa farming, the Theory of Change indicates that certification, training, and support activities should lead to the adoption of more sustainable farm practices and therefore to improved social well-being, economic viability, and environmental sustainability of cocoa farms. Specifically, the activities will not only protect on-site conservation values (e.g., by conserving existing natural ecosystems, restoring native vegetation, and protecting endangered species), but also support conservation at a landscape level by maintaining wildlife corridors and preventing encroachment. Through the adoption of good agronomic practices, it is expected that cocoa farms will maintain and improve soil health, reduce erosion, minimize water pollution, and use water in an efficient manner. By sustaining such key natural resources, farms should also reduce their input costs and become less susceptible to droughts and pest outbreaks, while also reducing greenhouse gas emissions. Cocoa farms are also expected to become more productive, efficient, and profitable—thereby ensuring that agriculture can form the basis of a decent livelihood for farmers, workers, and their families. Finally, certification is designed to help safeguard worker rights and benefit smallholders through effective and transparent management of group structures that support sustainable farm management and product marketing, often to international buyers with commitments to sustainable cocoa.

The SAN and the Rainforest Alliance aim to support sustainability improvements not only at the level of individual farms, but also more broadly across landscapes and value chains. To this end, the program aims to establish a positive feedback loop whereby companies realize value from sustainable sourcing and therefore choose to invest more in increasing the sustainability of their supply base. At the same time, as neighbors, governments, and other stakeholders see the benefits of sustainable agriculture on certified farms, best practices are scaled up and contribute to wider aggregate benefits at the community and landscape scale.

Understanding the causal links between an organization's activities and desired outcomes is an ongoing process. Evaluation studies such as the ones presented in this report help clarify the extent to which the benefits described in the Theory of Change are actually being delivered in practice. Where results are less than expected, this information can suggest ways that the program might be improved, or that the logical framework should be revised.

* See http://www.rainforest-alliance.org/sites/default/files/2016-08/SAN_RA_Impacts_Report.pdf#page=16 for a visual representation of the SAN/Rainforest Alliance Theory of Change

certification only if they achieve a total score of 80 or above for the entire standard and achieve a score of 50 or above for each of the 10 component principles in the standard and are in full compliance with 23 critical criteria. Cocoa produced on certified farms may be sold and commercialized using the Rainforest Alliance Certified label.

While the SAN Standard provides a framework and set of best practices for improving the productivity and sustainability of cocoa farming, to implement this framework widely among smallholder cocoa farmers may require providing them with training and other kinds of support, such as access to quality inputs, planting materials, or farm record-keeping assistance. The majority of cocoa farmers seeking Rainforest Alliance certification receive training and support to institute sustainable farming practices before they undergo a certification audit. Such training is usually conducted by agronomists from in-country NGO partners, government agencies, or company partners, often based on training modules developed by the Rainforest Alliance. A typical training program is based on a two-tiered training approach. First, Rainforest Alliance or SAN agronomists train the staff of local NGOs or group administrators, usually in three-to-four-day sessions that are half classroom-based and half field-based. During these "train the trainer" sessions, the Rainforest Alliance or SAN agronomists provide the trainees with a package of training materials[7] and modules that are specifically geared towards farmers. These local trainees then become trainers themselves, working directly with farmers in six to 12 sessions that each address one specific topic, such as best agronomic practices, occupational health and safety, recordkeeping, and climate-smart agriculture. In addition to training, cocoa farmers often receive access to key inputs such as fertilizers and finance before the certification audit. Recent research in Ghana found that financial support, knowledge, technical assistance, and increased access to farm inputs and credit produced significant positive impacts on Rainforest Alliance Certified cocoa farmers' natural and financial capital.[8]

Once the cocoa leaves the farms, the Rainforest Alliance traces it through the supply chain to the final chocolate manufacturers. This traceability—along with Chain of Custody (CoC) audits of the supply chain—help to protect the integrity of the Rainforest Alliance Certified™ seal on chocolate products that consumers buy in stores. The manufacturers must source the

7 http://www.sustainableagriculturetraining.org/

8 Fenger et al. 2017

Training Cocoa Farmers in West Africa

The Rainforest Alliance's technical assistance work in West Africa began in Côte d'Ivoire in 2006, through a partnership that involved cocoa growers' cooperatives, a large cocoa-buying company (Kraft) and the national government. This model was replicated in Ghana in 2008 under a similar partnership with Mars Inc., the Ghana Cocoa Board, and a consortium of civil society partners. By 2009, this approach began generating economic returns for farmers. These benefits, combined with growing commitments from major brands and consumer goods companies such as Mars, Kraft, and Unilever to shift their cocoa purchases toward a certified sustainable supply, provided the impetus for rapid growth of the program beginning around 2010.

The training program received a major boost in 2011 when the Rainforest Alliance received support from the Global Environmental Facility to execute the Greening the Cocoa Industry project in Ghana and several other countries. The Rainforest Alliance partnered with Olam International in Ghana's Juabeso-Bia District to train more than 2,000 cocoa farmers from 34 communities on climate-smart agriculture (CSA) practices and sustainable forest management, and to facilitate the establishment of two nurseries that raised 300,000 tree seedlings. These efforts are expected to sequester an estimated 140,000 metric tons of carbon dioxide equivalent (CO_2-e) over 20 years.

cocoa from the certified farms and have traceability documentation that ensures that the volume of cocoa sold from the certified farms through each point in the supply chain does not exceed what is produced or purchased at each step. Each claim of Rainforest Alliance Certified cocoa or use of the Rainforest Alliance Certified seal requires a signed license agreement and must be approved in advance by the Rainforest Alliance. Together, these requirements help ensure that products with the seal are credible, they encourage sourcing from certified farms, and they empower consumers to leverage their purchasing power in support of sustainable practices on and around cocoa farms.

III. OUTCOMES AND IMPACTS OF SAN/RAINFOREST ALLIANCE COCOA CERTIFICATION

In this section we examine the outcomes and impacts of the SAN/Rainforest Alliance cocoa certification program through three different lenses. First, we describe the current reach and characteristics of the cocoa program, to help understand the potential for market transformation and field-level effects. Next, we use data from SAN/Rainforest Alliance certification audit reports to identify the rates at which cocoa farmers are adopting sustainable agronomic practices on and around their farms, and how those rates change over time. Lastly, we summarize the small but growing body of independent research that uses scientific methods to identify the impacts of SAN/Rainforest Alliance certification on farm productivity and a handful of other variables.

