2018 Rainforest Alliance Impacts Report

Partnership, Learning, and Change

Deanna Newsom and Jeffrey C. Milder

Foreword

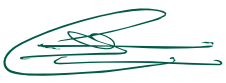
As any farmer who produces Rainforest Alliance Certified™ crops would surely attest, farms are busy places. Farmers, hired workers, and oftentimes family members are there on a daily basis, doing the hard work that's required to turn plants, sunshine, soil, and water into certified coffee, tea, bananas, and other products that eventually make their way to markets and tables around the world. Things get even busier during a certification audit. Accredited auditors can spend days on the farm, examining all aspects of an operation to assess compliance with the certification standard. And long before any certification audit takes place, many farmers have already participated in training programs conducted or developed by Rainforest Alliance agronomists or trainers; these programs cover many different topics, such as disease-resistant plant varieties, productivity-boosting pruning techniques, water conservation, and wildlife-friendly practices.

But at the Rainforest Alliance, an enormous amount of work also occurs off the farm. We partner with organizations all over the globe to develop a vision and practical approach to sustainability that guide us when revising our standard, designing training programs, or planning on-the-ground projects. Implementing this approach often requires focusing extra attention on specific topics and contexts. For example, exposure to pesticides has been shown to cause asthma, neurological problems, and other illnesses among the children of farm workers; how can this outcome be prevented? Many farm families lack sufficient food to eat; what can be done to address this cruel irony? Partnerships—with the ISEAL Pesticides Working Group, the Global Living Wage Coalition, and other issue-specific initiatives—enable the Rainforest Alliance certification program to devise collective strategies aimed at tackling these complex problems. Rainforest Alliance's recent merger with UTZ, which has operated its own successful agriculture certification program for over a decade, promises to be our most powerful partnership yet.

This brings us to the key themes for this report: partnership, learning, and change. Partnership: how can we better collaborate to address deeply rooted sustainability challenges, and expand the reach and impact of sustainable agriculture beyond the more than 1.3 million producers that are directly involved in the program? Learning and change: how can we be quicker and more effective in responding and adapting the program to the sustainability challenges and opportunities that arise across a diverse set of crops and landscapes? Throughout this report, these key aspects of the program are highlighted in green-colored sidebars, as well as in a final section on learning and change.

Has the Rainforest Alliance certification program been successful? That question inspired the document you are currently reading. This 2018 Rainforest Alliance Impacts Report presents the available evidence on the outcomes and impacts of the certification program. (The report focuses solely on the Rainforest Alliance certification program, which is being run separately from the UTZ certification program until the publication of our single new standard in 2019.) In addition to statistics and trends on the production of certified products and the program's geographic scope and participants, the report also summarize the findings of independent scientific studies that compare conditions on Rainforest Alliance Certified farms with those on non-certified farms. And it analyzes data from certification audit reports to understand how certification is addressing three important issues: protecting farmer and farm-worker livelihoods; conserving natural ecosystems; and reducing pesticide use and risk.

The impacts and partnerships featured in this report link the Rainforest Alliance certification program to broader global shifts: the movement toward a world where agriculture is productive, efficient, and sustainable; where farmers and farm workers have a decent standard of living; and where rural landscapes and communities are healthy, resilient, and protective of forests, ecosystems, and wildlife. We are proud to be a part of this movement and invite you to join us.



Han de Groot
CEO

Executive Summary

As the year 2018 begins, many environmental and social challenges loom larger than ever: rural poverty remains widespread, deforestation and ecosystem degradation continue nearly unabated, and climate change threatens our ability to feed a growing population. Farmers and farm workers tend to experience these challenges especially acutely.

The Rainforest Alliance was founded in 1987 to address these complex issues in the context of rural landscapes and commodity value chains. The organization seeks to conserve biodiversity and support sustainable livelihoods by transforming land-use practices, business practices, and consumer behavior. The Rainforest Alliance's sustainable agriculture certification program is a primary means of doing so. This program includes a sustainability standard, auditing processes, and a consumer-facing label, as well as training and other support to facilitate the transition to sustainable agriculture. These activities are implemented or supported with a wide range of partners, including agronomists, trainers, certification bodies, scientists, government officials, private companies, and other innovators who have joined forces to devise solutions to these urgent problems.

At the close of 2017, the Rainforest Alliance certification program included about 1.3 million farmers in 57 countries, covering a total area of about 3.5 million hectares. Production from Rainforest Alliance Certified farms accounted for approximately 10.2 percent of the world's total production of cocoa, 19.9 percent of the world's tea, 5.6 percent of the world's coffee, and 6.4 percent of the world's bananas, as well as smaller proportions of numerous other crops.

As part of its commitment to monitoring, evaluation, and learning, the Rainforest Alliance regularly takes stock of available evidence to assess the results and effectiveness of its certification program. This work draws on a diversity of information including data on the size, location, and characteristics of certified farms; audit reports that document levels of compliance with the certification standard; independent scientific research that compares certified farms to their non-certified neighbors; and firsthand observations from farmers, scientists, and other experts. We present this information to our stakeholders—including producers, commodity-buying companies, and the general public—and use it to better understand and improve the impacts of this program.

The first comprehensive impacts report on the Rainforest Alliance certification program covered the time period from 2010 through the end of 2014. The current report continues where that one left off, evaluating results through the close of 2017 and incorporating scientific literature up until the date of its publication. This report begins by presenting a snapshot of the distribution and characteristics of Rainforest Alliance Certified farms

Workers apply Rainforest Alliance Certified stickers to banana bunches at the Platanera Río Sixaola farm in Costa Rica.

and identifies trends over time. It then focuses on three topics of special interest: improving the livelihoods of farmers and farm workers; conserving natural ecosystems; and minimizing pesticide use and risk. Throughout the report, we also highlight key partnerships through which the Rainforest Alliance works to address these topics. We conclude by illustrating how the organization uses monitoring and evaluation results to improve its programs and by highlighting some upcoming improvements to the M&E system.

The report draws the following conclusions:

- **The certified farm area and crop production volume continues to increase in some sectors while remaining flat in others.** The production of certified bananas increased markedly since 2015, particularly in Colombia and Ecuador, and the production of certified tea continues its steady upward growth. The area of Rainforest Alliance Certified cocoa farms declined in 2015 but has since stabilized, while certified coffee farm area and production volumes both increased in the past three years, recovering somewhat from a dip between 2013 and 2014.

- **Africa continues to dominate the portfolio.** By the close of 2017, the top six countries, in terms of number of certified farms, were located in Africa. Côte d'Ivoire and Kenya contained the largest and third largest total certified area, respectively.

- **Group certification is widespread within the Rainforest Alliance program.** At the close of 2017, 43 percent of Rainforest Alliance certificates were group certificates, and more than 99 percent of certified farms were members of a group. While 82 percent of group members are smallholder farmers with farms of 2.0 hectares or less, large farms (greater than 50 hectares) make up the majority of certified farm area in Mesoamerica, South America, East and Southeast Asia, and South Asia.

- **Banana and tea operations in all regions were widely compliant with the certification criteria we examined related to improving livelihoods for farmers and farm workers (demonstrating average compliance scores of 80 or above, out of 100)[1].** Cocoa and coffee farms also performed well, with average scores above 80 for the vast majority of criteria. Lower compliance (average scores of 60 or less) was observed in some regions for criteria related to annual medical exams for workers conducting hazardous tasks and/or applying agrochemicals, and soil and crop fertilization programs.

- **Certificates for all crops in all regions had average compliance scores of 80 or above for six of the 10 criteria we examined related to the conservation of natural ecosystems.** Areas of consistently good performance included the protection of nearby natural areas and wildlife habitat, and the creation of buffers between natural areas and agrochemical-use areas. Many crop-region groupings performed poorly (with average scores below 70) for criteria addressing buffers between crop areas and aquatic areas or areas of human activity, a result that is likely due to the difficulty of smallholders allocating their limited land to such buffer zones.

- **Certificates for all crops in all regions had average compliance scores of 80 or above for seven of the**

14 criteria we examined related to minimizing pesticide use and risk. The areas with consistently good performance included the criteria aimed at eliminating the most toxic pesticides, and criteria that seek to prevent excess chemical application and fumigation. Performance was mixed with regard to the storage and transport of agrochemicals, with no clear trends across crop-region groupings.

- **Two recent independent studies found that Rainforest Alliance certification was associated with higher household incomes and lower rates of poverty for coffee-farming households,** compared to non-certified farms. One study, conducted in Ethiopia, attributed these differences to the price premium paid to certified farmers, while the other, conducted in Uganda, attributed it to the significantly higher productivity of certified farms. A third independent study found that certified cocoa farmers in Ghana reported positive change in income, savings, and numerous other financial variables since achieving certification, in contrast to non-certified farmers, who reported either no change or negative change over the same time period.

- **Three recent independent studies found that Rainforest Alliance certification had a positive effect on forest quality.** Two studies examined the "forest coffee" region of Ethiopia. One found improvements in forest quality on certified forest coffee areas over a five-year period, and drastic forest degradation on non-certified areas over the same time period, with the positive changes extending beyond the boundaries of the certified coffee areas. The other study found that the premium associated with certified coffee helped incentivize farmers to maintain forest production systems that are valuable for biodiversity. In the third study, conducted in Ghana, certified farmers reported increases in the number of native shade trees and the presence of vegetative barriers, while non-certified farmers reported no change or a decrease in these variables over the same time period.

- **One recent independent study found that Rainforest Alliance certification had a positive effect on pesticide safety and the use of alternative pest-control practices, while a separate study found that certification had no effect on pesticide use patterns.** The first study found that certified cocoa farmers in Ghana reported improved recordkeeping related to pesticide and fertilizer use, improved agrochemical storage practices, and an increased frequency of alternative pest-control measures since certification; non-certified farmers reported no change or a decrease in the adoption of these practices over the same time period. The second study found that pesticide usage patterns and bird species composition on certified banana farms in Costa Rica were comparable to those on non-certified farms, while insect diversity was lower. The similarity between certified and non-certified farms may reflect the widespread implementation of certain sustainable farming practices across the entire Costa Rican banana sector.

- **The Rainforest Alliance certification program is supporting continuous improvement among farms and farmer groups that remain certified for multiple years.** When compliance scores were averaged across all crop-region groupings, we found that certified operations increased their scores by at least 10 points for five of the 41 certification criteria that we examined in this report (and decreased their compliance scores by at least 10 points for two of the criteria). The focus on continuous improvement is now being advanced further with the implementation of the new Rainforest Alliance Sustainable Agriculture Standard, which went into effect in July 2017. This standard codifies continuous improvement by requiring time-bound changes related to key elements of sustainability.

The positive results described above are the direct result of years—and sometimes decades—of collaborative effort, but there is much more to be done. The new 2017 Rainforest Alliance Standard brings a more rigorous, science-based, and farmer-centric approach to addressing key topics, including ecosystem conservation and restoration, living wage and living income, pesticides, and worker wellbeing. New and existing partnerships support efforts to address complex sustainability issues by working collaboratively with industry, government, producer associations, and other certification programs. And new upgrades to the certification program's monitoring and evaluation system will bring new data and insight to better document on-the-ground impacts, and support sound decision-making and continuous improvement by certified producers and the program itself. As we learn more about the successes and challenges of our certification program, we work to strengthen it on a continual basis, together with forward-looking farmers and partners around the world.

A woman sorts coffee beans on a farm in Ethiopia.

CHAPTER 1

An Introduction to the Rainforest Alliance Sustainable Agriculture Certification Program

The Rainforest Alliance green frog seal, found on Rainforest Alliance Certified™ coffee, bananas, and dozens of other products, is a simple symbol that represents a holistic sustainability approach and a rigorous implementation process. This section describes the different elements of the certification program, including the Rainforest Alliance Sustainable Agriculture Standard, the certification assurance process, training and technical support, and market development. Collectively, we refer to these elements as the "Rainforest Alliance sustainable agriculture certification program," or, hereafter, simply the "Rainforest Alliance certification program."

At the center of this certification program is the Rainforest Alliance Sustainable Agriculture Standard. This standard was initially developed by the Sustainable Agriculture Network (SAN), a network of 11 conservation and rural development NGOs from an assortment of countries. Since November 15, 2017, this standard—formerly known as the SAN Standard—has been managed by the Rainforest Alliance, which now is also responsible for other functions that were formerly conducted by the SAN, such as developing and administering certification policies, auditor training programs, and the accreditation process for certification bodies. Throughout this document, we refer to the Rainforest Alliance Sustainable Agriculture Standard as the 2017 Rainforest Alliance Standard.

During the large majority of the evaluation period that is the focus of this report (January 2015 to December 2017) the 2010 SAN Standard was in force. Therefore, we often refer to the criteria of the 2010 SAN Standard when discussing farm practice adoption and other results, while also noting places where the approach of the new 2017 Rainforest Alliance Standard differs.[2] The 2010 SAN Standard contained 100 criteria, 23 of which were mandatory "critical criteria" that were required to be fulfilled to achieve and maintain certification. The remainder (77) were "continuous improvement criteria," of which certified producers were required to meet a minimum percentage: at least 50 percent of all applicable criteria for each principle and at least 80 percent of all applicable criteria for the entire standard.[3] For each criterion, auditors score the farm or farmer group that is applying for certification as either "fully compliant," "non-compliant with a minor non-conformity," or "non-compliant with a major non-conformity."

Farmer training and technical assistance supports the certification program in important ways, and is conducted both in preparation for the first certification audit and as a means of promoting continuous improvement of farming practices on already-certified operations. Training programs vary in scope and length, but they generally provide in-person and online training of farmers and farm managers. To date, Rainforest Alliance trainers have trained thousands of farmers in 19 countries, while the Farmer Training App and online training

materials are available globally.[4] The Rainforest Alliance and its partners also develop, implement, and support other efforts to help farmers overcome the constraints they face in adopting more sustainable, productive, and profitable farming practices—for instance, by helping to provide them with access to improved planting materials, fertilizers, and financing for farm investments. Further down the supply chain, the Rainforest Alliance works to develop markets for certified products by increasing consumer, company, and government demand for sustainably produced agricultural products.

The relationship among these different elements of the certification program is elaborated in a "theory of change," which describes the means by which program activities and investments are intended to cause or contribute to the desired results. Specifically, farmer training and certification at the field level are expected to improve farmer knowledge and the adoption of more sustainable farming practices. These results, in turn, are expected to contribute to field-level outcomes, including improved farmer well-being, the conservation of biodiversity and other natural resources, and increased farm productivity and profitability. When these outcomes are replicated across many farms, and supported and magnified by the activities of other stakeholders, they contribute to the program's intended broader impact—namely, that rural landscapes become sustainable and resilient. Alongside these field activities, a complementary set of activities promotes market transformation, consumer awareness, and supply-chain investment to increase the demand and business case for sustainable agriculture.

The theory of change provides a guiding framework not only for the standard-setting process but also for monitoring, evaluating, and reporting the effects of the certification program. This monitoring and evaluation process, in turn, is used to adapt and improve the system's standards, strategies, and activities to deliver key outcomes more effectively over time. The full theory of change is provided in Annex C.

A Rainforest Alliance trainer meets with a cocoa farmer as part of the Climate, Nature and Communities in Guatemala program, which supports the country in reducing the negative impacts of climate change and conserving its natural resources.

Developing the 2017 Rainforest Alliance Standard

The sustainability standard that underlies the Rainforest Alliance certification program is periodically revised to incorporate evolving stakeholder expectations as well as the most recent science, knowledge, and practice related to sustainable agriculture. The present Rainforest Alliance Standard, which went into effect in July 2017, is the result of a full, multi-year revision process.

The standard revision process was led by the Sustainable Agriculture Network (SAN) and followed the best practices outlined in the ISEAL Alliance's Code of Good Practice for Setting Social and Environmental Standards, including extensive processes of consultation and technical analysis. This included four rounds of public consultation using a variety of outreach methods including online consultation platforms, webinars, and workshops, which were conducted in both urban and rural areas to make them accessible to all stakeholders. These consultations resulted in feedback from more than a thousand stakeholders in over 50 countries. As the revision progressed, the SAN also held intensive discussion forums with the standard's users, including producers, auditors, and sustainability advisors. In addition, the SAN conducted two rounds of field tests with both smallholder groups and large plantations, applying a draft of the revised standard on banana, cocoa, coffee, and tea farms, as well as in cattle production systems in Africa, Asia, and Latin America. Finally, the SAN also conducted a special round of consultation on its new list of prohibited pesticides. This process resulted in numerous refinements that optimize the new standard's rigor, practicability, and potential for positive impact.

The 2017 Rainforest Alliance Standard contains many noteworthy innovations designed to further advance sustainable livelihoods, improve farm productivity, protect forests and ecosystems, and increase resiliency to climate change. One important change is the creation of a "continuous improvement framework," which defines three performance levels and requires time-bound improvements related to key elements of sustainability. As in the 2010 SAN Standard, compliance with critical criteria remains mandatory and a prerequisite for certification. However, under the 2017 Rainforest Alliance Standard, non-critical or continuous improvement criteria are associated with a specific timeframe for implementation, denoted by levels C, B, and A. This phased implementation approach ensures improvement over time and guides farmers to invest in the most essential improvements first, while also making certification accessible, thereby encouraging more farmers to embark on the journey toward sustainability.

Other important changes include the introduction of the "Living Wage" concept and the associated essential needs framework to provide a decent standard of living for farmers and farm workers; increased protection for worker rights; the inclusion of the internationally recognized High Conservation Value concept to help identify and protect key conservation values; and a new science-based approach to pesticides, including an updated list of prohibited pesticides, a new pesticide risk mitigation process, and the mandatory use of integrated pest management. (Please see the respective report sections on each of these topics for further detail.)

The revised Rainforest Alliance Standard includes a framework for providing a living wage for farm workers, like this woman on a tea estate in Sri Lanka.

After the 2017 Standard was published in September 2016, the global network of almost 400 auditors associated with the program's accredited certification bodies was trained via a half-year online forum in which SAN training managers presented updated guidance documents and training tools. This online phase was enriched by six regional one-week training events that included practical exercises to assess risk and compliance related to the new criteria, as well as field trips to farms. The program's technical community of auditors and sustainability advisors has played a critical role in teaching certified farmers and interested non-certified farmers about the new standard.

Please note that the 2010 SAN Standard was in force until June 30, 2017, after which date the 2017 SAN Standard (subsequently renamed the 2017 Rainforest Alliance Standard) took effect. Therefore, the majority of the monitoring and data and evaluation findings presented in this report reflect the results of the 2010 SAN Standard and associated program elements.

– Oliver Bach, Sustainable Agriculture Network

CHAPTER 2

Report Methodology

The Rainforest Alliance operates a monitoring and evaluation (M&E) system for its agriculture certification program to assess the extent to which the desired results identified in the theory of change are being achieved. Designed in accordance with the ISEAL Alliance's Code of Good Practice for Assessing the Impacts of Social and Environmental Standards Systems (ISEAL Impacts Code), the M&E system utilizes multiple data sources and approaches to monitor results, assess the program's effectiveness, and identify opportunities for improvement (see Table 1). Consistent with the approach recommended by the ISEAL Alliance, the M&E system collects, analyzes, and synthesizes many different types of information from both internal and external sources, including regular on-farm audits, data collected through specialized monitoring tools and initiatives, and impact evaluation studies conducted by independent researchers. See Annex D for more detail about each element of the M&E system.

The information gathered though the M&E system is analyzed, communicated, and applied in multiple ways. Most fundamentally, the information is used to monitor performance and progress relative to the theory of change outcomes, and to share these results, both positive and negative, with stakeholders and partners. Relatedly, M&E data support the certification program's commitment to transparency—for instance, through the publication of a full, updated map of all Rainforest Alliance certificates[5] and their basic attributes. Insights from the M&E system are also used to help customize farmer training programs, quickly pinpoint implementation challenges reflected in lower compliance scores, and periodically revise the certification standard. See Chapter 7 for more information about the ways that M&E data are being used to improve the certification program, as well as an overview of some current efforts to improve and upgrade the M&E system.

Data Sources

The evidence presented in this report falls into four main categories:

1. Basic statistics on the program's geographic, sectoral, and market reach and characteristics
2. Rates of compliance with criteria in the certification standard
3. Results of scientific studies conducted by independent third parties
4. Interviews with scientists and farm workers

Each of these sources of evidence is described in greater detail below, and in Annex C.

The reach and characteristics of the Rainforest Alliance's certification program are analyzed using information on the area (in hectares) and amount of product grown (in kg) on each certified farm or group of farms.

TABLE 1 | *Overview of the monitoring and evaluation system*

results level (from Theory of Change)	data sources and methods	sections of this report where results are presented
Support strategies	Elements of the Rainforest Alliance certification program, including standards, policies, training programs, market development, and partnerships.	Introduction to the Certification Program (page 11)
Outputs operations, farmers, and lands to which support strategies are applied	Reach of the Rainforest Alliance system; characteristics of participating operations, farmers, and lands; and trends over time are analyzed based on data from the Rainforest Alliance Certificate Database.	Our Global Reach (page 21) Annex A: Global Reach, by Country (page 68)
Direct results short-term effects on farm practices, management systems, and purchasing decisions	Changes in farm practices are analyzed based on audit conformance data for selected crops and regions. More detailed evaluation of practice adoption (including comparisons to non-certified farms) is the focus of several scientific studies reviewed in this report.	Practice adoption data are presented related to farmer and farm worker livelihoods (page 32), natural ecosystem conservation (page 44) and pesticide use and risk (page 53).
	Sustainable (certified) purchasing is tracked through Rainforest Alliance's traceability database and market share analysis.	Data on market share and sales are reported in the Executive Summary (page 7) and in Our Global Reach (page 21).
Intermediate results changes in social, environmental, and farm productivity outcomes—and in business practices and policies—resulting from support strategies and direct results	Intermediate results at the farm level are assessed through context-specific evaluation studies conducted by third-party researchers or, in some cases, with the involvement of NGOs that provide certification training and support. Many of these studies include comparisons to non-certified farms.	Intermediate results are reviewed related to farmer and worker livelihoods (page 34), natural ecosystem conservation (page 45) and pesticide use and risk (page 52).
Broader impacts transformation of farming landscapes toward long-term sustainability	Broader impacts (beyond the farm level) are assessed through context-specific evaluation studies conducted by third-party researchers. To date, broader impact studies are available only for coffee-producing landscapes.	Broader results related to coffee certification are reviewed in the section on natural ecosystem conservation (page 45).

These data are then aggregated by region and crop, and when possible, are presented as a time series to illustrate multi-year trends. The data analyzed in this section are derived from the Rainforest Alliance Certificate Database, and reflect the certification portfolio as of December 31, 2017.

