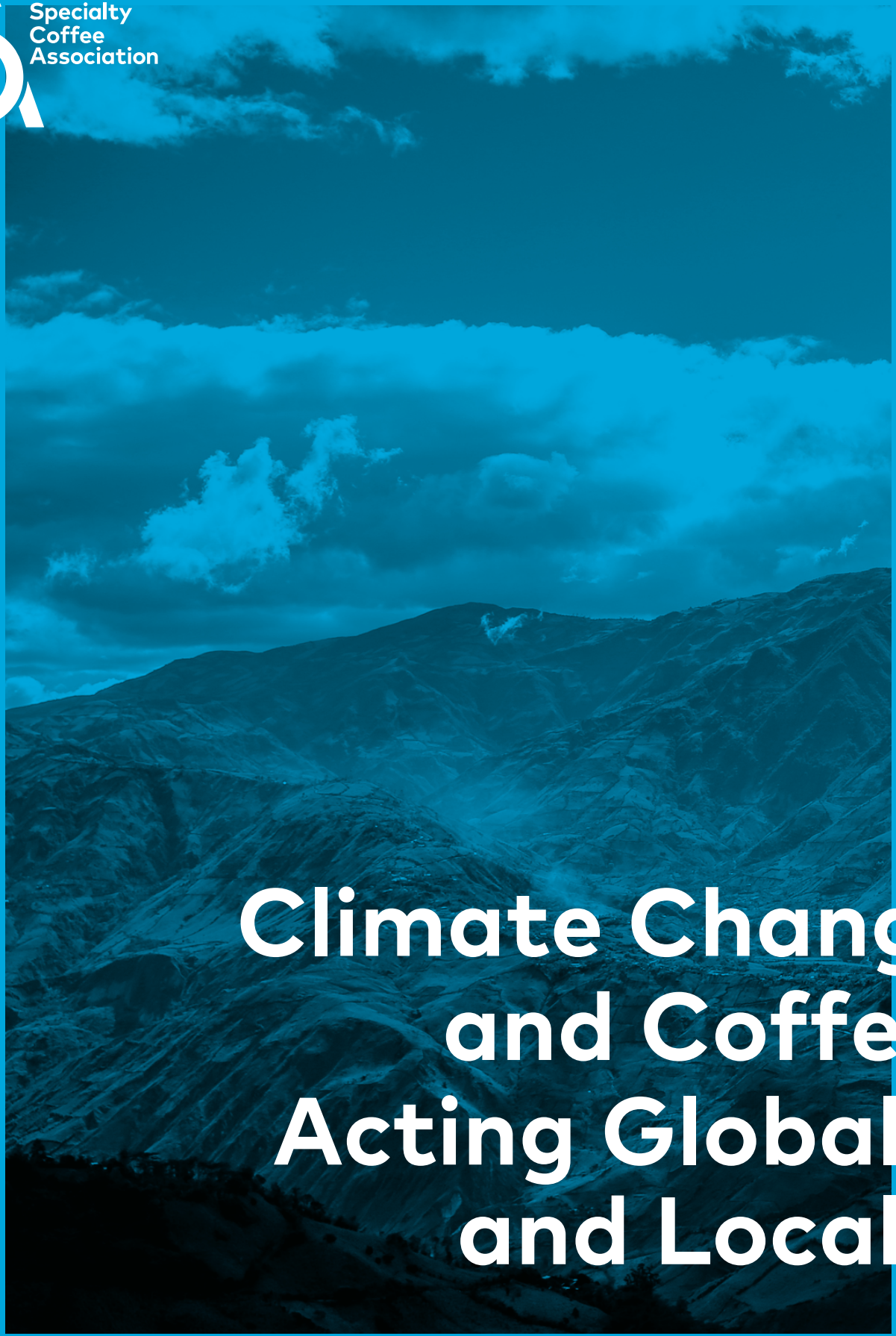
Specialty Coffee Association



Climate Change and Coffee: Acting Globally and Locally

An SCA White Paper

Introduction

The story of the SCA white papers begins with the Millennium Development Goals (MDGs) ratified by the United Nations in the year 2000. These eight goals were designed to serve as a global, collective agenda for sustainability, and they were simultaneously ambitious and broad – for example, "Eradicate Extreme Poverty and Hunger" was number one. The Specialty Coffee Association of America became an official signatory of the MDGs in 2005 and the organization enlisted the support of the volunteer leaders in its Sustainability Committee, which later became the Sustainability Council, to realize the potential of its commitment. In 2012, the Council embarked upon a project to write a series of papers on these global sustainability themes directed at the membership of the association and the broader coffee community. Each of these critical issue briefs, or white papers, would frame an issue, explain the relevance of the issue to coffee, and offer case studies and recommendations on the role of industry actors ranging from coffee producers to baristas, and even coffee drinkers.