Characteristics and Trends for SAN/Rainforest Alliance Cocoa Certification

At the close of 2016, there were 247 SAN/Rainforest Alliance cocoa certificates globally, consisting of 206,426 individu-

Figure 2. *Percentage of SAN/Rainforest Alliance Certified cocoa produced in each country in 2016*

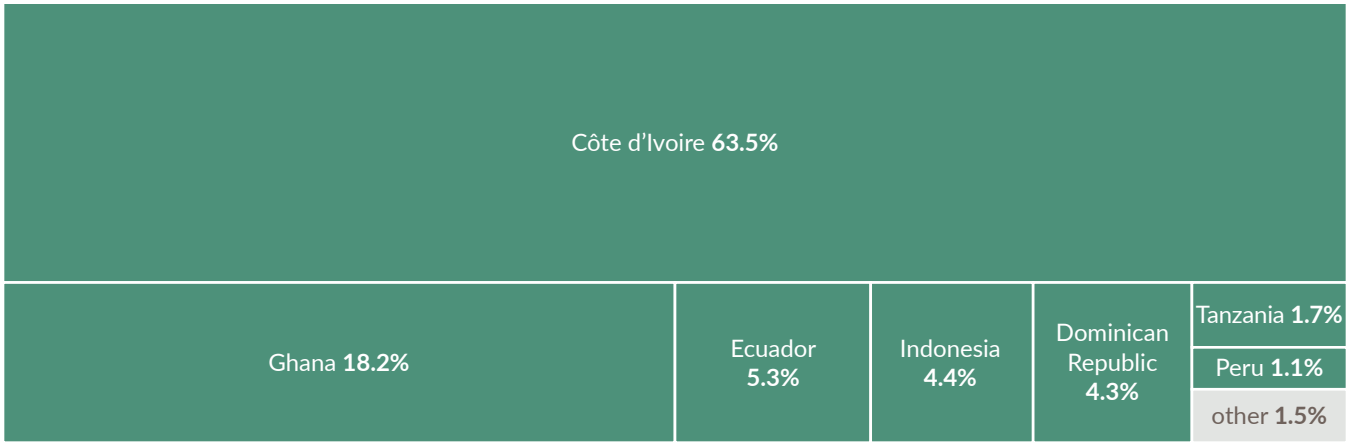


Figure 3. *Trends in Rainforest Alliance Certified cocoa production area (in hectares)*

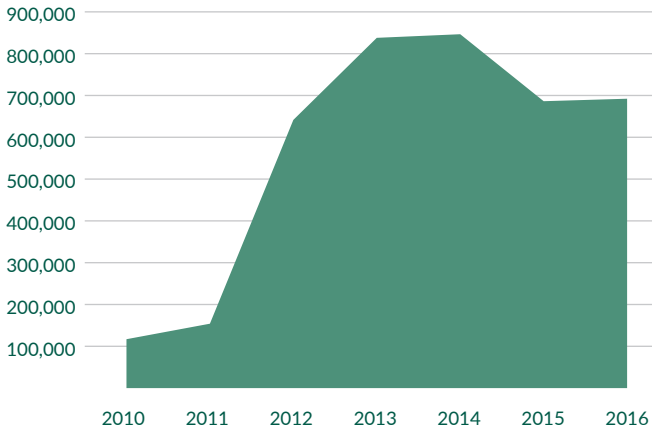
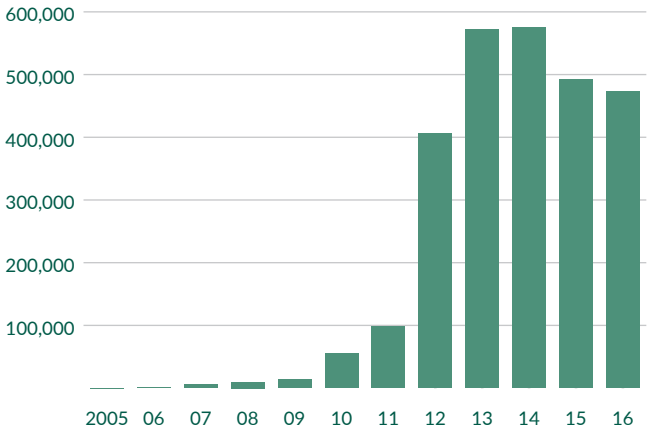


Figure 4. *Trends in total quantity (in metric tons) of Rainforest Alliance Certified cocoa produced*



al farms. The vast majority of these (96.8 percent) are group certificates, wherein hundreds to thousands of individual smallholder cocoa farmers are organized into a group that collectively seeks certification. Under this model, a designated group administrator is responsible for helping to ensure members' compliance with the SAN Standard, training and supporting members to achieve and maintain compliance, and holding the certificate. SAN/Rainforest Alliance Certified cocoa-farming groups contain an average of 864 members each, although size varies considerably. The individual farms that make up the group are typically owned and operated by smallholder farmers, and have an average farm size of 7.7 hectares, with 5.0 hectares of that area used for cocoa production. Individual (non-group) certificates consist of a farm under single ownership. These cocoa farms are typically much larger, with an average size of 971 hectares, of which 214 hectares are used to produce cocoa.

The combined total area of SAN/Rainforest Alliance Certified cocoa farms at the end of 2016 was 964,476 hectares, 692,228 hectares of which is used for cocoa production. The remaining 272,248 hectares consists of natural areas, riparian buffer zones, infrastructure zones, areas producing other crops, or other non-farm uses. In all, SAN/Rainforest Alliance Certified cocoa farms produced 473,480 metric tons of cocoa in 2016, representing about 13.4 percent of the world's cocoa production.

Compared to previous years, the amount of certified production area and quantity of cocoa produced declined slightly in 2016 (Figures 3 and 4). We attribute this decline primarily to a mismatch in the supply versus the demand for certified cocoa. Specifically, demand for certified cocoa has been growing in steps, as major cocoa buyers that have committed to certified sustainable sources are ratcheting up their purchases incrementally toward future targets (e.g., 2020). During this phase-in period, some certified producers experienced weak demand for certified produce and may have dropped certification. In other words, in the period of rapid growth from 2011-2013, the production of certified cocoa may have overshot demand;

Training Cocoa Farmers in Indonesia

The Rainforest Alliance has been training and supporting smallholder cocoa farmers in Central and South Sulawesi, Indonesia, since 2012. In 2013, through bilateral cooperation with Mars Inc., the Rainforest Alliance piloted a training module that focused on farm recordkeeping as a catalyst to drive the adoption of good agronomic practices, including proper and efficient input use and the rehabilitation of old planting stock and degraded soils to boost farm productivity. This approach was adopted by smallholder cocoa farmers with little or no prior experience in recordkeeping, and has since been replicated, first in other cocoa producing regions and now much more widely as a core element of the 2017 SAN Standard. Other training modules instructed farmers on soil and water conservation strategies, and explained key safeguards in the SAN Standard to conserve biodiversity and protect wildlife habitats, for instance in and around the Gunung Lompobattang Protected Forest in South Sulawesi.

In 2014, with funding from the Ford Foundation, the Rainforest Alliance began training 750 farmers in Central Sulawesi on farm management and post-harvest handling practices, and helped them establish group structures and build the business capacity of group administrators. The success of these smaller programs has helped catalyze a broader four-year partnership with Olam International and GrowCocoa aimed at incentivizing 8,000 cocoa smallholders in South and Southeast Sulawesi to implement farming practices that will optimize yields, help guard against climate change-induced risks, support farmer resilience, improve cocoa quality, and enable greater access to stable marketing channels.

Table 1. *Characteristics of SAN/Rainforest Alliance certified operations in the six countries with the most certified cocoa area, as of December 2016*

	Côte d'Ivoire	Ghana	Ecuador	Dominican Republic	Indonesia	Peru
Total certified area (ha)	648,238	168,186	41,913	27,233	21,885	13,549
Total cocoa production area (ha)	472,172	128,390	19,439	23,980	21,547	3,319
Volume of cocoa produced (kg)	300,480	86,266	24,911	20,406	20,953	5,203
Avg. yield (kg/production ha)	671	578	931	837	933	1,373
Individual certificates	2	0	3	0	0	0
Group certificates	172	12	17	4	9	7
Total number of farms	99,323	47,548	2,584	5,067	14,794	1,284
Avg. farm size (ha) (group members only)	6.9	3.6	20.9	13.3	1.6	11.0
Avg. farm production area (ha) (group members only)	5.0	3.2	10.1	12.3	1.6	3.4

however, this overshoot is anticipated to be temporary as commitments to sustainable purchasing are fully phased in during the next few years. Several initiatives are underway to accelerate market demand for certified cocoa so that producers can benefit more fully from their certified status. These initiatives include the introduction of a cocoa "mass balance" option, which allows manufacturers, brands, and retailers to source and label SAN/Rainforest Alliance cocoa even when it is not feasible to keep certified and non-certified product separate in the supply chain.