In addition to information on the basic characteristics of each certificate, the report draws upon audit data documenting each certificate's level of compliance (full, partial, or non-compliance) with each of the 100 criteria in the 2010 SAN Standard. These compliance data are recorded in each certificate's annual audit report and are based on auditors' field observations, interviews, and analyses of farm records and other documentation. Compliance data analyzed in this report are based on the version of the 2010 SAN Standard in force at the time of each audit report within the dataset: version three of the 2010 SAN Standard through November 30, 2015, and version four of the 2010 SAN Standard from December 1, 2015 to June 30, 2017. Changes made from version three to version four were limited to a handful of criteria and do not significantly affect the analysis of compliance data during the 2015-2016 period. Criteria numbers cited in this report refer to those in the 2010 SAN Standard version 4.

For the analysis of audit compliance data, we selected a sample of key crops and regions: banana farms in Central and South America; cocoa farms in West Africa, South America, and Indonesia; coffee farms in Central America and Brazil; and tea farms in East Africa, India, and Indonesia. To enable time-series assessments, this analysis was limited to operations that had been certified for at least two years and had available compliance data from a recent audit (usually 2015 or 2016) and at

Auditors survey the Finca San Francisco coffee farm in Guatemala.

Auditors review ledgers on a cocoa farm in Ghana. Part of the audit process includes documenting traceability.

TABLE 2 *Number of certified operations included in the compliance analysis for each crop-region grouping*

	certificates included in analysis	total certificates in crop-region grouping
banana - Central America	66	138
banana - South America	66	248
cocoa - Indonesia	10	10
cocoa - West Africa	58	186
cocoa - South America	15	36
coffee - Brazil	30	73
coffee - Central America	58	278
tea - India	52	117
tea - Indonesia	8	15
tea - East Africa	20	98

least one earlier audit (2012–2015). For crop-region groupings with more than 100 such certificates, a random sample was selected for analysis. In crop-region groupings with fewer certificates that met these parameters, all operations with at least two years of compliance data were included in the analysis (see Table 2). In total, this analysis included 383 certificates encompassing 224,262 individual farms.

For each time period ("most recent audit" and "older audit"), the average compliance level was calculated for each crop-region grouping (for example, bananas in in Central America or coffee in Brazil) against each 2010 SAN Standard criterion. This score was 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 non-compliance (i.e., a major non-conformity). For example, the compliance score for the criterion related to soil erosion control measures for a hypothetical region that had four certificates, two in full compliance with this criterion and two in partial compliance, would be 75 ((100+100+50+50)/4).

For each of the topics that this report examines in depth—protecting the livelihoods of farmers and farm workers, conserving natural ecosystems, and decreasing the risks of pesticide use—the focus was on the 10 to 20 criteria that most directly addressed that topic. For example, the examination of farmer and worker livelihoods considered criteria related to access to medical services (criterion 5.16), fair wages (criterion 5.5), clean and safe housing (criterion 5.14), and others. The compliance data for each selected set of criteria were analyzed to characterize performance levels during the most recent time period, assess changes over time, and highlight any crop-region groupings with notably high or low rates of compliance, as well as those with substantial changes in compliance. Criterion-level information on compliance

Members of the Rainforest Alliance Certified Maraba smallholder coffee cooperative in Butare, Rwanda sort beans at the cooperative's washing station.

and trends for each crop-region grouping helps to highlight areas and topics for which sustainable practices are well entrenched among certified farms, as well as areas of persistent challenge where additional training, support, and partnerships may be required to overcome barriers to improvement.

The report also presents the results of studies conducted by academic researchers or other scientists, independent of the Rainforest Alliance. Such studies can be particularly insightful, as they are typically designed to assess attribution—that is, they use rigorous methodologies that allow researchers to determine whether differences between certified farms and non-certified farms are attributable to the Rainforest Alliance certification program or to other factors. In sidebars throughout this report, the results of new scientific studies (published since the 2015 SAN/Rainforest Alliance Impacts Report) are summarized. These studies examine farm productivity and farmer poverty on cocoa and coffee farms (page 34), forest quality on and around certified cocoa and coffee farms (page 45), and practices related to pesticide use and pesticide alternatives on cocoa and banana farms (page 52).

Finally, the report also contains interviews with farmers who participate in the Rainforest Alliance certification program and scientists who have worked closely to help develop, implement, or evaluate the 2017 Rainforest Alliance Standard and the Rainforest Alliance certification program. These narratives supplement the report's scientific data with rich observations from the field.

SIDEBAR

The Rainforest Alliance-UTZ Merger

In June 2017, the Rainforest Alliance and UTZ announced their intent to merge. This decision was motivated by the desire of both organizations to increase the reach, positive impact, and value to farmers of certification, training, and other programs. In early 2018, the merger became official, and the new organization—also called the Rainforest Alliance—is now in a stronger position to tackle today's urgent environmental and social challenges, including climate change, deforestation, rural poverty, and unsustainable farming practices.

Currently and for the near future, the new organization continues to operate the existing Rainforest Alliance and UTZ certification programs side by side while a new, unified certification program and standard are developed. The new Rainforest Alliance also intends to broaden the scope of its work on policy, advocacy, and landscape-level partnerships to address deep-seated sustainability challenges and increase the scale and impact of the organization's work.

Han de Groot, former UTZ executive director and new Rainforest Alliance CEO, with former Rainforest Alliance president Nigel Sizer, now the organization's chief program officer.


RAINFOREST ALLIANCE
CERTIFIED

CHAPTER 3

Our Global Reach

The reach of the Rainforest Alliance sustainable agriculture certification program has continued to grow, with the number of Rainforest Alliance Certified farms reaching 1.3 million by the close of 2017 (Figure 1). Total certified farm area dipped in 2015 but rose again in recent years, reaching 3.5 million hectares by the end of 2017 (Figure 2). Similarly, the total area used to produce certified crops—which excludes farm areas used for infrastructure, conserved as natural ecosystems, or pro-

FIGURE 1

Growth in Rainforest Alliance Certified producers

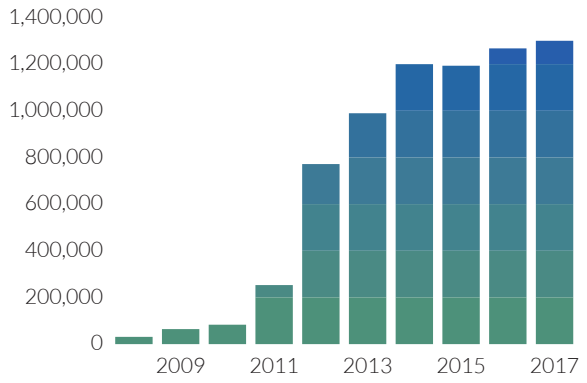


FIGURE 2

Rainforest Alliance Certified production area and total area (in hectares). Production area refers to land under certified crops only. Total area refers to the total size of certified farms, including on-farm infrastructure, conservation areas, and land devoted to crops and livestock that are not commercialized as Rainforest Alliance Certified.

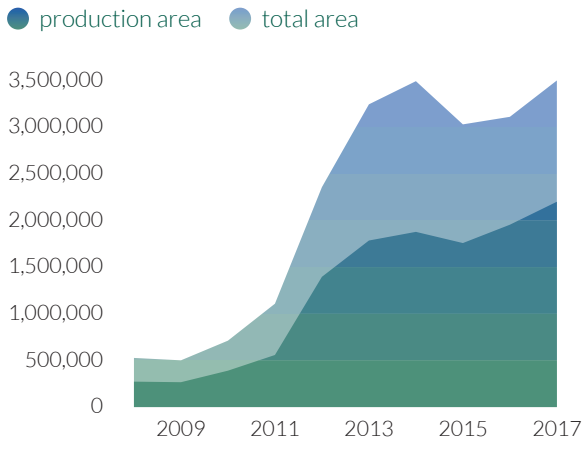


FIGURE 3

Number of Rainforest Alliance agriculture certificates per country, as of December 2017

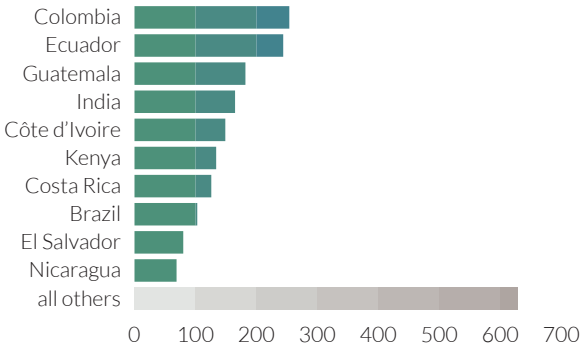


FIGURE 4

Percentage of Rainforest Alliance certificates by region, as of December 2017

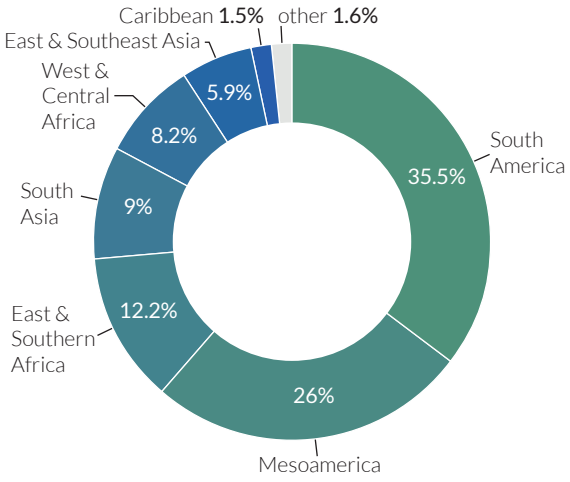


FIGURE 5

Number of Rainforest Alliance Certified farms per country, as of December 2017

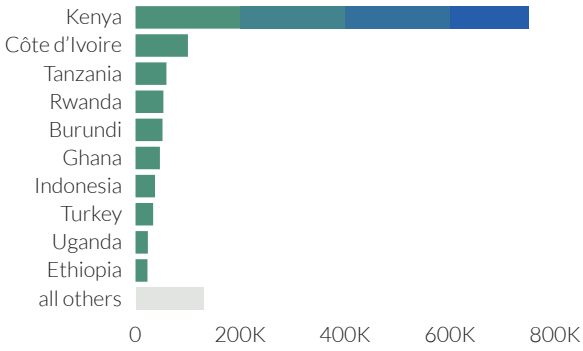
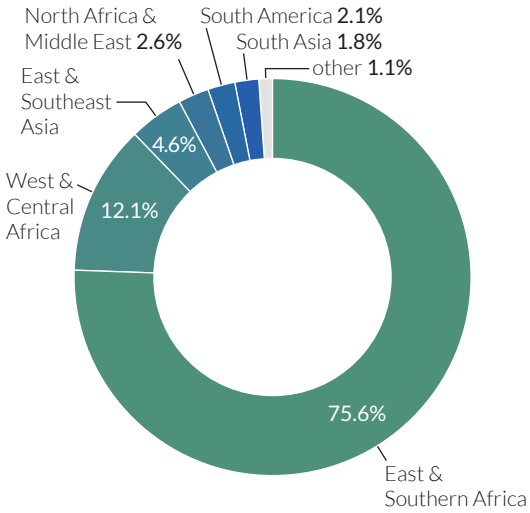


FIGURE 6

Percentage of Rainforest Alliance Certified farms by region, as of December 2017



ducing non-certified crops—rose notably over the past two years, reaching 2.2 million hectares by the end of 2017 (Figure 2).

Where and With Whom We Work

At the close of 2017, there were 2,135 active Rainforest Alliance agriculture certificates in 57 countries. The countries with the most certificates were Colombia (254), followed by Ecuador (244) and Guatemala (182). The past three years saw substantial growth in the number of certificates in Colombia and Ecuador due to an increase in certified banana farms in those countries. Globally, more than 60 percent of certificates are located in South America or Mesoamerica.

The picture changes, however, when the focus is shifted from the number of certificates per country to the number of farms per country. Kenya, with its vast groups of smallholder tea farmer cooperatives managed by the Kenya Tea Development Agency (KTDA), contains by far the largest number of certified farms, at nearly 750,000. The five countries with the next highest numbers of certified farms are also located in Africa: Côte d'Ivoire, Tanzania, Burundi, Rwanda, and Ghana. Not surprisingly, Africa dominates the regional breakdown of farm numbers, with nearly 90 percent of certified farms located there (75.6 percent in East and Southern Africa; 12.1 percent in West and Central Africa).

Shifting lenses again, to look at the total certified area by country, reveals yet a different picture. Côte d'Ivoire dominates, with 618,000 hectares, followed by Brazil (367,000 hectares), Kenya (362,000 hectares), and In-

FIGURE 7

Rainforest Alliance Certified land area per country (in hectares), as of December 2017

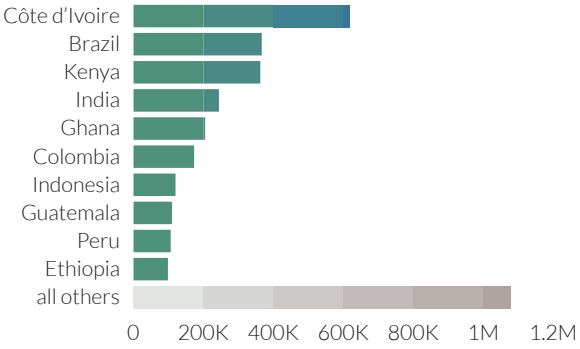
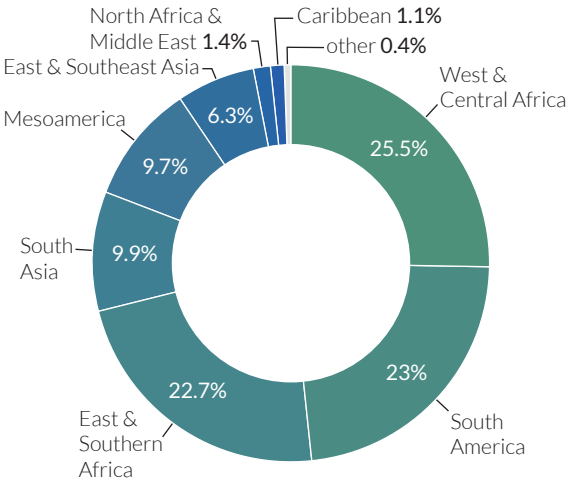


FIGURE 8

Percentage of Rainforest Alliance Certified land area by region, as of December 2017



dia (244,000 hectares). Regionally, Africa accounts for 48.2 percent of the total certified farm area.

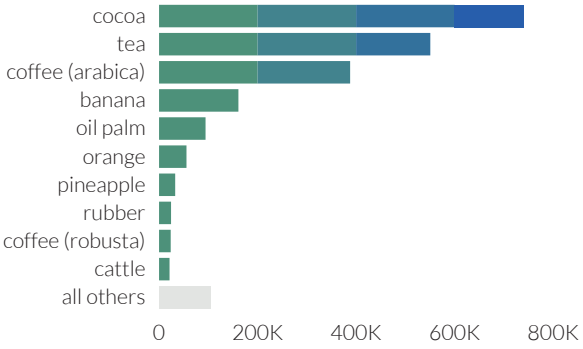
Rainforest Alliance Certified Crops

Nearly 750,000 hectares of farmland produce Rainforest Alliance Certified cocoa, roughly one-third of all Rainforest Alliance Certified crop production area. Tea and coffee are the next most dominant crops by production area, followed by banana and oil palm. According to the most recent data available, production from Rainforest Alliance Certified farms was estimated to account for 10.2 percent of the total global production of cocoa, 19.9 percent of the world's tea, 5.6 percent of the world's coffee, and 6.4 percent of the world's bananas.[6]

The figures on pages 24 and 25 show trends in production area and quantity of crop produced for the four

FIGURE 9

Rainforest Alliance Certified crops by production area (in hectares), as of December 2017



largest Rainforest Alliance Certified crops by production area: cocoa, coffee, tea, and bananas. For bananas, the production area and quantity of fruit produced increased markedly since 2015, jumps that are attributable primarily to the growth in Rainforest Alliance banana certification in Colombia and Ecuador. Tea production area and quantity experienced consistently steady growth over time. Rainforest Alliance Certified cocoa production area and quantity both contracted between 2014 and 2015, then showed modest growth between 2015 and 2017. This trend can largely be attributed to a temporary mismatch between the supply and demand for certified cocoa: despite buyer commitments to purchase Rainforest Alliance Certified cocoa in the early 2010s, some purchases took longer than expected to materialize, while other publicly-stated company commitments to third-party certification were

A cocoa nursery in Côte d'Ivoire, home to more Rainforest Alliance certified land area than any other country.

FIGURE 10

Rainforest Alliance Certified coffee production area (in hectares)

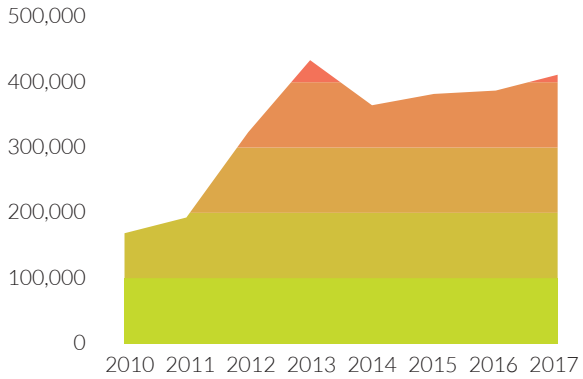


FIGURE 11

Rainforest Alliance Certified coffee production (in metric tons)

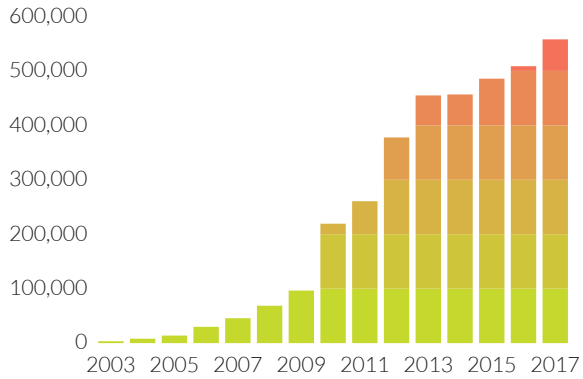


FIGURE 12

Rainforest Alliance Certified coffee production, by country

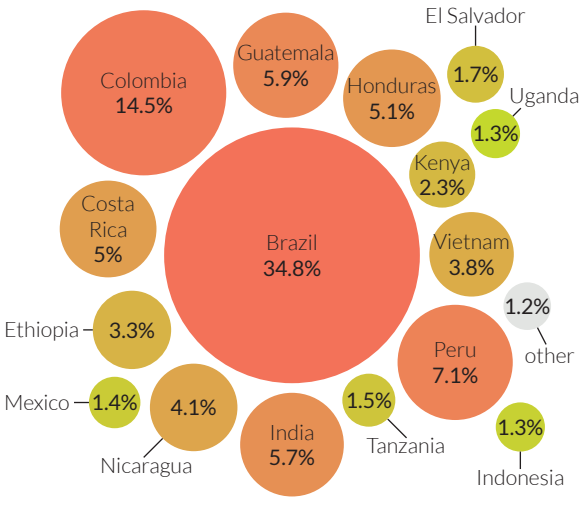


FIGURE 13

Rainforest Alliance Certified cocoa production area (in hectares)

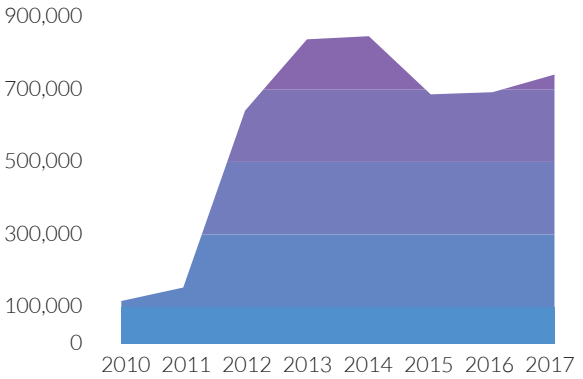


FIGURE 14

Rainforest Alliance Certified cocoa production (in metric tons)

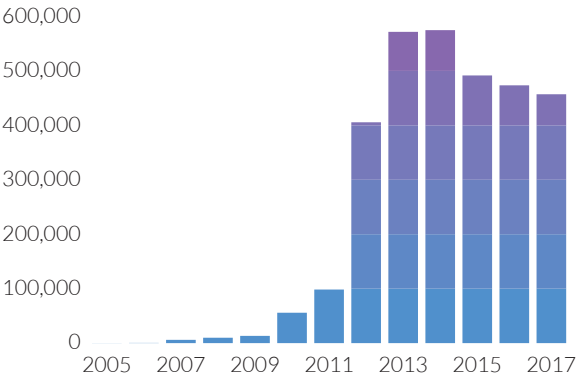


FIGURE 15

Rainforest Alliance Certified cocoa production, by country

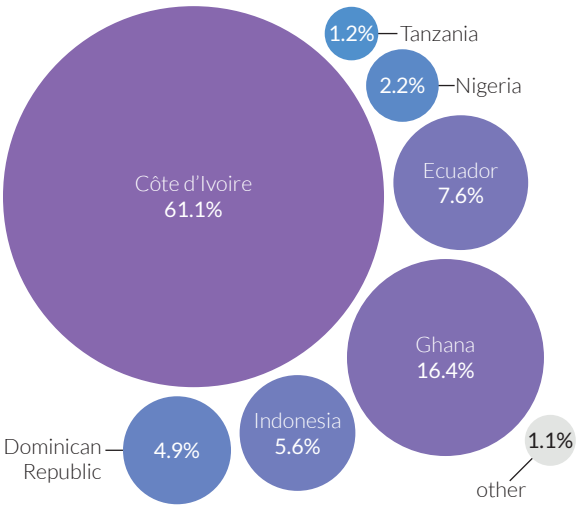


FIGURE 16

Rainforest Alliance Certified tea production area (in hectares)

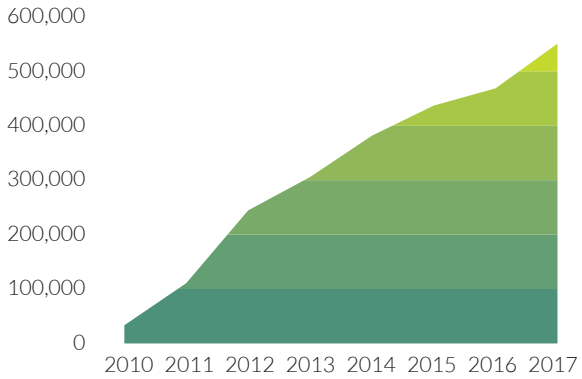


FIGURE 17

Rainforest Alliance Certified tea production (in metric tons)

