

FIRST INTERNATIONAL COFFEE RUST SUMMIT



FINAL REPORT

GUATEMALA, APRIL 18-20, 2013





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INTRODUCTION

Coffee is an export product with high impact on the economic and social development of many Latin American countries. The coffee industry provides jobs to thousands of persons in rural areas, contributes significantly to the foreign exchange income of each country, generates high volumes of oxygen, favoring environmental sustainability, has a multiplier effect on other productive and commercial activities, and enjoys a high international and domestic demand due to the delicacy of the drink obtained from the coffee grain.

Therefore, when there is a general or focused disease affecting the planting, harvesting, processing, and marketing of coffee, there is widespread concern which turns into actions from public and private, national and international entities, to halt and reverse the adverse situation.

This is the case of a disease that affects coffee plants significantly, which is caused by the *Hemileia Vastatrix* fungus, and known as coffee rust by all associated with coffee. It is estimated that crop losses for 2012/2013 may reach 30% or a little more, which is enough of an indicator to estimate the detrimental effect it will have on producing countries, in the short, medium, and long term, if the implementation measures to tackle this scourge is ignored or postponed.

The devastating effects of coffee rust motivated World Coffee Research (WCR) and PROMECAFE, together with the National Coffee Association of Guatemala – ANACAFE, for its initials in Spanish -, to plan, organize, and implement the First International Coffee Rust Summit, held in Guatemala City on Thursday 25, Friday 26, and Saturday 27 of April, with a preliminary meeting on Wednesday, April 24.

Support from multilateral institutions, private companies, public agencies, speakers, coffee experts, journalists, columnists, cooperatives, producers of coffee inputs, exporters, roasters, importers, and many other representatives of the large coffee chain was needed to bring about this event.

This Final Report includes what was discussed at the First International Rust Summit, beginning with the previous meetings, welcoming remarks, and the organization of the event. Following is a record of the topics addressed, which comprises an integral view of the problems resulting from this disease and the solutions proposed, which are and will continue to be promoted in the short, medium, and long term.

EVENT ORGANIZATION

The exchange of news and views from coffee-producing countries in Central America about current and future damage caused by the rust outbreak in coffee plantations made clear the urgency of addressing this issue thoroughly during a meeting with representatives from public and private institutions working in the coffee industry.

Due to the importance of coffee in Guatemala and its history as one of the leading coffee producers and exporters in the world, there was consensus about holding the “Coffee Rust Summit” here, hosted by the National Coffee Association, ANACAFÉ.

The event was sponsored by: Green Mountain Coffee Roaster, Inc. (GMCR), FOLGERS, RGC COFFEE, the United States Department of Agriculture (USDA), the U.S. Agency for International Development (USAID), and the Interamerican Institute of Agricultural Sciences (IICA).

It was decided to hold a Pre-Summit on Wednesday, April 17, to put forth and discuss topics in 8 working groups; each with an agenda. The summit was held during the next two days. On Saturday a summary of conclusions and recommendations would be made, evidencing what implementations are needed in order to face the critical situation brought about by the rust outbreak.

During the summit, the approaches produced by the groups were presented in plenary meetings for general knowledge of all participants. Thematic days were scheduled for Thursday 18 and Friday 19, to allow for the creation of a document to summarize the work done with conclusions and recommendations that all attendees should know, discuss, and enrich. Through questions and comments from audience and groups, in addition to relevant answers, actions agreed upon were prioritized, and the feasibility of their implementation was determined for the sake of coffee production.

On Saturday, April 20, an extraordinary meeting was held to summarize all the points addressed, to interact, and to learn key issues that resulted from the summit.

**PRE-SUMMIT:
THEMATIC APPROACH
OF RUST BY GROUP**

(Meetings held on Wednesday, April 17, 2013)

GROUP 1.

Situation Analysis

G.1.1 Group leaders

Mr. Alex Keller and Mr. Robert Nelson.

G.1.2 General approach

To produce the best solutions, you must first have the best analysis of the situation: what happened, why, where, to whom, and how. Seek to provide details known per country and global statistics.

G.1.3 Objective

Develop a working baseline for use by participants of the summit, of the knowledge on the outbreak of rust in Central America.

G.1.4 Deliverables

- Capture known information about the rust outbreak.
- Identify information gaps and provide solutions to fill the gaps.
- Develop a data collection matrix to analyze the causes of the problem.
- Conclude with the three highest-priority concerns.