In 2016, 64 percent of SAN/Rainforest Alliance Certified cocoa was produced in Côte d'Ivoire, 18 percent in Ghana, five percent in Ecuador, four percent in Indonesia, and one percent in Peru (Figure 2 and Table 1). Ten additional cocoa-producing countries, which are not the primary focus of this report, account for the remaining 7.5 percent of certified cocoa production. Table 1 describes the characteristics of the SAN/Rainforest Alliance Certified portfolio in the six countries with the largest amount of certified cocoa area. This table shows considerable variability in farm size and productivity among regions. See Figures 5, 6, and 7 for maps showing locations of SAN/Rainforest Alliance Certified cocoa farms in Ecuador, Peru, Côte d'Ivoire, Ghana, and Indonesia.

Adoption of Sustainable Practices on SAN/Rainforest Alliance Certified Cocoa Farms

The SAN Sustainable Agriculture Standard and associated farmer training emphasize the adoption of more sustainable farming practices related to agronomy, farm record-keeping, pesticide use, shade canopy management, water resource protection, natural ecosystem protection, and more. During the certification audit, whether or not farmers actually adopt these practices is recorded in the audit report, where the level of compliance—full, partial, or non-compliance—is assessed for each of the SAN Standard's 100 criteria. In this section, we quantify the extent to which different sustainable practices have been adopted on certified farms, using information from farm audit reports.

Figure 5. *SAN/Rainforest Alliance cocoa certificates in South America*

countries included in audit report analysis
SAN cocoa certificates

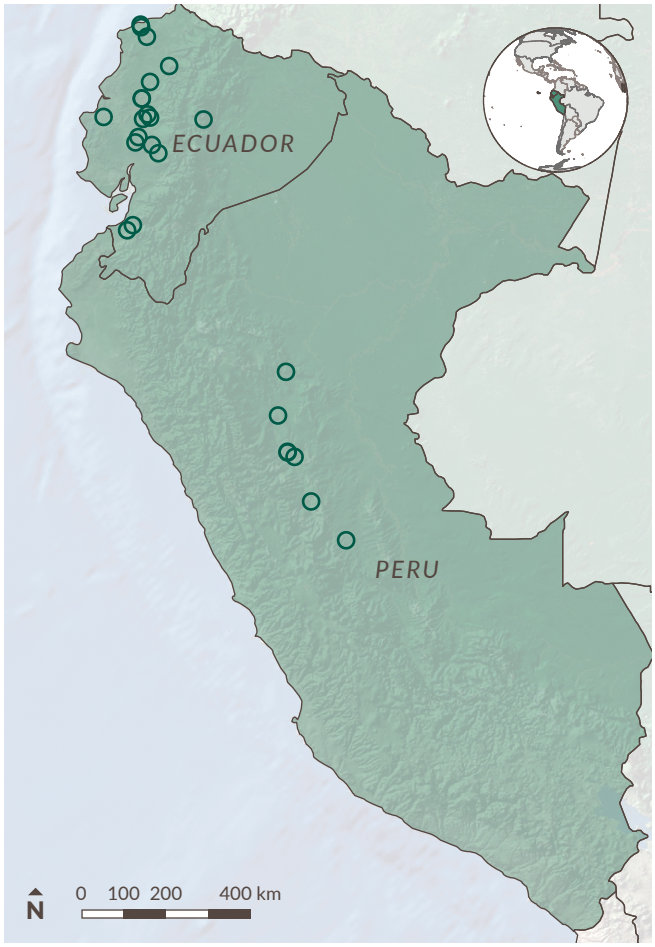


Figure 6. *SAN/Rainforest Alliance cocoa certificates in West Africa*

countries included in audit report analysis
SAN cocoa certificates

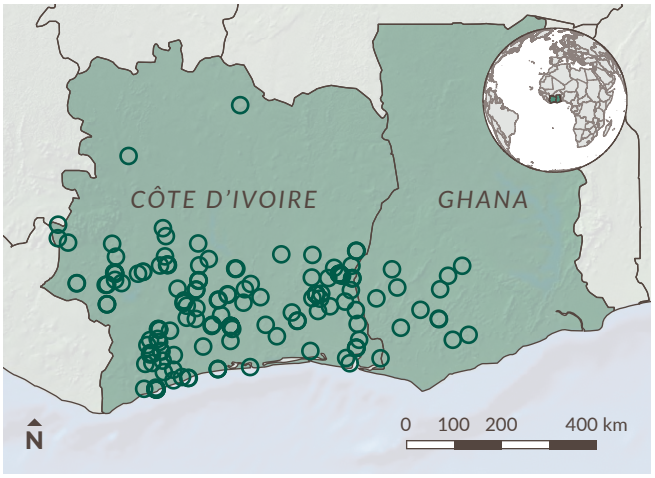
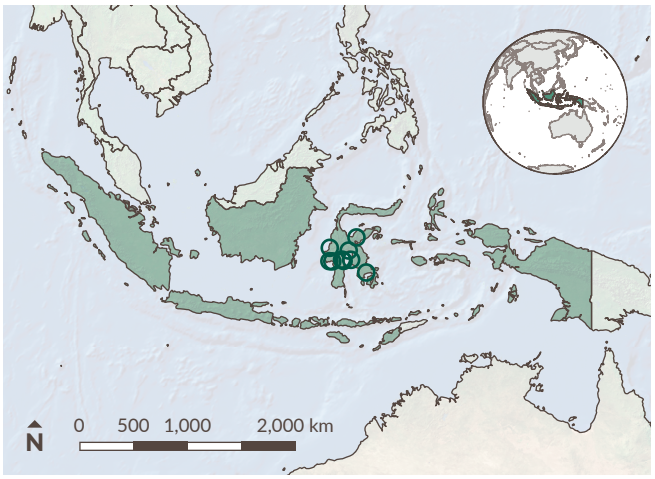


Figure 7. *SAN/Rainforest Alliance cocoa certificates in Indonesia*

countries included in audit report analysis
SAN cocoa certificates



We analyzed the audit data in two ways. First, we assessed current performance at the time of the most recent audit for 186 active cocoa certificates in the five countries on which this report focuses. Second, for the subset 90 of certificates for which a time series of two or more audit reports were available, we assessed changes in performance between the earliest and most recent audit. Both analyses focus especially on the 26 SAN criteria (out of the 100 total criteria) that most directly address four key challenges associated with cocoa production: 1) forest encroachment and biodiversity loss; 2) poor agronomy and low yields; 3) entrenched poverty and child labor; and 4) exposure to hazardous agrochemicals.

The analyses in this section calculate an average compliance score for each country for each criterion in the 2010 SAN farm standard and SAN group certification standard. This score is calculated by assigning 100 points for full compliance with a given criterion, 50 points for partial compliance (i.e., a minor non-conformity), and 0 points for a major non-conformity, as determined by the auditors. For example, the compliance score for the SAN criterion related to soil erosion control measures for a hypothetical country that had four cocoa certificates, two in full compliance with this criterion and two in partial compliance, would be 75 ((100+100+50+50)/4).