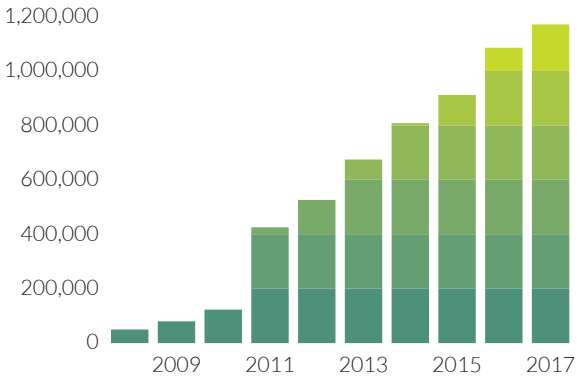


FIGURE 18

Rainforest Alliance Certified tea production, by country

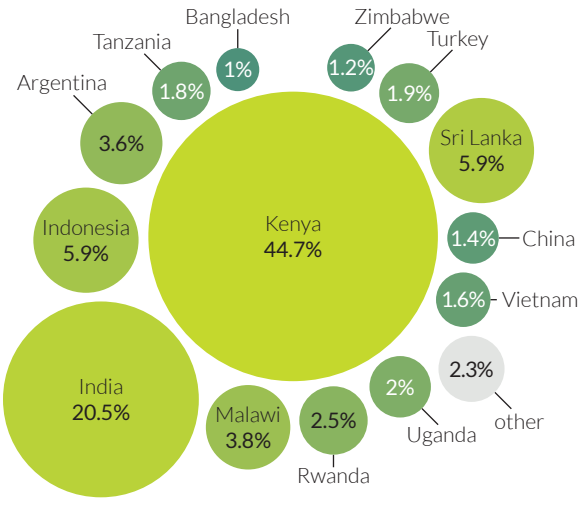


FIGURE 19

Rainforest Alliance Certified banana production area (in hectares)

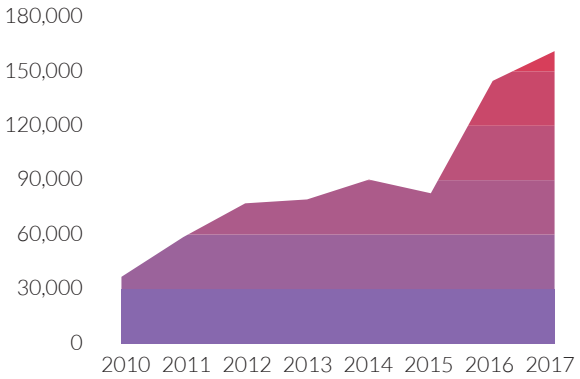


FIGURE 20

Rainforest Alliance Certified banana production (in metric tons)

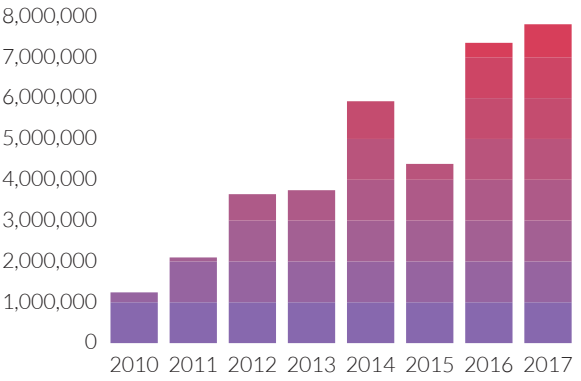


FIGURE 21

Rainforest Alliance Certified banana production, by country

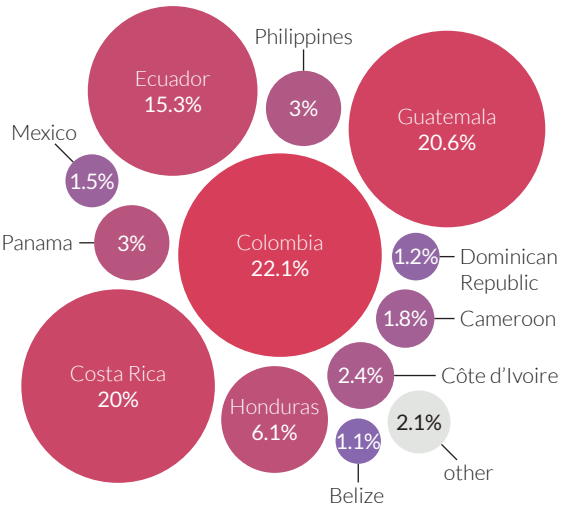


FIGURE 22 | *General distribution of Rainforest Alliance Certified crops in the Americas*

FIGURE 23 | *General distribution of Rainforest Alliance Certified crops in Europe, Africa, and the Middle East*

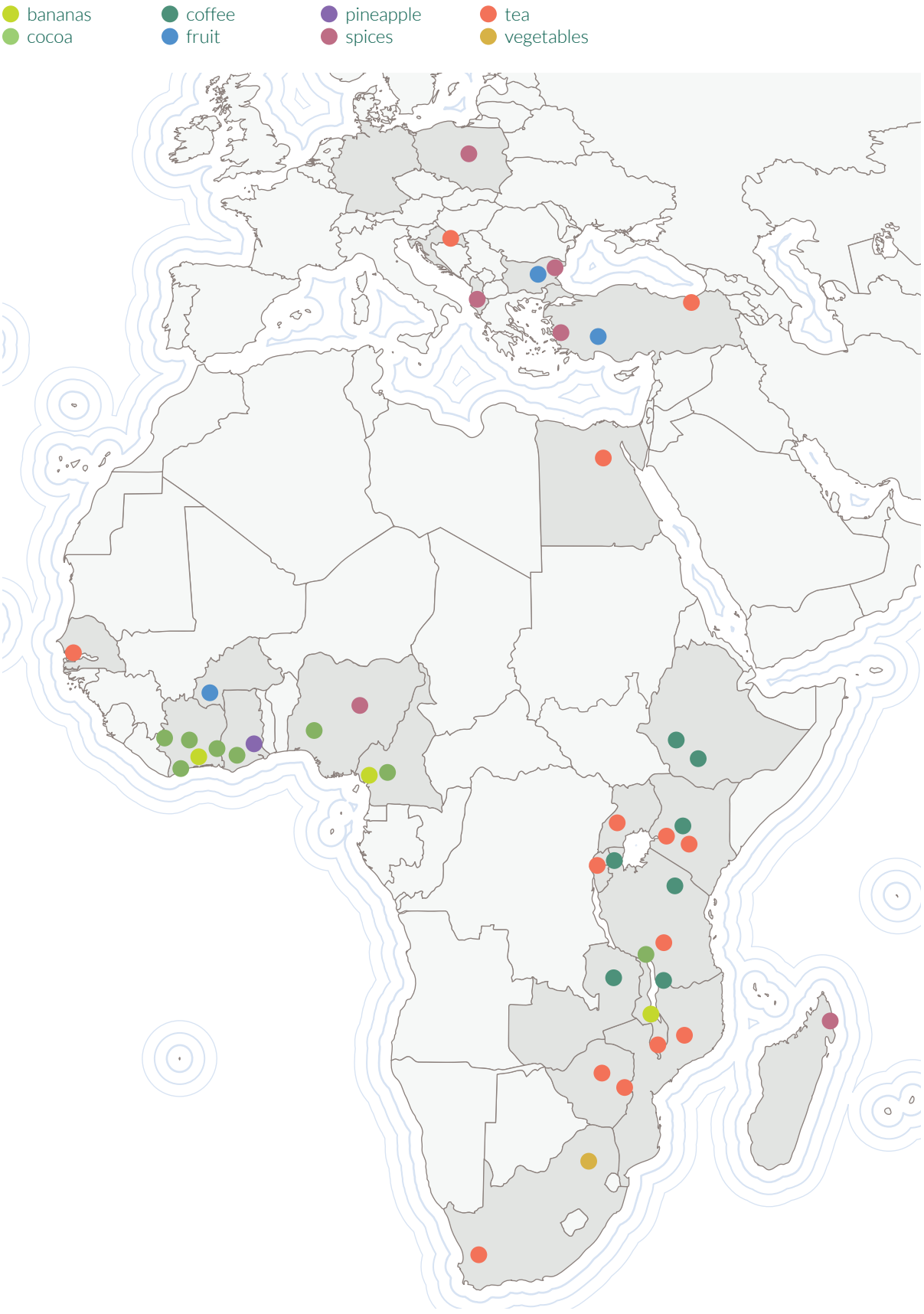
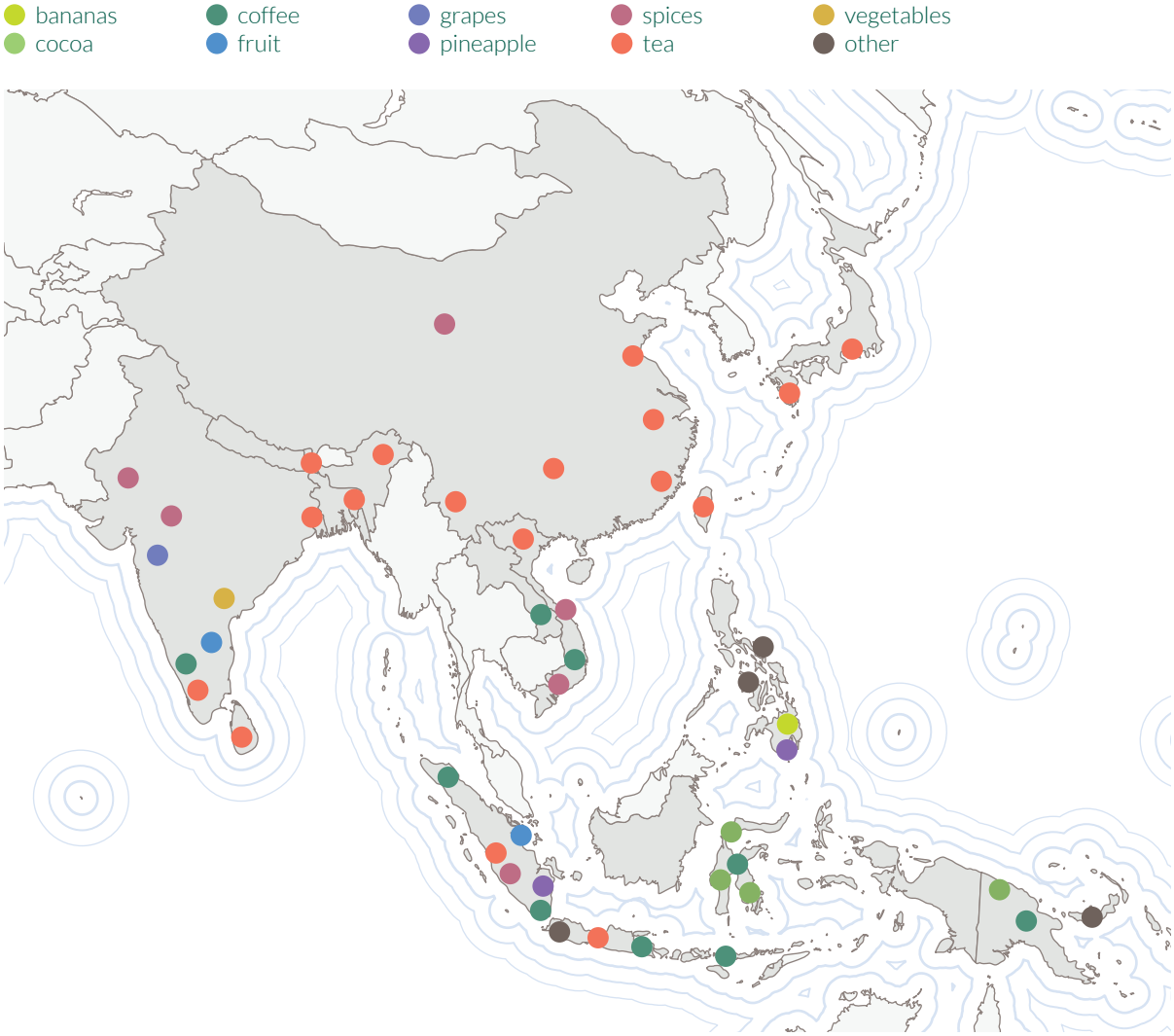


FIGURE 24 | *General distribution of Rainforest Alliance Certified crops in Asia*



dropped altogether. This limited demand disappointed some cocoa farmers who had become certified between 2011 and 2014, leading to the decrease seen in 2015. Coffee production area continued to recover from a dip between 2013 and 2014. The quantity of certified coffee also rose in both 2017, sustaining a trend of moderate growth that followed a period of rapid growth from 2009 to 2013.

The Role of Smallholder Farmers in the Rainforest Alliance Certification Program

Rainforest Alliance agriculture certification is available to all farms within the program's commodity and geographic scope, regardless of size. A primary objective of the program is to improve the livelihoods of smallholder farmers—those who rely primarily on family or household labor (or reciprocal workforce exchange with other members of the community) and who typically farm no more than a few hectares of land. Yet, the traditional farm-by-farm certification model is often inaccessible to smallholders, who may find it difficult for their small operations to shoulder the administrative and financial requirements of the certification and audit process. To address this potential barrier, in 2004 the SAN launched the group certification model, which spreads the cost of the certification audit over tens, hundreds, and sometimes thousands of individual farmers, and relies on a "group administrator" to provide training, verify the compliance of individual group members with the certification standard, ensure certified and non-certified products are kept separate, and assess and mitigate any risks. The responsibilities of the group administrator are specified in the Group Certification Standard.

In the 14 years since its creation, the group model has grown in both size and scope. It now accommodates traditional farmer cooperatives, outgrower models, and structures where a government or non-governmental entity serves as the group administrator. Today, 43 per-

FIGURE 25 *Percentage of Rainforest Alliance Certified farms in each size category, by region*

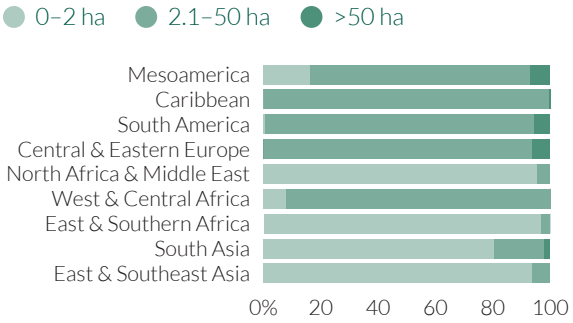
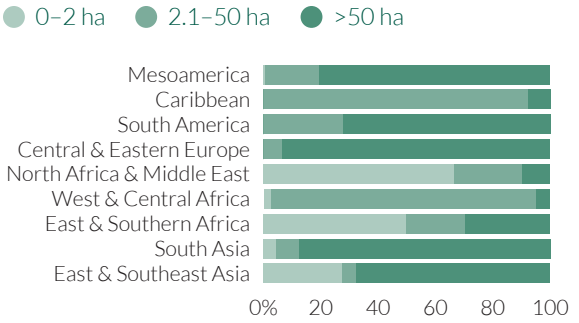


FIGURE 26 *Percentage of total Rainforest Alliance Certified land area in each size category, by region*

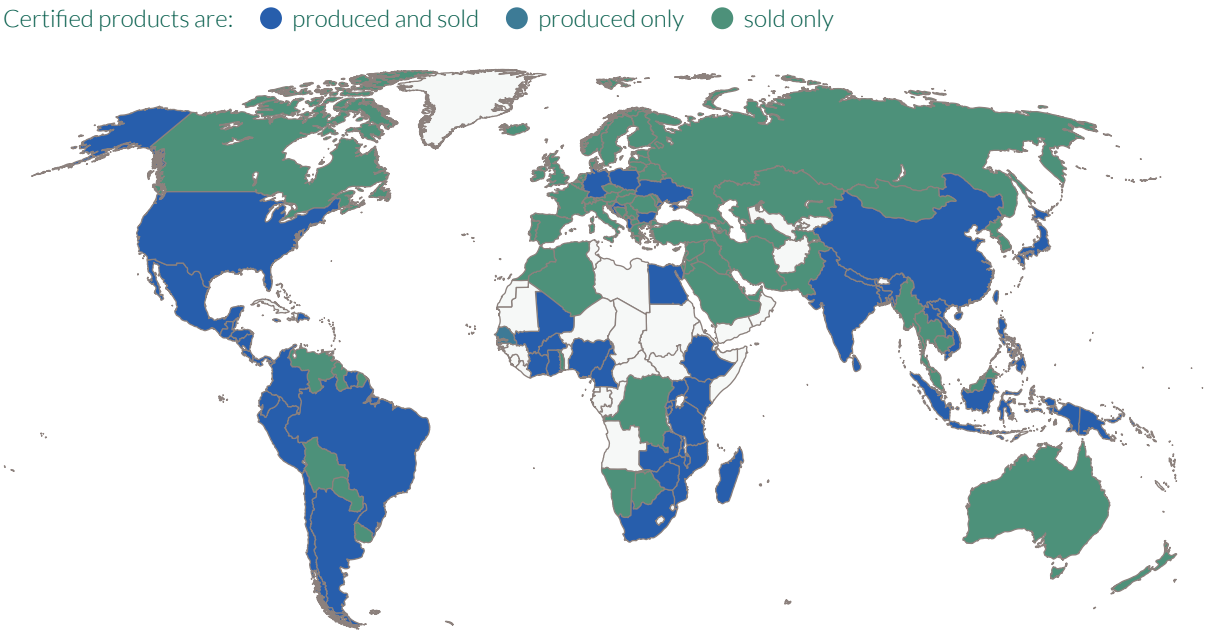


cent of Rainforest Alliance certificates are group certificates, and more than 99 percent of certified farms are members of a group.

The proportion of smallholders in the Rainforest Alliance portfolio varies considerably by region. When farmer numbers alone are examined, the dominance of smallholders in the portfolio is evident (Figure 25). In East and Southeast Asia, East and Southern Africa, and North Africa and the Middle East, more than 90 percent of certified farms are two hectares or less in size. This contrasts with the Caribbean, South America, Central and Eastern Europe, and West and Central Africa, where more than 90 percent of certified farms are between 2.1 and 50 hectares in size. Only in Mesoamerica, Central and Eastern Europe, Southern Africa, and South Asia are more than one percent of farms larger than 50 hectares, with the percentage of large farms in these regions ranging from 2.3 to 7.3.

Although there are comparatively few certified farms of 50 hectares or more, these farms make up the lion's share of total certified area in many regions (Figure 26). More than two-thirds of the total certified area in East and Southeast Asia, Mesoamerica, South America, Central and Eastern Europe, and South Asia is composed of large farms. In contrast, only one region—North Africa and the Middle East—can say that smallholder farms of two hectares or less make up more than half of its total certified area.

FIGURE XX *Where Rainforest Alliance Certified products are produced and sold*



CHAPTER 4

Protecting and Improving the Livelihoods of Farmers and Farm Workers

One of the core goals of the Rainforest Alliance certification program is to improve the livelihoods of farmers, farm workers, and their families. Fundamental to sustainable livelihoods is the ability of persons to meet 'essential needs' and attain a decent standard of living for themselves and their families through safe and dignified work. Essential needs are defined as the basic elements required for survival and prosperity. According to the Global Living Wage Coalition[7], these include food, water, housing, education, health care, transport, clothing, and provision for unexpected events.

Farm owners may fulfill essential needs for themselves and their families in different ways than farm workers, reflecting the different characteristics of the cash income and benefits that each earns or can access in other ways. These differences are reflected in the requirements of the the 2017 Rainforest Alliance Standard (and previously, the 2010 SAN Standard). For hired farm workers, the standard contains many provisions in support of fair pay. These include a critical criterion that requires workers to be paid at least the minimum wage, with additional criteria that cap overtime hours and require higher pay for overtime work and the right to bargain collectively for compensation and other benefits. Additionally, farm management is required to provide access to potable water and medical services during working hours. Workers who live on the farm must be provided clean, safe housing that adheres to minimum standards of safety, security, and quality. Finally, the standard specifies that farms must guarantee access to education for all school-aged children who live on the farm.

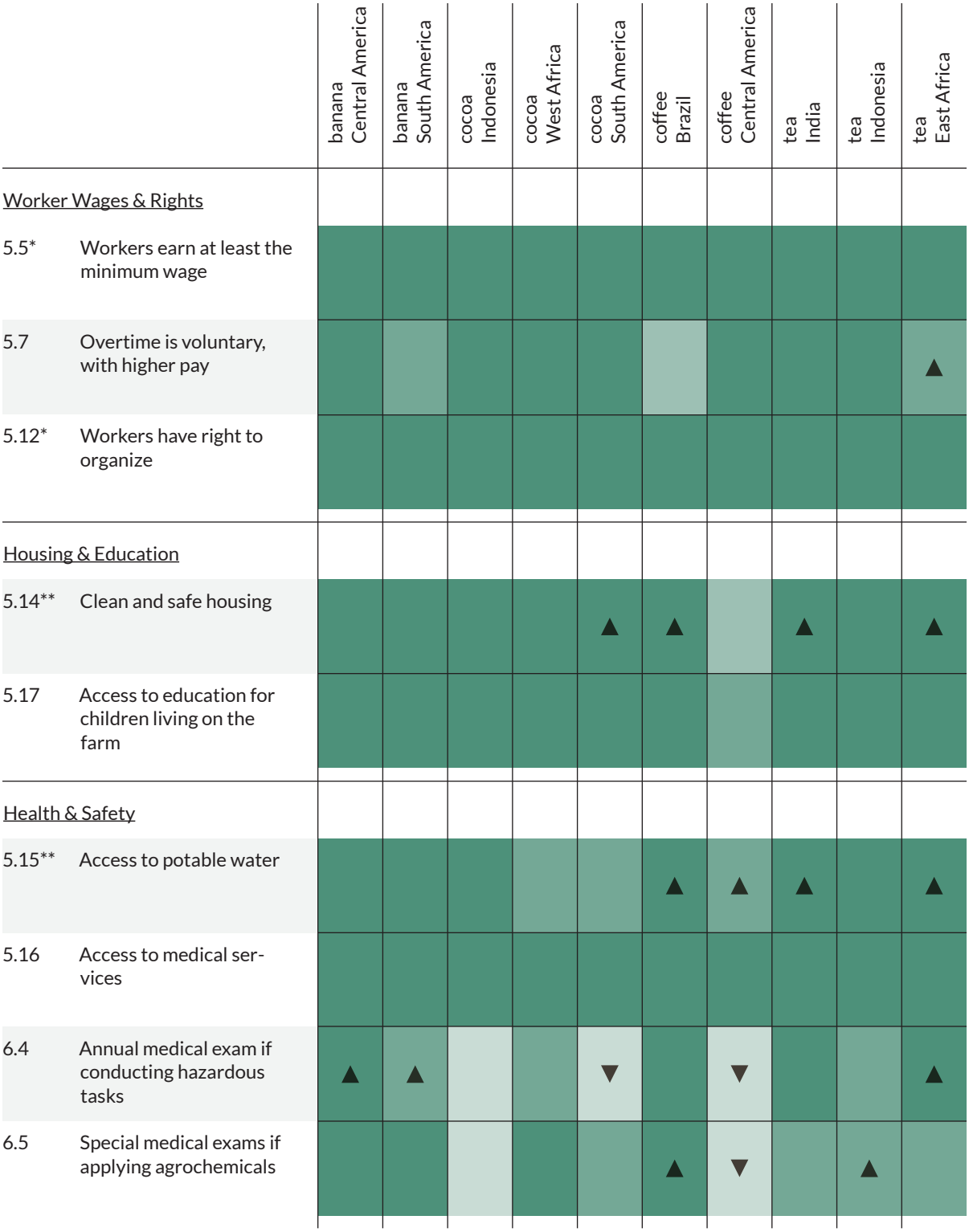
For farmers who own or manage their farms (i.e., are not hired workers), access to essential needs is determined largely by their own food production and cash income, plus whatever social services and benefits are available to them. Toward this end, the Rainforest Alliance certification and training programs focus on improved agricultural practices that boost farm productivity and crop quality, increase efficiencies and profitability, build stronger farm businesses, and work to connect farmers to better, more reliable markets that often provide market-driven price premiums. Several criteria in the standard address farm productivity, such as those on the prevention of soil erosion and the adoption of an effective soil and crop fertilization program.