Between 2012 and 2016, volunteers collaborated to write papers on five themes: food security, gender equality, farmworker inclusion, water security, and climate change. The SCAA published each paper upon its completion and they have been available as free, downloadable resources ever since, so it's not surprising to find references to them across the specialty coffee industry – from articles to lectures at events. The launch of the Sustainability Center within the unified Specialty Coffee Association in 2017 presented an opportunity to share the knowledge contained within these papers with a larger and more diverse audience, so in 2018 we are republishing the papers. The second edition of each paper will correct errors to the first and, where relevant, reflect changes in nomenclature (e.g., the name of a company or a place, or the title of an individual). Here in the introduction, we will comment on the evolution of the coffee industry's thinking and actions on the issue discussed in the paper.

A Blueprint for A Changing Climate was the last of the series of five papers to be published, which we might attribute to the sheer magnitude of climate change – it is difficult to write a brief introduction to something omnipresent – and to the fact that we aimed to synthesize a lot of information. The effects of climate change on coffee growing have been researched and documented extensively – unlike, for example, the effects of farm labor scarcity – but this surfeit of information has not led to large-scale transformation in the coffee sector and at present, industry-led initiatives are still disconnected from public finance and government policy. Unfortunately, the two years since this paper's original publication have seen notable setbacks in global progress to climate action, including the United States rescinding its commitment to the 2015 Paris Agreement and defunding the Environmental Protection Agency (EPA), as well as a startling rise in deforestation rates in Brazil – the first in more than a decade – resulting from drastic cuts to the budget of the Ministry of the Environment. Costa Rica offers an inspiring contrast in geopolitical leadership positioning by committing in 2017 to nurturing its forests and becoming the world's first carbon neutral country, and coffee even plays a role, as "Low-Carbon Coffee" is one of the Nationally Appropriate Mitigation Actions (NAMAs) designed to support the commitment, but its pioneering programs will not be sufficient to meet the global goal of keeping warming temperatures below the two-degree-Celsius tipping point that is the foundation of the 2015 Paris Agreement.

In the context of global shortfalls, it can feel glib or even disingenuous to applaud the efforts of individuals, but climate change isn't only affecting the environment – it's affecting people, and people are capable of incredible resilience, adaptation, and innovation in the face of unthinkable challenges. The organizations and companies who provided case studies for this paper embody these characteristics and have continued to make progress since 2016 despite political tumult: beginning with the non-profits, the organizations collaborating in CGIAR's Climate Smart Agriculture (CSA) project founded the Alliance for Resilient Coffee, which is a four-year initiative to align research and create tools for climate smart agriculture for the coffee sector funded by USAID's Feed the Future program; Proclimate and NorAndino continue their reforestation in Northern Peru, with the offset of their most recent partnership resulting in an additional 2 million trees planted in smallholder coffee systems; and World Coffee Research's International Multi-Location Variety Trial (IMLVT) now comprises more than sixty farming plots in 23 countries. The buyers profiled are also continuing to invest: Counter Culture Coffee used the lessons from its study to produce a toolkit in conjunction with Twin and the Nicholas School of the Environment at Duke University that helps users plan and facilitate a climate change adaptation workshop with coffee farmers (available at climatechangetoolkit.com) and Farmer Brothers recently announced it reached its goal of 90% waste diversion from its roasting plants and distribution centers, and it was also awarded a position on the Climate A List by the Carbon Disclosure Project. Challenges abound, but so do opportunities.

