



**WORLD COFFEE
RESEARCH**™

ANNUAL REPORT 2019



**Ensuring the
future of coffee**



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ABOUT THIS REPORT

This report covers World Coffee Research activities, highlights and results for the period from January 1, 2019, to December 31, 2019.

PROGRESS AND IMPACT

WHERE WE ARE & WHERE WE'RE GOING

Between 2012 and 2019, World Coffee Research (WCR) built the foundation to execute, for the first time, a shared global R&D agenda for coffee agricultural research. That foundation includes an unprecedented global network of trials beginning to produce meaningful harvests, as well as collaborative engagement with stakeholders across the industry and the world.



What WCR has delivered in its first 7 years will drive impact over the next decade:

A global breeding program

Supporting countries to accelerate breeding of the next generation of climate-resilient coffee varieties—2 global hubs, 50+ F1 hybrid crosses, a global strategy for conserving coffee genetic diversity in global genebanks

Tools to address a hidden crisis

Addressing a worldwide lack of competent systems for delivering high-quality, healthy planting material to coffee farmers with free, open-access nursery and seed production manuals, nursery training programs, and advocacy

The world's largest coffee variety performance trial and seed exchange

The International Multilocation Variety Trial entered its fifth year in 2019, returning performance data on 31 varieties at 40 sites in 22 countries

Open-access information for farmers and agronomists

Arabica Coffee Varieties Catalog (2016), Coffee Lexicon (2016), rust technical manual (2018), nursery and seed producers best practices guides (2019), open-access Arabica genome (2018)
View all at: worldcoffeeresearch.org/work

A global network of hundreds of farmer field trials

Measuring which combinations of variety and agronomic performance deliver the highest profits for different kinds of farming systems; 249 trials installed so far



ADOPTION PROCESS

HIGHLIGHTS FROM OUR YEAR

WHAT WE DID AND DISCOVERED IN 2019

Together with our partners around the globe, World Coffee Research had a busy 2019, in which we:



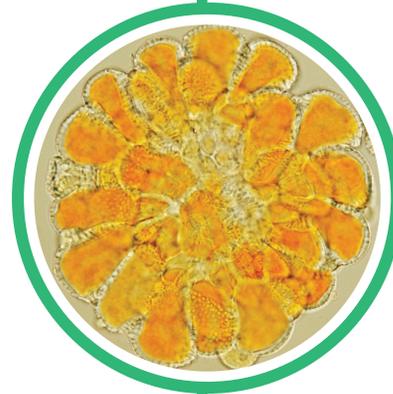
Launched two free best practice guides for nurseries and seed producers worldwide

Available in English and Spanish at worldcoffeeresearch.org/guias (p. 41)



Completed the first production harvest of experimental F1 hybrids in Central America

The first step toward selecting the next generation of climate-resilient varieties (p. 17)



Completed a breakthrough new genome assembly of *H. vastatrix*

Expanding our understanding of how coffee leaf rust works and how to combat it (p. 13)



Expanded our global network of farmer field trials dedicated to improving farmer profitability

294 trials in 15 countries (p. 31)



Welcomed a new CEO, Jennifer "Vern" Long

Taking WCR into the next era (p. 48)

TAKING THE PULSE OF COFFEE AG IN 2019

ORIGIN DIVERSITY IN DECLINE

If fewer origins are producing more of the world's coffee, it creates powerful supply chain risk and makes it harder to find the unique flavors that coffee drinkers want and coffee businesses rely on. Today, just five countries produce 72% of the world's coffee. Ten years ago, the same percentage of the world's coffee was produced by seven countries.

There is a growing gap between highly efficient producing countries like Brazil and Vietnam, which produce on average 1.5-2 metric tons of coffee per hectare, and nearly every other region in the world, where average yields hover around 0.5 metric tons/ hectare. Some of these countries are severely threatened today—including origins famous for their quality, like Kenya, El Salvador, and Mexico.

The most efficient producers are able to turn a profit while others operate at a loss—further consolidating their advantage. Add to these dynamics the pressures and unpredictability of climate change, which is pushing many coffee producers to the limits, and it is clear that the rich diversity of coffee origins is threatened. The future of origin diversity depends on many factors, including demand, but it will indisputably be impacted by innovations in coffee agriculture that have the potential to improve both quality and production.

Efficiency rules

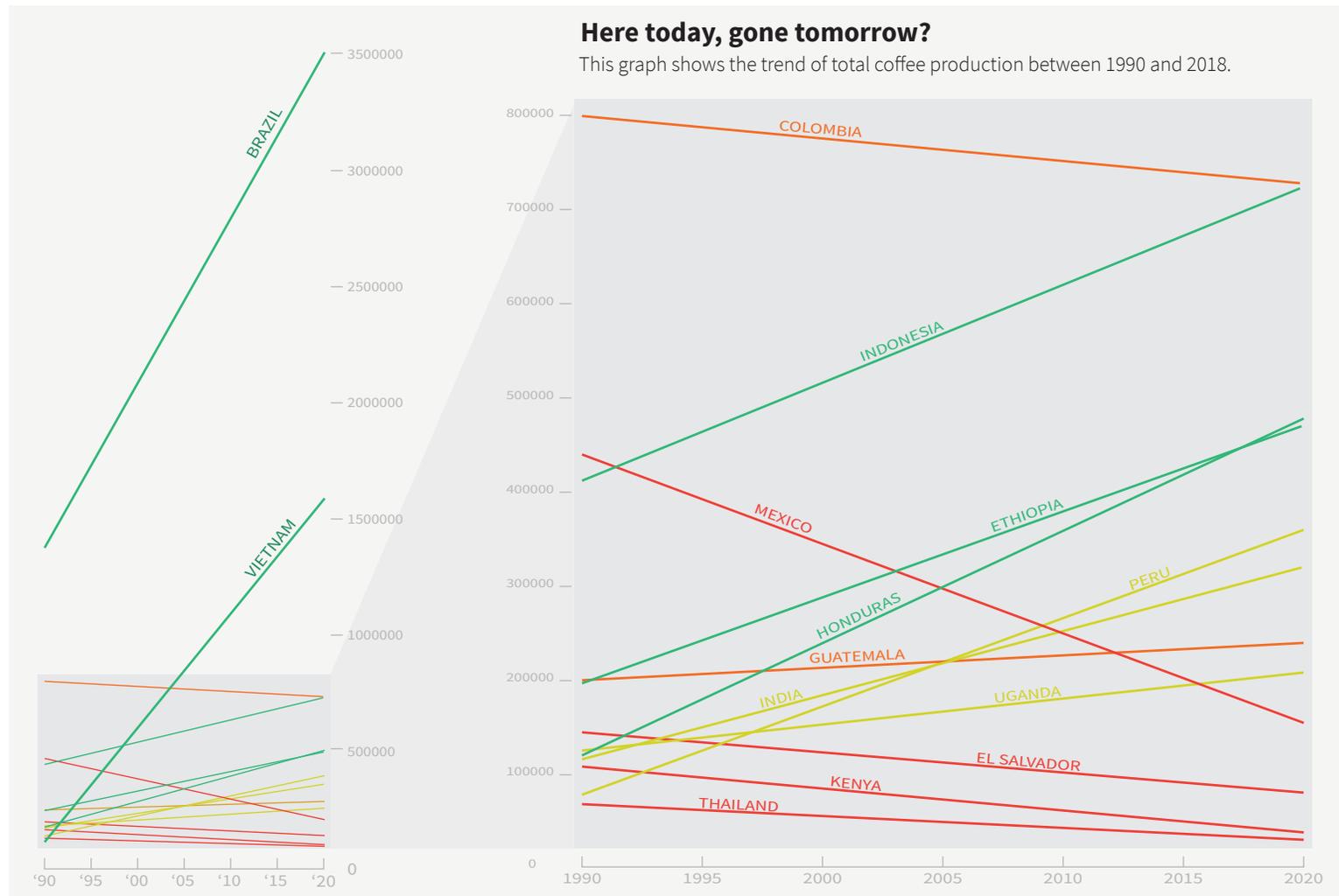
Over the last 30 years, coffee production globally has increased from 6 million metric tons to 10.3 million tons (a 70% increase), but nearly all of it (85%) has come from Brazil and Vietnam alone.

Danger zone

In a commodity market in which efficient producers drive prices—and where other livelihoods are becoming more attractive than coffee—countries will need to find ways to increase overall production to stay in the game.

Gone tomorrow

Lower-volume producers like Kenya, Mexico, and El Salvador that have not managed to increase production are in sustained decline, severely eroding the availability of coffees from these once-prominent origins.



COFFEE'S SUSTAINABILITY CRISIS

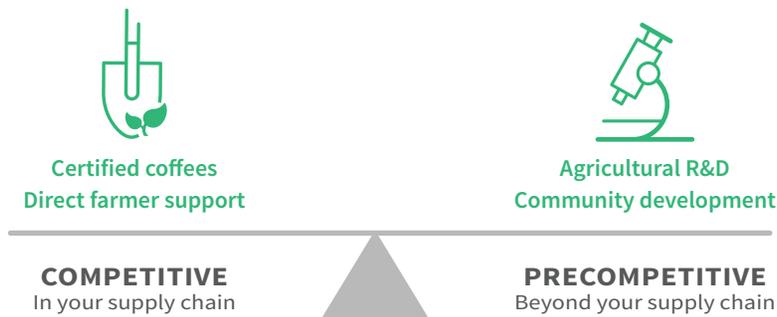
RECOGNIZING AG R&D'S ROLE IN THE FUTURE OF SUSTAINABILITY

“Farmer-focused agricultural innovation is fundamental. We cannot be a sustainable industry in the long term without it.”
 —Mario Cerutti, Chief Sustainability Officer, Lavazza

In 2019, two landmark reports were published in response to coffee's latest price crisis, concluding that economic viability is the catalyst for the sustainability of the entire coffee sector¹. While coffee agricultural R&D cannot alone solve coffee's sustainability crisis, it has for far too long been overlooked as an essential upstream activity enabling sustainable agricultural development.

Agricultural research is a primary driver of improved productivity and profitability, climate resilience and adaptation, and soil health and conservation among other critical factors. It helps us identify which approaches to coffee farming produce the largest benefit for the least cost (in terms of financial, human, and natural resources). That knowledge is essential for transforming coffee agriculture in ways that deliver inclusive growth to countries and drive positive change to meet the the United Nations' Sustainable Development Goals. The knowledge, technologies, resources, and efficiencies generated by agricultural R&D flow down through the entire value stream.

A balanced sustainability portfolio includes ag R&D:



¹“Coffee Development Report,” ICO, 2019; and “Ensuring Economic Viability and Sustainability of Coffee Production,” Colombia Center on Sustainable Development, 2019.

WCR's research agenda directly contributes to the following Sustainable Development Goals:



WCR's research agenda:

- Is focused on breeding and agronomy, the most efficient drivers of improved agricultural productivity
- Is aligned to focus not only on improving production efficiency, but especially on improving profitability and quality
- Contributes to global understanding of which varieties and practices are most suitable and profitable in agroforestry environments and for protecting soil health, and contribute to resilience in the face of climate change
- Is collaboratively executed with key organizations that transfer innovations directly to farmers, including national coffee institutes, coffee exporting companies, and extension organizations

ADVANCED RESEARCH

Accelerating the pace of innovation



UNDERSTANDING A MAJOR COFFEE DISEASE IN ORDER TO FIGHT IT

DECIPHERING THE BIOLOGY OF COFFEE LEAF RUST

Finding better solutions for coffee leaf rust is essential—it remains the most economically damaging disease affecting coffee. Despite the fact that coffee producers have been living with coffee leaf rust for nearly 200 years, serious questions remain unanswered regarding its biology. Successful disease management and breeding programs require understanding rust's reproductive strategies (including current genetic diversity and capacity for creating new genetic diversity) and its dispersal biology and history. Yet none of these questions has been conclusively resolved or rigorously tested.