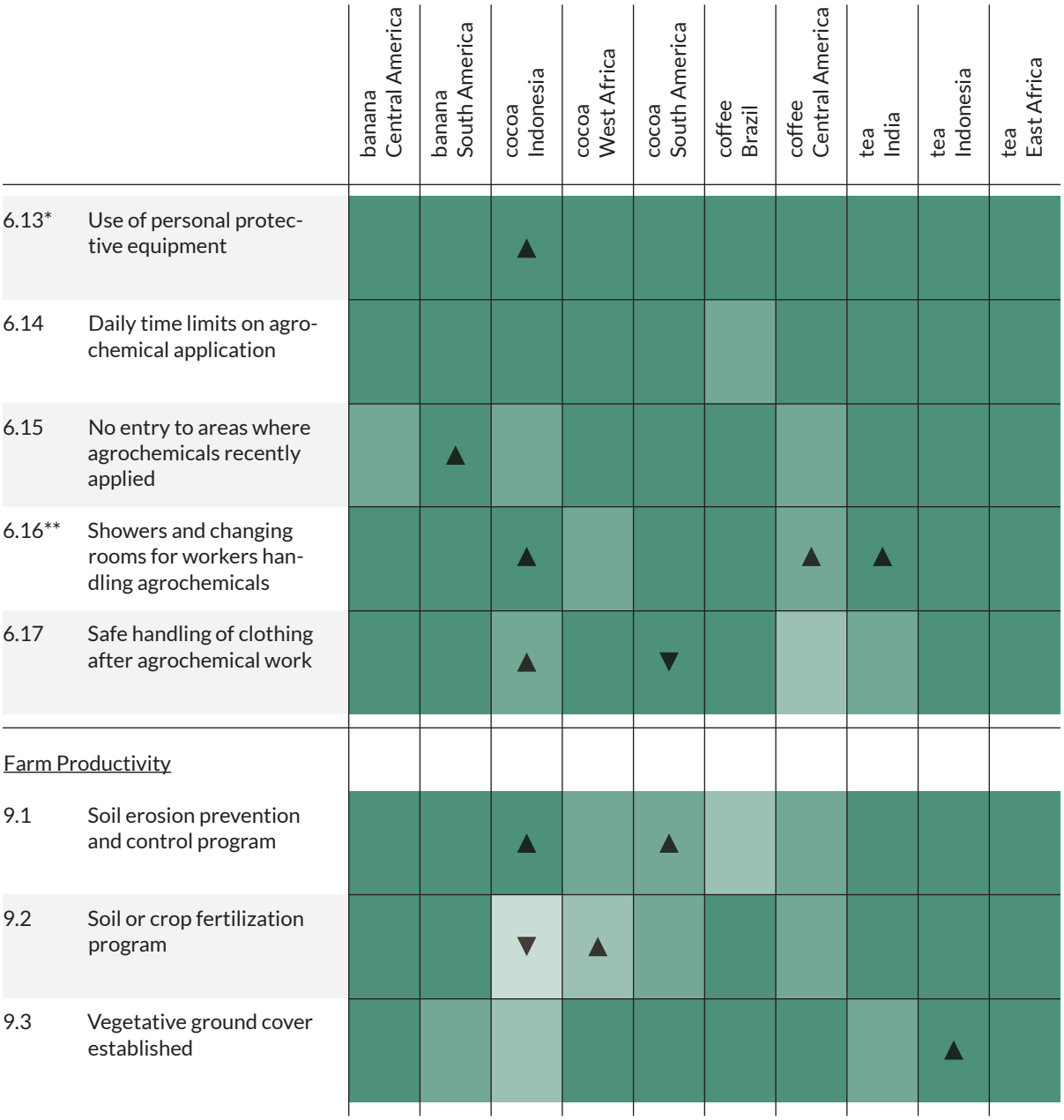
Many additional criteria help to protect the health and safety of farmers and farm workers who apply agrochemicals on the job, as well as their families. These include provisions for medical checkups for workers who conduct potentially hazardous activities; steps to prevent neighbors from being exposed to agrochemicals; mandatory use of personal protective equipment for all workers who come in contact with agrochemicals; dedicated showers and changing rooms for workers who handle agrochemicals; and restrictions on entry to ar-

TABLE 3

Performance of certified farms against 2010 SAN Standard criteria related to meeting the essential needs of farmers, farm workers, and their families during the most recent audit

average compliance score: ● 90–100 ● 80–89 ● 70–79 ● 69 or less
▲ increase of at least 10 points since the first audit ▼ decrease of at least 10 points since the first audit
* critical criteria since the standard's inception ** critical criteria since December 1, 2015





eas where agrochemicals were recently applied. Many of these criteria are designed not only to protect the person applying the agrochemicals but also to ensure that contaminated clothing does not pose a health risk to family members.

Results Based on Compliance Data

To assess performance and trends among certified farms as they relate to essential needs of farmers, farm workers, and their families, we analyzed patterns and trends in compliance scores for the relevant criteria of the 2010 SAN Standard, which was in force during our study period. See pages 17–18 and 72–73 for a description of the analysis methods.

Two of the criteria that relate to worker wages and rights—one requiring payment of at least the minimum wage and another requiring that workers have the right to organize—are critical criteria and therefore must be fully met by all certified operations. Compliance scores that relate to overtime pay and policies (criterion 5.7) were also high across all regions except for coffee farms in Brazil, where the average score was between 70 and 80.

Farms in all regions except one had average scores of 90+ for the criterion addressing access to education for school-aged children who live on certified farms. Requirements for clean and safe housing for workers who live on the farm (criterion 5.14) showed marked increases in compliance in several regions, probably because this criterion went from non-critical to critical on December 1, 2015 (when version 4 of the 2010 SAN

Standard came into force). The lower average score for this criterion among coffee farms in Central America reflects the inclusion of some pre-December 2015 audits in our dataset.

Performance was generally high for criteria related to health and safety, but there were a few notable exceptions. Three crop-region groupings (cocoa farms in Indonesia and South America, and coffee farms in Central America) had average compliance scores of 69 or less for criteria addressing regular medical exams and medical tests for farm workers who conduct high-risk activities, with decreases in performance exceeding 10 points in some cases. For the remainder of the criteria covering health and safety, average performance was nearly always 80 or above, with strong improvement over time for a number of criteria in several crop-region groupings. Not surprisingly, the greatest improvements were seen in two additional criteria that became mandatory in December 2015: criterion 5.15, requiring access to potable water (one of the eight essential needs), and criterion 6.16, requiring showers and changing rooms for workers who handle agrochemicals. To the extent that average compliance scores for these criteria fall short of 100, it is because the dataset includes some audit reports from before December 2015, when these were still continuous improvement criteria.

Performance on the criteria in Principle 9—which addresses farming practices aimed at improving farm productivity and income—was mixed, with consistently strong performance among several crop-region groupings but weaker performance (average compliance scores below 80) for at least one criterion each on cocoa farms in Indonesia and West Africa, and coffee farms in Brazil. Auditors in Brazil suggested that the low performance of coffee farms against criterion 9.1, which addresses soil erosion prevention and control, was due primarily to procedural issues, such as a lack of plans and programs, rather than deficits in on-the-ground soil conservation practices. Because criterion 9.2 requires farms to base their fertilization practices on the results of soil tests (to avoid over- or under-fertilizing), it is possible that the relatively poor performance of cocoa farmers in Indonesia and West Africa—who are mostly smallholders—was due to difficulties in conducting soil analysis.

Independent Research Results: Studies Find Higher Productivity, Yields, and Income on Rainforest Alliance Certified Farms

The body of research comparing farm yields and income on Rainforest Alliance Certified and non-certified farms has continued to grow since 2015, when a literature review was conducted on these topics as part of the 2015 SAN/Rainforest Alliance Impacts Report.[8] One new study[9] examined conditions in three types of Ugandan coffee-farming households: 129 households with farms that held a triple Rainforest Alliance/UTZ/4C certification; 166 households with farms that held a dual Fair Trade–Organic certification; and 300 households

A truckload of Rainforest Alliance certified cocoa beans awaits shipment in Côte d'Ivoire.

An Ethiopian coffee farmer inspects his plants on a farm near Jimma.

whose farms were not certified. Researchers found that poverty incidence was significantly lower among those households with Rainforest Alliance/UTZ/4C farms than among those with non-certified farms, and that total household income, per-capita income, coffee income, coffee yield, and labor productivity were all significantly higher among households in the former group. In contrast, households with dual Fair Trade–Organic certified farms experienced significantly lower yields than those with non-certified farms and saw no significant difference in household income or poverty.

In a second study[10], which focused on coffee producers in Ethiopia, researchers surveyed variables related to farm productivity and household welfare for households associated with 81 Rainforest Alliance Certified farms, 155 non-certified farms, and 189 farms that were certified by other programs. Researchers found that, compared with households of non-certified farms, those with Rainforest Alliance Certified farms had significantly higher household income, coffee income, and prices for dry coffee cherries, and their poverty rates were also significantly lower. A subsequent study from the same region of Ethiopia found similar results, with significantly higher economic returns and profits on certified farms than non-certified.[11] Unlike the Uganda study summarized above, the Ethiopia studies attributed the higher incomes on Rainforest Alliance Certified farms to the premium paid for certified coffee, not to differences in yields, and the authors note that differences in the supply chain—with certified coffee sold directly to processers and exporters, and non-certified coffee moving through a longer supply chain—might result in a more direct transmission of the price premium to certified farmers. It is also possible that the significantly older coffee plants on the Rainforest Alliance Certified coffee farms surveyed in Ethiopia (22 years old on certified farms versus 14 and 18 years old on the control farms in the two studies) contributed to the moderate yields.

Finally, a recent study on cocoa farms in Ghana also compared the production and welfare variables of 15 households with Rainforest Alliance Certified farms and 15 households with non-certified farms—this time, through the lens of financial capital[12] (see pages 46 and 52 for more results from this study). Financial capital was defined as "the capital base of economic assets that are essential for the pursuit of any livelihood strategy," and was measured using five metrics covering income, savings, investments, financial management, and internal support. Households with certified farms reported positive change on all financial capital variables since achieving certification, in contrast to households with non-certified farms, who reported either no change or negative change on all variables over the same time period. Participation in the Rainforest Alliance certification program was also associated with significantly higher cocoa yields (475 kg/ha on certified farms versus 169 kg/ha on non-certified). The study authors attribute their findings in part to active farmer organizations and enhanced access to agricultural inputs and credit on certified farms, echoing the observations described in the profile of Dr. Ximena Rueda, on page 38.

Interview with Rafael Rivas of Platanera Río Sixaola

Platanera Río Sixaola is located in Costa Rica and is the banana farm with the longest-standing Rainforest Alliance certificate, having first achieved certification in 1993. Rainforest Alliance staff member Jungwon Kim recently spoke with Rafael Rivas, a member of the farm's Workers' Committee, which was created to help workers voice and resolve problems or complaints.

Jungwon Kim: *Could you explain how the Workers' Committee functions?*

Rafael Rivas: When a worker has any kind of problem on the farm, they come to us first since we represent all workers. Committee members get together and analyze the cases before they meet with management to talk about the complaints. Sometimes a worker complains because he was paid less for a workday, or he or she is sick and wants to be switched to a different role. We get these kinds of complaints, which we escalate to management to see how we can help each worker.

JK: *You previously worked on a non-certified banana farm in Panama. How were things different there?*

RR: There, the company had the last word and workers had no say. Also, they didn't care about soil conservation. You didn't see green areas. You saw green because of the banana leaves, but no soil protection. Plastic rope was left on the ground. Everything was very disorganized. Salaries were different, too. On that farm, we had a set salary. Here at Platanera Río Sixoala you can always make more—though never less—than minimum wage because our contracts allow us to negotiate and work in different ways and on different shifts to increase our salary.

JK: *Are there other benefits from working at Platanera Río Sixaola?*

RR: We receive a lot of benefits. There is a house for workers. They help local schools. Sometimes they support leisure trips for workers, and they always help in many ways. Our boss even built us a soccer field where we can exercise. We also want to start raising funds to celebrate gatherings. Those are some ideas we have and want to implement.

Platanera Río Sixaola workers harvesting banana bunches. Employees' interests are represented by a Workers' Committee.

Working Toward a Living Wage for All

In recent years, the imperative of providing a living wage for all workers has gained prominence as a popular movement and policy priority in many countries around the world. However, the challenges of attaining this goal in the context of international commodity value chains should not be underestimated: in many countries and crop sectors, farm workers have traditionally earned just a fraction of the living wage. Entrenched economic realities and trade structures in many commodity sectors impose large barriers to transforming the remuneration of wage labor. Nevertheless, the Rainforest Alliance is dedicated to working toward this goal, and is doing so both through its own certification program and through broader global partnerships to create conditions that can enable broad progress toward a living wage for all.

Within the Rainforest Alliance certification program, the launch of the 2017 Rainforest Alliance Standard brought with it a more rigorous approach to addressing the essential needs and standard of living of farm workers and their families by including new criteria on a living wage. According to the Global Living Wage Coalition (GLWC), a living wage is sufficient remuneration to afford a decent standard of living for a worker and his or her family. A decent standard of living is indicated by the fulfillment of the eight essential needs described earlier in this section. The level of remuneration required to fulfill these needs must be determined by context-specific benchmarking exercises, following a standard methodology.

Where GLWC-sanctioned living wage benchmarks exist, the 2017 Rainforest Alliance Standard requires farm employers to negotiate, document, and implement a living wage plan directly with workers or through a collective bargaining process. Where benchmarks do not yet exist, workers must be provided with health care, basic education, and increases to inflation-adjusted cash wages on an annual basis (at minimum). Other criteria in the 2017 Rainforest Alliance Standard that address essential needs include those that protect the health of pregnant and nursing female workers, require access to potable water, and require that housing for workers and their families (where provided) be safe and sanitary. The Rainforest Alliance and its partners are providing training on and support for the implementation of these living wage requirements in the 2017 Rainforest Alliance Standard.

Collaborative approaches can accelerate progress toward the payment of living wages, which is why the Rainforest Alliance is also leading and supporting advocacy and program activities to advance a living wage agenda with workers, companies, governments, and civil society partners. The organization is a founding member of the GLWC, a coalition of standards systems and living wage experts that works with partner networks to establish living wage benchmarks in key countries using a consistent, objective, and agreed-upon approach (the Anker Methodology). At the same time, the Rainforest Alliance is leading an initiative to develop a Living Wage Portal, which is creating a web-based collaborative space to provide open access to information on living wage benchmarks that follow the Anker Methodology, track progress, share experiences and lessons learned, and serve as a discussion forum.

Finally, the Rainforest Alliance is pursuing opportunities to help support producers and other actors in the implementation of the living wage concept on the ground. For instance, the organization is collaborating with banana farms, banana-trading and -buying companies, the Sustainable Trade Initiative (IDH), and other sector actors to pilot living wage implementation mechanisms in Costa Rica and Belize. The goal is to develop and advance economically viable wage improvement plans that achieve or significantly progress toward living wages for all workers in two pioneering supply chains.

Attaining a living wage for all agricultural workers is a tall ambition with a profound payoff for the well-being of rural households and communities around the world. While it will not happen overnight, the Rainforest Alliance is working to drive this change through recent revisions to its standard, through efforts to develop a common and credible protocol for living wage benchmarking and monitoring, and through collaboration with producers and commodity buyers to implement the living wage concept through practical and time-bound roadmaps for action.

Tea workers sort leaves on the Kericho farm in Kenya.

Interview with Dr. Ximena Rueda

Dr. Ximena Rueda's interest in sustainability certification began more than a decade ago, when she worked for the Colombian Coffee Growers Federation as its strategic marketing director. Now, as a professor and head of the sustainability area at the School of Management at Universidad de los Andes in Bogotá, she examines sustainability certification and the challenges facing smallholder farmers through a scientific lens. Some of her studies have focused on the impacts of Rainforest Alliance certification, a program that first drew her interest due to its emphasis on the protection of natural ecosystems. Rainforest Alliance staff member Deanna Newsom sat down recently with Dr. Rueda to talk about her findings and the value of partnerships among farmers.

Deanna Newsom: *One of your studies found that farmers with certified farms experienced more peer-to-peer learning, more frequent visits from extension workers and local cooperatives, and more funding opportunities than those whose farms were not certified.[13] Can you tell us more?*

Ximena Rueda: The Colombian Coffee Growers Federation is a strong association that is committed to sustainability. This commitment and the fact that the federation's extension agents are evaluated on whether the farmers they serve pass their certification audits mean that farmers whose farms are certified receive an exceptional amount of support. Also, the national reach of the federation gives farmers access to research outcomes from Cenicafé (the federation's research center), as well as resources from the government, international organizations, and credit agencies that support farmers' efforts to improve quality, productivity and sustainability. This partnership of farmers—the federation and all of its associated resources—has been a key factor in the adoption of sustainable farming practices in Colombia.

DN: *The certification standard prohibits children from participating in farm activities that hamper their ability to attend school. Your research has found that children on certified farms in Colombia achieved significantly higher levels of education than those on non-certified farms.[14] Why do you think this is?*

XR: We know that many smallholder coffee farmers are not very educated. They have, on average, only elementary education. We wondered about the detailed record-keeping that is required for Rainforest Alliance certification. How do these farmers manage it? It turns out that their children are helping with record-keeping, as they are more educated than their parents. We did not know whether our findings showed that households with certified farms had better-educated children to begin with, or whether parents on certified farms saw the value of their kids' education and decided to keep them in school longer. The extension agents who we consulted believe it's the latter, and that makes sense: Parents see that school attendance is valuable for their children, but also for the farm. We saw in our fieldwork that, as the kids grow up, they are trusted with more and more farm management decisions, which is a great source of pride to both the parents and the children.

Research found that children on certified coffee farms in Colombia stay in school longer than children on non-certified farms.

Dense tree cover provides shade to coffee plants growing below on a farm in Santander, Colombia.

DN: *Many Rainforest Alliance auditors and technicians have observed that, over time, the neighbors of certified farms often start voluntarily implementing sustainable practices, too. One of your studies confirmed these observations, concluding that "certification processes are generating spillover effects on adjacent farms and communities through emulation of practices and improved transparency and traceability."*[15]

XR: When we looked at regions in the Andes that had many certified farms, we saw that tree cover was recovering. And while certified coffee farms were leading the movement, sustainable practices were also being implemented on non-certified farms because farmers saw the benefits of protecting water sources or increasing their resilience to El Niño. We also observed cases where farmers dropped out of the program—maybe they were disappointed by a lack of price premium, or were tired of having an auditor show up every year—but they kept implementing the practices. What they'd learned was obviously valuable. Additionally, having certified cooperatives in a specific location improved transparency and traceability for all coffee farms, as prices and premiums were publicly displayed and certified coffee was kept separate from non-certified coffee. Farmers could see that this was the case, improving the credibility of the certification program.

DN: *What's next for your research program?*

XR: We have observed that some climate change adaptation strategies—such as the use of disease-resistant coffee plants—are not being adopted homogenously across the landscape. Why are some farmers using these strategies and others aren't, despite incentives to do so? Are there alternative strategies that we aren't aware of? Or are variable local microclimates the explanation? I'm also interested in the effects of the surrounding landscape on farm-level biodiversity. Does proximity to a protected area influence on-farm biodiversity? These are the questions I'd like to focus on in the future.

The Rainforest Alliance and the United Nations' Sustainable Development Goals

Workers sift coffee cherries on Fazenda Itaoca in Brazil. Productivity gains on Rainforest Alliance Certified coffee farms have been recorded by numerous scientific studies.

In September 2015, the United Nations (UN) released a set of Sustainable Development Goals (SDGs). These 17 goals are the successor to the Millennium Development Goals (MDGs) and have been ratified by all UN member nations, which are now tasked with meeting the goals by the year 2030. While the SDGs and MDGs differ in some important ways—the SDGs have a stronger focus on empowering women and partnering with local governments and the private sector—the core MDG themes of improving livelihoods, education, and environmental sustainability are still front and center in the SDGs.

The vision of sustainability that is defined in the SDGs overlaps significantly with that of the Rainforest Alliance, and a raft of scientific evidence validates that Rainforest Alliance certification is playing a meaningful role in helping to shift agricultural households, communities, and landscapes toward the desired outcomes outlined in the SDGs. What follows is a summary of key research results on the effects of Rainforest Alliance certification relative to several of the SDGs.

SDGs 1, 2, and 8: End poverty in all its forms everywhere; zero hunger and promote sustainable agriculture; decent work and economic growth

Poverty reduction and improved livelihoods is central to the sustainable development agenda, as reflected in SDGs 1, 2, and 8. A strong and growing evidence base from the coffee and cocoa sectors indicates that Rainforest Alliance Certified farms are consistently more productive than their non-certified counterparts, thus leading to higher incomes and the reduction of poverty, especially in vulnerable rural areas. Examples of these productivity gains are seen with coffee in Brazil[16], Peru[17], Colombia[18], and Nicaragua[19], and with cocoa in Ghana[20] and Côte d'Ivoire[21]. These studies typically attribute productivity gains to the yield-boosting agronomic prac-

tices that are central to the Rainforest Alliance certification and agriculture training programs, such as optimal fertilization, soil conservation measures, integrated pest management, effective pruning techniques, and the revitalization of older plant stock. In addition to these examples of yield improvement, studies have documented higher wages paid to workers on certified tea farms in Kenya.[22] See page 34 for more information on three new studies examining productivity on Rainforest Alliance Certified farms.

SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

This SDG overlaps closely with the 2017 Rainforest Alliance Standard criterion that requires farms to provide access to education to all school-aged children who live on the farm. Several studies indicate that Rainforest Alliance certification supports increased educational opportunities for farmers' and farm workers' children. In a coffee-growing region of Colombia, for instance, the children of certified farmers had significantly more years of schooling than those of non-certified farmers.[23] In a tea-growing region of India, a higher proportion of workers' children on Rainforest Alliance Certified estates attended school, compared with the children of workers on non-certified estates. Those workers were also more satisfied with the schooling their children received than workers on non-certified estates.[24] Finally, in the western cocoa-growing region of Côte d'Ivoire, significantly more children on Rainforest Alliance Certified farms were studying at the appropriate grade level, compared with children on non-certified farms.[25] Authors of these studies note that households with certified farms may be more likely to encourage their children to attend school—in order to assist with the record-keeping and financial management that are increasingly necessary for effective farm management and that are promoted by the Rainforest Alliance certification program. As these farmers age, they often look to their children to carry on the operation of their farm business (see profile on page 38).