The UN replaced its eight Millennium Development Goals with 17 Sustainable Development Goals (SDGs) in 2015. The SDGs are more specific than the previous set of goals, but progress is predicated on recognizing their interdependence. We cannot hope to advance in farmworker inclusion without understanding the economic, social, and environmental obstacles that keep them on the margins, nor can we address any community, anywhere in the world, in isolation. In our events, our education, and our research, the Specialty Coffee Association will continue to support and promote work being done by industry stakeholders to advance farmworker inclusion and we will continue to share our own progress.

Thank you for downloading this paper, confronting climate change in specialty coffee wherever you are, and for supporting the SCA's commitment to make coffee better.

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Summary

"Climate change is the greatest challenge of our time."

– Thomas Stocker, co-chair of the United Nations' International Panel on Climate Change, 2013

That the climate has changed, is changing, and will continue to change is not in question; the question is what we should be doing, as an industry, to make sure coffee survives and thrives as the production landscape shifts. While a changing climate impacts everyone on the planet, some people— like small-scale agricultural producers—are more vulnerable to its effects than others.[1] Millions of coffee farmers and farm workers are experiencing irregular weather patterns, warmer temperatures, and increased outbreaks of pests and diseases as a result of human-induced climate change, and these challenges not only threaten individual farms, but the supply of specialty coffee globally. For some farms, it is already too late for coffee— the transition into crops like cacao or out of agricultural production has already been completed.[2] For others, the question remains to be answered: is it possible for coffee to continue to thrive?

Even where it is possible, possible will not equate to easy—adapting to changing conditions at the farm level, as well as to changes in the suitability of entire countries and regions to coffee growing, will require new thinking. Strategies and investments will need to focus not only on agriculture and the environment, but also address economic and social impacts of climate change ranging from crop loss to migration by families and communities. If it is to succeed, adaptation will involve the entire coffee industry—not just the farmers whose livelihoods are most immediately affected.

The whole coffee value chain—including farmers, roasters, and coffee drinkers—contributes to accelerating climate change through the emission of greenhouse gases generated by producing, processing, distributing, and brewing coffee. Thus, while in the short term the need may be greatest to adapt coffee agriculture to unpredictable and ever-changing climatic conditions, the coffee industry must also be accountable for its contributions to global climate change. Greenhouse gas production must be reduced and mitigated at every stage in a process of continual improvement that is only just beginning.

Methodology & Rationale

This paper, developed by volunteers for the Specialty Coffee Association (SCA), provides an overview of some potential impacts of climate change to the coffee value chain. It also examines some of the work being done by industry and community leaders in case studies on mitigation and adaptation strategies, and it makes recommendations for how all stakeholders in the industry can participate in building a more resilient coffee sector. Climate Change and Coffee is one of a series of issue briefs published by the SCA to raise awareness among members of the industry community on critical issues and threats to the sustainability of coffee.

Understanding the Issue

The Intergovernmental Panel on Climate Change (IPCC) of the United Nations has concluded—with more than 90% probability— that human-produced greenhouse gases have caused much of the observed increase in Earth's temperatures over the past 50 years.[3] The largest volume of these gases is carbon dioxide (CO2), which is released by burning fossil fuels to generate electricity and power vehicles and exacerbated by deforestation. Most discussions of greenhouse gases focus on CO2, but it's important to recognize other greenhouse gases, as well, including methane (CH4), which results from natural gas burned primarily for industrial production and from the breakdown of organic matter in livestock-based agriculture and landfills, and nitrous oxide (N2O), which is produced in the manufacture and application of chemical fertilizers. Both CH4 and N2O are many times more powerful than CO2 in terms of their contributions to the global greenhouse effect, and agriculture is a major contributor of both – the IPCC estimates agriculture's share of anthropogenic emissions worldwide at 70% for CH4, 50% for N2O[4], and an estimate from 2010 attributes roughly 25% of the global greenhouse gas burden[5] to agriculture. It should be noted that all farming methods are not equal when it comes to greenhouse gases, and that while agriculture's contribution to climate change is mighty overall, the per capita contribution of coffee- producing countries like Mexico and Indonesia to global totals is much smaller than per capita contributions from coffee-drinking countries like the United States and Germany.[6]