In 2019, rust expert Dr. M. Catherine Aime of Purdue University continued work to develop a deeper understanding of the biology, reproductive strategies, and genetic diversity of coffee leaf rust. The purpose of her work is to determine whether *H. vastatrix* has a sexual stage, and if so where it occurs, and map the global movement of *H. vastatrix* both historically and leading up to a disastrous epidemic in Latin America in 2012. Key output so far includes:

- 1 new genome assembly of *Hemileia vastatrix*
- 15 SSR markers identified for genotyping *H. vastatrix*
- 934 samples of *H. vastatrix* from 14 countries assembled for the first global population analysis

This study aims to provide the necessary data for breeders to produce more durable resistance in arabica cultivars. It also aims to provide the data necessary for modeling the variables involved in producing disease epidemics. More resistant cultivars and knowledge on how to better manage farms to prevent outbreaks will provide farmers with the tools to lower their risk and increase productivity and income. Other potential applications include the development of rapid tests to quickly and cheaply test rust spores on coffee farms to determine which race of rust is present.



CAN IT BE DONE?

FIGHTING RUST WITHOUT CHEMICALS



Costly fungicides and pesticides aren't the only ways to control pests and diseases on a farm. In the wild, coffee leaf rust has its own range of natural enemies. "Classical biological control" reunites pests with their natural enemies and allies.

Since 2015, World Coffee Research has been working with researcher Dr. Robert Barreto at Universidade Federal de Viçosa in Brazil to identify and evaluate some of the natural enemies of rust. Barreto and a team of Ph.D. students made significant progress in 2019 analyzing promising candidates. Most excitingly, after four years of controlled trials of hundreds of candidates in the lab, the team established the first field tests of the most promising naturally occurring enemies of coffee leaf rust (antagonistic fungi) at the Universidade Federal de Viçosa experiment station. Further evaluation will reveal if any of these promising candidates have the potential to be turned into rust control products.

4 new species of naturally occurring allies to coffee (called endophytes) in the genus *Trichoderma* discovered

2 taxonomic studies of mycoparasitic genera *Nectriaceae* and *Digitopodium* (e.g., fungi that eat coffee leaf rust) completed

1 dissertation completed and **3** in progress;
four publications forthcoming

MOBILIZING GLOBAL RESEARCHERS

A NEW ERA FOR ROBUSTA?

As the effects of climate change on Arabica production and quality become increasingly challenging, there is a renewed interest in *C. canephora* (Robusta)—in particular, improving cup quality. Since 2018, World Coffee Research has been engaging partners to form a shared research agenda for *C. canephora* breeding efforts globally. The global Robusta R&D consortium includes WCR, NaCORI (Uganda), CCRI (India), ICCRI (Indonesia), WASI (Vietnam), CNRA (Cote d'Ivoire), INIFAP (Mexico), PROMECAFE, IRD (France), CIRAD (France), MERCON Group, Nestle, and Lavazza and is supported by contributions from J.M. Smucker.

Robusta R&D Working Group Workshop

Cote d'Ivoire, April 2019

KEY PRIORITIES IDENTIFIED:

- Understand the current state of *C. canephora* genetic resources and form a plan to ensure the fair exchange of resources for global breeding
- Focus on rapid genetic progress through the establishment of a Robusta International Multilocation Variety Trial to evaluate existing Robusta varieties in multiple environments
- Build a collaborative global *C. canephora* breeding program focused on increasing the standard quality of Robusta (clean cup, lowered bitterness), and the creation of new, higher-quality Robusta varieties

Can Robusta taste better?

Relatively little research has been undertaken to improve Robusta cup quality and there are significant reservoirs of genetic diversity available, which indicates there is high potential for improvement. But in order for breeders to truly address Robusta cup quality, it is necessary to define objective targets for quality by linking quality perception, sensory descriptive properties (e.g., the flavors, aromas, and other sensory properties of different Robustas) and the chemical/molecular precursors associated with higher quality perception. With support and assistance from Lavazza, OLAM, ECOM, Nuemann Kaffe Group, JDE, Nestle, and Nespresso, WCR is establishing a research program to identify volatile compounds that may predict quality perception in Robusta coffee and, through genome-wide association (GWAS) approaches, incorporate quality-relevant genetic targets into Robusta breeding programs. Utilizing such predictive markers could dramatically shorten the time and cost associated with breeding new varieties that place quality at the forefront. In 2019, work began to identify a diverse range of samples for evaluation and to formulate the research protocol for execution in 2020.

APPLIED RESEARCH

Creating the future of coffee through breeding and agronomic research

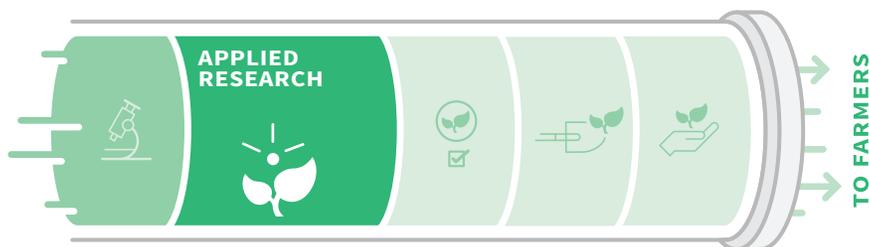
BREEDING TRIAL CELEBRATES A MILESTONE HYBRID HARVEST

WCR's breeding program focuses on a new class of coffee varieties called F1 hybrids. Because of their high performance, they have remarkable potential to transform coffee production in the coming decades.

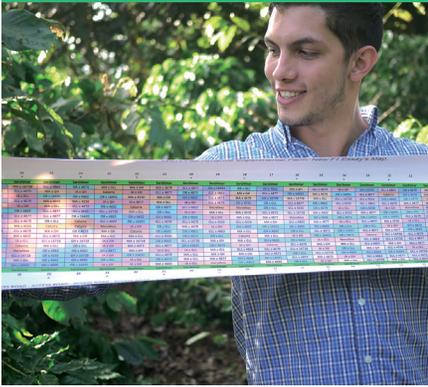
In 2019, WCR's F1 hybrids program reached an exciting milestone: the first production harvest. While we have carefully monitored and measured each plant's growth since it arrived in the field, the production of cherries means that we can now gather two of the most important pieces of data on each cross: yield and cup quality.



The yield and quality data from the 2019 harvest will allow us to remove low-performing candidates from the trial. But by itself, data from the first harvest is not a reliable predictor of lifetime performance, so the plants will be carefully monitored through three to four more harvests, and compared with data from the same plants located in different environments, to ensure that performance is consistent before final selections are made on which varieties can be released for farmers through a collaborative breeding hub serving Central America.



WHAT DOES A BREEDING TRIAL LOOK LIKE?



1 This map is the legend for the experimental design of the F1 hybrids trial at Flor Amarilla in El Salvador. There are 36 crosses in the trial. Each cross is represented by anywhere from three to 33 individuals, which are randomly distributed through the plot so that differences in soil, sunlight, or drainage in one area of the plot don't influence the results.



2 The harvest begins the day before picking, when the research technician walks the plot to note which trees are ripe enough for picking the following day. On the day of harvest, the technician arrives with the plot map, a scale, and a notebook.



3 Each individual tree is carefully harvested to pick only the ripest cherries.



4 Cherries from each tree are weighed individually. Each tree is picked three to four times over the course of the harvest season, and data from future picking will be added to the total for each tree to get a robust estimate of the total yield of that tree for the year.



5 The weight of cherries from each individual tree is recorded. The performance data of each individual is averaged to make a final determination about the performance of a given cross.



6 After weighing, all the cherries of each cross are combined together for processing and quality evaluation. Near the WCR research farm in El Salvador, the J. Hill mill has special facilities for processing these tiny microlots. Beans are wet-processed.

CENTRAL AMERICAN BREEDING HUB



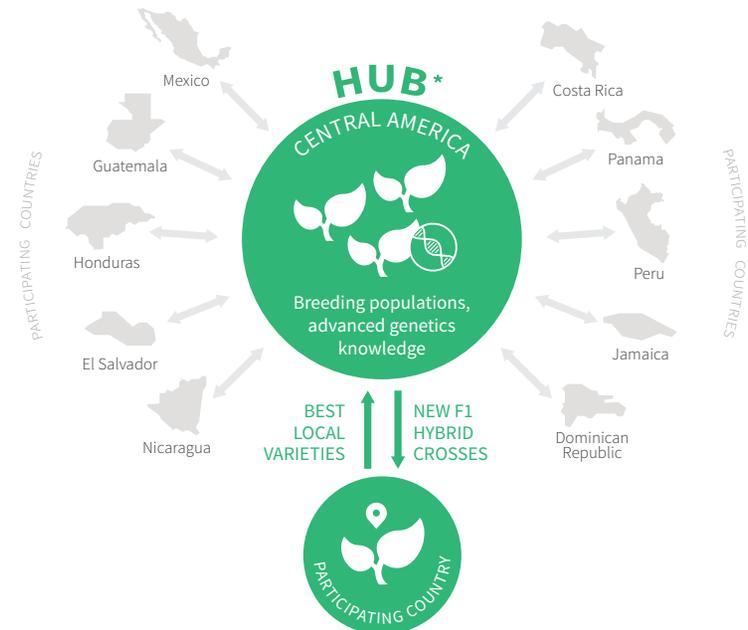
Building the next generation of resilient, high-quality coffee varieties that will meet market demand and sustain the industry's genetic resources and breeding pools is a major, cross-cutting initiative too big for an individual institute to undertake. The cornerstone of WCR's strategy is the creation of a network of regional breeding hubs that countries, research institutes, and private sector partners can utilize to accelerate the pace of coffee genetic improvement. Hubs have a collaborative design and governance among participating partners and are coordinated locally by a host institution. WCR's advanced research feeds the hubs; countries and other users bring their best regional varieties to make new crosses adapted to a range of local growing conditions and that meet local farmers' needs.

Building on the successful launch in 2017 of an African Breeding Hub in Rwanda, significant progress was made in 2019 toward the establishment of a collaborative breeding hub for the Latin America region, serving the 10 member countries of PROMECAFE. The hub would provide support for national coffee institute breeders and others from the PROMECAFE region to jointly develop and assess new coffee varieties using modern breeding methods and taking advantage of new populations of genetically diverse arabicas.

2019 KEY ACTIVITIES:

- A technical meeting of plant breeders from the region was held in Guatemala City and a "Petit Committee" was chosen from among those participants to lead the next steps in selecting a host country for the breeding hub. Represented were the following organizations: ANACAFE, CENTA CAFÉ, CSC, ICAFE, IDIAP, IHCAFE, IICA, INDOCAFE, INTA, and JACRA, with WCR and PROMECAFE as the meeting hosts
- Petit Committee meeting to discuss possible host institutions
- Engagement of the Technical Committee and Board of Directors of PROMECAFE in the decision regarding country host and breeding hub site
- Negotiation of terms to formalize the establishment of the Latin America Breeding Hub

The establishment of the Latin America Breeding Hub is being supported through the USDA MOCCA project (see p. 45).

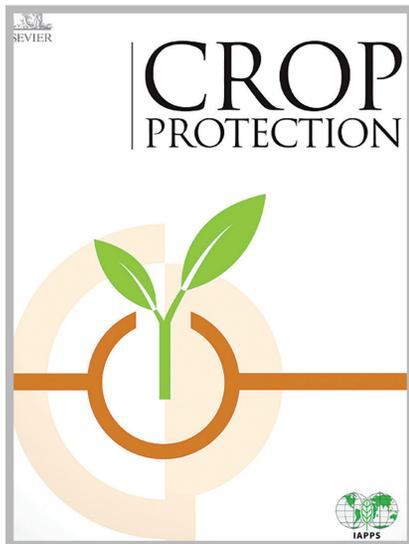


When it comes to coffee leaf rust, is shade good or bad for coffee?