Students at a school on the Craigmore tea estate in India. All children of workers on the estate receive free schooling.

A blue-gray tanager on a certified coffee farm in Peru.

SDG 15: Sustainably manage forests, combat desertification, halt and reverse land degradation and biodiversity loss

This SDG focuses on many aspects of sustainable land management and ecosystem conservation, including deforestation, wildlife trafficking, species loss, and habitat degradation. Several scientific studies have found that Rainforest Alliance Certified farms have lower deforestation rates and more tree cover than non-certified farms—for instance, in coffee-growing regions of Ethiopia[26], Brazil[27], and Colombia[28]. In these cases, researchers used satellite imagery to assess changes in forest cover over time and found significantly lower rates of forest cover loss in landscapes with certified farms compared to landscapes without them. With regard to biodiversity and habitat, researchers also found higher tree diversity[29], better habitat connectivity for key species[30], and improved forest quality on and around certified coffee farms[31] when compared with non-certified farms. Other studies have documented the habitat value that Rainforest Alliance Certified farms provide for key species such as Neotropical monkeys[32], Neotropical migrant birds[33], and threatened and iconic Amazonian forest birds[34].

The SDG framework is being embraced by the private sector, and several business-led initiatives are underway to implement the SDGs through company actions, often in partnership with governments.[35] The available scientific evidence strengthens the case that Rainforest Alliance certification can help businesses and governments meet their SDG-related commitments.

CHAPTER 5

Conserving Natural Ecosystems

The Rainforest Alliance certification program strongly emphasizes the conservation of natural ecosystems because of the multiple values they provide to humans and wildlife. Natural ecosystems resemble those that are (or would be) found in a given area in the absence of significant human management impacts—i.e., they have similar species composition, structure, and function.[36] The conservation of existing natural ecosystems in agricultural landscapes has been demonstrated to be a critical means of protecting biodiversity: agricultural landscapes containing natural ecosystems have higher species richness and diversity than those without them, and act as refugia for many rare and endangered species.[37] Natural ecosystems also help to furnish critical ecosystem services for farmers and nearby communities, including clean water, erosion control[38], improved crop pollination and control of pest outbreaks[39]. In these and other ways, natural ecosystems on and around farms can help farmers better adapt to a changing climate and extreme weather events. Finally, most natural ecosystems in regions where Rainforest Alliance Certified crops are produced also store relatively large amounts of carbon[40], making them essential to the fight against climate change.

The conservation of natural ecosystems, both within farm boundaries and adjacent to farms, has been a central element of Rainforest Alliance certification since its inception. To achieve compliance with the 2017 Rainforest Alliance Standard (and previously, the 2010 SAN Standard), farms are required to protect and/or restore all natural ecosystems, avoid destroying any natural ecosystems, and ensure that any new crop production plots are located on land that is suitable for long-term agriculture production. In addition, the 2017 Rainforest Alliance Standard contains provisions requiring that farms do not harm nearby protected areas, that crop areas do not negatively impact water bodies through erosion or agrochemical runoff, and that vegetated buffers are maintained between areas of chemical use and natural areas, and between crops and areas of human activity. The standard also addresses the protection of wildlife habitat and threatened or endangered species, the maintenance of ecosystem connectivity, and adequate shade cover, canopy structure, and tree species diversity in agroforestry systems for shade-tolerant crops such as coffee and cocoa.

Results Based on Compliance Data

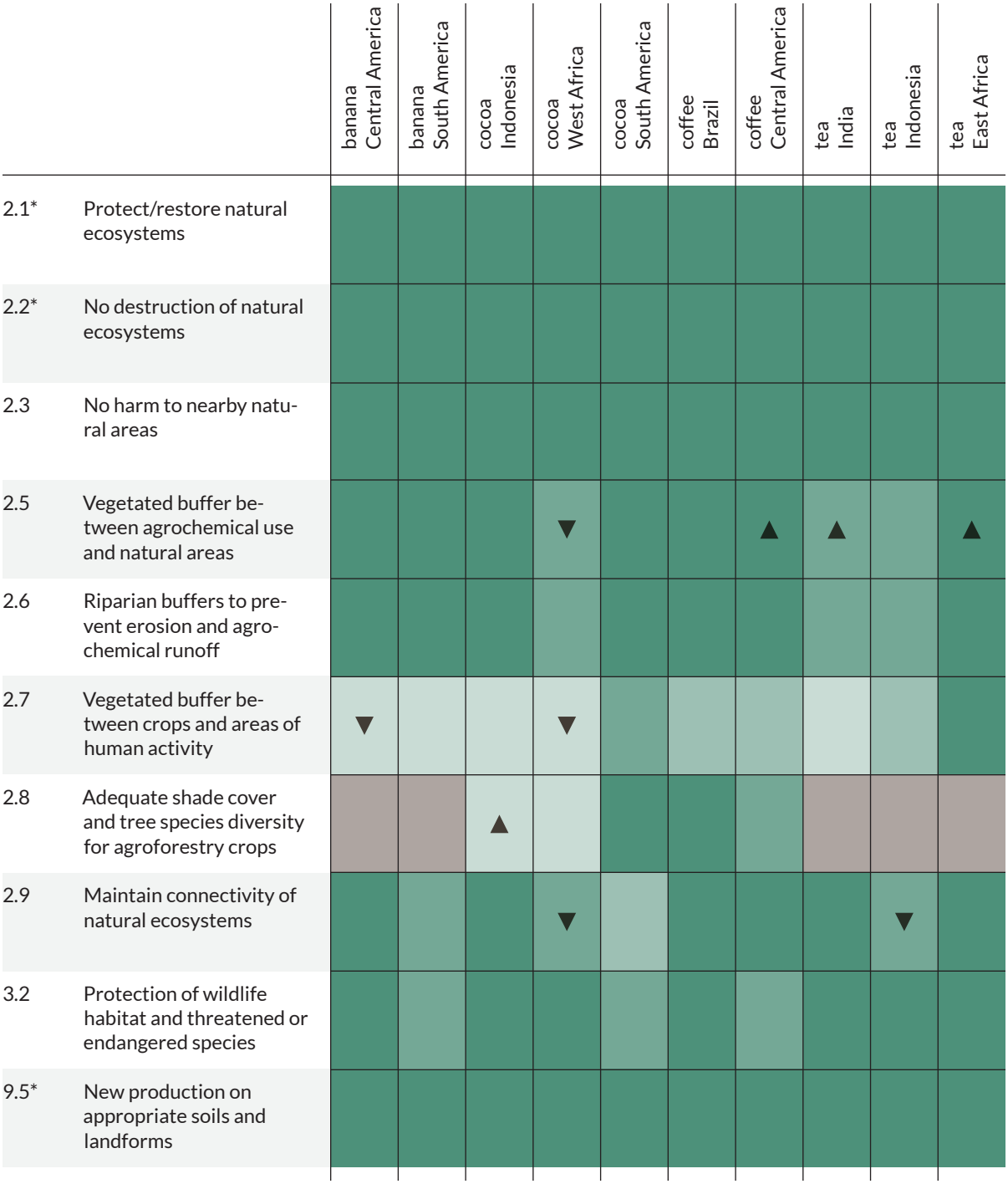
To assess performance and trends among certified farms as they relate to the conservation of natural ecosystems, changes in compliance scores were analyzed for the relevant criteria of the 2010 SAN Standard, which was in force during our study period. See pages 17–18 and 72–73 for a description of the analysis methods.

As required by the standard, all farms consistently fulfilled the mandatory critical criteria, which prohibit the destruction of on-farm natural ecosystems (criterion

TABLE 4

Performance of certified farms against 2010 SAN Standard criteria related to the conservation of natural ecosystems

average compliance score: ● 90–100 ● 80–89 ● 70–79 ● 69 or less ● not applicable
▲ increase of at least 10 points since the first audit ▼ decrease of at least 10 points since the first audit
* critical criteria



2.2), require the protection or restoration of existing ones (criterion 2.1), and ensure that crop production can be expanded only to areas with adequate climatic and soil conditions (criterion 9.5). Farms achieved similarly high scores for criteria aimed at protecting wildlife habitat (criterion 3.2) and nearby parks, reserves, or other

conservation areas (criterion 2.3).

Performance varied considerably for the three 2010 SAN Standard criteria that focus on establishing or maintaining on-farm buffers, which can serve to protect natural ecosystems and water bodies while establishing linear habitat features on farms. There was a high level of compliance (with strong improvement for three crop-region groupings) for the criterion requiring buffers between areas of agrochemical use and natural areas (criterion 2.5). However, buffers between crops and areas of human activity (criterion 2.7) and between crops and aquatic areas (criterion 2.6) were often lacking or inadequate, with several crop-region groupings posting average compliance scores below 70. While the provision of riparian buffers increased markedly in three crop-region contexts, the provision of buffers around areas of human activity decreased markedly in two crop-region contexts.

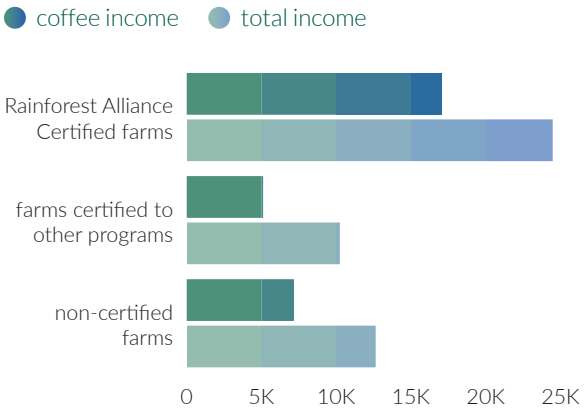
Adherence to criterion 2.8—which requires adequate tree cover and diversity of shade tree species for shade-tolerant crops, such as coffee and cocoa, and does not apply to banana or tea—varied considerably by crop-region grouping. Compliance rates were relatively high for coffee in South America and Mesoamerica, and for cocoa in South America, yet much lower (with average scores of less than 70) for cocoa operations in Indonesia and West Africa. One explanation for this relatively poor performance in West Africa is a legal framework that does not always give farmers clear ownership of the trees on their land, creating a situation whereby loggers sometimes remove trees without the farmer's permission, often damaging cocoa trees in the process. This creates an incentive for farmers to pre-emptively remove shade trees and seedlings to protect their cocoa crop.[41] The historical context of certified farms also plays a role: on many of the certified cocoa farms in South America, numerous overstory trees were left intact and cocoa trees planted beneath them; in parts of West Africa, in contrast, cocoa farms were typically created on existing farmland or on land from which most or all trees, including potential shade trees, had been removed.

Independent Research Results: Studies Find Higher Forest Quality and Better Adoption of Conservation-Friendly Farming Practices on Rainforest Alliance Certified Farms

As reviewed in the 2015 SAN/Rainforest Alliance Impacts Report, a substantial body of scientific literature from 2015 and earlier has documented the contribution of Rainforest Alliance certification to protecting forests, increasing tree cover on and around farms,

At the Dammeria B tea estate in Sri Lanka, hedges act as a buffer zone separating tea fields from the surrounding forest.

FIGURE 28 *Average income on coffee farms in Ethiopia (in Ethiopian birr)*



and conserving wildlife. Three studies published more recently shed additional light on the role of Rainforest Alliance certification in conserving natural ecosystems. The first was conducted in a region of Ethiopia where "forest coffee" grows in its native habitat in the forest understory, and the right to harvest coffee is allocated to individuals based on traditional agreements. Researchers examined 148 Rainforest Alliance Certified forest-coffee areas and 92 non-certified coffee areas and found that between 2005 and 2010 certified forest-coffee areas experienced a significant increase in forest quality, while non-certified areas experienced drastic forest degradation.[42] This effect extended to areas outside the certified farm boundary; natural forest areas within a 100-meter radius of the certified forest-coffee boundary experienced significantly lower forest degradation than zones surrounding non-certified areas.

In a separate study from Ethiopia[43], researchers documented higher profitability on Rainforest Alliance Certified "semi-forest" coffee plots (where coffee is produced in natural forests with some canopy thinning) than on non-certified semi-forest coffee plots. Higher profitability was attributed mainly to a price premium (averaging 20 percent) for Rainforest Alliance Certified coffee that was linked to demand from international supply chains. The researchers note that this premium can help incentivize farmers to maintain semi-forest production systems, which are valuable for biodiversity, rather than shifting to intensified "garden coffee" or other cropping systems in which native tree cover is removed. The authors concluded that "coffee certification can support incentives towards farmers for land sharing between less intensified coffee production and the conservation of semi-natural forest … to protect semi-forest coffee systems from further intensification at a low opportunity cost."

Finally, a study of cocoa farming households in Ghana assessed changes to "natural capital" on 15 Rainforest Alliance Certified farms and 15 non-certified farms, based on farmers' reports of trends over a five-year period[44] (see pages 35 and 52 for more results from this study). The study's authors defined natural capital as "the natural base from which resources flow and services useful for livelihoods are derived," and they measured it using 23 indicators covering diverse aspects of forest condition, biodiversity, crop production, water quality, soil fertility and erosion, air quality, and more. On farms that were certified, farmers reported that they observed positive changes in 21 of the 23 natural capital indicators since achieving certification five years earlier, in contrast to non-certified farms, where farmers experienced no change over the same time period in 15 of the variables, negative change in two variables, and positive change in one. (The attitudes of the latter group toward five variables were not reported.) With regard to natural ecosystems in particular, when farmers were asked to reflect on changes in the past five years, those with certified farms reported increases in the number of native trees and shade trees, and in the establishment of agrochemical-free vegetation barriers along water bodies, farm boundaries, and frequently-traveled roads. On non-certified farms, farmers reported no change or a decrease in sustainable practices among these same variables. Both groups reported that they did not clear forests to expand their cocoa production area but rather converted former farmland or rehabilitated older cocoa farms.

TABLE 5 *Farmer-reported changes in environmental conditions on cocoa farms in Ghana. The study asked 15 Rainforest Alliance Certified farmers to compare their current (2012–2013) situation with the situation pre-certification (2007–2008), and asked 15 non-certified farmers to compare changes over the same time period.*

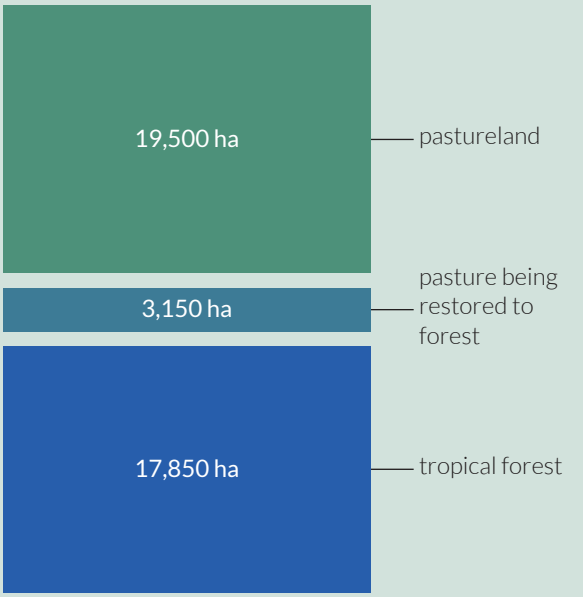
▲ positive change ● no change ▼ negative change

	Certified farms	non-certified farms
state of the forest	▲	●
agrochemical-free vegetation barriers	▲	▼
native trees/ha	▲	no data
shade trees/ha	▲	no data
no use of burning when preparing land	▲	●

Set-Asides on Cattle Ranches in Brazil

Just like other Rainforest Alliance Certified farms, certified cattle ranches are required to identify, protect, and restore natural ecosystems within their boundaries. At the close of 2016, there were five Rainforest Alliance Certified cattle ranches in Brazil. Combined, these ranches had 19,500 hectares of pastureland for cattle grazing, with another 21,000 hectares set aside as non-grazing natural areas. As reported in the certification audit reports, eighty-five percent of this set-aside area is tropical forest, with the remainder composed of pasture that is being restored to forest. Consistent with criterion 3.3 of the 2010 SAN Standard and criterion 2.4 of the 2017 Rainforest Alliance Standard, these five ranches also prohibit hunting, including of jaguar, a rare species that is often shot and killed on conventional cattle farms due to the fear that it will prey on calves. Recent scientific research has found that jaguars with more access to natural areas, and thus wild prey, are less likely to attack cattle.[45] This evidence suggests that certification requirements to conserve existing natural ecosystems and prohibit hunting may provide a win-win for wildlife and ranchers: they can help strengthen the viability of jaguar populations while reducing the incidence of human-wildlife conflict associated with cattle predation.

FIGURE 27 *Land use on Rainforest Alliance Certified cattle ranches in Brazil*



Cattle on Fazendas São Marcelo, a Rainforest Alliance Certified cattle ranch in Brazil.

Fulfilling Deforestation-Free Supply Chain Commitments and Protecting Native Tree Cover on Farms

Cocoa farmer Abel Yaranga in the protected forest zone on his farm in San Juan de Cheni, Peru.

In the past few years, hundreds of retail brands, investors, commodity traders, producers, and governments have committed to ending large-scale forest conversion for agriculture, which is the leading cause of tropical deforestation. At the same time, the specter of climate change has heightened the imperative for farmers to manage their land in "climate-smart" ways, with diversified native tree cover to improve resilience to droughts, pest outbreaks, and other shocks. This context informed the development of the 2017 Rainforest Alliance Standard, which was designed to help fulfill company "deforestation-free" supply chain commitments, promote climate-smart agriculture, and draw upon credible, state-of-the-science implementation guidelines that support these aims.

While the 2010 SAN Standard already prohibited any destruction of forests or other natural ecosystems on certified farms, the 2017 Rainforest Alliance Standard extends this protection retroactively; farms that de-

stroyed natural ecosystems after January 1, 2014 (or within five years preceding the initial application for certification, whichever is earlier), are ineligible to become certified. This change helps align the 2017 Rainforest Alliance Standard with company commitments, many of which specify a "cutoff date" after which farms in their supply chain should be deforestation-free. To help put this requirement into practice, the 2017 Rainforest Alliance Standard references the High Carbon Stock approach (www.highcarbonstock.org) for delineating forests and provides additional practical guidance on identifying natural ecosystems in other contexts.

In the same spirit of aligning Rainforest Alliance certification with company sourcing commitments and international norms, the 2017 Rainforest Alliance Standard replaces the high-value ecosystem concept used previously with the internationally recognized High Conservation Value (HCV) concept.[46] This change enables the Rainforest Alliance certification program to benefit from the detailed definitions and guidance provided by the HCV Resource Network (HCVRN) and—in cases where a full-scale HCV assessment may be required (typically on large plantations in high-risk contexts)—the group of licensed HCV assessors who are managed by the HCVRN.

Finally, the 2017 Rainforest Alliance Standard includes a new approach for protecting and restoring on-farm native vegetation to better conserve wildlife habitat, restore native biodiversity, and improve climate resilience. This approach stems from key learning that emerged from the program's M&E system and field observations in dozens of countries, notably that:

- Under the 2010 SAN Standard, compliance with criterion 2.8 (agroforestry shade cover) varied considerably by crop and context. This suggested that the shade cover requirements were not sufficiently tailored to different contexts, or that farmers encountered barriers or did not see a benefit in maintaining agroforestry systems.

- Although there are many win-win benefits of diversifying on-farm vegetation—particularly in the face of climate change—the 2010 SAN Standard was not always specific enough in its requirements to conserve or restore such native vegetation, and compliance with some of the related criteria (2.6, for example; see Table 4) was variable.

- More emphasis was needed on protecting critical habitat elements on farms, such as large native trees that are often remnant rainforest trees.

Based on this learning, the 2017 Rainforest Alliance Standard provides a more rigorous approach to conserving and restoring native vegetation, but also one that can be better adapted to the wide range of contexts where Rainforest Alliance certification occurs. This includes several components that are implemented at "Level C" (i.e., immediately or within the first three years of certification) as part of the 2017 Rainforest Alliance Standard's continuous improvement framework:

- Conservation: Where existing native vegetation exists outside of natural ecosystems, it must be maintained (criterion 2.5). This includes agroforestry shade cover, vegetated riparian zones, and large native trees. This requirement helps sustain agroforestry systems that are valuable for native wildlife, such as Neotropical migratory birds.

- Restoration: Farms that currently lack native tree cover must restore it to reach 10 percent or 15 percent total cover, depending on the context (criterion 2.6). These levels can help the farm diversify and improve climate resilience, typically with little or no loss of productive cropland. In the case of shade-tolerant crops (for example, cocoa and coffee), this requirement can be met by restoring diverse native shade canopies, which provide multiple benefits for farm productivity and biodiversity.

- Vegetated riparian zones, where lacking, must be restored to context-appropriate widths (as specified in the standard) to help protect water quality and create wildlife corridors.

Forest cover provides habitat for native wildlife, like this bluish-fronted jacamar on a coffee farm in Peru.

CHAPTER 6

Minimizing Pesticide Use and Risk

Pesticides are substances designed to destroy or repel pests, including insects and other animals, fungi, and weeds. The use of pesticides in agriculture is widespread, and many pests that attack tropical crops in particular are difficult to manage effectively without pesticides. For instance, the Black Sigatoka fungus, which can reduce banana yields by up to half, thrives in moist areas and is very difficult to control without agrochemicals in many banana-producing areas. Even organic agriculture, which strives to use natural processes and materials in crop and livestock production, commonly relies on a variety of synthetic and non-synthetic pesticides.

Although pesticides have been associated with higher crop yields[47] and reduced farm labor[48], serious tradeoffs can exist. The overuse of pesticides, the application of especially toxic pesticides, and pesticide spills have serious negative consequences for the environment, farm workers, and wildlife. Indiscriminate pesticide use can also disrupt food webs and natural pest-control mechanisms (for example, pest predators and parasites), foster pests' resistance to chemical controls, and place farmers on a treadmill of escalating chemical use that is neither environmentally nor economically sound.

This section of the report evaluates the means and effectiveness of the Rainforest Alliance certification program's efforts to minimize pesticide use and its associated risks to people, wildlife, and the environment. These include prohibiting the use of the most toxic pesticides, encouraging integrated pest management and alternative forms of pest and weed control, and protecting against pesticide spills and other forms of contamination. Chapter 4 examines requirements in the certification standard that aim to protect farmers, farm workers, and their families from the negative effects of pesticides on human health.

The 2017 Rainforest Alliance Standard (and previously, the 2010 SAN Standard) prohibits the use of the most toxic pesticides—including those banned by the Stockholm Convention and the Rotterdam Convention—as well as those that are illegal or not officially registered for use in the country where the certification applicant is located. The standard also specifies that farms should have a plan to eliminate the use of World Health Organization (WHO) class-1a and -1b pesticides except under severely limited circumstances.