The IPCC predicts that the continued production of greenhouse gases at current rates will lead to global temperature increases of between 0.5 and 8.7 degrees Fahrenheit over the next century.[7] In addition to warmer temperatures, climate change also affects global weather patterns, and scientists have already observed an increase in the frequency and intensity of extreme weather events like storms, floods, and droughts.[8] Climate change is also impacting the predictability of precipitation, which affects agricultural communities by eroding the delineation between wet and dry seasons, increasing the intensity of rainfall, and threatening the availability of water for irrigation.[9] Whether coffee plants depend exclusively on rain or receive supplemental irrigation to satisfy their water needs, water is vital. Drought – especially paired with increasing temperatures – can devastate a farm by both reducing the ability of plants to bear fruit and by increasing their vulnerability to agricultural pests and diseases, which are also evolving and shifting in geographic range as a result of climate change.[10]

IPCC estimates agriculture's share of anthropogenic emissions worldwide attributes roughly 25% of the global greenhouse burden

How the problem is relevent to the coffee industry

Coffee plants need specific climatic conditions to thrive.

Though it may at times seem like coffee plants are hardy, given that they grow in more than seventy countries worldwide, *Coffea arabica*— the species of coffee which will be the focus of this brief and henceforth referred to as, simply, coffee—requires certain environmental conditions to survive and a more specific set to thrive. Take temperature, for example: coffee's optimum annual mean temperature is 18 to 21 degrees Celsius (65 to 70 degrees Fahrenheit), and while it can withstand temperatures of 30 plants are stressed and taste quality may suffer.[11] A recent study of the global impact of climate change on coffee predicts that the area suitable for coffee will be reduced by 50% from current levels by 2050,[12] and much of that future loss will occur in countries and regions cherished by coffee drinkers past and present. Increasing temperatures, irregular rain, and prolonged dry seasons directly threaten the viability of coffee plants and coffee cup quality,[13] and, by extension, the livelihoods of coffee farmers and communities who may be unable to predict weather patterns, prepare adequately for the challenge they face, and manage their operations profitably.

Challenges to coffee production

The timing and duration of seasonal rain is critical to triggering flowering and seed development in the coffee plant, and the small farms that produce seventy percent of the world's coffee[14] depend on rain to meet the water needs of their coffee plants throughout the year. Unfortunately, too much of a good thing—in this case, rain water—can also damage coffee fruit during its development and destabilize soil, thereby causing problems for coffee plants and the surrounding environment. The availability of water is also critical to post-harvest processing, as globally, washed coffee still commands higher prices than coffee processed without water.[15] Advances in processing technology have made it possible to greatly reduce the volume of water needed for washing coffee, but the costs to obtain and maintain water-efficient milling equipment are prohibitive for many small-scale farmers, and historically, buyers have not placed high value on water conservation. Though awareness of water scarcity is increasing—and more information can be found in the SCA paper on Water Security[16]—access to clean water continues to underpin the production of specialty coffee worldwide. Many farmers who rely on rainfall to irrigate their coffee plants also depend on the sun to dry coffee after it has been picked.

In the absence of mechanical dryers, the drying process can take days or even weeks, and delays can exert pressure on farm infrastructure where drying space is at a premium, as well as on farmer finances when a household must wait on coffee to dry in order to sell it. Inconsistent processing and drying can also affect taste quality negatively, which further constrains the earning potential of farms.

Finally, climate change also has an impact on coffee production by increasing the prevalence of some pests and diseases. Along with heavier rains, higher temperatures create favorable conditions for pathogens such as coffee leaf rust and the coffee borer beetle. The recent expansion of these two devastating pathogens in Central America has been attributed to effects of changing weather conditions.[17] All farms were not affected equally – the age of coffee trees and the biodiversity of the surrounding ecosystem play important roles in plant and farm resilience – but the regional estimate of 18 million bags of coffee lost between 2012 and 2015 serves as a clear warning about the scale of the industry's vulnerability.[18]