Researchers and students from CIRAD and CATIE, with funding from World Coffee Research, took a deep dive into the microscopic world to answer this question. Researchers have known for years that shade can have both positive and negative effects on coffee leaf rust. But what determines whether shade is “good” or “bad” when it comes to rust? It turns out that dense shade trees like *Chloroleucon eurycyclum* are problematic when it comes to coffee leaf rust. Dense shade reduces the amount of rain reaching coffee tree leaves. In general rain is good for coffee—it “washes” rust spores off leaves and to the ground. Because this washing effect was reduced under heavy shade, coffee leaves under shade had more than double the number of rust spores on average as leaves in full sun.

The “washing” effect of rain had never been reported before, and the paper’s authors suggest it may have contributed to the coffee leaf rust epidemic that ravaged Central America starting in 2012. The authors estimate that as many as 25% of spores may be washed off of coffee trees by rain in full sun, compared to only 8% below shade.

The authors conclude that although shade trees are essential for adapting to increasing temperatures, they have unwanted effects on leaf rust. The results suggest that some types of shade—smaller trees, and those with smaller, pinnate, flexible leaves—may be better for controlling rust. In addition, pruning shade trees during the rainy season may help control the fungus.



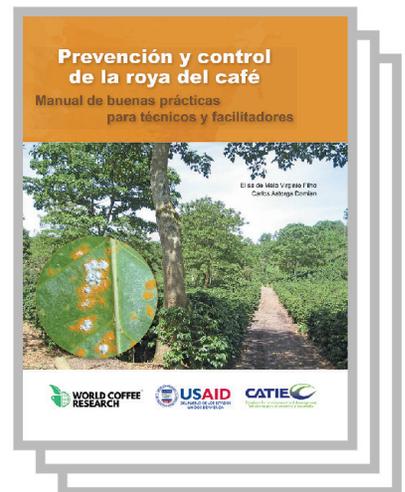
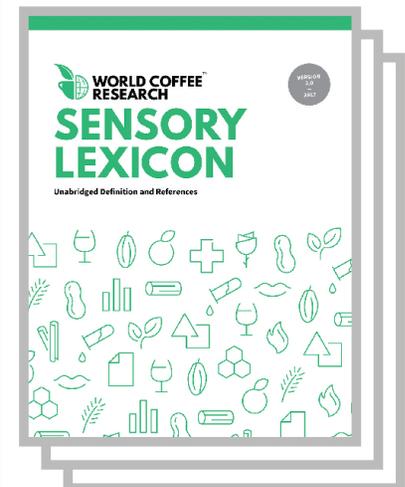
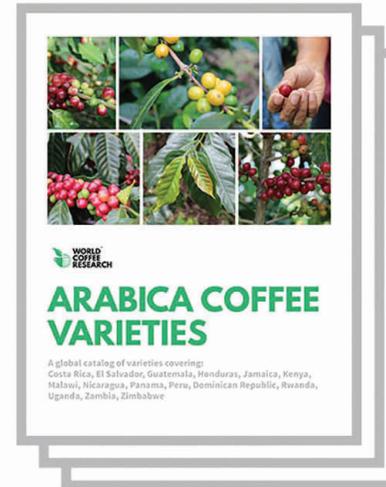
Read the full article in the journal **Crop Protection**:

Avelino, J., Vilchez, S., Segura-Escobar, M., Brenes-Loaiza, M., Virginio Filho, E., & Casanoves, F. (2019). Shade tree Chloroleucon eurycyclum promotes coffee leaf rust by reducing uredospore wash-off by rain. Crop Protection.

OTHER FREE DOWNLOADS

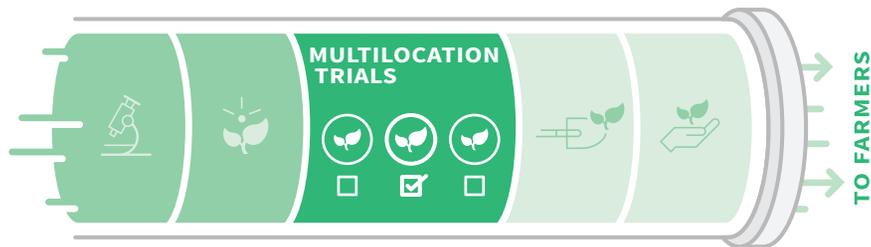
Download the following resources for free from the WCR website:

worldcoffeeresearch.org/work



MULTILOCATION TRIALS

Testing coffee varieties in our international trial network



Together with partners in 22 countries, World Coffee Research has built an unprecedented international network of research trial sites to test variety performance and build collaborative research capacity with partners in coffee-producing countries.



LOCATIONS

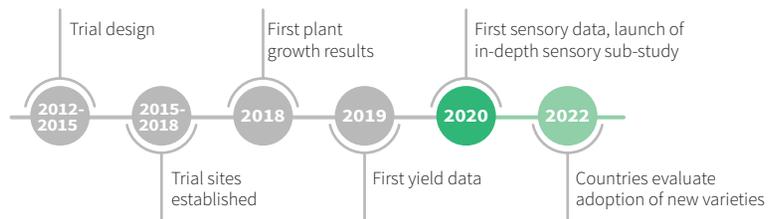
In 2014 we began work to establish the world’s largest coffee variety performance trial and seed exchange—the International Multilocation Variety Trial, or IMLVT. The trial brings 31 of the world’s best arabica varieties to two dozen countries for rigorous testing and evaluation. Each participating country conducts the trial collaboratively with World Coffee Research, assigning researchers to install, monitor, and maintain the research plots and conduct agronomic evaluations.

“WCR has now matured a unique network to gather global data on varieties and performance in such a huge number of different environments. It has never been done in the centuries of the existence of the coffee market. This legacy will last forever.”

—Giacomo Celi, Director of Sustainability, Mercon

THE IMLVT COMES OF AGE

In 2019, the IMLVT reached a critical milestone: It turned five years old. The first plants for the trial were shipped starting in 2014 from a phytosanitary lab in Florida; the first trials were installed beginning in 2015. Those sites are now reaching maturity with the production of their second harvest. For the first time ever, harvests of IMLVT plots happened in 2019 at 13 sites globally.



In 2020, research results on vegetative growth, yield, cup quality, and disease incidence from across the network will be aggregated into the first global report for the trial.

MARGINAL CLIMATES: IMLVT in Zambia



IMLVT sites around the world are located in diverse environments so that coffee researchers can rigorously evaluate which varieties perform best in each. This includes placing trial sites in “marginal zones”—sites with extreme climates that significantly challenge the coffee plant. In many coffee areas, farmers are already seeing increased frequency of marginal weather from year to year. In addition, such marginal conditions are expected to become more and more common in the coming years. The varieties that do well today in these marginal IMLVT sites will be good bets for farmers who live in areas predicted to become, for example, hotter and drier over the next 10 to 20 years.

Since 2016, WCR has been running a trial site at Kateshi Estate in Mafinga Hills, located in Zambia’s Northern Province, in partnership with OLAM. The area typically receives about 125 centimeters of rainfall per year, arriving during the six of winter months, leaving the other half of the year in drought conditions. The temperature at Kateshi Estate peaks around 34 degrees Celsius (93.2 degrees Fahrenheit) with an average temperature of 25 Celsius during the summer. The trial plot is minimally irrigated to keep the plants alive.

The trial at Kateshi Estate started in 2016 and features 23 coffee varieties: 16 dwarf varieties and seven tall varieties. Matilda Mumba of OLAM, who assists in managing the trial, said that early results suggest that “the tall varieties are performing poorly. We saw a lot of leaves dropping off the trees due to drought stress.” In particular, the varieties Gesha, AB3, Sln.5B, and Sln.6 have struggled with poor production.

The results from Zambia are still preliminary—covering only two harvest cycles—but are important early indicators about the performance of some key varieties in extremely dry conditions. Performance data from Zambia will be compared with data from 40 other sites and shared with the 22 participating countries to shed light on which of the trial’s varieties are best suited for dry climates.

PARTNER HIGHLIGHT: Junta Nacional del Café (JNC), Peru



The IMLVT would not be possible without the collaboration and coordination of the national partners who host the trials, care for the plants, and collect the data. One of the oldest and most active partners in the trial is the Junta Nacional del Café (JNC) in Peru, a national association of farmer organizations with a mandate to strengthen its member organizations. Through its efforts, the JNC makes significant contributions to the Peruvian coffee sector's development, helping to support the competitiveness of Peru's 220,000 coffee farms.

The JNC oversees two IMLVT trial sites in dominant coffee regions: Junín (with average temperatures of 21 degrees Celsius and 150 centimeters of rainfall; trial site at 1,190 masl,) and Cajamarca (average annual temperature of 22degrees Celsius and 130 centimeters; site at 1,687 masl). The trials, hosted by CENFROCAFE and Finca Mountain Villa, were installed in December 2015.

Despite coffee's importance as an export crop, Peru does not have a research center specialized in coffee. Peruvian coffee is exclusively arabica and is dominated by Caturra, Typica, and—since the rust outbreak in 2012—Catimor varieties. Yet in the 250 years since coffee was first brought to Peru, there has never been any system for the formal introduction and assessment of new varieties. That is changing with the IMLVT and—hopefully—with a newly published national action plan by the Ministry of Agriculture and Irrigation (MINAGRI). The trial site in Cajamarca has become a destination for visiting researchers, students, agronomists, farmers, and politicians—hosting more than 2,000 visitors since 2017.

As a result of five years of observations of the 26 varieties (plus five local varieties) in the trial, Peru is one of the first IMLVT hosts beginning work to introduce new varieties through formal processes, bringing new and diverse opportunities to farmers in the country over the coming decade.

In addition to WCR member companies, major sponsors of WCR's multilocation trials include:

- Coffee Alliance for Excellence (CAFÉ) Project to improve incomes for coffee-farming households in Peru, led by TechnoServe Peru, funded by USAID
- Feed the Future Democratic Republic of the Congo Strengthening Value Chains (SVC) Activity in South Kivu, led by Tetra Tech, funded by USAID
- Maximizing Opportunities in Coffee and Cacao in the Americas (MOCCA), led by TechnoServe, funded by USDA
- Philippine Coffee Advancement and Farm Enterprise (PhilCAFE) project, led by ACDI/VOCA, funded by Food For Progress, USDA

FARMER FIELD TRIALS

Measuring pathways to profitability



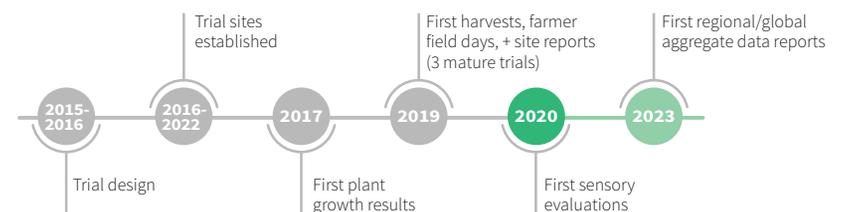
First things first—coffee sustainability depends on farmers being profitable.

The Global Coffee Monitoring Program (GCMP) is an unprecedented global study of on-farm drivers of profitability that has the potential to transform coffee agricultural practices and contribute substantially to the economic sustainability of coffee farming. This network of trial sites are situated in farmers' fields and managed by the farmers themselves, with support from partnering supply chain agronomists. The trials generate data on which combinations of varieties and climate-smart agronomic practices provide the highest returns to the farmer, and under what conditions those profits are maximized. With the magnitude of the trial network, its execution in real-world conditions, the focus on profitability, and engagement across coffee supply chains, it is WCR's most ambitious and innovative program.

The trial fills a global gap of rigorously designed research into factors affecting profitability under real-world conditions, helping to answer one of the most basic questions farmers face: Given my constraints, what is my path to profitability?

Because cost is one half of the profitability equation, farming approaches that reduce costs (even if they do not increase production) can be an essential factor in increasing profitability. It's a major goal of the GCMP network to deliver better information on how these pathways to profitability differ for different types of farming systems.