The standard also promotes integrated pest management (IPM) – a scientifically based process to manage pests effectively through careful monitoring, prevention, the use of non-chemical pest-control measures, and the judicious application of pesticides when it is technically and economically warranted, and in a manner that minimizes risks to human health and the environment. IPM encourages natural pest-control methods, such as beneficial insects or microbes, in lieu of chemical pesticides

A Guatemalan coffee farmer with a box of wasps used for natural pest control on the Finca Buenos Aires farm.

whenever feasible. Additional criteria also support the application of IPM through effective management of agrochemicals: these criteria specify that farmers should conduct agrochemical inventories, track application rates and results, rotate chemical products, reduce their use over time, and avoid excessive chemical use through proper maintenance, repair, and calibration of chemical-application equipment. Criteria also restrict the use of post-harvest fumigation, and require that workers who apply, handle, or transport pesticides and other chemicals receive training on the safe application and transport of such substances, as well as on emergency procedures and first aid.

Several criteria in the certification standard aim to minimize the risk of pesticide contamination or spills, covering topics such as safety in storage facilities and workshops, the avoidance of spills during transport, and the development of an emergency response plan.

Results Based on Compliance Data

To assess performance and trends among certified farms as they relate to minimizing pesticide use and risk, we analyzed changes in compliance scores for the relevant criteria of the 2010 SAN Standard, which was in force during our study period. See pages 17–18 and 72–73 for a description of the analysis methods.

In addition to full compliance with the critical criterion that forbids the use of 100 prohibited pesticides, audit results indicated consistently high compliance rates for the 2010 SAN Standard criteria on the elimination of WHO class-1a and -1b pesticides (criterion 8.5). Banana producers in South and Central America showed strong improvements with regard to the elimination of WHO class-1a and -1b pesticides, with average compliance scores increasing more than 10 points between audit periods.

For the criteria that aim to reduce the use of permitted pesticides, compliance scores were consistently above 80 for criterion 8.3, which addresses the need to maintain and repair equipment to minimize waste and prevent the excessive application of agrochemicals. Performance was also consistently high for criteria that require the regulation of post-harvest fumigation practices (criterion 8.7) and training on diverse aspects of agrochemical application and safety (criterion 6.3). The latter became a critical criterion in December 2015, although full compliance is not registered in Table 6 because some audit records in the dataset pre-date this change. A high proportion of cocoa producers in each region (West Africa, South America, and Indonesia) appeared to have difficulty implementing IPM practices (criterion 8.1) and keeping inventories and detailed records of agrochemical use (criterion 8.2), with relatively low average compliance scores for these criteria. Unlike smallholder coffee farmers in Latin America, who often have stronger growers' associations and a longer history of training in sustainable agriculture practices, technicians report that smallholder farmers who cultivate cocoa typically have less access to the information needed to implement IPM and document pesticide use.

For the numerous criteria that address various aspects of pesticide storage, transport, and emergency response, few crop- or region-specific trends emerged. Cocoa producers in West Africa and coffee producers in Brazil were the only two groups with average compliance scores of 80 or above for all criteria in this section; all others crop-region groupings averaged 79 or below for one or more of the seven criteria examined. These variable compliance rates likely reflect the numerous and detailed requirements within these criteria, three of which contain five or more specific elements. Although many of these criteria are technical and can be complex, the Rainforest Alliance and its implementation and training partners seek ways to simplify and contextualize these requirements to fit the scale, risk level, and capacity of farms of different sizes. For instance, smallholders in some settings have been trained on how they can repurpose used but clean 55-gallon drums as storage lockers for pesticides.

Independent Research Results from Ghana and Costa Rica

A literature review revealed only two post-2015 studies that examine differences in the application or effects of pesticides on Rainforest Alliance Certified farms versus non-certified farms. A study of cocoa farming households in Ghana compared the changes to pesticide-related practices on 15 Rainforest Alliance Certified households and 15 non-certified farming households[49] (see pages 35 and 46 for more results from this study). When asked to reflect on changes since achieving Rainforest Alliance certification five years earlier, farmers from certified households reported improvements in record-keeping related to pesticide and fertilizer use; the storage of agrochemicals in a special room or on the farm, rather than in the kitchen or bedroom of their

TABLE 6 | *Performance of certified farms against 2010 SAN Standard criteria related to minimizing the use and risk of pesticides*

average compliance score: ● 90–100 ● 80–89 ● 70–79 ● 69 or less
▲ increase of at least 10 points since the first audit ▼ decrease of at least 10 points since the first audit
* critical criteria since the standard's inception ** critical criteria since December 1, 2015

		banana Central America	banana South America	cocoa Indonesia	cocoa West Africa	cocoa South America	coffee Brazil	coffee Central America	tea India	tea Indonesia	tea East Africa
6.9	Safe design of agrochemical storage areas	▲		▼	▲	▲		▲		▲	▼
6.10	No surplus or prohibited agrochemicals kept on site										
6.11	Agrochemical and fuel storage areas located a safe distance from buildings and water bodies				▲						
6.12	Minimize risk of agrochemical spills during transport										
6.18	Emergency response plan for all potential emergency types			▲	▲	▲			▲		▼

houses; and an increase in the frequency with which they implemented measures to stop the spread of black pod disease (such as burying diseased pods). Farmers from non-certified households reported no change or a decrease in the adoption of these good practices for pest control and pesticide risk management over the same time period.

Research in Costa Rica documented pest management practices, as well as insect and bird diversity (hypothesized to be affected by such practices) on five organic, five Rainforest Alliance Certified, and six non-certified banana farms.[50] Patterns of pesticide usage were found to be similar on the Rainforest Alliance Certified and non-certified farms, whereas pesticides were not applied on the organic farms. The researchers also found distinct insect and bird assemblages on the three types of farms, with the organic farms containing the highest abundance and diversity of these taxa, at least for plots within banana-producing areas. Rainforest Alliance Certified farms had comparable bird species composition to non-certified farms but lower insect diversity. The researchers suggest that the general comparability of practices and biodiversity indicators on the sampled Rainforest Alliance Certified versus non-certified banana farms may reflect the wide uptake within the Costa Rican banana sector, across both certified and non-certified farms, of many practices that are specified in the certification standard, resulting in fewer detectible differences. They also recommended improvements to 2010 SAN Standard requirements that relate to pesticide management. Such improvements have now been incorporated into the 2017 Rainforest Alliance Standard—for instance, through the mandatory use of integrated pest-management techniques, an updated and scientifically based list of prohibited pesticides, and other measures (see sidebar).

The Platanera Río Sixaola banana farm in Costa Rica uses biodegradable bags coated with a natural pesticide made from chili and garlic to protect banana bunches.

A New Approach to Pest Management and Pesticides

A homemade insect trap uses natural substances to attract berry borer beetles and keep them away from coffee cherries on the Finca Santa Eloísa farm in Veracruz, Mexico.

The development of the 2017 Rainforest Alliance Standard provided an important opportunity to revisit the Rainforest Alliance certification program's approach to pest management and pesticides. This process drew on learning from the M&E system (for example, data from compliance results highlighted above) and on engagement with diverse experts and partners to create a new approach that builds upon and further extends global efforts to minimize the risks associated with pesticide use.

At the heart of this new approach is Integrated Pest Management (IPM), which is now mandatory (i.e., a critical criterion) in the 2017 Rainforest Alliance Standard. Farmers who use IPM regularly monitor pest populations and pest outbreaks, and use these records when designing and planning pest-control efforts. When pest-control measures are economically justified, farmers prioritize the use of non-chemical pest-control mechanisms that cause the least disruption to the agroecosystem. Chemical pesticides, when required, are used only in a manner that minimizes risks to human health and the environment.

In tandem with the new IPM requirement, the 2017 Rainforest Alliance Standard includes a revised and expanded list of prohibited pesticides that includes 150 substances, which is in alignment with the Highly Hazardous Pesticides framework set out by the WHO and the Food & Agriculture Organization of United Nations (FAO). This list was also developed with input from the ISEAL Pesticides Working Group to improve harmonization among different standards' lists of prohibited pesticides, with the aim of simplifying farmers' pest-control decisions.

Perhaps the most innovative aspect of the new approach to pesticides is the incorporation of specific risk mitigation actions for an additional 170 pesticides, with the aim of enhancing the protection of farm workers, bystanders, pollinators, vertebrate wildlife, and aquatic life. This risk mitigation approach is based on a state-of-the-science risk assessment process that has screened hundreds of agricultural pesticides, and developed practical and effective mitigation protocols (see profile on page 56 for more information). It distinguishes the 2017 Rainforest Alliance Standard as the first ISEAL-member certification standard that requires tailored measures to reduce the negative impacts of pesticides on the populations of insect pollinators on tropical and subtropical farms. More broadly, this risk mitigation approach greatly reduces the chance that pesticide substitution (i.e., the replacement of a banned substance with one or more permitted substances that are also toxic) will endanger farm workers, local communities, fish, and wildlife.

While it is important to have rigorous pesticide-related protections in the standard, the producers and experts who were involved in the standard-development process emphasized the ongoing need to develop new pest-control solutions as farmers contend with emerging or worsening pest problems (some linked to climate change) and seek replacements for highly toxic substances that are presently in use. These solutions can include developing new pest-control protocols for specific crops and local contexts; working with regulators to register less toxic substances for legal use; and requiring investments in training and education to promote safer and more effective practices. The Rainforest Alliance certification program supports and contributes to bigger-picture solutions through its involvement in the ISEAL Pesticides Working Group, dialogue with industry, and other measures.

Interview with Dr. Paul Jepson

Dr. Paul Jepson is an ecologist and professor at Oregon State University, whose work on integrated pest management (IPM) and pesticide risk assessment spans more than three decades and has taken him across the globe. Dr. Jepson was a member of the SAN's International Standards Committee—the body of technical experts convened by the SAN to help the network revise the 2010 SAN Standard. In this capacity, his particular focus was on helping to develop the approach to IPM and the new pesticide hazard elimination and risk mitigation framework in the 2017 Standard. Rainforest Alliance staff member Deanna Newsom spoke with Dr. Jepson to discuss his work on IPM and pesticide risk management.

Deanna Newsom: *The new standard not only expands the list of prohibited pesticides from 100 to 150 substances, but it also requires farmers to undertake risk mitigation practices for an additional 170 permitted pesticides. Why are these new requirements necessary?*

Paul Jepson: Imagine you're a farmer, and you're using three different chemicals out in the field. One might be a herbicide that you apply before you plant so that the young crop isn't outcompeted by weeds. Then maybe there's a disease that threatens your crop, so you apply a fungicide. And later in the season, you use an insecticide to kill off a pest. Under both the 2010 and 2017 standards, if any of these chemicals is on the prohibited list you must stop using it and find an alternative. But the reality is that many of the alternative pesticides also pose a risk to the environment and human health if used incorrectly. That's why we developed the risk mitigation framework—to address those cases. I should add that these uses for pesticides must also now be justified as part of an integrated pest management (IPM) program. This encourages farmers to identify alternative pest control measures and thereby reduce pesticide use.

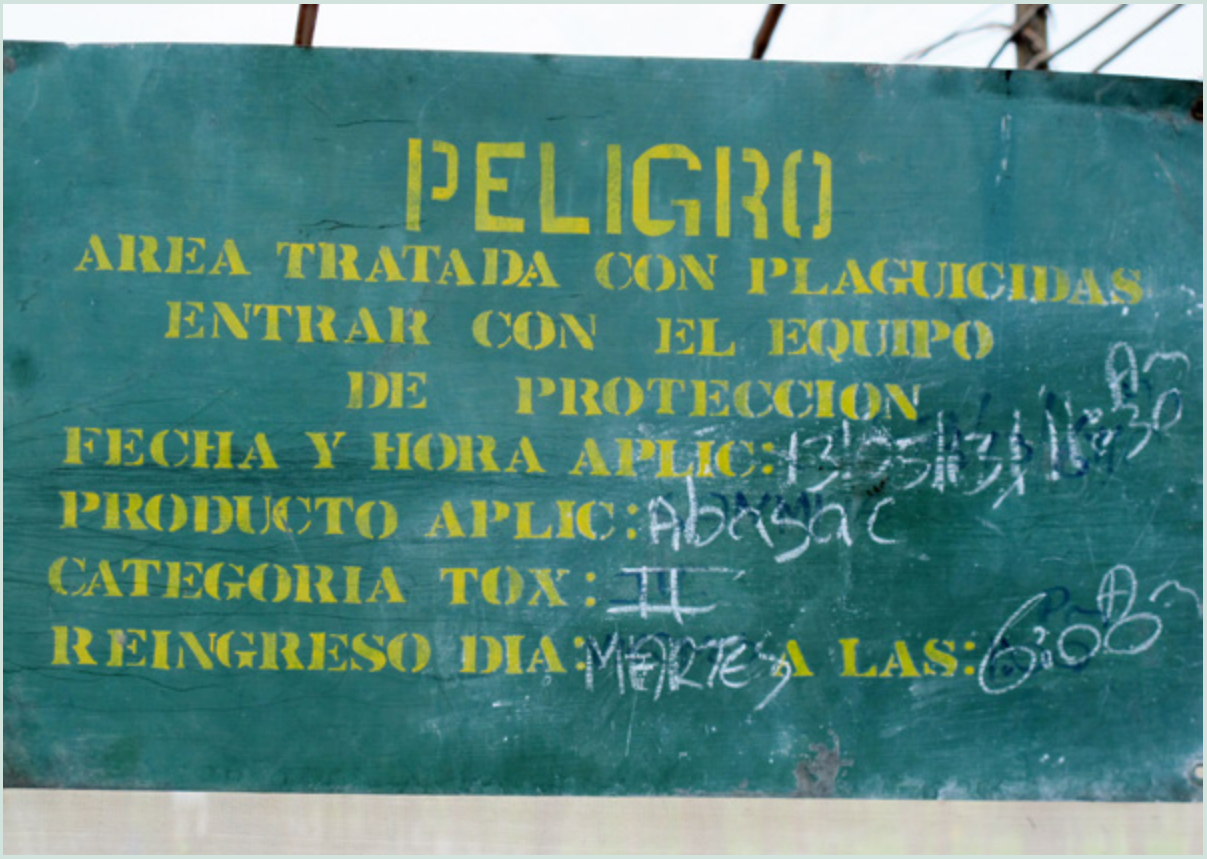
DN: *How does the new risk mitigation approach work?*

PJ: If you're the farmer above, it's possible that the insecticide you're using is permitted but is especially toxic to fish. However, this risk can be substantially mitigated if you apply some simple practices. For instance, maybe you will need to avoid spraying it within a certain distance of a stream. Maybe you will need to use a certain application nozzle on your sprayer that minimizes drift. Or perhaps you will need to delay spraying if the wind is blowing in a certain direction. All of these risk mitigation measures are scientifically based, tried and tested, and are not particularly onerous for farmers. And most of these mitigation measures can be found right there on the label of the products sold in the USA or Europe, but they're missing from the labels of the same products when they are sold in developing countries. With the new standard, we've simply codified this risk management approach to make it easy for farmers to know which practices to apply, and when they need to apply them, to mitigate the most significant environmental and health risks.

DN: *Your team has already tested this approach in West Africa. How have farmers there responded?*

PJ: We were really impressed by the degree to which farmers complied with risk-based information once they understood the basis for it. But it's also clear that farmers need knowledge about the basic concepts, such as the health risks associated with dermal exposure, in order to believe what we're telling them. We must help farmers understand that a leaf can look green and healthy but actually poses a huge health risk to them and their family if an invisible spray deposit is present. That's difficult. There's a lack of translation of science into the public domain. We've found that pictograms and other symbol-based training materials, when used within participatory education programs, have been very effective in West Africa. And when we show these same training materials to farmers in Oregon, they say, "Wow, that is so much easier for me, too."

At a training meeting in Ghana, cocoa farmers learn sustainable farming practices.



At Falcon Farms, a Rainforest Alliance Certified flower farm in La Ceja, Colombia, a sign informs workers when an area has been treated with pesticide, and when it will be safe to re-enter.

DN: *It's good to hear that farmers are receptive, but what are the implications of these risk mitigation practices for farm management? Are farmers able to combat pests effectively and maintain farm productivity?*

PJ: We often refer to the "pesticide treadmill," which still runs in many crops globally, even in the US. This treadmill of use often occurs when farmers apply pesticides more and more frequently because the naturally occurring predators of pests are gone, usually killed by broad-spectrum pesticides. We're trying to pull away from this phenomenon by creating a tool that certification programs can use to help farmers reduce pesticide dependency. But until farmers see that they can maintain productivity with much lower pesticide use, it can feel to them like a risky thing to try. The transition needs to happen gradually, and it can take two or three years, during which time predator populations can recover, if the conditions are right.

DN: *You've sat on international advisory councils before. What was it like working on a certification standard?*

PJ: I really believe in certification and what the Rainforest Alliance and the SAN are doing. When you work on non-certified farms in the developing world, farmers say, "Yes, I feel sick; yes, I'm noticing that this chemical is toxic; yes, I'll do what I can to minimize my exposure. But I have no choice—I have to use it." The Rainforest Alliance and the SAN are helping to provide farmers with an alternative. The new standard adds much more structure and science to the process, which increases the likelihood that changes made by farmers will benefit their productivity, as well as protecting their families and wildlife. It's like the layers within an onion—we've added more layers of protection. One could always go further, but with the new standard, we've built in the key elements of IPM and the mitigation of environmental and health risks. And we've done this in a way that I think farmers can actually adopt.

DN: *Can you tell us what's next for your research program?*

PJ: In West and Southern Africa, we're working on a risk index that is specific to knapsack sprayer applicators. We're also quantifying the amount of time that people should wait before entering fields that have been sprayed. Pesticide labels often recommend waiting one day, or until the chemical deposits are dry, but with some pesticides we are finding that people actually need to wait a number of weeks to be safe.

CHAPTER 7

Learning and Change

As highlighted throughout this report, learning and change is a fundamental feature of the Rainforest Alliance certification program. While the organization's mission to protect biodiversity and improve livelihoods remains a guiding beacon at all times, new sustainability challenges, shifting market dynamics, and evolving stakeholder expectations all require regular adaptation and improvement of the program's certification standard, assurance mechanisms, training, and other strategies. This "adaptive management" is informed by the program's monitoring and evaluation (M&E) system, which is itself being continually improved to generate greater amounts of data and insight on what is and is not working well, and why. In this section, we highlight a few examples of how the M&E system informs the operation and improvement of the certification program. We also summarize three initiatives presently underway to improve the M&E system.

Harnessing Data to Improve Program Design

M&E results from the entire Rainforest Alliance certification portfolio and field data from specific locations help to inform the design of the program's standards, training programs, and other strategies. Here, we highlight two examples.

Early in the process of developing the 2017 Rainforest Alliance Standard, analysis of M&E data from the implementation of the 2010 SAN Standard confirmed broadly what many auditors and trainers had observed anecdotally: while producers were able to achieve high levels of compliance and make good progress on the majority of continuous improvement criteria, a handful of continuous improvement criteria showed little improvement in many contexts. In some cases, these criteria were among the most meaningful but difficult ones to implement, related to agronomy, pesticides, and worker well-being.

This finding led to a re-conceptualization of the structure and scoring system for the 2017 Rainforest Alliance Standard, including a substantial increase in the number of critical criteria (37 out of 119 farm criteria in the 2017 Rainforest Alliance Standard versus 23 out of 100 in the 2010 SAN Standard version four), as well as a new continuous improvement framework. Under this new framework, the standard designates each continuous improvement criterion as either Level C, B, or A, according to how essential it is to a sustainable farming system and how much time and investment it requires to implement.

This approach defines a stepwise roadmap for producers to increase performance over time, beginning with those topics that are most essential and/or most feasible. Upon entering the certification program, producers must fulfill all critical criteria and half of the Level C criteria. By the third year, they must achieve near-full compliance with Level C and 50 percent compliance

with Level B. By the sixth year, the producer must maintain near-full compliance to Level C and Level B criteria, with substantial progress on Level A. By providing a more structured approach to continuous improvement, this framework addresses limitations in the previous approach that had become apparent over time. The new framework is also better suited to drive real improvement over time by setting a rigorous but realistic entry level upon which producers must continuously improve over a six-year period.

In addition to portfolio-wide M&E across all Rainforest Alliance certificates, more detailed data collection in particular contexts can be instrumental in helping to identify—and design programs that overcome—key barriers to sustainable agriculture. The Rainforest Alliance conducts such data collection according to standardized protocols that reflect best practice in survey and sampling design for agronomic, economic, social, and environmental variables. In Sulawesi, Indonesia, these protocols were used to gather data on a statistically representative sample of cocoa farms to identify training priorities that address farmers' specific needs. In Bantaeng Regency, data collection on 304 cocoa farms revealed that only two percent had farm management plans and kept on-farm records of costs, while only three percent of farmers kept records of pesticide and chemical fertilizer applications. In nearby Poso, less than one percent of the sampled farmers had farm maps or maintained records of income and expenses, agrochemical use, and pest and disease incidences. Low adoption of these practices was identified not only as a non-compliance risk for producers seeking certification, but also as a barrier to farmers' ability to improve the productivity and profitability of their farm businesses. As a result of this diagnostic data collection, a training program was designed to include modules on record-keeping, group management, and business-skills development, to further improve the farmers' management and financial-literacy skills.

New Initiatives for Improving the M&E System

Through continued investment in its M&E system, the Rainforest Alliance certification program aims to improve the ability of producers, program managers, and others to be more effective in tracking progress, monitoring performance, and improving management in near-real time. Here, we summarize three new initiatives that are presently underway.

Digitizing Group Internal Management Systems

The managers of certified farm groups provide group members with diverse services, including training on topics such as safe agrochemical application and the provision of farm inputs such as fertilizers. The group's Internal Management System (IMS) is a documented set of procedures and processes that a group implements to comply with the certification standard and policy requirements, facilitate annual risk evaluations, manage the certificate, and develop and implement continuous improvement plans. However, most IMS are presently paper-based; as a consequence, critical information on the characteristics and farming practices of group members is inaccessible for analysis. This significantly hinders the ability of group administrators or trainers to guide group management decisions, assess and manage non-compliance patterns and risks, and target training efforts to meet farmers needs most effectively.

Creating and implementing digital IMS that are directly linked to the audit process could address this problem. The Rainforest Alliance is presently developing and trialing such systems in a handful of contexts. In Sulawesi, Indonesia, for instance, one pilot initiative is customizing and implementing a digital IMS platform for a cocoa cooperative of 1,000 smallholder farmers. The members of the cooperative expect that moving from a paper-based system to a digital IMS will enable them to manage information on its group members more effectively, improve understanding of progress and challenges, implement continuous improvement plans and technical assistance services in a timelier manner, and guide decision-making based on data on compliance patterns, farm input use, product quality, productivity, and profitability.

Scaling Up New Spatial Analysis Requirements

Farm-level monitoring data can be most useful when coupled with spatial information on the geographic extent of each certified farm. This combination enables an analysis of spatial patterns of program reach, farmer characteristics, productivity, and compliance patterns and risks. It also enables more precise and cost-effective compliance assessment for land-based safeguards, such as prohibitions on deforestation and protected area incursion. Finally, it enables secondary analyses that relate certified production units to key contextual factors,

Students gather data on a cocoa farm in Sulawesi, Indonesia to help identify priorities for farmer training.