Economic Vulnerability

Even if the climate cooperates at every stage of growing, harvesting, and processing coffee on the farm, the effects of climate change may still threaten the viability of a coffee farming business, for example, if landslides make roads impassable or hurricanes damage export infrastructure and delay coffee sales and shipments. Global climate models show that extreme weather is becoming more common, and stronger and more frequent El Niño events can be attributed to greenhouse warming.[19] Events like El Niño impact agricultural communities of all sorts, but they can be particularly crippling to small-scale agricultural producers who have limited savings and no access to credit to rebuild after a bad harvest. The need for credit will only increase as adaptation costs are added to the other costs farmers regularly incur in producing coffee. When erratic rainfall patterns prompt uneven flowering and cherry growth cycles on coffee trees, it increases the number of times farmers and pickers must visit a single tree or an entire segment of a farm to harvest ripe coffee fruit and thereby increases labor costs. Faced with the threat of losing coffee (and income) to blights like coffee leaf rust, farmers may purchase additional inputs like pesticides and herbicides that they had not budgeted for. Where should that money come from? Mounting and unpredictable costs make it increasingly risky for farmers to depend on coffee production alone for income, which may result in a diminished supply of coffee worldwide.[20] Thus, while securing financial services for farmers might seem to be an unlikely strategy for coping with climate change, it's one of many examples of how inseparable this issue is from others facing coffee producers, communities, and value chains.

Faced with the threat of losing coffee, farmers may purchase additional inputs like pesticides & herbicides that they had not budgeted for.

Photo provided by Raw Material

Framing Solutions

Meaningful work on an issue as big and multi-faceted as climate change requires equal parts cooperation, flexibility, and innovation, and every member of the coffee value chain has a role to play. Estimates of which activities in the chain generate the most greenhouse gases depend upon how the particular coffee under study is grown. Farm size and fertilizer use determine whether the largest contribution to coffee's carbon footprint comes from the farming or brewing phase of the coffee lifecycle,[21] [22] and further study is needed. All companies can measure, reduce, and offset the greenhouse gas emissions generated by their operations—whether in roasting coffee, transporting it, milling it, growing and fertilizing it, or brewing it—to slow future changes in the climate.

Meanwhile, adaptation to climate change will depend not only on farmers employing different agricultural practices, but also on the ongoing development and dissemination of successful adaptation strategies regionally, nationally and internationally. Coffee stakeholders at every stage of the value chain should be called on to invest in ongoing research, training, advocacy, and financing.

Even with everyone working together, the coffee community cannot expect to solve or reverse global climate change, and yet it must respond with strategies to simultaneously mitigate greenhouse gas emissions and adapt coffee production practices in order for coffee plants—and everyone who depends on coffee— to survive and thrive. Some stakeholders have taken the lead, and their examples offer valuable guidance for the industry as a whole.

Recommendation No. 1

Support the development and uptake of climate- smart agricultural practices

As a response to the effects of climate change and climate variability on smallholder farms, new measures are being defined under what is called 'Climate Smart Agriculture' (CSA). This term includes techniques such as building soil fertility and protecting watersheds, as well as increasing farmer access to knowledge, inputs, and markets.

Case Example:

The Consultative Group for International Agricultural Research focuses on CSA in value chains in Peru & Nicaragua.

The Consultative Group for International Agricultural Research (CGIAR), along with Rainforest Alliance, Root Capital, and Sustainable Food Lab, launched a project focused on introducing CSA to coffee and cocoa-based farming systems in Peru and Nicaragua. The project will assess the climate change exposure of coffee systems and develop appropriate, useful CSA practices with farmers to increase the resilience of farms and communities. The guidelines developed from these practices will be incorporated into existing training curricula and used to leverage financing to scale up the project and support broader application of effective CSA practices. The project's desired outcome is to contribute to a common adaptation strategy applicable across a regional scale and even suitable for crops beyond coffee and cocoa. The ability to match specific CSA practices to cropping systems on a farm or in a region will enable everyone involved—from the coffee chain to the public sector and civil society, too—to reach thousands of farmers through training space, and financing relevant to climate change.

Recommendation No. 2

Undertake supply chain mapping and research

Despite knowing that changes in temperature and weather patterns will not occur uniformly worldwide and that different places will experience different degrees of change,[23] predictions about impacts on a sub-national scale are tricky to make and usually too specific to find funding. [12] Even fewer studies exist detailing how climate change will affect coffee production and farmer livelihoods on a community level, but farmers are eager to share their experiences and explore ideas with peers and buyers alike. Investing in specific research and understanding how individual farmers are experiencing climate change presents an opportunity to strengthen supply-chain relationships, mitigate climate-related risks, and gain valuable insights.