- 5 new countries added to the program in 2019
- 13 countries with trials installed as of end 2019
- 189 new trial sites installed in 2019
- 333 trials installed across entire network as of end 2019
- 20 trials that produced first or second harvest in 2019
- 1 farmer field day held in 2019 (Nicaragua)
- 34 varieties being tested across trial network



RESEARCH FOR IMPACT

The Global Coffee Monitoring Program measures pathways to profitability.

Rigorous

The trial is rigorously designed to test eight combinations of variety + climate-smart agronomy practices against the farmer's current practice (the "control" treatment) to **determine which generate the most profit**.

Research trials, not demo plots.

Real-world

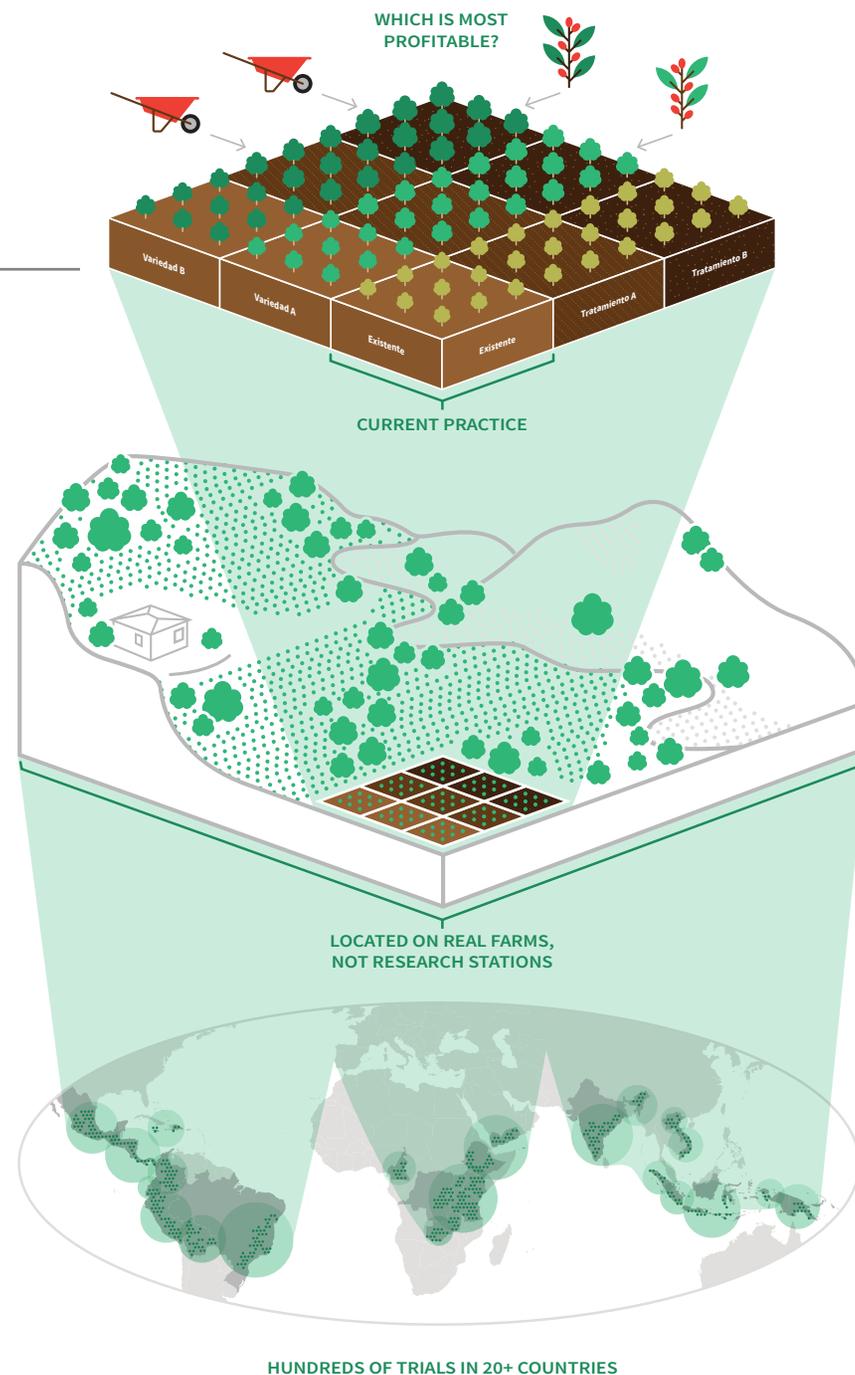
This is research in the real world—taking place on real farms of all kinds, and different challenges and constraints. The network of hundreds of trial sites globally captures much of the rich diversity of coffee farming systems around the world: Small/large farms, high/low elevations, sun/shade, hot/cool temperatures, dry/wet conditions, etc. It will tell us what actually works to lower costs, improve production, and ultimately yield higher profits for different situations.

For different kinds of farms, what are the pathways to profitability?

Really big

Data are aggregated across hundreds of trials to measure the interaction and effect of different variables on productivity, quality, and cost of production to understand different pathways to profitability.

Collaboratively executed by WCR with over 50 exporting company, cooperative, and NGO partners.



The Global Coffee Monitoring Program is an unprecedented global trial studying how two key farm-level decisions—agronomic practices and variety—impact profitability across a diversity of coffee farming systems in real-world conditions. How does it work and what will we learn?

Background—what determines farm profitability?

Farm profitability is the result of many factors at the farm, from basic management practices to how the farmer manages risk or debt, as well as factors beyond the farmer's control, such as price. In general, the main drivers are: yield (production), price, costs and cash flow management. A farm receiving high prices but with very high costs would have low profitability. A farm with low production but very low costs may have reasonable profitability. As the recent coffee price crisis has shown, one factor can exert a powerful influence on all others—when prices are extremely low, only extremely efficient farms are able to produce a profit.

Why research farm-level drivers of profitability?

Farmers have control over farm-level decisions that significantly influence profitability. They have little or no control over price (except for the ability to capture price premiums related to quality or certifications). Except for times when the global price is extremely low, farm-level management decisions are the main determinants of profitability.

There is abundant research available on how to maximize coffee production under ideal conditions. The problem is that the “optimal package” is simply too expensive for most coffee farmers, both in terms of cash inputs and labor/time. This is one reason why, globally, the vast majority of coffee farms produce only a fraction of what is possible.

While it is critically important to understand optimum farming practices, it's equally essential to understand the incremental actions that can flip a farm from being unprofitable to profitable, for example, by reducing the time cost of mulching. Historically, the vast majority of research on coffee production has focused on maximizing production, not maximizing profit. Actions to maximize profit may look very different than those to maximize production, depending on the type of farm and the farm's conditions. Farmers in all kinds of different situations want to know: What's good enough to make me money?

There is a dearth of robust, applied research addressing how to help producers to lower their costs and increase their profitability, allowing them to “stay in the game.”

The trial—what is being tested?

The global network will contain hundreds of farmer field trial sites. The trial is rigorously designed to test eight combinations of variety + climate-smart agronomy practices against the farmer's current practice at each site. Trial sites are selected to represent the wide diversity of farming systems and agroecology found in coffee production systems globally.

Varieties

For each country there is typically a menu of three to five available high-quality varieties that can be tested, from which two are chosen (the third variety is whatever the farmer is currently or predominantly using). A list of all varieties included in the trial globally is below.

Varieties being tested at sites in the GCMP network:

(Each trial tests 3 varieties.)

Anacafe 14	H16	RAB C15
Batian	H1 Centroamericano	Ruiru 11
BM 139	Icatú	San Isidro
Bourbon	Jackson	Sarchimor T5296
Bugisu Local	Kabare 16	SL14
Catimor	Lempira	SL28
Catuai	Mariana	Starmaya
Caturra	Marsellesa	THA1
Costa Rica 95	Mulungu	Typica
EC14	Obata	Villa Sarchi
El Carmen (not official)	Oro Azteca	
Gesha	Parainema	

Agronomy practices

In each country, a group of experts is convened to discuss the farming systems in that country and the main barriers to productivity for each. A list of specific agronomy practices for each of the four categories below is generated. Farmers choose which agronomy practice they want to test on their farm from the menu.

There are four categories of agronomy practices being tested globally:

1. Nutrition practices
2. Soil conservation practices
3. Planting practices
4. Shade practices

Why variety + agronomy practices?

Variety performance is one of the main determinants of quality, production, and profitability for a farmer. But the same variety can perform very differently in different conditions. This trial examines the interaction between improved varieties and different farm practices to see what gives farmers the most benefit in terms of higher yield, higher quality, lower cost of production, and higher profits.

Why not focus on nutrition/fertilization?

Most farmers, agronomists, and researchers would agree that appropriate nutrition is one of the single most important ways to improve production. So why does the GCMP *not* focus exclusively on nutrition? Because in practice, many farmers either do not apply nutrition at all, or do not apply it in the recommended amounts because it is costly. This study gives farmers the opportunity to choose which intervention to test based on their farming approach and situation. Through the GCMP trial design, we can see whether it makes sense for some types of farms to go for certain varieties given the practices accessible to them.

The results—what will we learn?

At each farm trial site, we learn which of the nine treatment combinations costs the least, produces the most, and gives farmers the largest profit.

Once enough trial sites in a country or region are producing harvests, data is aggregated into subsets (national, regional, and/or global) and analyzed using multivariate regression analyses to measure the interactions and effects on production, cost, and profitability of many factors including agricultural practices, varieties, temperature and rainfall, soil, elevation, socioeconomic characteristics (e.g. farm size and income).

The impact—how will the results of the trial drive farmer profitability gains?

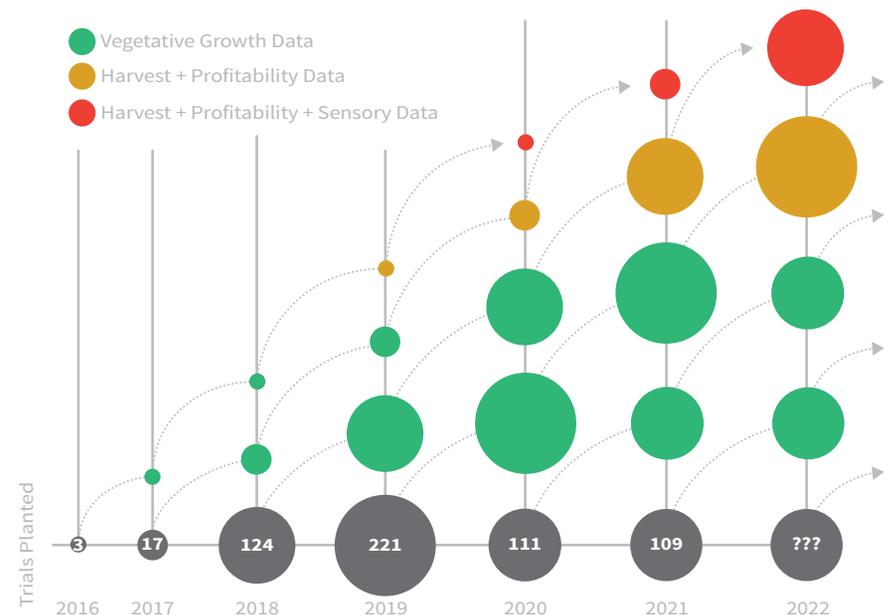
Ultimately, it is hoped that the results of this research will contribute to a step change in global knowledge about the effects of varieties, climate, and environment on coffee production and profitability. Rather than a “one size fits all” approach to farmer training and variety recommendation, we will learn how to tailor recommendations for the different realities that farmers face. And the trial will provide the most comprehensive data yet on the impact of investing in coffee farm renovation and technology adoption, moving the needle in a substantive way to help farmers remain in farming and protect origin diversity.

Why do we need this research now?