G.1.5 Specific questions, issues, and concerns to address

- What really happened?
- What are the likely causes?
- What are the supporting facts? What is the scientific evidence?
- Due to origin, was the rust outbreak similar or different?
- Did farm size have an influence?
- Assuming that access to statistical information is poor, what indicators and methods can be identified so that a proper analysis of the situation is conducted and the limited resources are optimized in order to lessen the effect of rust in coming years?

The current rust epidemic has unique characteristics in intensity and pervasiveness in all kinds of varieties. Its impact is resulting in actual and potential job losses. The most affected country is Guatemala.

From the probable causes that allowed for rust to emerge, the following were considered the most important: lack of knowledge, the weather, little or no importance given to the problem, economic factors, migration, failure to communicate, poor agricultural management, and susceptible coffee varieties.

Climate changes have a high influence in the situation that we are experiencing with regard to coffee; they are affecting both resistant and non-resistant varieties. Producers were not warned nor guided enough. For example, fungicides were not appropriate or were not properly applied.

Moreover, the weather has been changing over short periods, while coffee takes four years to adapt to these changes. This means plants are vulnerable. The weather is so determining that the fact that rust has been present in Guatemala for 30 years affecting low-altitude coffees can be attributed to it; only now highland coffee plantations are also being affected.

It was confirmed through observation that well-managed plantations have no problems, while those lacking administration, in addition to incorrect fungicide application for 2 years, are the most affected.

Although Guatemala is the country rust has affected most, the difference with other Central American countries is minimal.

Farm size does not seem to imply a more or less severe rust impact. Rather, the damage caused by the outbreak is linked to the resistance level of varieties.

Another difficulty coping with the situation is the lack of methods to obtain information and statistical records. This prevents prioritizing the use of resources, which are already very limited.

It is important that local and regional institutions linked to this topic collect and systematize information about the weather, rainfall patterns, infection rates, crop varieties and quality, monitoring other diseases, soil types, and so on.

Then, what are the solutions to prevent another rust outbreak like this one in 2013 and 2014? Suggested measures include: to diagnose the situation, ongoing research, access to technology, extension services, development and exchange of better practices, diversification of varieties, monitoring and alerting systems, crop insurance, communication among producers and to society, and access to financial sources.

What is the priority?

- Research focused on different varieties.
- Extension services aimed to transferring knowledge and technology.
- Modernization of farm management through appropriate techniques and technology.
- Improvement of soil use and conservation.
- Investment oriented more towards research than marketing.

GROUP 2.

Short-term control

G.2.1 Group leader

Mr. Marco Arévalo, with Agroexpertos.

G.2.2 General approach

Rust control by chemical and agronomic interventions is the main conduit through which producers can avoid further damage the next season.

G.2.3 Objective

Provide plenty of knowledge on fungicides and other short-term control methods, so that governments, NGO's, private exporters, cooperatives, and other conduits have the latest technical information to assist farmer groups in taking the best decisions on fungicides.

G.2.4 Deliverables

Fact sheet on short-term control methods and related good agricultural practices. SWOT Analysis of recommendations for each intervention.

G.2.5 Specific questions, issues, and concerns to address

- Which fungicides to use and how?
- What agronomic practices can be recommended?
- Which aspects are important to take into account in short-term control measures?

The life cycle of the disease must be known. We must not wait for the disease to appear. Fungicides have to be applied when the rainy season begins. Small grains must be protected.

Systemic fungicides are recommended (foliar): Epoxiconazole (Opus), Cyproconazole (Alto), Caporal, Silvacur, Amistar (azoxystrobin). Constant monitoring is necessary. Due to natural plant protection, seeds are not intoxicated.

Fungicides producers are concerned. These products must be registered in every country. We must not forget that each coffee-importing country has regulations of its own regarding the maximum amount of fungicide allowed.

Regulatory agencies take into account the residues in green coffee, when actually they should measure roasted coffee.

ANACAFÉ recommends Epoxiconazole (Opus) when the grain is still small and, 45 days later, an application of Cyproconazol (Alto), which has proven very efficient in the last 15-20 years.

It is important that companies train fungicide applicators on their use.

Coffee consumption is closely related to food safety: fungicides should not be a problem if applied correctly. Fungicide residues must be less than the MLR limits of the consuming country.

Risk criteria must include: (1) long-term health, (2) security for those who apply the fungicide, and (3) the environment.