In the following subsections, we report results related to each of the four challenge areas listed above, followed by a summary of key differences and trends among the different regions where SAN/Rainforest Alliance Certified cocoa is produced.

Protecting Forests and Biodiversity

Cocoa is grown in regions dominated by moist tropical forests that are typically high in biodiversity. When cocoa farms are established, some or all forest cover is eliminated to make way for cocoa trees, which typically displace at least some native biodiversity. However, these impacts can be mitigated

by planting cocoa under a shade canopy of native trees (i.e., agroforestry) and by retaining other on-farm natural vegetation such as riparian buffers. In addition to helping protect biodiversity, such measures can also significantly improve cocoa yields[9] by supporting pollinators, preventing pest damage, and protecting against drought and soil loss. However, in some regions, farmers tend to retain little native vegetation on their farms. Additionally, as poor farming practices lead to pest and disease outbreaks, decreased soil fertility, and low yields, some farmers feel compelled to further expand production into nearby natural forests.

To address these challenges to on- and off-farm biodiversity, the SAN Standard contains critical criteria that require farmers to protect and restore natural ecosystems (criterion 2.1), and renders farms that have damaged high value ecosystems in recent years ineligible for certification (criterion 2.2). Criterion 2.8 specifies that farmers should manage their cocoa as a diverse agroforestry system with at least 40 percent shade canopy cover, at least 12 tree species per hectare, and at least two vertical layers of canopy cover. Other criteria addressing connectivity of natural ecosystems and buffer areas around streams and other water bodies can also help protect forests and biodiversity.

Audit results indicate that SAN/Rainforest Alliance Certified cocoa farms are fully protecting on-farm natural ecosystems and effectively addressing off-farm encroachment into neighboring conservation areas. Generally, certified operations also performed well for criteria related to maintaining adequate buffer zones between crops and aquatic areas (criterion 2.6) and maintaining adequate connectivity of natural ecosystems on the farm (2.9).

However, **many certified cocoa farms in West Africa and Indonesia did not maintain sufficient tree canopy cover or species diversity to comply fully with criterion 2.8 (agroforestry shade cover).** Compliance scores for criterion 2.8 during recent audits averaged only 25 in Côte d'Ivoire, 34 in Ghana, and 55 in Indonesia. In contrast, all of the evaluated operations in Ecuador and Peru fully complied with this criterion. The regional differences in performance related to shade cover management illustrate the legacy that historical factors and legal frameworks can have on current practices. When cocoa farms

9 Asare 2016

Table 2. *Average compliance score at most recent audit for criteria that address forest encroachment and biodiversity loss. Compliance scores range from 0 to 100; operations are awarded 0 points for non-compliance, 50 points for partial compliance, and 100 points for full compliance. Compared with previous audit scores, ▲▲ indicates an increase of 25–45 points, ▲ indicates an increase of 11–24 points, ▼ indicates a decrease of 11–24 points, ▼▼ indicates a decrease of 25–45 points. Changes of +/- 10 points are not indicated. The first sample size presented is the number of certificates used to calculate the most recent score; the sample size in parenthesis is the number of certificates included in the time series analysis. In the left column, critical criteria are denoted by an asterisk (*).*

		All regions	Côte d'Ivoire	Ghana	Ecuador	Peru	Indonesia
Sample size		186 (90)	124 (50)	28 (17)	16 (10)	7 (6)	11 (7)
2.1*	**Protect/restore natural ecosystems**	100	100	100	100	100	100
2.2*	**No destruction of natural ecosystems**	100	100	100	100	100	100
2.3	**No harm to nearby natural areas**	100	100	100	100	93	100
2.6	**Buffer between crops and aquatic areas**	83	81	▲ 98	▲▲ 97	93	▼ 45
2.8	**Adequate tree diversity, shade cover, and natural vegetation**	37	25	34	100	100	▲ 55
2.9	**Maintain connectivity of natural ecosystems**	78	▼ 73	100	▼ 66	▲▲ 86	91
Average for above criteria		83	80	89	94	95	82

Farmer Voices

Vida Tsatso, a cocoa farmer at Nkranfum, Ghana, shares her views on cocoa farming before and after training with the Rainforest Alliance:

"I have now realized there were so many things we used to think and do that were normal practices from time immemorial, and just did not think that some of these practices were negatively affecting our lives, the soil, water bodies and our environment. We used to clear the trees and other forms of vegetation that used to be around water bodies. I used to fell the bigger trees on my cocoa farm because I didn't see the reason why they should be on my farm. The worst of all was that these trees attracted the chainsaw operators who would come and fell them, causing damage to my cocoa trees. So the safest thing that I thought was to kill these trees when they were young."

were established years ago in South America, they were typically established under an existing forest canopy: some trees were removed to provide light to cocoa seedlings but many existing trees were retained as canopy cover. In West Africa, in contrast, forests were typically felled when establishing cocoa farms, and overstory trees had to be actively planted afterwards. An additional factor inhibiting agroforestry management in West Africa was a legal framework that failed to give farmers clear ownership of the trees on their land. This situation opened the door for unscrupulous loggers to remove overstory trees from cocoa farms without the farm owner's permission, often using machinery that damaged cocoa trees in the process. As a result, many farmers felt they had no choice but to eliminate shade trees and seedlings from their farms to protect their cocoa crop. Compounding the legal factor, in many cases, is an incorrect assumption on the part of farmers or local extension workers that shade cover is detrimental to crop productivity.

Despite these barriers, Rainforest Alliance agronomists in West Africa report that in recent years farmers have accepted the importance of overstory trees and shade cover and begun planting more trees; however, since it typically takes at least five years before trees are large enough to fulfill the requirements of criterion 2.8, there will be a time lag before these improvements affect compliance scores.

The Sustainable Yields Module

In 2011, with support from Mars Inc. and later the Dutch Sustainable Trade Initiative (IDH), the Rainforest Alliance developed the Sustainable Yield Module (SYM), a series of training modules that describe best practices for increasing cocoa farm productivity. The SYM was piloted with smallholder cocoa farmers in Cote d'Ivoire, Indonesia, Ghana and Peru. In Cote d'Ivoire, measurements taken by Rainforest Alliance partner Centre d'Etudes, Formations, Conseils et Audits (CEFCA) indicate that productivity increased by 86 percent over a two-year period on 40 farms implementing the SYM (though the lack of a control group limits our ability to attribute increases solely to the SYM). Since then, the SYM has remained a core element of technical assistance around the world and informed the development of the 2017 SAN Standard, particularly on productivity-related topics such as integrated pest management and farm renovation and rehabilitation.

Improving Agronomic Practices and Boosting Yields

Yields on smallholder cocoa farms are generally far below where they could be, due to sub-optimal management of pests and diseases, soil fertility and fertilization, and a lack of rejuvenation practices such as pruning. For instance, in Ghana, cocoa farms following either a sustainable intensification program (as promoted by SAN/Rainforest Alliance certification) or conventional full-sun intensification (which is not eligible for Rainforest Alliance certification) can approach or exceed yields of 1,000 kilograms per hectare per year (kg/ha/yr), compared to a baseline of unimproved practices that yield less than 300 kg/ha/yr, according to models.[10] Two key SAN Standard criteria that promote improved agronomic practices are criterion 8.1, which addresses integrated pest management and pest monitoring, and criterion 9.2, which specifies a soil and crop fertilization approach based on periodic soil sampling and analysis and prioritizing the use of organic fertilizers. The requirements of the training programs through which smallholder cocoa farmers typically learn about these practices are outlined in criteria 1.1 and 1.4 of the group certification standard, which require trainings be conducted in the local language and are suited to the local context.