Too many coffee farms globally are not profitable, creating powerful incentives for farmers to exit coffee. At the same time, the knowledge base to drive shifts in profitability is miniscule compared to what it should be for a sector with coffee’s global importance and for a crop where resource-constrained smallholder farmers are a significant source of global coffee supplies. This trial will significantly refine and update our understanding of what works for different kinds of farmers in the real world to spark a global, sector-wide shift in farmer profitability and coffee production and quality. Real-world farm research isn’t the only thing needed to improve the economic sustainability of coffee production—there is widespread and urgent need for training, access to credit, and other supports for farmers. But if our underlying knowledge about what works for different kinds of farmers in less-than-ideal conditions is significantly lacking, none of these other supports will return their anticipated benefits.

When will data be available?

Because coffee is a tree crop that takes on average three years to mature, it takes time for different kinds of data to become available. In the first two years after a trial is planted, we collect plant growth data; in year 4, we obtain the first harvest and profitability data; and in year 5 we collect sensory data. As illustrated below, in 2021, we will begin to have a critical mass of harvest and profitability data globally.



FOCUS ON THE FARMER: CATARINA TAHAI AJ POP



Catarina, right, and her three sisters have produced coffee their entire lives.

“We need new approaches to be profitable,” says Catarina Tahai Aj Pop. Catarina’s tiny farm, Chuixaq’ol, is located in a remote part of Guatemala between the Atitlan and San Marcos regions. It may seem like an unlikely research site, but it’s part of a global network of hundreds of trials in diverse farmer fields testing which varieties and agronomy practices produce better profits for farmers than their current practices.

Coffee has provided the majority of Catarina’s family’s income for three generations. With the help of her daughter and three sisters, she does all of the planting, cleaning, fertilizing and harvesting herself. Catarina sells her cherries to the local coop, FECCEG, where she is a respected member. But with low prices and the rust epidemic of 2012-2015, which nearly destroyed her farm, she has had to supplement with banana and Maxan (leaves to wrap tamales) to survive. “In the community, we don’t have a lot of help to bring in new varieties or support the planting.”

Catarina, FECCEG, and WCR co-managed the trial on her farm, collecting meticulous data about every cost, and soon—once the trial produces its first harvest in 2020—about production and cup quality. She is eager to see the results. “There is also a lot of interest from neighbors who see that we are doing different things and want to know how to participate.”

TAKING IT TO THE FIELD

The first-ever farmer field day for on-farm trials belonging to the Global Coffee Monitoring Platform took place in November in Nicaragua.

In November 2019, WCR’s largest trial shared its first results with farmers in Nicaragua at a farmer field day. Twelve neighbors, most of them smallholder farmers, visited the on-farm research site at Finca La Marsellesa in Jinotega to observe differences in how the 2-year-old plants were growing. Like all GCMP plots, the La Marsellesa research site is divided into a grid of nine squares, each testing a different combination of variety and farming practice to determine which combinations produce the most profit. During the field visit, WCR agronomist Elly Castro and partner Philippe Courtel of ECOM presented the different treatments and costs associated with each. At the end of the day, one farmer turned to Courtel and asked: “So, in your opinion, what is the best variety?” He smiled before answering. “Bigger doesn’t necessarily mean better. What is your focus: volume or quality? The best variety is the one that covers your costs.”

La Marsellesa site:

Varieties: Marsellesa, Starmaya, and Centroamericano

Agronomy treatments:

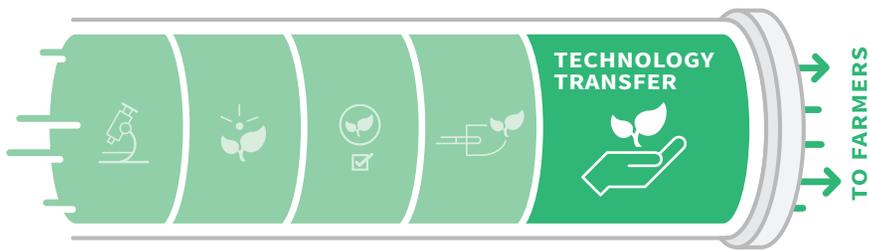
- Soil conservation: Using *Brachiaria ruziziensis* groundcover planted in between rows of coffee to retain moisture, and reduce soil temperature, runoff, and weeds
- Nutrition: Two different fertilization approaches, one which is more expensive (but only requires one application per year, therefore reducing labor costs), and one that is cheaper but requires three applications.

Farmer reactions:

- Most of the visiting farmers use family labor and typically do not keep track of such labor as a cost. They were surprised to learn that a more expensive fertilizer could be “cheaper” if labor is taken into account. Low prices in 2019 prevented most farmers from purchasing fertilizer.
- Using groundcover is uncommon in Nicaragua. A number of farmers expressed interest in incorporating it to deal with erosion of soils and nutrients on steep slopes and to preserve water and lower soil temperatures in the dry season.
- All the farmers were interested to see the final results of the harvest and the answer to the question: Which variety is most profitable?

TECHNOLOGY TRANSFER

Getting healthy plants and new knowledge to farmers



In 2019, WCR continued work to address a hidden crisis in the coffee sector: A worldwide lack of competent systems for delivering high-quality, healthy planting material to coffee farmers.

NEW BEST PRACTICE GUIDES



In November, WCR and PROMECAFE launched two new, open-access manuals of best practices for coffee seed producers and nursery managers, available in both English and Spanish. These training guides focus on improving plant health and improving genetic purity/traceability, with tailored content for small, medium, and large operations.

Download free at
worldcoffeeresearch.org/guias

TRANSFER

There are no global figures available, but country studies have demonstrated that it is not uncommon for upwards of 50% of coffee trees produced by nurseries—especially small, informal ones—to die before or soon after they are transplanted to the field. Today, most of the increased production potential of better varieties never reaches farmers because of the widespread problems found in nurseries. Very few countries worldwide are currently able to deliver high-quality plants to all of their farmers.

With each poor-quality seedling planted in their fields, farmers lock in lower production potential for decades to come, which powerfully reinforces the poverty trap faced by smallholder farmers in particular. Improving nursery production practices has the potential to dramatically improve the productivity and profitability of coffee farms globally and to ensure that the genetic gains coming from new/improved varieties are able to reach farmers.

Published **2** open-access best practice **manuals**
(English + Spanish)

Manuals accessed **1,000 times** from users in
84 countries in 2019



NURSERY DEVELOPMENT PROGRAM



In 2019, WCR continued its program to support a long-term goal to build a strong and professional coffee seed sector that doesn't leave out smallholder farmers. The WCR Nursery Development Program builds the capacity of small nurseries to produce genetically pure and healthy seedlings for smallholder farmers in countries around the world. Nursery staff are trained on best practices both for plant production and for business management, and are assisted to locate genetically pure seed stock.

130 nursery managers and technicians trained in
Peru + Puerto Rico

1,500,000,000 plants: The production capacity of
nurseries trained in 2019

In 2020, the nursery development program will expand to East Africa with trainings in Uganda, Democratic Republic of Congo, and Rwanda, and will also host trainings in Mexico, Guatemala, Nicaragua, Honduras, El Salvador, and Peru.

SEED SECTOR FINDINGS FOR THREE COUNTRIES

A typical first step before nursery training programs are implemented is to undertake a baseline assessment of the seed and nursery production systems in a location. In 2019, WCR conducted three seed sector analyses in countries with particularly difficult and disorganized seed production systems: East Timor, the Philippines, and Mexico.

<10% of true-to-type varieties found in seed lots surveyed

East Timor findings:

- East Timor is home to the famous Timor Hybrid (a rust-resistant *C. arabica* x *C. canephora* hybrid). There is a genetically diverse group of Timor Hybrids currently being propagated on the island, but also a surprising number of mixed Catimors (Caturra x Timor Hybrid) found as a result of many different introductions.

Philippines findings:

- The number of officially approved/released varieties is very small. The way in which seeds are certified and produced has led to a lot of mixing, rather than pure varieties. Farmers in the south are using introduced Catimors, while in the north they are still planting relatives of Bourbon.

Mexico findings:

- There is high interest in the south about varieties that can tolerate coffee leaf rust. Most of the analyzed samples were a mixture of Catimors, Sarchimors, and other rust-resistant varieties. The proximity of seed plots to older Bourbon plantations has led to mixing.



COLLABORATION AT THE CENTER

Implementing the global research agenda together with partners

In order to carry out a shared, global research agenda, we rely on partnerships not only with national governments and the private sector, but also with public sector actors around the world. Globally, a number of important publicly funded coffee development projects incorporated World Coffee Research in 2019 as a partner. These projects provide a key avenue to ensure that development efforts take into account long-term capacity building through research investment, and connect the research agenda to the needs and priorities of smallholder farmers. They are a key driver of the long-term impact of coffee agricultural R&D.

Maximizing Opportunities in Coffee and Cacao in the Americas (MOCCA)



Countries: Guatemala, El Salvador, Honduras, Nicaragua and Peru

Funders: Food for Progress, USDA

Main project partners: TechnoServe, PROMECAFE, NCIs, NGOs

Through the MOCCA project, WCR is dramatically expanding its package of work in Central America, including the establishment of 100 additional on-farm technology trials (see p.31) in farmers' fields; working with PROMECAFE and its member countries to establish a Latin American Breeding Hub to train breeders; establishing 10 Multilocation Agronomy Trials (two per country); expanding the International Multilocation Variety Trial (see p.25); and developing a coffee nursery professionalization tool to get the best, healthiest varieties into the hands of farmers.

Philippine Coffee Advancement and Farm Enterprise (PhilCAFE) project



Country: Philippines

Funders: Food For Progress, USDA

Main partner: ACDI/VOCA

The five-year project aims to support 13,700 coffee farmers to triple their coffee production and result in a 10-fold increase in coffee exports for the Philippines. WCR's contributions will include: an analysis of the country's nursery and seed systems that showed limited genetic diversity and poor nursery management; an upcoming study to identify the main barriers to higher production; and building research capacity. WCR is also installing 20 on-farm technology trial sites and two sites of the International Multilocation Variety Trial, developing a locally targeted nursery training manual, and working with the Bureau of Plant Industry to improve the way coffee seeds are certified, as well as supporting local research capacity through mini-grants.

Strengthening Value Chains Kivu

Country: Democratic Republic of Congo

Funder: Feed the Future USAID

Main project partners: Tetra Tech, ONC, INERA, UCB



The SVC project aims to improve incomes for 15,000 coffee farmers in South Kivu through increased coffee productivity, value addition through improving quality, financial management, and strengthened market linkages. WCR has installed 30 on-farm technology trials in farmer fields and will install an additional 15 more to understand which combinations of improved varieties and climate-smart farming practices drive the largest profitability gains, as well as six multilocation agronomy trials to identify the rate of return on investment of novel approaches to agronomy, including densification, the use of cover crops, intercropping with soy and beans, organic fertilization formulation and doses, and fertilizer application rates. In addition, WCR is assisting with the establishment of professionalized seed lots for the mass production of improved varieties, and research to understand the key constraints to improved productivity (such as dieback, old trees, etc.). WCR also supports the Saveur du Kivu competition, through providing training for cuppers and local judges and improving the sampling. The event brings together top lots of Congolese coffee for specialty coffee buyers.

Inclusive, Sustainable, and Connected Coffee Value Chain



Country: Timor-Leste

Funder: Asian Development Bank

Main partners: Landell Mills, OLAM

This project contributes to the redevelopment of Timor-Leste's coffee sector by delivering a package of training and extension services to smallholder farmers. WCR has completed a variety/seed sector analysis for the island and will support the establishment of local variety trials using promising local varieties or populations, as well as look into how to import new varieties. WCR is establishing 10 on-farm technology trials in farmer fields and has completed a variety/seed sector analysis for the island (see p. 44).

Coffee Alliance for Excellence (CAFE) Project

Country: Peru

Funder: USAID

Partner: TechnoServe



WCR has done a SWOT analysis and needs assessment of the nurseries and the varieties available in the area. As part of the project, WCR has established four OFTTs and will establish an additional four in the next year.