A manager points out a location on a map of the Nyara tea estate in Kenya.

such as deforestation rates, biodiversity hotspots, areas of water scarcity, and poverty maps. To realize the benefits of improved spatial data, the Rainforest Alliance is now instituting new, more comprehensive requirements for certified operations that involve furnishing information on the location and boundaries of certified farms and groups. Given that there is a wide variation in the technological capacity and training of certified producers to furnish such data, the Rainforest Alliance is providing easy-to-use protocols for mapping farm locations and boundaries—for instance, using smartphones and simple apps that are increasingly widely available.

The implementation of these techniques in Ghana's Bia-Juabeso landscape helps to illustrate the value of making these changes. There, field technicians used GPS-enabled devices to map farms as part of routine internal inspections. Overlay of these data with protected-area maps revealed a handful of farms that appeared to be located inside the Krokosua Hills Forest Reserve and thus at high risk of non-compliance with 2010 SAN Standard criteria 2.2 and 2.3, which prohibit farms from destroying natural ecosystems and negatively impacting national parks, wildlife refuges, or other conservation areas, respectively. Further investigation and a review of the farmers' legal documentation and reserve boundaries revealed that some farms were actually outside the reserve while others were legal farms that pre-dated the creation of the reserve and were therefore in compliance with the standard. A small number of farms that were within the reserve boundaries but lacked legal documentation were excluded from the group certificate and the opportunity to access certified markets. This example illustrates how the newly required spatial data on production units can help quickly pinpoint specific risks, which can then be further investigated as part of audit processes.

Using the Supporting Evidence Framework to Gather Farm-Level Data

During the annual certification audit, auditors assess an operation's compliance with the certification standard, observe practices in the field, speak with farm employees and neighbors, and scrutinize documents such as training and pay records. Yet, at present, much of this valuable information is not systematically recorded. To improve both its assurance and M&E functions, the Rainforest Alliance certification program is presently developing a new approach to data collection during the audit, called the Supporting Evidence Framework (SEF). Under the SEF, auditors document and record additional information that is currently either being examined during the audit but not recorded, or recorded but not in a standardized way. This might include variables such as the number of workers trained, the extent of riparian buffers, or the wage level of the lowest-paid worker. A guiding principle of the SEF is that it not place an additional burden or cost on the auditor or farm owner.

A first draft of the SEF was recently pilot-tested in Costa Rica and Kenya, revealing opportunities as well as challenges for implementing the framework more widely. For instance, the pilot found that while much of the identified information already exists in farm and group documents, the extraction and organization of these data took more time than expected. Furthermore, the pilot revealed challenges in capturing information on vegetation cover and the training of group members—two critical supporting evidence fields. The SEF will be further refined in the coming months as part of ongoing work to improve assurance integrity and M&E systems based on observed field conditions with regard to key social, environmental, and agronomic practices and outcomes.

Reginaldo Bonifácio de Oliveira

"My name is Reginaldo Bonifácio de Oliveira, and I've worked for Fazendas São Marcelo for eight years. Vale do Sepotuba, the ranch where I work, is located in Tangará da Serra in western Brazil, in the state of Mato Grosso. I was born and raised in the same state, in the mountainous ranching community of Salto do Céu. I'm married and have three children.

I am the lead cowboy on the ranch, and my day starts at around 6 a.m. I work on all aspects of managing the herd [which includes vaccinating and deworming the cattle; weighing and feeding them; and evaluating the condition of the ranch's pastures].

Before I started working at Fazendas São Marcelo, I had never heard about certification. [Now I know that it] concerns itself with animal welfare, the environment and the well-being of employees, both in their work lives and personal lives. We have received training in proper animal welfare practices, calving and birthing, and first aid, as well as how to tame the horses.

Certification has changed the way I think about my work and how I treat the animals and my team members. We have seen [new programs] in the community, the cattle are less aggressive, and the taming of horses has shifted to a humane and rational approach. The environment is taking back its natural place. It's increased the number of wildlife we see on the ranch grounds—they seem comfortable here.

I'm happy to be part of the program, especially given that it is changing the way people view ranching in Brazil today. We're looking for innovative ways to reduce the impact of ranching on the environment."

Cowboys lead a herd of cattle on the Fazendas Sao Marcelo ranch in Mato Grosso, Brazil.

Eva Llanes

In the early 1990s, during the waning years of Peru's bloody internal conflict, armed rebels from the Shining Path guerilla group terrorized the village of San Juan de Cheni, making it impossible to maintain any semblance of normal life—such as properly tending to the village's cocoa plots. Community members fought back, eventually restoring security, but by then, new and urgent challenges confronted them, including a fungal disease that decimated cocoa production and predatory middlemen who paid low prices for what little saleable cocoa the land yielded.

In the hopes of negotiating better prices as a group, the community formed an association called APROCHEN (Asociación de Productores Agropecuarios de San Juan Valle Cheni), which achieved Rainforest Alliance certification in 2010. Since then, these farmers have more than doubled the prices that they receive for their cocoa beans—which they've learned to cultivate using methods that not only control fungal disease outbreaks, but also protect and restore local rainforests, streams, and rivers.

"My mother gave me my cocoa trees," says cocoa farmer and APROCHEN Secretary Eva Llanes. "They are my inheritance. The truth is that as women we can do anything. I'm proud of all the things I've achieved. I've tried to comply with what the Rainforest Alliance says, to give an example to the others that a woman can do it. Before, we sold our cocoa to any middleman who showed up, and they took advantage. Now that we sell directly to exporters, we are earning more money. My life is getting better, and my family's life is getting better."

Eva Llanes stands among young cocoa plants in APROCHEN's nursery.

CHAPTER 8

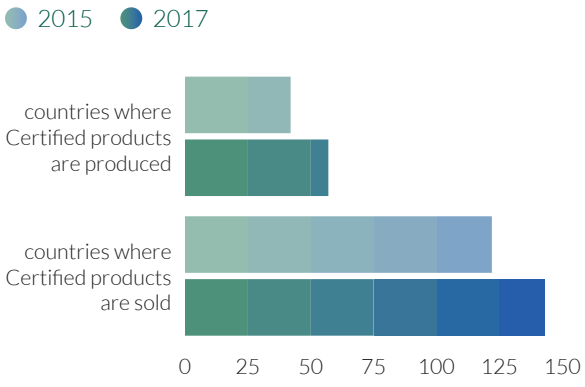
Conclusion

The 2018 Rainforest Alliance Impacts Report is being published at a unique moment in time. As an organization with a 30-year history of partnering with farmers, conservation organizations, scientists, and businesses around the globe, the Rainforest Alliance has just embarked on its biggest partnership yet: a merger with sustainability certification organization UTZ. While this change inspires excitement about and anticipation of a stronger Rainforest Alliance that is better able to support farmers, businesses, and consumers on the path to sustainability, it also invites reflection on the successes and limitations of the organization's work to date.

The findings in this report give us reason to be hopeful. The number of certified farms and farmer groups is at an all-time high, with noteworthy growth in some countries, such as Colombia and Ecuador. The production volumes of crops that saw contractions in recent years, such as coffee and cocoa, have recovered or stabilized in 2017, while the production volumes of other crops, such as tea and bananas, have seen continued strong growth. Compared to two years earlier, the number of countries producing certified farm products has increased from 42 to 57, and the number of countries selling these products has grown from 122 to 143.

The most important indicator of effectiveness, however, is not the size of the program but its aggregate benefit to farmers, farm workers, their families, and the environment that they share with myriad species of plants and animals. To assess the effects of the Rainforest Alliance certification program on these people and places, we examined data from farm audit reports and reviewed independent scientific studies. Audit data indicate that, with a few exceptions, certified farms and farmer groups achieve consistently high rates of compliance with the criteria that address worker wages

FIGURE 29 *Growth in countries producing and selling Rainforest Alliance Certified farm products*



Juan Pinchi harvests cocoa pods on a Rainforest Alliance Certified farm in Juanjui, Peru.

and rights, housing and education, health and safety, and farm productivity. Likewise, farms achieved high compliance rates with criteria that promote the conservation of natural ecosystems, both on the farm and nearby—with the exception of criteria related to buffer zones that separate crops from other areas, which had relatively low rates of compliance for many crops and regions. On the subject of minimizing pesticide use and risk, compliance rates were mostly high for criteria that address the elimination of the most toxic pesticides and the reduced use of permitted pesticides, with mixed performance for the criteria that address the safe storage and transport of pesticides.

Independent studies published within the past two years confirm previous findings that Rainforest Alliance certification is associated with higher household incomes and lower rates of poverty among farming households. One study attributed these differences to the price premium paid to certified farmers, while two others attributed it to the significantly higher productivity of certified farms. Two recently published studies on the conservation of natural ecosystems on and around Rainforest Alliance Certified farms used very different research methodologies—one relied on remote sensing data and the other on farmer perceptions—but both concluded that certification had a positive effect on forest quality.

While largely positive, this body of evidence also highlights some of the challenges that the Rainforest Alliance must strive to address in the future. The independent scientific studies presented in this report show that poverty is still found on Rainforest Alliance Certified farms, though at significantly lower rates than on non-certified farms. The compliance analysis found that, for some crops and regions, a significant proportion of farms encountered difficulties with adopting good practices such as integrated pest management. However, changes found in the 2017 Rainforest Alliance Standard will push farmers to attain greater progress in these areas. This work is supported by key partnerships—with the Global Living Wage Coalition, for instance, as well as with leading scientists on integrated pest management and risk-based pesticide management—to help address these very topics.

As the Rainforest Alliance moves into a new chapter of its history, the organization retains its farmer-centric orientation while simultaneously embarking on new partnerships and collaborations to scale the reach and impact of its approach to sustainability.

ANNEX A

Global Reach, by Country

TABLE 7

The number of Rainforest Alliance Certified farms, certificates, and total certified area for each of the 57 countries with Rainforest Alliance certificates. Data are as of December 2017.

country	Certified farms	certificates	total certified area, in hectares
Albania	174	6	2,150
Argentina	574	38	40,457
Bangladesh	17	2	20,239
Belize	19	1	4,781
Brazil	407	103	366,609
Bulgaria	3	3	11,294
Burkina Faso	270	2	940
Burundi	53,117	6	11,154
Cameroon	9	2	35,453
Chile	78	63	18,949
China, Republic of (Taiwan)	53	2	120
China, The People's Republic of	7,497	30	10,581
Colombia	11,185	254	173,217
Costa Rica	3,907	126	93,881
Côte d'Ivoire	99,882	149	618,486
Croatia	5	4	1,298
Dominican Republic	4,080	27	36,587
Ecuador	3,929	244	91,429
Egypt	8	5	1,671
El Salvador	320	80	20,602
Ethiopia	22,790	23	98,413
Germany	1	1	138
Ghana	46,472	14	204,800
Guatemala	3,045	182	109,901
Honduras	1,650	41	35,799
India	9,036	165	244,128
Indonesia	37,164	42	119,996

country	Certified farms	certificates	total certified area, in hectares
Jamaica	3	3	99
Japan	65	3	503
Kenya	749,084	134	362,408
Lao People´s Democratic Republic	5	1	2,465
Madagascar	10,675	12	46,441
Malawi	17,114	12	48,252
Mali	134	1	3,965
Mexico	1,221	53	32,986
Mozambique	1	1	1,566
Nepal	1,052	4	1,755
Nicaragua	676	69	32,868
Nigeria	11,273	6	23,077
Panama	29	4	7,577
Papua New Guinea	4,641	4	31,848
Peru	10,861	55	106,307
Philippines	721	21	41,856
Poland	1	1	118
Rwanda	51,446	29	38,062
Senegal	369	2	406
South Africa	6	6	25,088
Sri Lanka	13,826	21	78,301
Suriname	1	1	4,099
Tanzania	58,897	23	96,869
Trinidad and Tobago	41	1	407
Turkey	33,587	13	46,772
Uganda	23,564	8	39,771
United States	3	2	929
Vietnam	10,370	23	13,141
Zambia	1	1	4,600
Zimbabwe	192	6	17,181

ANNEX B

Methodology

The information presented in this impacts report is derived from three sources: 1) basic data from Rainforest Alliance certificates; 2) audit data from a subset of 383 certificates from 10 crop-region groupings; and 3) results from impact studies. Each of these sources is discussed in sequence below.

Basic Data from Rainforest Alliance Certificates

The Rainforest Alliance Certificate Database was the source of information for time-series data on the number of certificates, total production hectares, and total certified hectares. It was also the source for data on breakdowns of these quantities by crop, country, and region. Finally, the Rainforest Alliance Certificate Database was the source of data on the quantity of certified products produced by each certified entity. The certificate database is updated continually as certificates are added, terminated, or renewed.

Following are notes about the analysis of these source data:

- **Time series:** Trend data reported for the number of farms, production hectares, total certified hectares, and quantity produced are based on all active certificates as of December 31 in each indicated year.

- **Breakdown by region:** Data for total number of farms, production hectares, and total certified hectares summarized by geographic region are based on the region classifications indicated in Figure 30.

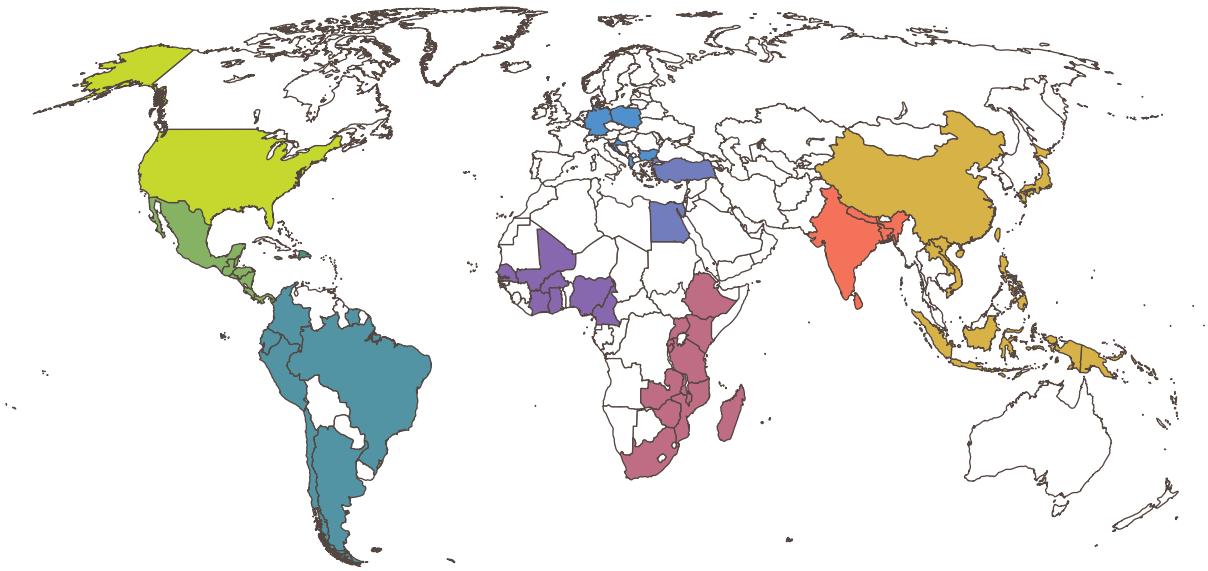
- **Breakdown by farm size:** For group certificates, data on the proportionate breakdown of certified farms and certified land by farm size (0-2 ha, 2-50 ha, and more than 50 ha) are based on the mean size of farms within each group certificate. Given that farm size distribution data from group certificates are therefore approximate, the overall distributions by farm size per region should be interpreted as indicative but not precise distributions.

- **Quantity of products produced:** Production volumes reported in the crop-specific infographics reflect metric tons of:
  - **Cocoa:** cocoa beans
  - **Coffee:** green coffee beans, or equivalent
  - **Bananas:** bananas
  - **Tea:** made tea (following initial processing and drying)

- **Percentage share of world production:** Statistics on the percentage share of Rainforest Alliance Certified crops in total world production are calculated by dividing the total production for each crop on certified farms by the total world production for the corresponding year, as reported by FAOSTAT

FIGURE 30 | *Classification of countries into regions for the purpose of regional breakdown analyses*

- North America *(United States)*
- Mesoamerica *(Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama)*
- Caribbean *(Dominican Republic, Jamaica, Trinidad and Tobago)*
- South America *(Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Suriname)*
- Central & Eastern Europe *(Albania, Bulgaria, Croatia, Germany, Poland)*
- North Africa & Middle East *(Egypt, Turkey)*
- West & Central Africa *(Burkina Faso, Cameroon, Côte d'Ivoire, Ghana, Mali, Nigeria, Senegal)*
- East & Southern Africa *(Burundi, Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Rwanda, South Africa, Tanzania, Uganda, Zambia, Zimbabwe)*
- South Asia *(Bangladesh, India, Nepal, Sri Lanka)*
- East & Southeast Asia *(China, Republic of [Taiwan]; China, the People's Republic of; Indonesia, Japan, Lao People's Democratic Republic, Papua New Guinea, Philippines, Vietnam)*



for bananas (http://faostat.fao.org), the International Cocoa Organization for cocoa (http://www.icco.org), the International Coffee Organization for coffee (http://www.ico.org), and the International Tea Committee for tea (http://inttea.com).

It should be noted that data on certified production reflect the total production of each crop on certified farms, not the total quantity of each crop that is sold or labeled as Rainforest Alliance Certified, which is lower. Production values are reported for 12-month periods, but these periods do not always coincide with the calendar year. Total production values reported for each year are based on the updated production volume data for each certificate in each year, even if the reporting period for this production volume falls partially outside of the corresponding calendar year. As such, volume figures should be treated as approximate.

Audit Data from Rainforest Alliance Certificates

To evaluate patterns and trends in conformance with 2010 SAN Standard criteria by crop and region, we analyzed data from 766 audit reports representing 383 Rainforest Alliance certificates. These certificates were selected according to the following parameters:

1. They were active in 2016.

2. They covered operations that had been audited at least twice under the then-current (July 2010) version of the SAN Standard (to enable time-series analysis to be conducted).

3. They were located in one of the priority regions selected for analysis, including Central and South America for bananas; West Africa, Indonesia, and South America for cocoa; Central America and Brazil for coffee; and India, East Africa, and Indonesia for tea. These crop-region groupings were selected because they represent the greatest concentration of activity for each of the four largest Rainforest Alliance Certified crops.

For crop-region groupings with more than 100 certificates that met the above parameters, a random sample

was selected for analysis. For crop-region groupings with fewer certificates that met these parameters, all operations with at least two years of compliance data were included in the analysis (see Table 2).

For each time period ("most recent audit" and "older audit"), the average compliance score was calculated for each crop-region grouping against the 41 SAN Standard criteria that most directly addressed the following three topics: protecting the livelihoods of farmers and farm workers (17 criteria), conserving natural ecosystems (10 criteria), and decreasing the risks of pesticide use (14 criteria). This score was 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 non-compliance (i.e., a major non-conformity). For example, the compliance score for the SAN criterion related to soil erosion control measures for a hypothetical region that had four certificates, two in full compliance with this criterion and two in partial compli¬ance, would be 75 ((100+100+50+50)/4). The compliance data for each selected set of criteria were analyzed to characterize performance levels during the most recent time period, assess changes over time, and highlight any crop-region groupings with notably high or low rates of compliance, as well as those with substantial changes in compliance.

Other information: Please note the following additional points about the audit-based analyses:

- The amount of time between the initial audit and the final audit varied substantially among different operations in each crop-region grouping. Additionally, for any given certified operation, the amount of time between individual audits sometimes deviated from the standard interval of 12 months. As a consequence, the period of time over which changes in conformance were evaluated differed within the sample group for each crop-region grouping.

- Compliance data analyzed in this report are based on the version of the 2010 SAN Standard in force at the time of each audit report within the dataset: version three of the 2010 SAN Standard through November 30, 2015, and version four of the 2010 SAN Standard starting on December 1, 2015. Changes made from version three to version four were limited to a handful of criteria and do not significantly affect the analysis of compliance data during the 2015-2016 period.

- For group certificates, the analysis of changes in conformance may be complicated by the fact that group membership can change over time. When new members join a group, they are inspected and may affect the conformance score for the group overall. Non-conformities associated with new group members are treated as new non-conformities for existing groups rather than initial non-conformities, even though the members that recently joined the group were being audited for the first time. This dynamic is particularly prevalent among cocoa group certificates and may serve to reduce the apparent progress in conformance among certified cocoa groups.

- Data from the Rainforest Alliance Certificate Database and audit records are analyzed and reported here only in aggregate form, which does not expose information about individual producers.

Impact Studies

In addition to data derived through the certification audit process, evidence on the effects of the Rainforest Alliance certification system was available from numerous evaluation and impact studies conducted over the past several years. These studies complemented the evidence base that was available from certification data: whereas data from the certification system are helpful to characterize support strategies, direct results, and certain key outcomes, research studies can provide a deeper assessment, particularly of key outcomes and broader impacts as defined in the Rainforest Alliance theory of change (see "Overview of the Monitoring & Evaluation System," p. 16). Research studies can also help evaluate causal linkages between support strategies and results by using experimental or quasi-experimental designs to discern the effect of specific interventions. However, as the studies each focus on specific groups of producers, crops, or locations, their results may not be generalizable across all certified producers in a given region or crop sector. Please see Annex E for the full citations of the research studies summarized in this impacts report.

We used the following criteria to determine which research studies to synthesize and reference in this report:

- The study was published in 2016 or later (all studies published before 2016 were summarized in the 2015 SAN/Rainforest Alliance Impacts Report).

- The study sought to evaluate the effects of one or more Rainforest Alliance support strategies—typically farmer training and/or certification—on one or more theory of change results (direct results, key outcomes, and/or broader impacts).

- The study included a credible point of comparison or counterfactual, such as a control group of non-certified producers or a control site. We also included studies where the objective was to assess changes in the effects of certification over time, in which case the point of comparison was an earlier point in time for the producers being evaluated.

Throughout this report, we summarized key findings of research studies meeting the above criteria. In preparing these summaries, every effort was made to provide a balanced portrayal of positive, negative, and neutral results. Specifically, research results were summarized as follows:

- Results were summarized that were relevant to the topics discussed in this report (i.e., relevant to the theory of change results).

- Where results on a particular topic were summarized, we strove to portray them in a balanced way, whether positive, negative, or neutral.

- In general, only statistically significant results were summarized in this report. Where we used the term "significant" or "significantly," it indicated that the original research reported statistical significance at $p \leq 0.05$. In some instances, we summarized results that were not statistically significant (or where the researchers did not report statistical significance), because the results provide useful descriptive information on a particular topic and because better-quality evidence was not available. Any research results that were not reported to be statistically significant in the original study are noted as such in the text.