Audit data indicate that the certified cocoa farms are tailoring farmer training programs to the local context, and, in most countries, are performing other aspects of training well. Notably, **there was evidence of improvement over time in training performance** for nearly all countries we examined.

With regard to integrated pest management and soil and crop fertilization, audit results indicate considerable room for improvement in most countries, with overall compliance scores

10 Gockowski, J., Afari-Sefa, V., Sarpong, D. B., Osei-Asare, Y. B., & Agyeman, N. F. (2013). Improving the productivity and income of Ghanaian cocoa farmers while maintaining environmental services: what role for certification? International Journal of Agricultural Sustainability, (February), 1–16. http://doi.org/10.1080/14735903.2013.772714

Table 3. *Average compliance score at most recent audit for criteria that address low yields associated with poor agronomy. Compliance scores range from 0 to 100; operations are awarded 0 points for non-compliance, 50 points for partial compliance, and 100 points for full compliance. Compared with previous audit scores, ▲▲ indicates an increase of 25–45 points, ▲ indicates an increase of 11–24 points, ▼ indicates a decrease of 11–24 points, ▼▼ indicates a decrease of 25–45 points. Changes of +/- 10 points are not indicated. The first sample size presented is the number of certificates used to calculate the most recent score; the sample size in parenthesis is the number of certificates included in the time series analysis. In the left column, criteria from the SAN group certification standard are denoted by the prefix "G."*

		All regions	Côte d'Ivoire	Ghana	Ecuador	Peru	Indonesia
Sample size		186 (90)	124 (50)	28 (17)	16 (10)	7 (6)	11 (7)
1.9	**Training and education program**	87	90	96	▲ 72	▼ 64	64
8.1	**Integrated pest management**	64	58	▼ 77	▼▼ 81	50	77
9.2	**Soil or crop fertilization program**	62	50	▲ 100	▼ 69	▲▲ 71	▼ 73
G1.1	**Training program for group members**	▲ 76	▲ 77	84	▲ 70	71	64
G1.4	**Training suited to local cultural context**	99	99	95	100	100	100
Average for above criteria		78	75	90	78	71	76

of 64 and 62, respectively. There is evidence that operations in Ghana and Peru have improved their practices related to soil and crop fertilization over time, while operations in Ecuador and Indonesia experienced a slight decrease in performance. Implementation of practices related to integrated pest management decreased in Ecuador and Ghana over time, and remained stable in all other countries. Recognizing the need to boost the implementation rates of these practices, the 2017 SAN Standard includes new critical criteria on integrated pest management and other aspects of farm planning and management.

Farmer Voices

According to Joshua Armah, a smallholder cocoa farmer from Nkranfum who participated in a Rainforest Alliance training program:

"I was able to double my production by implementing best practices and achieved that without the application of fertilizers. Now I want to continue increasing my yield and we are discussing with exporters if our group can get an advance to buy fertilizers. The changes I implemented on the farm are: appropriate pruning to ensure sufficient sunlight to my trees, weed management, eliminating diseased pods, sanitation management of the farm. Most important is to maintain the farm healthy, as soon as I see a branch that needs pruning, I prune."

Addressing entrenched poverty and child labor

Cocoa-growing families frequently live in poverty, due in part to low cocoa yields and a lack of other income-generating activities. The effects of poverty are exacerbated by a lack of social services in many cocoa-growing regions. In addition, child labor has historically been widespread on cocoa farms in West Africa, limiting educational opportunities for children and often subjecting them to tasks that are dangerous or too physically demanding. SAN Standard criteria 5.8, 5.9 and 5.19 put restrictions on the hours worked by youth aged 15 and 17, and prohibit child workers between the ages of 12 to 14 except on family farms when special safety conditions are in place and working does not interfere with school. In addition, criteria 5.15 and 5.16 require clean drinking water for farmers, workers and their families, and access to medical services.

Audit reports indicate all certified cocoa farms to be in compliance with criteria related to the employment of minors. With very few exceptions, families on certified cocoa farms had access to education for school-aged children and access to medical services for all workers and their families, with compliance scores of 90 and 99, respectively, for all countries combined.

Table 4. *Average compliance score at most recent audit for criteria that address entrenched poverty and child labor. Compliance scores range from 0 to 100; operations are awarded 0 points for non-compliance, 50 points for partial compliance, and 100 points for full compliance. Compared with previous audit scores,* ▲▲ *indicates an increase of 25–45 points,* ▲ *indicates an increase of 11–24 points,* ▼ *indicates a decrease of 11–24 points,* ▼▼ *indicates a decrease of 25–45 points. Changes of +/- 10 points are not indicated. The first sample size presented is the number of certificates used to calculate the most recent score; the sample size in parenthesis is the number of certificates included in the time series analysis. In the left column, criteria that were critical at the time of the audit are denoted by an asterisk (*).*

		All regions	Côte d'Ivoire	Ghana	Ecuador	Peru	Indonesia
Sample size		186 (90)	124 (50)	28 (17)	16 (10)	7 (6)	11 (7)
5.8*	**No workers under 15 years old**	100	100	100	100	100	100
5.9	**Minors (12-14 years old) may work part-time on family farms only under special safety conditions**	99	99†	100	100	100	100
5.15	**Access to potable water**	84	77‡	100	91	86	100
5.16	**Access to medical services**	90	88	100	84	100	100
5.17	**Access to education**	99	100	100	94	100	100
5.19	**Minors may participate in harvesting only under strict conditions**	100	100	100	100	100	100
Average for above criteria		95	93	100	95	98	100

† Compliance score was 100 in 2016, after criterion 5.9 became a critical criterion.

‡ Compliance score was 100 in 2016, after criterion 5.15 became a critical criterion.

Most certified farms were found to be providing potable water for farmers, workers and their families, but the operations in Peru and Ecuador that were not in compliance will need to address this criterion by their next audit, as it became a critical criterion in the fall of 2015.

Improving Safety and Minimizing Overuse of Agrochemicals

Smallholder farmers and workers can be exposed to toxic chemicals if these substances are used improperly or without protective equipment, stored in an unsafe manner or location, transferred home on workers' clothing or skin, or if banned or illegal agrochemicals are used. These and other issues related to agrochemicals are addressed in the 20 SAN criteria that focus on responsible and safe agrochemical use. Overall, the approach of the SAN Standard and associated farmer training is to minimize the need for toxic agrochemicals on cocoa farms by promoting integrated pest management, pest monitoring, and prophylactic measures such as removal of diseased pods. However, to the extent that chemical pesticides are used, the standard includes numerous measures to minimize the risk that these substances pose to people and the environment. In

Farmer Voices

A woman participating in a Rainforest Alliance training program in the Nkranfum community of Ghana says:

"My yield in cocoa production has increased from about three bags to about ten bags per acre since I started practicing what I was taught during the training sessions, and it keeps improving. Most women in the program can testify that thanks to this, our children are now happily in school."