Case Example:

Counter Culture Coffee partners with The Nicholas School of the Environment at Duke University

In 2013, Counter Culture Coffee (CCC) partnered with The Nicholas School of the Environment at Duke University to develop a two-year project to study the various impacts of climate change on three groups of smallholder coffee producers in Colombia, Peru, and Guatemala that supply coffee to CCC.

In the first phase of the research, students studied how climate change was impacting each producer group, how farmers were adapting, and how the political and social landscape in the community and country influenced their adaptation strategies. In phase two, a second group of students took the suggested adaptation recommendations for each coop and, with the input of coop leaders and CCC, narrowed them down to three per coop, and conducted feasibility studies for implementing the chosen strategies.

Unlike generalized studies, the results of these studies are tailored to specific social and environmental conditions and the structure of each producer group. Because the buyer and producers were able to contribute input throughout the research process, the recommendations focus on strategies that these parties see as valuable. At the time of this paper's publication in 2016, CCC was using the conclusions of the study to develop an organic fertilizer project with the Colombian producer organization, ASORGANICA, and went on to take steps with the producer groups in Guatemala and Peru, as well as others, in the years since.

Recommendation No. 3

Measure and reduce your carbon footprint

Addressing climate change impacts in the coffee sector requires a two-pronged approach— supporting activities that help farmers adapt to climate change while also decreasing emissions of greenhouse gases that will accelerate the pace of that change. Companies can set an example by taking responsibility for their own contribution to climate change by measuring their carbon footprints and implementing a plan to reduce those emissions.

Case Example:

Farmer Brothers' carbon footprint measurement & reduction initiatives

Farmer Brothers has been tracking emissions data at some of the company's facilities since 2009. However, greenhouse gas emissions at specific facilities represent only a small fraction of the total value-chain footprint. To generate a full picture of the company's total value-chain footprint, the company included activities from the roasting of the coffee to the distribution to customers. In order to obtain objective benchmarks, the company submitted its inaugural report to the Carbon Disclosure Project, a globally recognized sustainability scoring system that rates companies' climate change, water and forest-related impact and risks to investors. With a goal of increasing accountability and getting employees on board, the company stated its commitment to reduce its carbon footprint per unit of output (e.g., per ton of roasted coffee sold) by 80% before 2050.

Through these efforts, Farmer Brothers learned that the emissions from activities involving the production of goods (including coffee) constituted approximately 85% of their total value-chain emissions. Direct emissions accounted for about 14% of the company's impact, mainly from on-road vehicle fuel combustion. Indirect emissions—from purchased energy use to light office buildings, for example— contributed only 1% to the carbon footprint.

The ongoing annual measurement of their footprint enabled Farmer Brothers to see and appreciate the positive impact of initiatives such as the installation of Certified Clean Idle engines on company delivery trucks and the purchase of Renewable Energy Certificates for production facilities. Likewise, the carbon footprint study also revealed an opportunity for improvement in how the company tracks the transport modes and distances of each type of product that they purchase, whether coffee, spices, packaging materials, or other non- coffee products. This information is not only helpful to increasing efficiency, but it will also be critical to achieving Farmer Brothers' footprint reduction goal.

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Recommendation No. 4

Offset carbon emissions by purchasing carbon credits

In recent years, new policies have changed the compliance landscape in important ways related to farm labor: the California Transparency in Supply Chains Act (2010) and the UK Modern Slavery Act (2015), which require select companies to disclose their efforts to identify and address risks for human trafficking and modern slavery in their supply chains. And changes in the regulatory environment, such as the passing of the Food Safety Modernization Act, could impose further new requirements related to traceability and supply chain transparency on specialty coffee companies operating in the United States.

Proactive engagement with public policy related to farm labor won't just help ensure that specialty coffee actors stays on the right side of the law, as the following case study suggests, but it may also put valuable tools for supply chain engagement at their disposal.

Case Example:

Progreso Foundation's reforestation in smallholder coffee systems in Peru

Most of the farms in the Piura region of northern Peru are in the hands of smallholders with fewer than three hectares, or seven acres, of land per family, and many of these families depend on coffee as their primary income source. Unfortunately, due to the high deforestation rate in the upper regions of the Sierra Piura Mountains, the downstream coffee areas have been affected by erosion and experienced reduced productivity.