Certified organic production only allows the use of coppers. They are suitable for low levels of rust and are applied every 30-35 days. At higher incidence, lower effectiveness.

Shade management is an important factor to agronomic practices. Shade must be regulated. It seems that “at more shade, more rust, because at less light, less radiation - which promotes rust.” It was mentioned that in Guatemala there is rust with or without shade, with or without sun. The severity of rust will depend on the weather and the amount of shade. After the first prune, up to 3 additional prunes must be made after the productive cycles.

Furthermore, an undernourished plant exposed to sunlight is more prone to rust.

In short, agronomic techniques cannot be recommended widespread, because conditions in each country vary.

Fungicide investment to control rust is high:

- Brazil: 1-2 bags of green coffee (60kg) = cost of fungicide / ha per year. 90% of producers use this model in Brazil.
- Guatemala and Costa Rica: fungicide cost + labor, US\$150-200/hectare/year

GROUP 3.

Socioeconomic impact of the rust outbreak in the living conditions of producers

G.3.1 Group Leader

Mr. Michael Sheridan.

G.3.2 General approach

Analysis of the situation regarding the macroeconomic impact at household level. Understanding the impact on family farming and discussing options, alternative agriculture included.

G.3.3 Objective

Define and quantify the socio-economic impact of the rust outbreak in Central America. Develop strategies to help vulnerable populations rebuild their livelihoods and cope with the crisis while reverting it.

G.3.4 Deliverables

Capture basic information about the impact on producers and communities. List and analyze critical points. Conclude with the three highest-priority concerns. Summarize the strategic plans of the Central American governments and potential methods to support government strategies with private sector programs and NGOs.

G.3.5 Specific questions, issues, and concerns to address

- Define the problem and the impact
- What factors are directly related?
- What concerns are generated by a rust outbreak?
- What are the fundamental facts?
- Are there related critical points?
- At what point should a producer be advised to leave the coffee sector? What alternatives are there? Which organizations will provide support? How?
- What current problems intensified due to the rust outbreak?
- Any atypical cases or contradictory information?
- Taking into account socio-economic concerns, which needs call for attention?
- Why do these issues need focusing?
- Which are the highest-potential opportunities?

The exercise related to socioeconomic impacts focused on three aspects - current situation, future situation, and action plan - with three key indicators (income, employment, and food security).

Current Impacts

In Guatemala, drought has spread to many areas, affecting many producers already at subsistence level. Throughout the Central American territory, losses are reported of 30 or 40% the harvest. Major problems occur in low areas, but the weather spreads them into higher areas.

Preliminary estimates position the loss of coffee sacks and their monetary value in extremely alarming figures, projecting a decline in production of 40%-50% in 2013/14. The total economic impact (including all aspects) is estimated in a loss between \$1.5 and \$2 billion.

In terms work, a reduction in the number of temporary and permanent jobs is registered with the consequent reduction in family income.

Two indicators of the rust impact are: incidence (percentage of plants with rust) and severity (on each plant). There is no decline in quality but in quantity.

At present, one of the big issues is that measurements are different among countries, and this is where uncertainty derives regarding which country will be more severely affected. Statistics are usually elaborated by PROMECAFE, but a specific basis needs to be used in order to avoid loss of credibility.

Prices will continue to decline until September. They are artificially low. It is estimated that they will continue to decline because coffee is being diluted with “Robusta”.

One of the main problems is the lack of reliable information as to which varieties should be grown, which fungicide to apply, and what indicators to follow to be well informed.

Future Impacts

It is deemed that if no immediate and coordinated action is taken against rust, the crisis will be much worse in 2014 (80% loss).

Security as a problem in itself will increase. Guatemala is a bridge for drug trafficking. If 400,000 people (in the region) are losing their jobs, the unemployed would be eligible for illegal ways to generate income, such as drug trafficking or kidnapping.

In the case of Guatemala, food security becomes an issue of national interest due to the increase in crime, migration to the United States, and farm invasions.

A food security problem is not forecasted in El Salvador. This is thanks to the Salvadoran government’s endeavor to help produce basic grains. Problems will likely arise regarding other issues but not food safety.

There are a considerable number of producers who may be affected by factors such as difficulty to access funding, fertilization, and plant renewal.

Impact will depend on the decisions made by coffee growers. A decline of 30-40% in occupancy levels of coffee is predicted.

Producers must be provided with diversification options so that they can balance out better opportunities (hydroelectric plants, mango industry, etc.).