Table 5. *Average compliance score at most recent audit for criteria that address potential exposure to hazardous agrochemicals. Compliance scores range from 0 to 100; operations are awarded 0 points for non-compliance, 50 points for partial compliance, and 100 points for full compliance. Compared with previous audit scores, ▲▲ indicates an increase of 25–45 points, ▲ indicates an increase of 11–24 points, ▼ indicates a decrease of 11–24 points, ▼▼ indicates a decrease of 25–45 points. Changes of +/- 10 points are not indicated. The first sample size presented is the number of certificates used to calculate the most recent score; the sample size in parenthesis is the number of certificates included in the time series analysis. In the left column, criteria that were critical at the time of the audit are denoted by an asterisk (*).*

		All regions	Côte d'Ivoire	Ghana	Ecuador	Peru	Indonesia
Sample size		186 (90)	124 (50)	28 (17)	16 (10)	7 (6)	11 (7)
6.3	**Agrochemical use training**	▲ 92	▲ 92	▲▲ 95	▲ 88	93	▲ 95
6.10	**Safe agrochemical storage**	▲ 84	▲ 90	68	84	100	59
6.11	**Location of agrochemical and fuel storage areas**	▲ 88	▲▲ 89	▲ 77	91	100	95
6.13*	**Use of personal protective equipment**	100	100	100	100	100	▲100
6.17	**Safe handling of clothing after agrochemical work**	96	97	100	88	100	86
8.2	**Inventory and reduction of agrochemical use**	74	77	▼ 61	▼ 84	▲ 93	50
8.4*	**Ban on illegal substances and agrochemicals**	100	100	100	100	100	▲100
8.5	**Eliminating use of WHO pesticides**	97	98	88	97	93	100
Average for above criteria		91	▲ 93	86	92	97	86

this analysis, we look in depth at the eight SAN criteria that most directly address the risks of agrochemical use to human health and safety on cocoa farms (Table 5).

Certified cocoa farms achieved full compliance with the critical criteria related to use of personal protective equipment (PPE) and the prohibition of illegal substances and agrochemicals. Performance related to other agrochemical safety criteria varied considerably by country and topic area. Over time, there was substantial **improvement in several agrochemical safety areas**, such as safe fuel and agrochemical storage, as well as training on topics such as the interpretation of agrochemical labels, emergency procedures, and the use of protective gear. Particularly strong improvements were observed in West Africa and Indonesia, as discussed further in the next section on regional trends in compliance. Improvements in agrochemical safety practices may be attributable, at least in part, to the upgrading of criterion 6.3 (training on safe agrochemical use) to a critical criterion in 2015, resulting in more emphasis on this topic during farmer training provided by group administrators. Nevertheless, there remains some room for improvement in pesticide safety: for instance, criterion 8.2—which requires a farm agrochemical inventory, and agrochemical rotation and reduction—registered an average compliance score of 74 across the five focal countries.

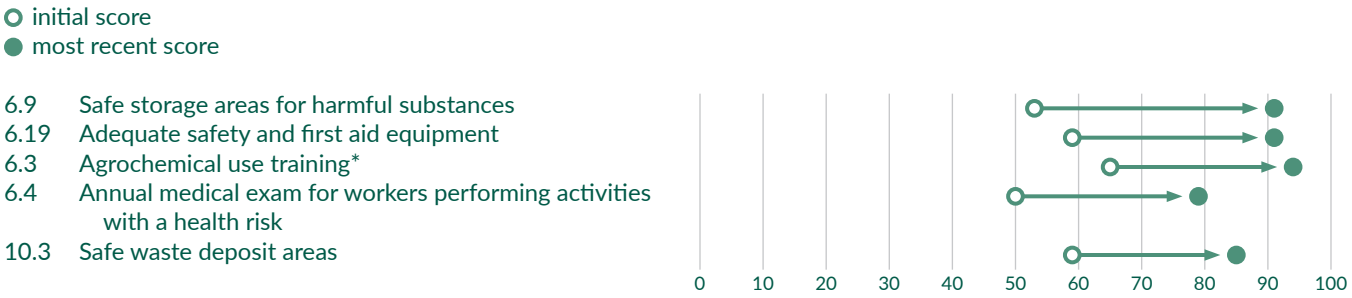
Trends, Successes, and Challenges per Region

Despite some commonalities in cocoa production systems across the tropics, cocoa farmers and farming communities in each region face unique opportunities and challenges. In this section, we analyze audit data to report the most salient

Figure 8. *Criteria of the SAN Standard with the strongest improvement in performance over time, for Côte d'Ivoire.*

* The upgrade of criterion 6.3 to a critical criterion was not fully phased in at the time of the audits used in this sample; thus, the compliance score is less than 100.

Figure 9. *Criteria of the SAN Standard with the strongest improvement in performance over time, for Ghana.*



* The upgrade of criterion 6.3 to a critical criterion was not fully phased in at the time of the audits used in this sample; thus, the compliance score is less than 100.

trends in each region and to discuss the strengths and limitations of the SAN/Rainforest Alliance program to address key challenges and needs for the cocoa sector. Specifically, in each region we review performance data and trends for all 100 criteria in the 2010 SAN Standard[11] to identify the five criteria for which improvement was strongest in each country, while also noting risk areas where performance had declined over time.

West Africa

As noted in the last subsection, **in West Africa the areas of strongest improvement over time were related to agrochemical use and safety**. Compliance with criteria addressing the storage of agrochemicals, agrochemical use training, and first aid and safety equipment increased by 18 to 38 points over time. The large gains in West Africa are likely due to the fact that Ivorian and Ghanaian farmers historically have applied many more agrochemicals, did not have as much knowledge of alternative pest control methods, and have not engaged with organic farming and multiple certification programs to the same degree that farmers in South America have. In addition, governments in West Africa have traditionally promoted agrochemicals much more heavily than governments in South America. Thus, cocoa farmers in West Africa had much more room for improvement than farmers in other regions.

Sacks of cocoa beans are loaded in a truck to go to market in Côte d'Ivoire. *Photographer: Nice and Serious*

Improvements in agrochemical safety might also be due in part to the creation of "sprayer teams" for many farmer groups in West Africa. These teams consist of specialists that are highly trained in agrochemical use and PPE, and travel to farms to apply agrochemicals as requested (and paid for) by the farm owner. This approach improves efficiency and increases safety as the individual farmers are no longer responsible for storing chemicals, acquiring, and washing equipment, and conducting many of the other agrochemical-related safeguards required by the SAN Standard.