We encourage interested readers to refer to the original source of each research study (as cited in Annex E) for additional information. Many of these studies are available from the Rainforest Alliance's website at http://www.rainforest-alliance.org/work/impact/research.

Disclaimer

This document was prepared on the basis of data available from multiple sources, including the SAN and its certification bodies, as well as commissioned and independent research studies. The authors did not independently validate these data, and therefore the Rainforest Alliance does not guarantee or warrant the accuracy, reliability, completeness, or currentness of the information in this report. The Rainforest Alliance will not be liable for any direct or indirect loss, damage, cost, or expense, including without limitation any consequential damages incurred or that arise from any person using or relying on information in this report.

ANNEX C

Theory of Change

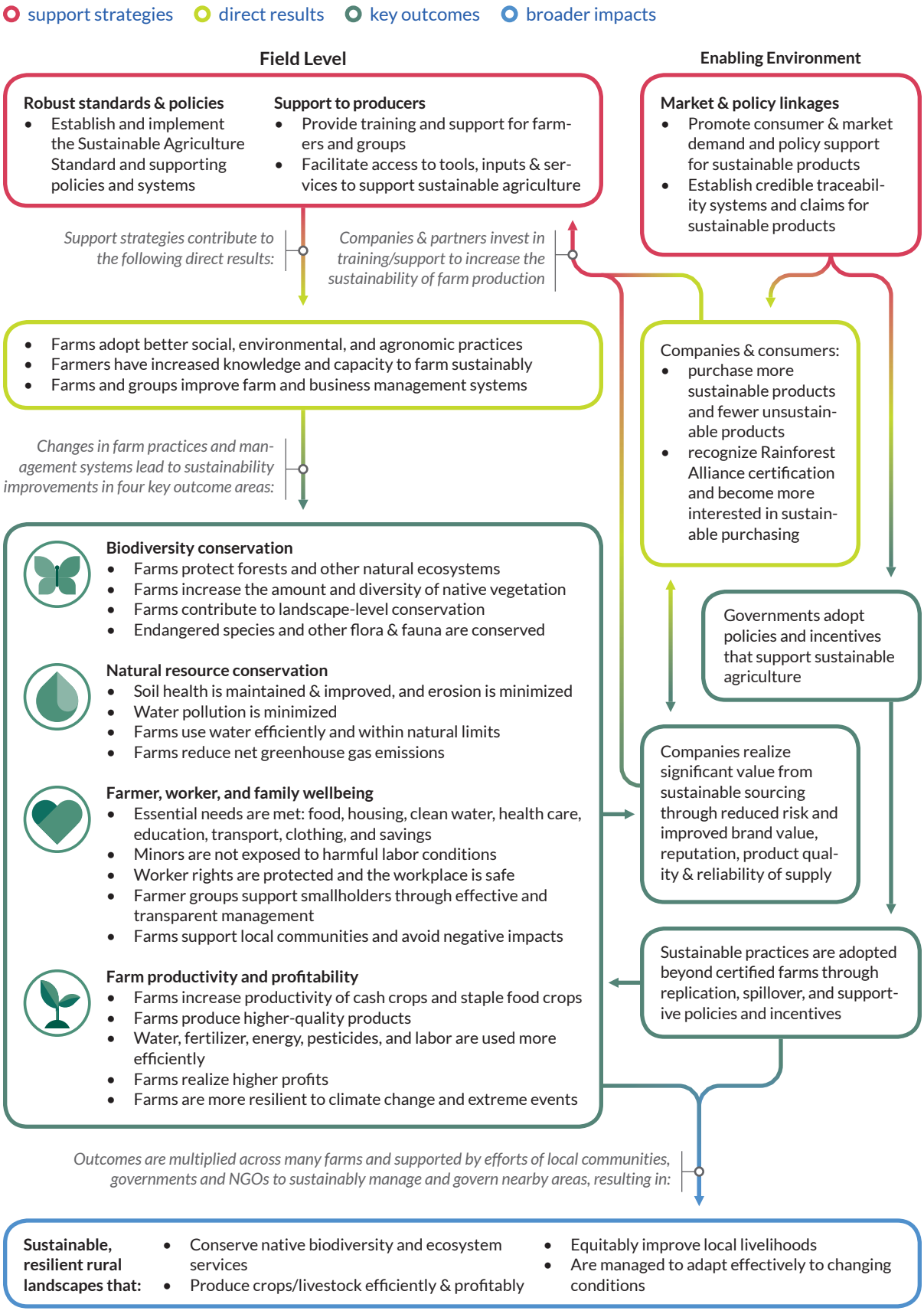
The theory of change that guides the Rainforest Alliance certification program was introduced in Section 1 of the report.[51] This Theory of Change was developed jointly between Rainforest Alliance and the Sustainable Agriculture Network (SAN) in 2014. In this annex, we elaborate further on the individual elements of the theory of change. The text in this annex is drawn from the 2015 SAN/Rainforest Alliance Impacts Report, available at https://www.rainforest-alliance.org/impact-studies/impacts-report-2015.

Driving change at the field level and in the enabling environment: The theory of change includes support strategies, direct results, and intermediate results focused both at the field level (left side of the diagram) and at influencing the enabling environment for sustainable agriculture (right side of the diagram). Both pathways are essential to achieving the theory of change outcomes and impacts, and the two function in a complementary way to support positive change on individual production units while simultaneously increasing incentives, investment, and policy support for sustainable agriculture. When the theory of change logic plays out fully, improved sustainability at the field level benefits not only local producers and their neighbors, but also companies and consumers up the value chain. These benefits support positive feedback whereby companies realize significant value from sustainable sourcing and therefore choose to invest more in increasing the sustainability of their supply base. At the same time, best practices are replicated and scaled up as neighbors, governments, and other stakeholders see the benefit in sustainable agriculture.

Support strategies: Support strategies are the activities that the Rainforest Alliance or its partners carry out to support the results identified in the theory of change. In addition to the establishment of the Sustainable Agriculture Standard and its supporting policies and systems, key strategies include working with farmers and farmer groups to improve the sustainability of agriculture through training, field support, and the facilitation of access to key management tools, farm inputs, and sources of capital. Support strategies also include work to increase the demand for sustainably certified products and sustainable farming practices from consumers, companies, food industry groups, governments, and civil society.

Direct results: Direct results describe the changes in farming practices, farm management systems, and farmer knowledge that are expected to arise from implementing the support strategies. These changes are important enablers of key outcomes and broader impacts. Increased farmer knowledge and improved farm-management systems also enhance the ability of land managers to respond and adapt to change, and support resilient households and community livelihoods. Achievement of direct results may be supported or facilitated by the certification program but also requires substantial initiative and (sometimes) investment on

FIGURE 31 | *The theory of change guiding the Rainforest Alliance certification program*



the part of producers and producer groups, who are instrumental in the achievement of these direct results.

Key outcomes: Key outcomes include changes in social, environmental, economic, and farm productivity conditions on and around certified farms. In many ways, these results are the most tangible manifestation of progress toward sustainability. Key outcomes also include improvements to the enabling environment that lead to better incentives, more supportive policies, and the replication of sustainable practices beyond certified farms. The system's focus is on four outcome areas:

- **Biodiversity conservation:** Biodiversity conservation has always been a central sustainability focus for the Rainforest Alliance certification system. The goal is for farms not only to protect on-site conservation values (e.g., by conserving existing natural ecosystems, restoring native vegetation, etc.), but also to support conservation at the landscape level by maintaining wildlife corridors and supporting the management objectives of nearby protected areas. The standard also helps to protect endangered species and conserve other native flora and fauna.

- **Natural resource conservation:** Agriculture cannot be sustainable if it diminishes the essential natural resources that are the basis of a productive farm, including soils, water, and the native species that supporting pollination and pest-control functions. Key intended outcomes include maintaining and improving soil health, reducing erosion, avoiding water pollution, and using water in an efficient manner that leaves ample water resources to support nearby communities and ecosystems. By sustaining key natural resources, farms reduce their input costs and become less susceptible to droughts, pest outbreaks, and climate change. Finally, farms' increased tree cover, improved soil health, and reduced input use all contribute to reducing greenhouse gas emissions and making sustainable farms part of the climate change solution. Together, these outcomes strongly support "climate-smart agriculture," which improves farm performance for both climate change adaptation and mitigation.

- **Farm productivity:** A central objective of the certification program is to support farmers in their efforts to increase the productivity, efficiency, and profitability of their farms—ensuring that agriculture can form the basis of a decent livelihood for generations to come. Key intended outcomes include increased productivity at the whole-farm level—including cash crops, food crops, livestock, and tree and forest products—as well as improved product quality of cash crops. The efficiency with which farms use land, water, fertilizers, and labor can vary dramatically within a given region. By supporting more robust farm management systems, business management practices, and natural resource management, the certification system seeks to close this "efficiency gap" so that farmers can save money on inputs while protecting the environment.

- **Well-being of farmers, workers, and their families:** A decent standard of living is achieved when farmers, workers, and their families have adequate resources for food, housing, clean water, health care, education, transport, clothing, and savings. Improving agricultural livelihoods toward such a "living wage" or "living income" level is a core objective of the Rainforest Alliance. This outcome is promoted through a range of standard requirements and through the work of Rainforest Alliance and its partners to leverage additional investment in support of key livelihood needs. Additionally, the Standard helps to ensure that the rights of workers and minors are protected, in accordance with local laws and international norms, such as the conventions of the International Labor Organization. Where small-scale farmers are organized into groups, the objective is that these group structures support their members in the improvement of their livelihoods through transparent governance and effective management of crop marketing, training, and other functions.

Broader impacts: While the achievement of these key outcomes within individual farms and farmer groups can be profoundly important, farms, communities, and ecosystems stand a better chance of being sustainable over the long-term if they are supported by and linked to sustainable management efforts over a broader landscape. Sustainable rural landscapes typically include well-managed farms, waterways, forests, or other natural ecosystems and human settlements, and deliver a full range of benefits for biodiversity conservation, food production, and the advance of human livelihoods. The achievement and maintenance of sustainable and resilient rural landscapes is the ultimate "broader impact" identified in the theory of change. The Rainforest Alliance certification program contributes to this impact by promoting sustainable farming across a "critical mass" of farms within key landscapes and regions. Rainforest Alliance and its partners also collaborate with community, government, corporate, and NGO partners to establish complementary activities, policies, and investments that help to replicate and complement best practices in sustainable management and scale impacts to entire landscapes.

Unintended effects: While the theory of changes describes the results that the certification program intends to deliver, and the mechanisms by which these results are expected to be achieved, it is also possible that the certification system could cause or contribute to some unintended effects. Rainforest Alliance assesses the potential for (or actual realization of) such unintended consequences on an ongoing basis, in view of field auditing and training experience, as well as input from producers, buyers, and other stakeholders. The relevant organizations then take steps to minimize

negative unintended effects through the design of field support programs, periodic revisions to the standard and policies, and efforts to improve the enabling environment for sustainable agriculture. Key potential unintended effects are outlined here (but not shown in the theory of change diagram).

One set of unintended effects relates to the possibility that activities or results at each level of the theory of change might not drive the hypothesized changes at subsequent levels of the theory of change. For instance, field-level support strategies may drive the adoption of sustainability best practices in some issue areas but not others, or in some locales but not others. This may be due to constraints at the field level that are difficult to overcome, such as farmers' lack of access to capital, or local adherence to farming practices that are at odds with those defined in the standard. Even where improved practices are adopted, these practices might not always lead to an improvement in key outcomes, due to variations in farm conditions and contexts, or other factors. And farm-level improvements in key outcomes might be of insufficient aggregate scale to strongly support sustainability at a landscape scale, or might be outweighed by other unsustainable land-use patterns or trends in the landscape. All of these factors could impede attainment of the theory of change results.

A second set of potential unintended effects has to do with the possibility of tradeoffs among the different theory of change results. For instance, if farms retain and restore natural ecosystems and other native vegetation, their total crop production might be less in the short term than if they opted for monoculture production without natural vegetation. And the adoption of certain social and environmental good practices (e.g., payment of higher wages, installation of wastewater treatment systems, etc.) could reduce overall profitability, or the availability of capital for other kinds of farm investments.

We also recognize that farmers' participation in international value chains for traded commodities can have both positive and negative implications for sustainability. These effects are rarely unique to certified value chains, but certification may either ameliorate or exacerbate sustainability challenges. For instance, smallholder producers involved in certified value chains often benefit from greater external investment, training, or support than their non-certified neighbors. However, as an unintended consequence, farmers could become more vulnerable to commodity price fluctuations, for instance, if they become more reliant on revenue from cash crops or more dependent on specific buyers or traders that purchase certified products.

ANNEX D

Monitoring and Evaluation Indicators

The thematic focus of monitoring and evaluation (M&E) data collection and reporting is defined by the suite of M&E indicators presented below (Table 8). These indicators were selected according to two primary criteria:

1. Indicators relate closely to the theory of change. Individual indicators are able to characterize specific theory of change support strategies, direct results, key outcomes, and broader impacts, while the collective indicator set is sufficient to characterize all key result areas and permit rich data analysis and disaggregation to gain further insight into different kinds of results, and the conditions or contexts in which they are realized.

2. Indicators are specified according to evaluation good practice, such as applicable "SMART" guidelines that call for indicators to be specific, measurable, attainable, relevant, and time-bound. Indicators are appropriate to assess the hypothesized intended and unintended consequences that may come about as a result of certification, training, and related interventions.

Wherever possible and appropriate, these indicators have been aligned with indicators or indicator frameworks developed and tested by the community of practice of sustainability standards systems, researchers, private companies, and NGOs involved in developing sustainability performance measures for agricultural production systems and value chains. For instance, the indicator set incorporates the large majority of ISEAL Common Indicators.

Indicators are divided into three categories, as presented in Table 8. Indicator set A pertains to the size, location, and characteristics of Rainforest Alliance Certified farms, crops, and lands. These indicators are used to document the reach of the support strategies identified in the theory of change. Indicator set B pertains to market-related direct results. Indicator set C—the one most closely linked to social and environmental sustainability—tracks direct results, intermediate results, and broader impacts. These indicators are organized according to the key outcomes in the theory of change (see Figure 31).

Please note that the table presents indicators, not the means of measuring them. For certain indicators, especially in the right column of Table 8, there may be many different, credible ways to measure or quantify the indicator. For instance, water quality may be assessed by means of chemical tests, macroinvertebrate inventories, or certain visual assessments, such as the use of sedimentation tubes. Within the bounds of the indicator framework, appropriate means of measure may be selected in the context of specific monitoring or impact studies.

As shown in the table, some indicators are intended to be tracked across all certificates. Others require more in-depth evaluation and cannot typically be measured through the audit process; these indicators are assessed through sampled monitoring efforts or as part of impact studies. The table includes all indicators that are within the scope of the M&E system, as of December 2017. Indicators in black are those that have been the focus on monitoring, evaluation, and impact studies to date, and for which sufficient data have been amassed. Data on most of these indicators is reported in this document. For those that are in gray, it has not been possible to monitor them to date, or they have only recently become the focus of monitoring, with little or no data amassed to date; these indicators are considered priorities for ongoing or future investigation.

TABLE 8 *Summary of indicators for the Rainforest Alliance certification program M&E system. Please see the text for further explanation.*

	Rainforest Alliance M&E system indicators	
theory of change results theme	**intended to be assessed for all certificates through auditing and traceability processes**	**intended to be assessed for a sample of certified operations, or as part of impact studies**
(A) Indicators to track support strategies (outputs): *Reach of support strategies and characteristics of the people, groups, and lands reached through these support strategies*		
Farms and producers	Number of certificates, by crop, location, and type (group vs. individual) Number of certified farms, by crop, location, and type (group member vs. individual) Size distribution of certified farms, by crop and location Size distribution of land area under cultivation (for group members only) Number of members per certified group, by gender and inclusion in the certificate	
Workers	Number of workers on certified farms, by location, crop, employment status, worker origin, and gender	
Lands	Certified land area, by location and crop Certified production area, by location and crop	Relation of certified lands to areas of high social or environmental risk (various spatial indicators)
Producer training and support	Number of producers trained in best practices, by location, crop, type (farmer vs. worker), gender, type of training provider, and training topics	Farmer perception of training quality and utility

theory of change results theme	Rainforest Alliance M&E system indicators: intended to be assessed for all certificates through auditing and traceability processes	Rainforest Alliance M&E system indicators: intended to be assessed for a sample of certified operations, or as part of impact studies
Other key characteristics of certificate-holders	Number and identity of other certifications held Labor model(s) used by farmers within certified groups Level(s) of mechanization among farmers within certified groups Group's position(s) in the value chain	Land tenure status of group members Farmer age (group members only) Years of formal schooling completed (group members only)
(B) Indicators to track production- and market-related direct results and key outcomes: *Contributions of sustainable production, certification, and marketing to market and sector transformation*		
Production	Quantity of production, by product, variety, location, and farm type (group vs. individual)	
Sales	Quantity of certified product sold as certified, by product type Proportion of product sold as certified, by product type and origin	Amount of price premium to producers for certified sales
Public recognition, understanding, and use of the certification label	Number of countries in which Rainforest Alliance Certified products are sold Number of SKUs using the Rainforest Alliance Certified seal	Proportion of consumers recognizing and understanding the meaning of the seal in key consuming markets
(C) Indicators to track field-level direct results, key outcomes, and broader impacts: *Results related to the areas of social, environmental, economic, and agronomic sustainability identified in the theory of change*		
Biodiversity: Farms protect forests and other natural ecosystems	Land area under conservation management, by location and management objective Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	Rate of ecosystem destruction or restoration compared to surrounding areas Water quality and habitat quality characteristics in aquatic natural ecosystems
Biodiversity: Farms increase the amount and diversity of native vegetation	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	Quantity and diversity of on-farm vegetation
Biodiversity: Farms contribute to landscape-level conservation	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	Changes in landscape composition and structure following certification
Biodiversity: Endangered species are protected and all native flora and fauna are conserved	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	Presence, abundance, or survivorship of species in key taxa around certified farms

theory of change results theme	Rainforest Alliance M&E system indicators	
	intended to be assessed for all certificates through auditing and traceability processes	intended to be assessed for a sample of certified operations, or as part of impact studies
Natural resources: Soil health is maintained and improved, and erosion is minimized	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	Adoption of specific practices to foster soil conservation and health Fertilizer application rates relative to crop requirements Sediment load in receiving water bodies on or near certified farms
Natural resources: Water pollution is minimized	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	Chemical and biological properties of receiving water bodies on or near certified farms
Natural resources: Farms use water efficiently and within natural limits	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	Quantity of irrigation water used per crop unit produced (irrigated crops only)
Natural resources: Farms reduce net greenhouse gas emissions	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	Estimates of net GHG emissions based on existing calculator tools
Farmer, worker, and family well-being: Essential needs are met related to food, housing, clean water, health care, education, transport, clothing, and savings	Conformance with key criteria of the Rainforest Alliance Standard, by crop, location, and characteristics of farmer or worker populations (as characterized by Indicator set [A])	Education levels of children of certified farmers Number of school-aged children attending school full-time (compared to total number of school-aged children in household) Level of farmer savings and investment over the past 12 months Change in household livelihoods assets index
Farmer, worker, and family well-being: Minors are not exposed to harmful labor conditions	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	
Farmer, worker, and family well-being: Worker rights are protected, and the workplace is safe	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	
Farmer, worker, and family well-being: Farmer groups support smallholders through effective and transparent management	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	Characteristics of the group management structure Durability, transparency, and fairness of trading relationships
Farmer, worker, and family well-being: Farms support rural communities and avoid harmful impacts to them	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	

theory of change results theme	Rainforest Alliance M&E system indicators	
	intended to be assessed for all certificates through auditing and traceability processes	**intended to be assessed for a sample of certified operations, or as part of impact studies**
Farm productivity and profitability: Farms increase productivity of cash crops and food crops		Variety, age, and regeneration status of perennial crop plants Productivity (quantity produced per hectare) of certified crops, by crop and location
Farm productivity and profitability: Farms produce higher-quality products		Measures of product quality (e.g., grading results or reject rates, etc.)
Farm productivity and profitability: Water, fertilizer, energy, pesticides, and labor are used more efficiently	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location	Quantity of irrigation water used per crop unit produced (irrigated crops only) Fertilizer application rates relative to crop requirements Energy use for crop processing
Farm productivity and profitability: Farms realize higher profits		Gross income and net income from certified crops Gross income and net income from all farm activities
Farm productivity and profitability: Farms are more resilient to changing conditions and extreme events	Conformance with key criteria of the Rainforest Alliance Standard, by crop and location (including climate-smart agriculture index)	Rates of crop loss or income loss due to climate-related shocks, such as pest or disease outbreaks, or drought

ANNEX E

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ANNEX F

Endnotes

1 Audit compliance analysis includes certificates in the following crop-region groupings: banana farms in Central and South America; cocoa farms in West Africa, South America, and Indonesia; coffee farms in Central America and Brazil; and tea farms in East Africa, India, and Indonesia.

2 The 2010 SAN Standard was in force through June 30, 2017. The SAN Standard underwent a multi-year revision process during the reporting period, and the 2017 SAN Standard came into effect July 1, 2017, superseding the 2010 SAN Standard. From November 15, 2017 onward, this standard is known as the 2017 Rainforest Alliance Sustainable Agricutlure Standard and is managed by Rainforest Alliance.

3 The new 2017 Rainforest Alliance Standard contains a different scoring system, which is described on page 13.

4 https://www.rainforest-alliance.org/business/training/courses/sustainable-agriculture/

5 http://www.rainforest-alliance.org/impact

6 International production figures are derived from the following sources: [bananas] FAO (http://www.fao.org/faostat/en/#data/QC); [cocoa] International Cocoa Organization (https://www.icco.org/about-us/international-cocoa-agreements/cat_view/30-related-documents/46-statistics-production.html); [coffee] International Coffee Organization (http://www.ico.org/prices/po-production.pdf); and [tea] International Tea Committee (http://www.inttea.com). The calculation for bananas is based on world production data from 2014, the last year for which such data could be found at the time of writing.

7 www.globallivingwage.org

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36 The 2017 Rainforest Alliance Standard provides a full elaboration of this definition.

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46 HCV areas are those that provide or sustain one or more of six different HCVs related to rare and endangered species, large-scale ecosystems, rare or threatened ecosystems, ecosystem services, the basic needs of local communities or indigenous peoples, and cultural resources. For more information, please refer to the HCV Resource Network (www.hcvnetwork.org), which provides detailed definitions, guidance on assessments, and other technical references that may be used when applying this part of the 2017 SAN Standard.

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51 This Theory of Change was developed jointly by the SAN and Rainforest Alliance in 2014 as part of the organizations' joint ownership and management of the certification program at that time. Rainforest Alliance has not updated this Theory of Change since it assumed full ownership of the certification program in November 2017.

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About the Rainforest Alliance
The Rainforest Alliance is an international nonprofit organization working to build a future in which nature is protected and biodiversity flourishes, where farmers, workers, and communities prosper, and where sustainable land use and responsible business practices are the norm. We envision a world where people and nature thrive in harmony.

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