Alliance for Resilient Coffee

Countries: Honduras, Guatemala, Uganda

Funder: USAID

Main partner: HRNS



The Alliance for Resilient Coffee is a consortium of seven leading non-governmental organizations and research institutions working at the intersection of climate change and coffee production. The consortium's goals are to provide tools, knowledge, products, and solutions needed to increase private sector engagement with and implement climate-smart agriculture. WCR has established as part of this project 20 on-farm technology trials testing the profitability of climate-smart agronomy approaches and varieties in farmer fields—6 in Uganda, 6 in Honduras and 7 in Guatemala—as well as created a pilot renovation and rehabilitation decision support tool.

Rehabilitating Puerto Rico's Coffee Seed Sector Post Hurricane Maria



Funders: Starbucks Foundation and Fonalledas Foundation

Partner: Puerto Rico Coffee Roasters

The project seeks to contribute to the rehabilitation of the Puerto Rican coffee sector through the provision of new varieties and improving the nurseries on the island. As part of the project, WCR will also establish 16 OFTTs on the island to identify the best combination of variety and management for Puerto Rico.

Innovative Technology for the Management of Coffee Nurseries—Mexico



Funder: Inter-American Development Bank

Partner: Sustainable Harvest

This project is to train and equip small coffee producers in Oaxaca and Chiapas with innovative agricultural, managerial and market tools in order to obtain a greater income. WCR's role is to work with the cooperatives to improve their nursery operations and their management of their seed lots.

WCR WELCOMES A NEW CEO

Dr. Jennifer “Vern” Long takes the reins



In June, WCR was delighted to welcome a new CEO, Dr. Jennifer “Vern” Long, who took over from WCR founder and outgoing Chief Executive Officer, Dr. Tim Schilling. Drs. Long and Schilling worked side by side from June to December 2019, and Dr. Schilling remains on the WCR Board of Directors. “With Vern, WCR is in exceptionally capable hands,” says Dr. Schilling. “She is a natural leader and entrepreneurial thinker, and an experienced organization builder. She’s the perfect fit.”

A plant breeder by training, Dr. Long brings 25 years of experience in international agricultural research with a focus on smallholders. She served previously as the Director, Office of Agricultural Research and Policy at the U.S. Agency for International Development (USAID), managing a global program portfolio of >\$140 million per year.

Dr. Long has substantial experience convening diverse stakeholders—from industry, national governments, CGIAR international agricultural research centers, university scientists, and farmers—to formulate a shared crop research agenda to improve productivity among smallholder farmers across low- and middle-income countries in Central America, West Africa, East and Southern Africa, and South Asia.

“Coffee production faces numerous challenges in the coming years, which agricultural research and development are uniquely positioned to address. I am eager to build on Tim’s success in establishing WCR as one of the leading coffee organizations in the world.”

— Dr. Jennifer “Vern” Long



WHO WE ARE

A collaborative, not-for-profit research organization, we were formed by the global coffee industry in 2012, recognizing that transforming coffee growing into a profitable, sustainable livelihood that can meet rising demand while also safeguarding natural resources will necessarily require innovation in coffee agriculture. WCR enables the global coffee industry to invest in agricultural innovation to empower producers.

MISSION

To grow, protect, and enhance supplies of quality coffee while improving the livelihoods of the families who produce it.

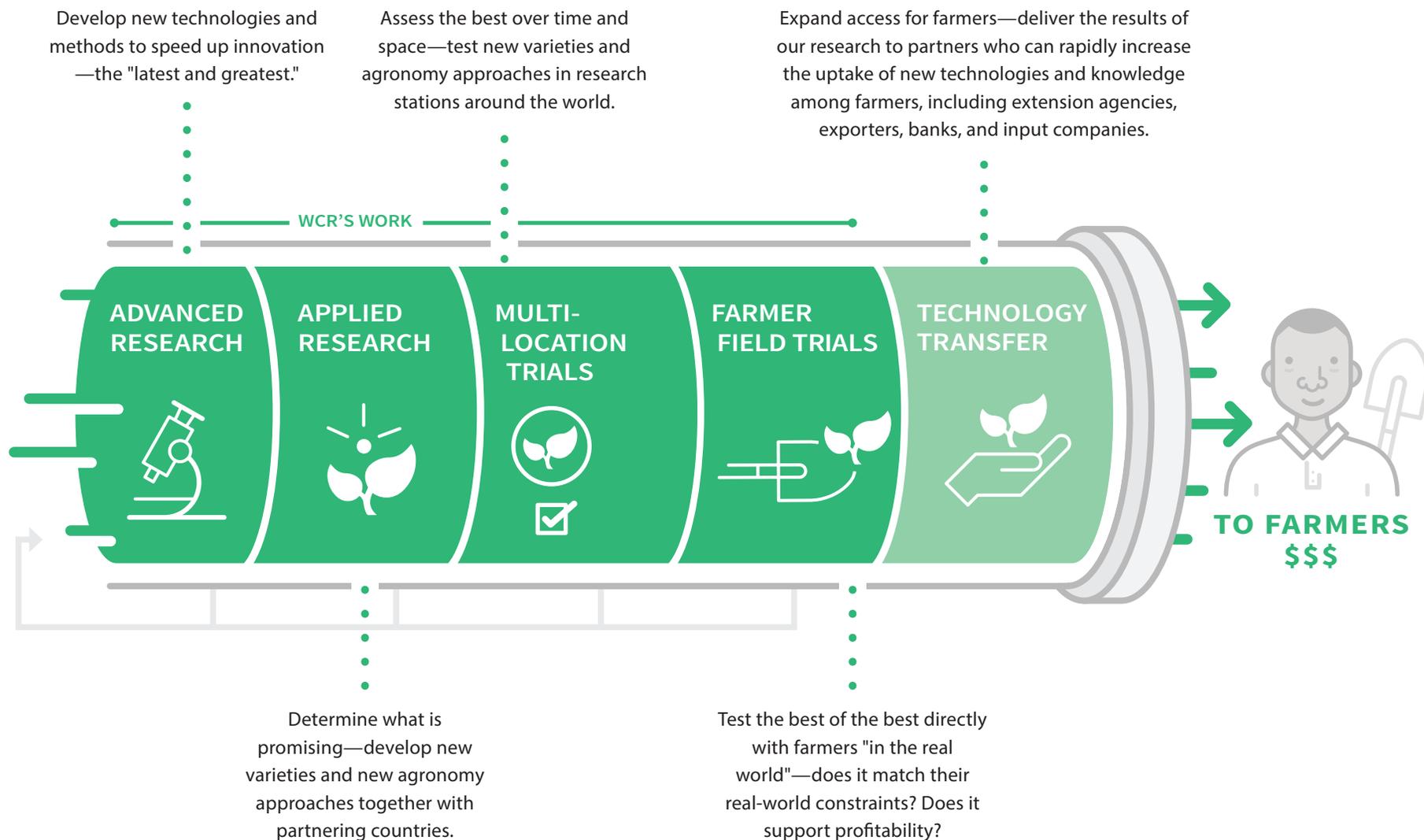
IMPACT

Using advances in agricultural science, it is possible to dramatically improve coffee yields, coffee quality, climate resilience, and farmer livelihoods.



THE INNOVATION PIPELINE

WCR's technology pipeline delivers solutions that address major threats to global supplies of quality coffee and that improve resilience and profitability for coffee farmers.



COLLABORATIVE, OPEN, GLOBAL

OUR PARTNERSHIP APPROACH

World Coffee Research drives collaborative research to ensure the future of coffee.

We rely on deep collaboration with local research institutions, coffee organizations, governments, and NGOs to carry out an ambitious, shared research agenda. In each country, we begin with the national coffee institute or organization to align our work to their strategy; together, we agree on research activities that World Coffee Research and the country can undertake collaboratively.

Multi-stakeholder partnerships: 67 partners, including 29 government institutes and research organizations.

COLLABORATING INSTITUTIONS



MEXICO / CENTRAL AMERICA / THE CARIBBEAN

- GUATEMALA – ANACAFE
- HONDURAS – IHCAFE
- MEXICO – INECOL
- COSTA RICA – CATIE
- EL SALVADOR – CSC
- NICARAGUA – INTA
- COSTA RICA – ICAFE
- PANAMA – MIDA
- JAMAICA – JACRA
- DOMINICAN REPUBLIC – CODOCAFE
- PUERTO RICO – Department of Agriculture, UPR REGIONAL – PROMECAFE



SOUTH AMERICA

- COLOMBIA – CIAT
- BRAZIL – Funarbe/UFV
- PERU – JNC

WCR LOCATIONS



EL SALVADOR:
RESEARCH FARM & LATIN AMERICA REGIONAL OFFICE



RWANDA:
EAST AFRICA REGIONAL OFFICE



UNITED STATES:
ADMINISTRATIVE & SCIENTIFIC HQ



FRANCE:
EUROPE OFFICE



AFRICA

- DEMOCRATIC REPUBLIC OF CONGO – INERA, UCB
- CAMEROON – IRAD
- KENYA – KALRO
- UGANDA – NaCORI
- ZIMBABWE – CRI
- MALAWI – DARS
- RWANDA – RAB, NAEB REGIONAL – IITA



ASIA / AUSTRALIA

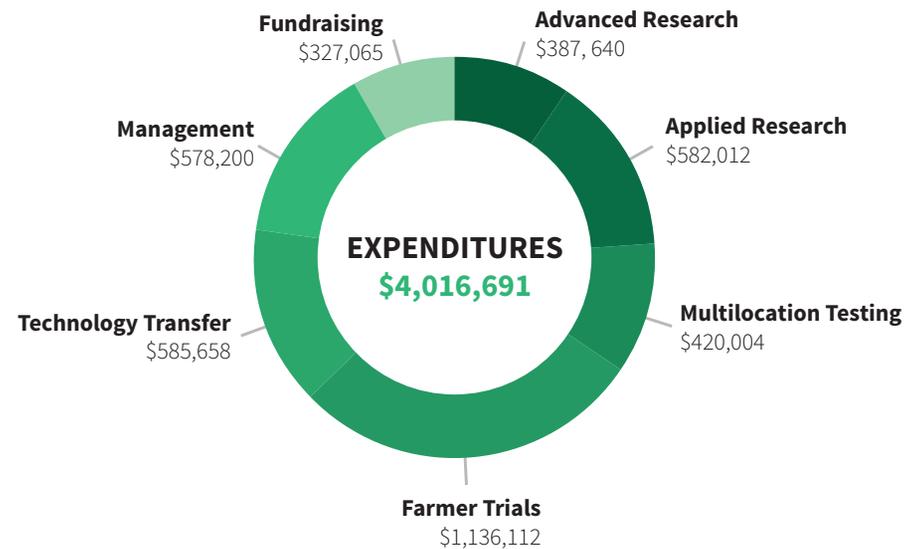
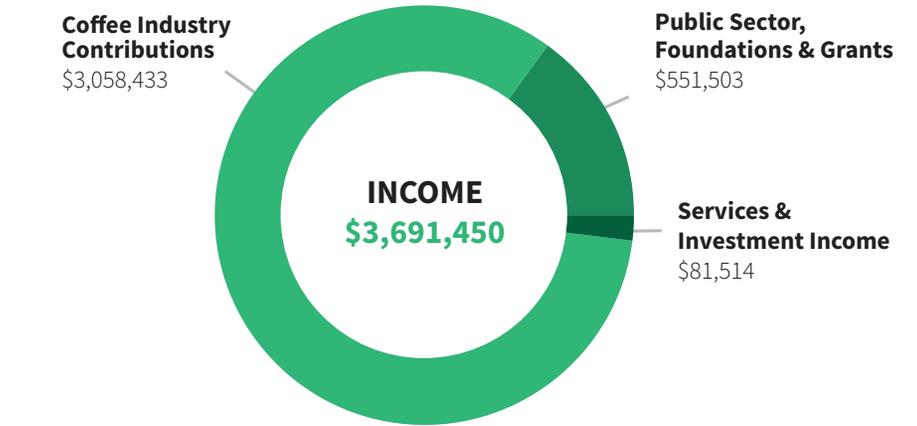
- INDIA – CCRI
- INDONESIA – ICCRI
- AUSTRALIA – Southern Cross University
- VIETNAM – WASI
- PHILIPPINES – Local government
- EAST TIMOR – East Timor government

INVESTMENT IMPACT

By leveraging in-kind contributions from our partners, along with grant dollars, public funds, and service income, we are able to increase the impact of the coffee industry's investment.