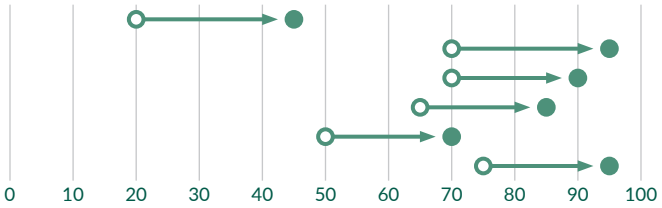
Analysis of West Africa audit data also reveals a few topics requiring greater attention to achieve consistently high sustainability performance. In Côte d'Ivoire, performance decreased most steeply for criteria involving buffer areas between crops and areas of human activity, and between natural areas and areas of agrochemical use. We suspect that inci-

11 See http://www.san.ag/biblioteca/documento.php?id=162 for detailed information on each SAN criterion.

Figure 10. *Criteria of the SAN Standard with the strongest improvement in performance over time, for Ecuador.*

○ initial score
● most recent score

6.18 Development of an emergency response plan
2.6 Buffer between crops and aquatic areas
6.3 Agrochemical use training*
4.8 Septic tanks not for industrial wastewater
1.8 Service providers compliant with standards
4.3 Irrigation use monitoring

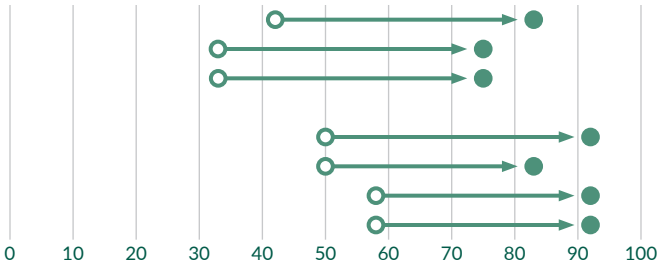


* The upgrade of criterion 6.3 to a critical criterion was not fully phased in at the time of the audits used in this sample; thus, the compliance score is less than 100.

Figure 11. *Criteria of the SAN Standard with the strongest improvement in performance over time, for Peru.*

○ initial score
● most recent score

2.9 Maintain connectivity of natural ecosystems
1.2 Long-term planning
G 2.2 Measures to prevent or minimize risks identified in assessment
1.4 Management system available to workers
9.2 Soil or crop fertilization program
5.14 Clean and safe housing*
4.1 Water conservation program



* The upgrade of criterion 5.14 to a critical criterion was not fully phased in at the time of the audits used in this sample; thus, the compliance score is less than 100.

dence of non-conformance for these criteria reveal the need for smallholder farmers to maximize production area. In Ghana, areas with the biggest declines in performance included the lack of documentation of trainings, the use of fumigation only as a post-harvest treatment, and open waste and burning.

South America

Cocoa farms in Ecuador had noteworthy improvement in a diverse set of criteria covering irrigation systems and the appropriate use of water for irrigation (4.3), the treatment of industrial wastewater (4.8), buffers between crops and aquatic areas (2.6), and others shown in Figure 10.

Harvesting cocoa on the Asociación San Carlos farm in Ecuador.

In neighboring Peru, strong gains were seen for criteria addressing farm planning and management systems, such as those related to long-term planning (1.2), the prevention of risks that might interfere with the group's successful implementation of the SAN Standard (G2.2), and ensuring that the farm's social and environmental management system is accessible to workers (1.4). Large improvements were also seen for criteria related to fertilization program (9.2) and connectivity of natural ecosystems (2.9).

While there were no dramatic decreases in performance for any of the SAN Standard criteria in either Ecuador or Peru, there were a few criteria for which performance decreased slightly over time, including related to the provision of annual medical exams for workers engaged in hazardous activities, conducting an inventory of wildlife on the farm, and maintaining buffers between crops and areas of human activity. These topics merit particular attention as part of future farmer training and support efforts in South America.

Indonesia

Indonesia has seen rapid growth in its cocoa sector in the past decade, including growth in the number of SAN/Rainforest Alliance cocoa certificates. Our analysis shows that, over time,

Figure 12. *Criteria of the SAN Standard with the strongest improvement in performance over time, for Indonesia.*

certified farms in Indonesia have made strong improvements on topics related to health and safety resources and services (6.6), the provision of showers and changing facilities for agrochemical workers (6.16), as well as soil erosion prevention (9.1). Two aspects of group management—documentation of trainings (G1.3) and managing conflicts of interest with impartiality (G3.4)—also experienced strong gains.

Areas with declines in performance included the group certification criterion requiring the prevention of risks that might interfere with the group's successful implementation of the SAN Standard. Safe storage for harmful substances also saw a slight decline, along with collaborations with local communities.

Impacts Research: Linking Sustainable Practices to Long-Term Change

To paint a complete picture of the effects of the SAN/Rainforest Alliance program on cocoa-producing farms, farmers, and nearby communities and ecosystems, it is helpful to supplement data on changes in farm-level sustainability practices (as presented above) with the findings of impact studies that compare certified farms to comparable non-certified farms, or that investigate broader impacts beyond the farm level. There is currently a modest body of impacts research conducted by independent researchers on the effects of SAN/Rainforest Alliance certification. At present, all of this research focuses on West Africa, although studies evaluating impacts in the Indonesian context are currently underway. Here, we summarize key findings from the available impacts research on SAN/Rainforest Alliance certification.

NOTE: Portions of this summary are adapted from the 2015 SAN/Rainforest Alliance Impacts Report, available at http://www.rainforest-alliance.org/impact-studies/impacts-report-2015.

Three studies found that SAN/Rainforest Alliance Certified cocoa farms adopted several important social, environmental, and agronomic practices at a higher rate that non-certified farms. These practices included the use of PPE for agrochemical application, the use of safe agrochemical storage practices, the maintenance of protective buffers around water bodies, the retention or planting of shade trees, the adoption of more practices to improve cocoa quality, such as pod breaking and fermentation, the replanting or rejuvenation of old cocoa trees, and farmer access to affordable medical treatment.[12]

Looking beyond the adoption of improved practices to actual social, economic, and environmental outcomes, six recent empirical studies compare performance of SAN/Rainforest Alliance Certified farms with a non-certified control group. All six studies conclude that farm productivity and/or profitability are higher on certified cocoa farms than nearby non-certified farms. Three of these studies took place in Ghana. The first found that certified farmers reported positive changes to income, savings, and cocoa production, while non-certified farmers reported negative or no changes to those same variables.[13] Another study found that cocoa yields were significantly higher on certified farms than on uncertified farms, and in interviews 67 percent of certified farmers indicated that returns from certification were "much more" than what they had invested in the process, while another 22 percent indicated that returns were "a bit more" than what they had invested.[14] The third study from Ghana found that SAN/Rainforest Alliance Certified farms had higher productivity than non-certified farms, and that farms with a long certification history had the highest productivity.[15] In addition to productivity gains, certified farmers in this study reported benefits including improved soil quality, reduced disease incidence, and increased biodiversity.

A 2011 study carried out in the context of private-public partnerships between cocoa industry actors, international donors, and local training partners examined how SAN/Rainforest Alliance certification affected smallholders in six cocoa cooperatives in two regions of Côte d'Ivoire, and found that the average annual productivity on certified farms was nearly 50 percent higher than on non-certified farms.[16] All six study cooperatives also increased their cocoa quality: measures of flavor, color, amount of foreign matter, and moisture content all improved across the board. The authors attribute these differences in cocoa productivity and quality to farmer training by Rainforest Alliance and government agronomists on crop management, tree pruning, raising seedlings in nurseries, agroforestry systems, and integrated pest management, the latter of which is credited in reducing the number of cocoa pods affected by black pod disease by about 35 percent.

A separate study in Côte d'Ivoire compared yield and income

12 Fenger et al. 2017; Addae-Boadu 2014; Borg and Selmer 2012; Bennett et al 2012

13 Fenger et al. 2017

14 Deppeler et al 2014

15 Borg and Selmer 2012

16 Krain et al 2011

on certified and non-certified farms both at the start of certification and two years later. This research revealed significantly higher annual yields on certified farms, and nearly four times as much net cocoa income as the non-certified farms.[17] Associated with these quantitative gains was an improvement in farmers' outlook: 67 percent of certified farmers reported that their economic circumstances had improved, while 75 percent of the uncertified farmer group said that their circumstances had worsened. Farmer confidence in the future of cocoa production was also higher among farmers who had achieved SAN/Rainforest Alliance certification.