In 2011, the Norandino cooperative, in conjunction with ProClimate, developed a reforestation project designed to help farmers adapt to climate change while also providing them a new source of income. The 213 hectares planted between 2011 and 2014 are certified through the Gold Standard as carbon offsets, and over the course of its 25- to 30-year lifetime, the total number of credits from the project's 213 hectares is projected to reach 40,280 tonnes of CO2. At the same time, sales of timber harvested sustainably during that period are estimated to generate approximately US $1,264,820 in supplemental income to the coffee farmers participating. Additionally, the reforestation will mitigate the effects of climate change and will make coffee plantations less susceptible to the risks of landslides, flooding, pests, and diseases.

Beyond its financial benefits, a sustainable forestry system for timber production also decreases pressure on remaining natural areas and helps stabilize soil, thereby avoiding erosion, and the native tree species planted are expected to contribute positively to the biodiversity of the region. Revenues from the carbon credits will also contribute to technical assistance for farmers and to the cost of the additional labor required to plant and maintain the forest. This model enables farmers to restore the local ecosystem and mitigate climate change while also improving their own livelihoods, and it enables traders and roasters to at once invest in the longevity of the communities where they buy coffee and account for their carbon emissions.

Over the next 25 to 30 years, sales of timber harvested sustainably are estimated to generate approximately

$ 1 ,264,820 USD

in supplemental income to the participating coffee farmers

Recommendation No. 5

Progress the Coffee Plant

Coffee farmers typically have few choices about which coffee varieties are available for them to plant. Their choices are often limited by forces beyond their control—low levels of national investment in coffee research, the lack of a professional coffee seed sector, and a tradition among countries of not sharing genetic material. These constraints mean producers often rely on planting material that is susceptible to disease or does not perform optimally in their environment and of which the agronomic traits are not known or available. Until recently, no comprehensive effort had been made to gather improved coffee varieties from around the globe and make them available to producers in different countries.

Case Example:

World Coffee Research's international multi-location variety trial

The International Multilocation Variety Trial (IMLVT) is a first-of-its kind undertaking to facilitate the global exchange of the world's highest quality coffee varieties and evaluate their performance. To date, 23 countries have agreed to participate in the trial and to install, maintain, and monitor test plots (on average 1-3 per country) containing 35 different varieties. On each plot, a comprehensive list of variables is measured using standardized protocols developed by World Coffee Research—including plant vigor, productivity, coffee leaf rust and other disease and pest incidence, bean characteristics, bean chemistry, and cup quality.

The IMLVT trial focuses on the potential for existing varieties to address current challenges, while creating mechanisms for their evaluation and sharing across countries. Meanwhile, the changes predicted for the coming century (temperature increases, increased incidence of extreme weather, the spreading of diseases and pests) will overwhelm our current varieties. Thus, the trial also lays the groundwork for the development of new varieties. It will document how varieties perform in different environments, enabling researchers to unlock the genetic origins of key traits like drought tolerance and beverage quality.

The best performing varieties can then be made available to producers to increase supplies of quality coffee for those countries.

By 2020, WCR will have thousands of data points about variety performance across trial sites. And by 2030, the next generation of coffee varieties will have been developed, informed by this new dataset, and will be available to farmers worldwide.

How to get involved

Slowing and ultimately reversing the trajectory of climate change cannot be done by the coffee industry alone – it will depend on government agreements and require global coordination. However, opportunities exist at each stage of the coffee value chain to take actions that will simultaneously help protect the product and the people who make a living from it, as well as reduce the impact of the most energy-intensive activities in coffee production, roasting, and preparation.

Roasters

Mitigate your impact by: choosing energy-efficient roasting equipment; investigating incentives for renewable energy in your state; and monitoring the use of energy for lighting, computing and HVAC in your facility. Also, consider the location of your roaster and the impact of employee commuting, if you're not located near public transportation or in a bike- friendly, walkable area. Minimize travelling and transport distances. Invest in collaborative research. If you have contact with your coffee suppliers, leverage your purchasing relationships to explore opportunities to craft and fund programs that will help them adapt to the effects of climate change on their farms.

Retailers and Baristas

Heating water is an energy-intensive activity, so institute a power-down policy for all of your equipment as part of the end-of-day cleaning routine. Read the SCA Green Guides on energy, water, and waste. Provide incentives—like discounts for reusable cups—to consumers to encourage them to minimize their resource use. Engage the roasters you buy from in conversations about their energy-use practices and their suppliers (per above).