2019 FINANCES*



2019 YEAR-END FINANCIAL POSITION

Cash/Investments: \$1,192,167 Liabilities: \$237,022
 Other Assets: \$2,407,955 Net Assets: \$3,363,100

Total: \$3,600,122

*pre-audit figures on an accrual basis

For every dollar contributed by members in the coffee industry, WCR conducts **\$1.33** worth of research.



IN LOVING MEMORY

PASCAL GAKWAYA KALISA

WCR Africa Regional Coordinator

TEAM

Our core scientific and administrative team applies their expertise in coffee, genetics, plant science and diseases, and sensory science to create and execute an ambitious research agenda.

LEADERSHIP

- Dr. Jennifer “Vern” Long, *CEO*
- Dr. Tim Schilling, *WCR Founder and President WCR Europe*
- Dr. Kraig Kraft, *Global Programs Director*
- Danielle Knueppel, *Global Coffee Monitoring Program Director*
- Greg Meenahan, *B2B Partnership Director*
- Hanna Neuschwander, *Communications Director*
- Siaska Vieira de Castro, *Administration and Finance Director*
- Salvador Urrutia Loucel, *Latin America Regional Director*

TEAM

- Julio Alvarado, *Research Technician*
- Sara Bogantes, *Central America GCMP Coordinator*
- Josue Callejas, *El Salvador Country Agronomist*
- Elly Castro, *Nicaragua Country Agronomist*
- Elisabeth Fillmore, *Communications Assistant*
- Nicole Freeman, *Contracts & Grants Manager*
- Koleen Hall, *Business Manager*
- Jarrod Harris, *Finance and Post-Award Coordinator*
- Alexa Heinicke, *B2B Partnership Manager*
- Pascal Gakwaya Kalisa, *East Africa GCMP Coordinator*
- Jean Baptiste Kayigamba, *Breeding and IMLVT assistant*
- Molly McLain, *Checkoff Coordinator*
- Viviana Medina, *Puerto Rico Coordinator*
- Jimmy More, *Peru Country Agronomist*
- Simon Martin Mvuyekure, *Coffee Breeding Hub Ambassador*
- Maureen Namugalu, *Uganda Country Agronomist*
- Maud Nicolas, *WCR Europe Business Manager*
- Square Nyasulu, *Malawi Country Agronomist*

- Jose Paiz, *Guatemala Country Agronomist*
- Solène Pruvot-Woehl, *IMLVT Project Leader*
- Nuzul Qudri, *Regional Coordinator – Indonesia*
- Sylvain Roulain, *Research & Development Agronomist*
- Jean Paul Rugwiro, *Rwanda Country Agronomist*
- Nicaise Sheila Sagbo, *Coffee Economy Technician*
- Hector Andres Santos Rojas, *Honduras Country Agronomist*
- Peter Sinnott, *Database Manager*
- Samuel Thuo, *Kenya Country Agronomist*
- Lucile Toniutti, *Molecular Breeder*
- Emilia Umaña, *Nursery Development Specialist*

In 2019, WCR's team grew to 36.

BOARD OF DIRECTORS

Our board members are some of the most important leaders and thinkers from coffee

companies around the world. They work hard behind the scenes to guide our programs.

- Doug Welsh, *Peets (Chair)*
- Jim Trout, *The J.M. Smucker Company (Vice Chair/Secretary)*
- Shawn Hamilton, *Java City (Treasurer)*
- James McLaughlin, *Intelligentsia Coffee*
- Edwin Price, *Center on Conflict and Development, Texas A&M University*
- Ric Rhinehart, *Specialty Coffee Association*
- Matt Saurage, *Community Coffee Company*
- Keith Writer, *Betty & Taylors of Harrogate*
- Monique Oxender, *Keurig Dr. Pepper*
- Frank Dennis, *Swiss Water*
- Mario Cerutti, *Lavazza*
- Jim Smith, *Royal Cup*
- Eric Poncon, *ECOM*
- Regina Chin, *National DCP/Dunkin'*
- Mike Keown, *Farmer Brothers (Former Chair)*
- Furio Suggi Liverani, *Illycaffè*

SCIENTIFIC ADVISORY GROUP

These internationally renowned scientists are at the top of their fields, and volunteer their time to help guide and provide feedback on our research agenda.

- M. Catherine Aime, Fungal Pathology Expert, Purdue University
- Walter Baethgen, Climate Change Expert, Earth Institute, Columbia University
- Elisabeth Guichard, Sensory Expert, French National Agronomic Research Institute (INRA)
- Kyle Murphy, Socioeconomics Expert, Jameel Poverty Action Lab (J-PAL)
- Seth Murray, Quantitative Genetics Expert, Texas A&M University

COLLABORATING RESEARCHERS AND STUDENTS

Researchers and graduate students from around the world are working on problems and projects connected to WCR's shared global research agenda.

- M. Catherine Aime, Purdue University
- Jacques Avelino, CIRAD
- Roberto Barreto, Universidade Federal de Viçosa, Brazil
- Benoit Bertrand, CIRAD
- Espoir Bisimwa Basengere, Universite Catholique de Bukavu
- Melanie Bordeaux, Fundacion Nicafrance
- Jean-Christophe Breitler, CIRAD-INECOL
- Christian Bunn, CGIAR
- Edgar Chambers, Kansas State University
- Jane Cheserek, KALRO, Kenya
- Phillipe Courtel, Fundacion Nicafrance
- Harry Evans, Universidade Federal de Viçosa
- Jean-Xavier Guinard, UC Davis Coffee Science Center
- Joseph Kimemia, Kenya
- Trish Klein, Texas A&M University
- Rachel Koch, Purdue University
- Sarada Krishnan, Denver Botanic Gardens
- Simon Martin Mvuyekure, Rwanda Agriculture Board
- Christiane Masirika Fazili, Universite Catholique de Bukavu
- Scott McAdam, Purdue University
- Elias de Melo, CATIE
- Fabienne Moreau, ADNid
- Paul Mulemangabo, INERA/RAB
- Luciano Navarini, illycaffè
- Surya Prakash, CCRI, India
- William Ristenpart, UC Davis Coffee Science Center
- Carlos Rodriguez, Starbucks
- Sara Sarmiento Salcedo, postdoctoral fellow, Universidade Federal de Viçosa
- Susana Schuller, JNC, Peru
- William Solano, CATIE
- Paul Songer, Songer & Associates
- Ucu Sumirat, ICCRI, Indonesia

- Paulo van der Ven, RD2 Vision
- Antonio Chalfun, University Federal Lavras
- Tobias Kretzschmar, Southern Cross University
- Osmar Matute, IHCAFE
- Nayani Surya Prakash, CCRI India
- Ucu Sumirat, ICCRI Indonesia
- Elijah K. Gichuru, (KALRO) CRI Kenya
- Robert Manson, INECOL Mexico
- Philippe Courtel, Fundacion Nicafrance
- Susana Schuller, JNC Peru
- Arinaitwe Godfrey, NACORI Uganda
- Caleb Mahoya, CRI Zimbabwe
- Rapha Ricon, University Federal Lavras
- Marino Suarez, INCOCAFE, Dominican Republic
- Paul Mulemangabo, INERA, Democratic Republic of Congo
- Sergio Morales, Anacafe, Guatemala
- Yonis Morales, IHCAFE
- Pedro Pereira, OLAM Laos
- Nathan Kachiguma, NARS Malawi
- Job Chemutai, NACORI Uganda
- Brahim Banda, OLAM Zambia
- Gerald Bryan, JACRA, Jamaica
- Jorge Sanders, PRCR, Puerto Rico

Students

- Kifle Belachew, Ph.D. student, Jimma University
- Marina Bracale, Ph.D. student, Universidade Federal de Viçosa
- Taya Brown, Ph.D. student, Texas A&M University
- Adans Agustín Colmán, Ph.D. student, Universidade Federal de Viçosa
- Jorge Diaz-Valderrama, graduate student, Purdue University
- Teeratas Kijpornyongpan, graduate student, Purdue University
- Miraine Ndacnou, Ph.D. student, Universidade Federal de Viçosa
- Thaisa Nobrega, Ph.D. student, Universidade Federal de Viçosa
- Maria del Carmen Herrera Rodriguez Ph.D., Universidade Federal de Viçosa

OUR MEMBERS AND PARTNERS

Members

Our members—companies and organizations large and small—help set the global agenda for coffee research. Their support is the foundation for a vibrant and sustainable coffee sector.

216 companies and individuals supported WCR's work in 2019, an **increase of 38%** over the prior year.

\$500,000 +



THE J. M. SMUCKER COMPANY

\$200,000 to \$499,999



\$100,000 to \$199,999



\$40,000 to \$99,999

- Allegro Coffee
- Caravela Coffee
- Community Coffee Company
- EFICO Group
- Foodbuy
- Fundacion Fonalledas
- illycaffe
- KEYCOFFEE Y.S. Foundation
- Lavazza Professional
- PROBAT
- Sustainable Harvest

\$10,000 to \$39,999

- Beck Flavors
- Coffee Circle
- Clif Bar & Company
- Counter Culture Coffee
- Descamex
- Falcon Coffees
- Gaviña & Sons
- Intelligentsia Coffee
- Java City
- KEY COFFEE
- Lincoln & York Coffee Roasters
- Louis Dreyfus Company Suisse
- Mercon Coffee Group
- N.J. Douek & Uniglobe Coffee
- Olam Americas – Specialty Coffee Division
- Philz Coffee
- Royal Cup Coffee
- Swiss Water Decaffeinated Coffee

\$5,000 to \$9,999

- Batdorf & Bronson
- Belco SAS
- Coffee Libre
- Driftaway Coffee
- Eight O’Clock Coffee
- Equator Coffees & Teas
- Origin Coffee
- Reily Foods Company
- Single O
- Small Batch Coffee Roasters
- Specialty Coffee Association of Japan
- The Coffee Source
- Walker Coffee Trading
- Wilbur Curtis
- Workshop Coffee

\$1,000 to \$4,999

- Atlas Coffee Importers
- Cafcom
- Cafe Virtuoso
- Calendar Coffee
- Camel Coffee Co.
- C-COOP
- Chameleon Cold Brew
- Coffee by Tate
- Dark Woods Coffee
- Demus
- DR Wakefield
- Dunn Brothers Coffee Franchising
- Gimme! Coffee
- Honey Coffee/
- Izaki Coffee
- InterAmerican Coffee (U.S.)
- InterContinental Coffee Trading
- Irving Farm Coffee Roasters
- Japan Roasters’ Network

- Kaldi’s Coffee
- Kickapoo Coffee
- Kyokuto Fadie Corp.
- Marubeni Food Corp.
- Melbourne Coffee Merchants
- Mr. Espresso
- Orsir Coffee
- Ozo Coffee
- Pacific Espresso Coffee Roasters
- PublicUs
- Rave Coffee
- Red Cedar Coffee
- Roast House Coffee
- Sarutahiko Coffee
- Specialty Coffee Association UK Chapter
- Spyhouse
- Sweet Maria’s Coffee
- Tata Coffee
- The Seed
- Toa Coffee
- Tony’s Coffee
- Transcend Coffee
- Vides58 Coffees