Two studies—one in Ghana and one in Nigeria—reported that certified cocoa was more profitable to farmers than non-certified cocoa based on several standard business measures of profitability. In Ghana, both the benefit/cost ratio and the internal rate of return (a measure of the potential profitability of an investment over time) were significantly higher for Rainforest Alliance Certified cocoa than non-certified cocoa.[18] In Nigeria, researchers likewise estimated a significantly higher internal rate of return for certified cocoa (including Rainforest Alliance and three other certification systems) than non-certified cocoa, based on 59 percent higher gross revenues and 161 percent higher net revenues.[19]

Finally, as noted earlier, poor management of soil fertility and crop fertilization is a primary obstacle to higher cocoa yields and a contributor to long-term degradation of cocoa-producing lands. Research in Ghana found that Rainforest Alliance Certified farmers reported positive changes to forest condition, biodiversity, water quality, soil fertility and other environmental variables, while non-certified farmers reported negative to no changes in these variables.[20] A study of soil chemical properties on 150 cocoa farms (50 each of Rainforest Alliance Certified farms, UTZ certified farms, and non-certified farms) found that the Rainforest Alliance Certified farms registered significantly better soil fertility properties than non-certified farms relative to percent carbon, percent organic matter, available phosphorus and exchangeable potassium.[21] Percent nitrogen was not significantly different between non-certified farms and either type of certified farms.

IV. LOOKING TO THE FUTURE

As we reflect on the past five years of rapid growth in cocoa certification and associated farmer training under the SAN/Rainforest Alliance program, the results presented here confirm the overall effectiveness of this program. Results from both internal audit data and external, independent studies indicate that certified farmers are indeed implementing practices that contribute to reduced forest encroachment and biodiversity loss, improved agronomy and higher yields, reduced child labor and improved livelihoods, and safer and more judicious management of agrochemicals. The findings indicate that these improvements on certified farms stand in marked contrast to conditions on non-certified farms, which demonstrate lower levels of social, economic, and environmental sustainability, and in some cases evidence of deteriorating conditions over time. Finally, the time-series analysis presented in this report indicates that overall sustainability performance on certified farms, as indicated by compliance to criteria of the SAN Standard, is improving over time. This result confirms that the concept of continuous improvement, which is central to the SAN/Rainforest Alliance system, is being fulfilled on the ground.

The research presented here is helpful not just to document prior performance but also to help guide future activities to optimize the reach, effectiveness, and positive impact of the SAN/Rainforest Alliance program. In this regard, the results highlight a few areas of persistent challenge that merit additional focus as part of future training and support programs, industry collaborations, or other interventions. These include:

- Promoting context-appropriate agroforestry management for farms in Cote d'Ivoire, Ghana and Indonesia to increase tree canopy cover and tree species diversity, therefore generating dual benefits for biodiversity and for the sustainability of the cocoa cropping system;
- Increasing support to farmers related to integrated pest management and soil and crop fertilization in all regions;
- Investigating opportunities to replicate the strong improvements seen in some regions—such as agrochemical safety and use in West Africa, and improved farm planning and management systems in Peru—to other cocoa-producing regions.

The 2017 SAN Standard, which comes into effect in July 2017, contains new critical criteria that will address many of the above issues, such as integrated pest management, agrochemical safety, and farm planning and management. In addition, the standard's new continuous improvement rules require that rates of compliance with non-critical criteria increase from year to year, preventing declines in performance over time.

This report also points to the need for additional impacts research to better understand both the short-term and long-term impacts attributable to SAN/Rainforest Alliance certification and associated training: while the five available studies reviewed here provide important insights into impacts in West Africa, there is a need to investigate additional outcome areas as well as impacts in other cocoa-producing regions. At least two in-progress studies will help address this evidence gap. One will determine the effects of Rainforest Alliance training and certification on farm productivity and profitability, crop diversity and other indicators in Bantaeng, Indonesia. The second will assess the impact of Rainforest Alliance certification and training on productivity of cocoa (and other crops grown on the farm), net cocoa income, and labor conditions, such as children's access to education, wages, and health and safety measures. A full list of the Rainforest Alliance's research priorities in the agriculture sector is available at http://www.rainforest-alliance.org/impact/research-partnerships.

17 Bennett et al 2012

18 Addae-Boadu 2014

19 Oseni and Adams 2013

20 Fenger et al. 2017

21 Addae-Boadu 2014

References

Addae-Boadu, S., (2014). *The cocoa certification program and its effect on sustainable cocoa production in Ghana: a case study in Upper Denkyira West District.* Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

Asare, R. (2016). *The relationships between on-farm shade trees and cocoa yields in Ghana.* Department of Geosciences and Natural Resource Management, University of Copenhagen. (IGN Rapport).

Bennett M., Francesconi G.N., Giovannucci D., Daitchman J. (2012). *Côte d'Ivoire cocoa: COSA survey of Rainforest Alliance Certified farms.* Committee on Sustainability Assessment.

Borg, J. & Selmer, J.K. (2012). *From Ghana to Magnum Ice Cream: Tracking Down the Organisation of Sustainable Cocoa Product Chains.* ESA report 2012:14, Environmental Systems Analysis, Chalmers, Göteborg.

Cepeda, D., Pound, B., Nelson, V., Cabascango, D., Martin, A., Posthumus, H., and Ruup, L. (2013). Final Report: Assessing the Poverty Impact of Sustainability Standards in Ecuadorian Cocoa. Natural Resources Institute (NRI), University of Greenwich, London, UK.

Deppeler A., Fromm I., Aidoo R. (2014). *The unmaking of the cocoa farmer: Analysis of benefits and challenges of third-party audited certification schemes for cocoa producers and laborers in Ghana.* Retrieved from https://www.bfh.ch/fileadmin/data/publikationen/2014/3_Deppeler_The_Unmaking_of_the_cocoal_farmer_IFAMA.pdf

Fenger N.A., Bosselmann, A.S., Asare R., and de Neergaard, A. (2017). The impact of certification on the natural and financial capitals of Ghanaian cocoa farmers. *Agroecology and Sustainable Food Systems*, 41:2, 143-166, DOI: 10.1080/21683565.2016.1258606

Gockowski, J., Afari-Sefa, V., Sarpong, D. B., Osei-Asare, Y. B., and Agyeman, N. F. (2013). Improving the productivity and income of Ghanaian cocoa farmers while maintaining environmental services: What role for certification? *International Journal of Agricultural Sustainability*, (February), 1–16.

Krain E, Millard E, Konan E, Servat E. 2011. Trade and pro-poor growth: Introducing Rainforest Alliance Certification to cocoa production in Côte d'Ivoire. GIZ, Eschborn, Germany.

Oseni JO, Adams AQ. 2013. Cost benefit analysis of certified cocoa production in Ondo State, Nigeria. Invited paper, 4th International Conference of the African Association of Agricultural Economists, Hammamet, Tunisia.

Acknowledgments

We thank the Global Environment Facility and United Nations Environment Programme for supporting this research.

'GREENING THE COCOA INDUSTRY' GEF ID 3077

233 Broadway, 28th Floor
New York, NY 10279-2899
tel: 212.677.1900
fax: 212.677.2187
rainforest-alliance.org