Importers and Exporters

Minimize travelling and transport distances. Choose airlines with green travel credentials and choose economy class. In partnership with roasters and suppliers, develop incentives for climate smart agriculture and give preference to suppliers employing those techniques. Sponsor trainings on how to implement adaptation practices. Support and promote collaborative research to your customers.

Producers

Map and implement borders and buffer zones to nature protection areas. Participate in land-use planning and landscape management initiatives: climate smart agriculture includes practices ranging from water conservation to crop diversification and planting trees to prevent soil erosion. Work with agronomists, certification agents and technicians to determine what is right for your farm.

Works Cited

1 Morton, JF. The impacts of climate change on smallholder and subsistence agriculture. Proceedings of the National Academy of Sciences of the USA 104, 19680-19685. December 2007.

2 bit.ly/climagechangecentralamerica

3 IPCC. Climate Change 2014: Synthesis Report. 2014 - bit.ly/ClimateChange2014

4 IPCC/WMO/UNEP. "Climate Change 1995: Impacts, Adaptation, and Mitigation of Climate Change: Scientific-Technical Analyses." Prepared by IPCC Working Group II. Cambridge, UK: Cambridge University Press, 1996.

5 Bennetzen, E. H., Smith, P. and Porter, J. R. (2016), Decoupling of greenhouse gas emissions from global agricultural production: 1970–2050. Glob Change Biol, 22: 763–781. doi:10.1111/gcb.13120

6 bit.ly/2sewxqV

7 IPCC. Climate Change 2014: Synthesis Report. 2014 - bit.ly/ClimateChange2014

8 GTZ. Cambio Climático y Café. February 2010.

9 Nelson et.al., Climate Change: Impact on Agriculture and Costs of Adaptation. October 2009. International Food Policy Research Institute

10 FAO. "Climate-Smart" Agriculture: Policies, Practices and Financing for Food Security, Adaptation and Mitigation. 2010

11 Davis AP, Gole TW, Baena S, Moat J (2012) The Impact of Climate Change on Indigenous Arabica Coffee (Coffea arabica): Predicting Future Trends and Identifying Priorities. PLoS ONE 7(11): e47981. doi:10.1371/journal.pone.0047981

12 Bunn, C., Läderach, P., Ovalle Rivera, O. et al. A bitter cup: climate change profile of global production of Arabica and Robusta coffee Climatic Change (2015) 129: 89. doi:10.1007/s10584-014-1306-x

13 Schroth, G., Laderach, P., Dempewolf, J. et al. Mitig Adapt Strateg Glob Change (2009) 14: 605. doi:10.1007/s11027-009-9186-5

14 Eakin, H., Winkels, A., Sendzimir, J. 0209. Nested vulnerability: exploring cross-scale linkages and vulnerability teleconnections in Mexican and Vietnamese coffee systems. Environmental Science & Policy 12(4): 398-412.

15 bit.ly/2lSzfZx

16 bit.ly/2L0lNn6

17 Sachs J, Rising J, Foreman T, Simmons J, and Brahm M (2015) "The impacts of climate change on coffee: trouble brewing", The Earth Institute, Columbia University.

18 bit.ly/2skMOd7

19 Cai, et al. Increasing frequency of extreme El Niño events due to greenhouse warming. Nature Climate Change Vol. 4, February 2014. Published online: 19 January, 2014. DOI: 10.1038/NCLIMATE2100

20 Bunn, C., et.al. Multiclass Classification of Agro-Ecological Zones for Arabica Coffee: An Improved Understanding of the Impacts of Climate Change. Published: October 27, 2015 - bit.ly/2GUpIQ1

21 Balas. Carbon Footprint Across the Coffee Supply Chain: The Case of Costa Rican Coffee. November 2012. bit.ly/2L2vTnt

22 Salinas, Ben. Life Cycle Assessment of Coffee Production. December 2008. - bit.ly/2L2F87i

23 Fischer et.al. Socio-economic and climate change impacts on agriculture: an integrated assessment, 1990–2080. November 2005.

24 Goodward, Jenna; Kelly, Alexia (August 2010). "Bottom Line on Offsets". World Resources Institute. Retrieved 2010-09-08.

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