Up to \$999

- 32Cup Specialty Coffee
- Adam Obratil
- Andrew Chinery
- Ann Margaret Cortez
- Barista Hustle
- Be Brave
- Beanstock Coffee Roasters
- Black Oak Coffee Roasters
- BlendIn Coffee Club
- Blow Back Coffee Roasters
- Blume Coffee Traders
- Bolt Coffee Company
- Boon Boona
- Boxcar Coffee
- Brian Gaffney
- Bridge Coffee Company
- Brookmill Roastery
- Buckman Coffee Factory
- Calanthe Coffee Company
- Camino Real
- Coffee Roasters
- Caravan Coffee
- Casa Espresso
- Coffee Factory
- Coffee Nexus
- Coffee Traders
- Colour Coffee Roasting
- Conic Roasting
- Crankhouse Coffee
- Crop to Cup Coffee Importers
- Curve Roasters
- Dave’s Koffiebranderij
- Dear Green
- Dispatch
- Espanola Coffee Roasters
- Etrusca Comercial
- Fortitude Coffee Roasters
- Fulcrum Coffee Roasters
- Full City Rooster
- Greenway Coffee Company
- Hacienda La Minita
- Heart and Graft Coffee
- Huckleberry Roasters
- Imbibe Coffee Roasters
- Iron and Fire Coffee Roasters
- Jonas Wellington
- Jones Coffee Roasters
- Kate Causey
- Kiss the Hippo Coffee
- Landmark Specialty Coffee
- Limini Coffee
- Lūna Coffee
- Marigold Coffee
- Market Lane
- Monastery Coffee
- NEAT Coffee
- Nicolas Rivolta
- North Fork Coffee Roasters
- Olam International
- Olam Specialty Coffee Europe

- Olisipo Coffee Roasters
- Ome Project
- One Cup Coffee Roasters
- Pedro Ros Casanova
- Prufrock Coffee
- Public Coffee House
- Quaffle
- Rabbit Hole Roasters
- Rebel Alliance Roasters
- Rebel Dog Coffee Company
- Red Goni Coffee
- Rimini Coffee
- Ringtons
- River City Coffee
- Rose N Crantz Roasting
- Rose Park Roasters
- Ross Street Roasting
- Savaya, Center for Coffee Excellence
- Sightglass Coffee
- Square Mile Coffee Roasters
- Structure Coffee
- Square One Coffee Roasters
- Taf Coffee
- Taiwan Coffee Laboratory
- Takewara Coffee
- Tamikka Sims
- Tee Nguyen
- Temple Coffee Roasters
- The Excellent Cup
- The Roastery
- Tung Nguyen
- Vagabond Coffee Roaster
- Verve Coffee Roasters
- Vessel Roasters
- Wakuli
- WB Coffee
- West Cork Coffee Roastery
- Zen Coffee Roasters

CHECKOFF PROGRAM PARTICIPANTS

Through the Checkoff Program, roasters and importers can directly support the future of coffee by contributing pennies per pound on every green coffee purchase.

Checkoff Participating Suppliers

- 32Cup Specialty Coffee Merchants
- Abira Colombia
- Algrano
- Atlantic Specialty Coffee
- Atlas Coffee Importers
- Be Green Trading
- Belco
- Bourbon Specialty Coffees
- Cafe Imports
- Cape Horn Coffee
- Capricorn Coffee Comercio Internacional
- Caravela Coffee
- Caravela Limited
- Condesa Co.Lab
- Crop to Cup Coffee Importers
- Descamex
- DR Wakefield
- East Africa Coffee Company
- Expocaccer Cooperativa dos Cafeicultores do Cerrado
- Exportadora de Café
- Guaxupé
- Falcon Coffees
- Greencof
- Hacienda La Minita
- InterAmerican Coffee (UK)
- InterAmerican Coffee (US)
- InterContinental Coffee Trading
- Kawacom/ECOM
- La Bastilla Coffee Estates Corporation
- List + Beisler

- Melbourne Coffee Merchants
- MTC Group
- N.J. Douek/Uniglobe Coffee
- Nordic Approach
- Olam Americas – Specialty Coffee Division
- Olam International Limited
- Zephyr Green Coffee
- Olam Specialty Coffee Europe
- Onyx Coffee
- Paragon Coffee Trading Company
- Racafé
- RGC Coffee
- Royal Coffee
- Sucafina North America
- Sustainable Harvest
- Swiss Water Decaffeinated Coffee Company
- The Coffee Source
- This Side Up Coffee
- Trabocca
- Twin Trading
- Volcafe Specialty Coffee
- Walker Coffee Trading

Participating Retailers

- National DCP and Dunkin'

Participating Roasters

- Allegro Coffee Company
- Batdorf & Bronson
- Beanstock Coffee Roasters
- Black Oak Coffee Roasters
- Blow Back Coffee Roasters
- Blume Coffee Traders
- Bolt Coffee Company
- Boon Boona
- Boxcar Coffee Roasters
- Cafe Virtuoso
- Calendar Coffee
- Camino Real Coffee Roasters
- Caravan Coffee
- Casa Espresso
- Chameleon Cold Brew
- Coffee by Tate
- Coffee Factory
- Colour Coffee Roasting
- Conic Roasting
- Counter Culture Coffee
- Crankhouse Coffee
- Curve Roasters
- Dark Woods Coffee
- Dave's Koffiebranderij
- Dispatch
- Driftaway Coffee
- Dunn Brothers Coffee Franchising
- Equator Coffees & Teas
- Fortitude Coffee Roasters
- Full City Rooster
- Greenway Coffee
- Heart and Graft Coffee
- Huckleberry Roasters
- Imbibe Coffee Roasters
- Intelligentsia Coffee
- Irving Farm Coffee Roasters
- Java City
- Jones Coffee Roasters
- Junker's Café-Rösterei
- Kaldi's Coffee
- Kiss the Hippo Coffee
- Landmark Specialty Coffee
- Limini Coffee
- Lúna Coffee
- Marigold Coffee
- Market Lane
- Monastery Coffee
- Mr. Espresso
- NEAT Coffee
- North Fork Coffee Roasters

- Olisipo Coffee Roasters
- One Cup Coffee Roasters
- Origin Coffee
- Ozo Coffee
- Philz Coffee
- Prescott Coffee Roasters
- Public Coffee House
- Quaffle
- Rabbit Hole Roasters
- Rave Coffee
- Relief Coffee Roasters
- Rimini Coffee
- Ringtons
- River City Coffee
- Zen Coffee Roasters
- Roast Factory
- Roast House Coffee
- Rose N Crantz Roasting
- Rose Park Roasters
- Ross Street Roasting
- Saint Henri - Micro Torrefacteur
- Sample Coffee Roasters
- Single O
- Small Batch Coffee Roasters
- Spyhouse Coffee Roasters
- Square Mile Coffee Roasters
- Square One
- Coffee Roasters
- Structure Coffee Roasters
- Taylors of Harrogate
- Temple Coffee Roasters
- The Beautiful Bean
- The Excellent Cup
- The Roastery
- Tony's Coffee
- Vagabond Coffee Roaster
- Vessel Roasters
- West Cork Coffee Roastery
- Workshop Coffee

RESEARCH PARTNERS

Our global network of coffee research institutions includes universities, consortiums, public agencies, and laboratories including private company research departments. These institutions have dedicated human and infrastructure resources to the implementation of the World Coffee Research strategy and are models of the cooperative and collaborative approach necessary to mitigate today's constraints and face

- tomorrow's challenges.
- ADCI/VOCA
 - ADNid
 - African Fine Coffees Association
 - African Coffee Research Network
 - Agricultural Research for Development in Africa
 - Alfonso Anzueto
 - American Public Land Grant Colleges and Universities
 - Asociación Nacional del Café, Guatemala
 - Asociación Salvadoreña de Beneficiadores y Exportadores de Café
 - Beneficiadora Santa Eduviges, Costa Rica
 - Brazilian Coffee Research Consortium
 - Café California Mexico
 - Carlos Rivas
 - Catholic Relief Services
 - Catholic University of Bukavu, Democratic Republic of Congo
 - CATIE Tropical Agricultural Research and Higher Education Center
 - C. Dorman, Kenya
 - Central Coffee Research Institute, India
 - Centre for Agricultural Bioscience International

- CIAT International Center for Tropical Agriculture
- CIRAD French Agricultural Research Centre for International Development
- CodoCafe
- Coffee Industry Corporation, Papua New Guinea
- Coffee Research Institute, Zimbabwe
- Coffee Research Program
- Cohonducafe
- Conflict & Development Foundation
- Conservation International
- Department of Agricultural Research Services, Malawi
- ECOM Trading
- EFICO Group
- Enveritas
- European Union Horizon 2020 Program
- FECCEG, Guatemala
- FEDECOVERA, Guatemala
- Finca Aquiares, Costa Rica
- FNC Cenicafé, Colombia
- Fundacion Aggie de El Salvador
- Fundación Fonalledas Inc., Puerto Rico
- FundaECO, Guatemala
- Global Coffee Platform
- Global Coffee Review (WCR Media Partner)
- Great Lakes Coffee Company, Uganda
- Guatemalan National Coffee Association
- Hacienda Barbara Panama
- Hanns R. Neumann Stiftung, Germany
- Hawaii Agriculture Research Center
- Hiu Coffee/Union Hand Roasted
- Honducafe
- IHCAFE Honduras
- illycafe, Italy
- Indonesian Coffee and Cocoa Research Institute
- Institut National Pour L'étude Et La Recherche Agronomiques, Democratic Republic of Congo
- Instituto De Ecología, Mexico
- Inter-American Development Bank
- International Women in Coffee Alliance
- Jamaica Agricultural Commodities Regulatory Authority
- J. Hill & Cia, S.A. de C.V., El Salvador
- Junta Nacional de Café Peru
- KAWACOM, Uganda
- Kenya Agricultural and Livestock Research Organization
- Keurig Dr. Pepper
- La Marzocco, Italy
- Landell Mills
- Lavazza, Italy
- Mercon Coffee Group
- MIDA Panama
- Ministerio de Agricultura y Riego de Perú
- Molias de Honduras
- MZPCPU, Malawi
- National Agricultural Export Development Board, Rwanda
- National Coffee Research Institute, Uganda
- Nicafrance Foundation, Nicaragua
- Norman Borlaug Institute for International Agriculture at Texas A&M University
- Northern Coffee Corporation Ltd, Zambia
- NSF International
- OLAM International Ltd.
- Peruvian National Coffee Board
- PROMECAFE
- Puerto Rico Coffee Roasters
- Purdue University
- Radio Lifeline
- RD2 Vision
- Rogers Family

- Royal Botanic Gardens, Kew
- Ruivarbo, Costa Rica
- RWACOF, Rwanda
- Rwanda Agriculture Board
- Rwanda Trading Company
- Rwashoscco, Rwanda
- San'a University (Yemen)
- Songer & Associates
- Southern Cross University, Australia
- Specialty Coffee Association
- Starbucks and the Starbucks Foundation
- Sucafina, Switzerland
- Sustainable Harvest Coffee
- TechnoServe
- TechnoServe Peru
- Tetra Tech
- Texas A&M Center for Coffee Research
- Ueshima Coffee, Japan
- UFLA Brazil (Universidade Federal de Lavras)
- UGACOF, Uganda
- United States Agency for International Development
- United States Department of Agriculture
- Universidade Federal de Viçosa, Brazil
- UTZ, The Netherlands

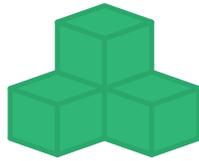
AFFILIATED ORGANIZATIONS

- Alliance for Coffee Excellence
- Coffee Quality Institute
- Crop Trust, Germany
- FlavorActiV
- International Coffee Organization
- National Coffee Association
- Specialty Coffee Association
- Specialty Coffee Association of Japan





**WE TURN
YOUR PENNIES**



**INTO AMAZING
RESEARCH**

Through the Checkoff Program, roasters can support our work by contributing pennies per pound or kilo of green coffee purchased through participating importers. See a list of participating importers and join the fight to ensure the future of coffee at:

worldcoffeeresearch.org/checkoff