Action Plan

Central America needs US\$1-2 billion to reactivate the coffee industry. The budget should include an emergency support fee while producers recover.

It is urgent to make an action plan that includes the following lines:

- Unified database that measures key indicators
- Monitoring of food safety issues (climate, first and last season production, prices, diversification, etc.)
- Funding: money for diversification and how it will reach farms effectively
- Identification of funding sources

The plan needs to pinpoint how to communicate the return of coffee to the industry. Also it needs to get stakeholders to remain on the market.

Commitment to sell as well as commitment to produce high-quality coffee must prevail: an internal exchange of ideas and experiences to reach efficient solutions; a viable plan for the roasters, and special attention to customers.

GROUP 4.

**Mitigation strategy: Financing,
 credit, trade, and solution delivery**

- NOTE: At the pre-summit was decided to move the discussions of this group to the meeting that took place on Friday, April 19, as part of the summit program.

Group 5.

Extension models

G. 5.1 Group leader

Ms. Rebecca Ott with J.M. Smucker Co.

G.5.2 General approach

Technology and information must reach the hands of producers in order to be applied against the reappearance of rust in 2013/14. This meeting aims to help understand the available extension types and evaluate the best methods to transfer technology to producers.

G.5.3. Objective

Short-term control of coffee rust must be carried out by farmers who know fungicides and how to apply them in the safest and most effective way. Besides fungicide application, good agricultural practices can help increase tolerance to rust resulting in increased productivity and quality. This group will identify ways to provide farmers with information and services for rust control and prevention in a more strategic fashion.

G.5.4 Deliverables

- Information flow diagram: a matrix including extension efforts by existing organizations
- Identification of technological interventions that need to be extended / transferred to farmers and the accompanying training needs
- Determine how control information and technology will get into the producer's hands
- Strategies for linking public extension, research, and experience with private sector, NGOs, and donor programs to ensure that extension messages reach farmers

G.5.5 Specific questions, issues and concerns to address

- Who provides the information?
- How do organizations interrelate in order to coordinate among themselves and avoid duplication?
- What gaps exist within current efforts?
- What other improvements can be made in transferring technology?
- Are there alternative approaches?

The following extension models can be mentioned:

1. Training trainers. This refers to training many facilitators so that, in turn, they replicate training in cascade effect. It is a low-cost strategy. It is usually done at the place of instruction. It covers the theoretical part. A demonstration is made, and then participants themselves monitor its implementation.

2. Group trainings organized by topic. These groups can replicate to individual producers.
3. Learn by doing. Producers who already have experience in organic production accompany the technicians in a completely practical approach. A demonstrative tour of success stories is made. Irradiation or model plots are mentioned to keep a record of organic production and present it to producers, with the proviso that one of the problems in some Central American countries is lack of staff.
4. The Anacafé model: combines training and demonstration in coordination with regional offices. Demonstrations, videos, and audio-visuals are used, through the website.

Local coffee organizations in each country are usually the facilitators of these models, complemented by NGOs efforts and / or programs of the Ministries of Agriculture.

There should be complementarity between local (government, private, and social) and regional organizations. In regard to government organizations, in some cases, it was found that some handle their policy in a rather particular way.

The challenges to overcome include illiteracy, which hampers training; poor electric power provision, which limits projecting audiovisual material; difficulty to communicate in Spanish due to the lack of knowledge of local languages; lack of budget; among others.

It is necessary to rely on a constant technology update through the use of cell phone applications, support from satellite maps, etc.

GROUP 6.

Rust monitoring / early warning system

G.6.1 Group leader

Mr. Jacques Avelino, expert rust epidemiologist

G.6.2 General approach

In order to prevent disasters such as rust, which will cost to governments and farmers billions of dollars, an early warning system (EWS) that can detect signs of a future disease based on biological and metrological data will be a great asset for Central America. This could include an assessment of the sources of information, such as geographic information systems (GIS), technical data / pathology, and climate / weather changes, and use them to monitor and warn vulnerable populations.

G.6.3 Objective

Discuss collectively the components of each system (monitoring and alerting) and coordinate the efforts required.

G.6.4 Deliverables

The path to follow in order to establish early warning systems and regional rust monitoring that describe the following components:

- GIS
- Technical / pathologic / monitoring aspects
- Training
- Coordination and management
- Communication

G.6.5 Specific questions, issues, and concerns to address

- Taking into account results, resources, and constraints, what are the criteria?
- What is the early warning system and how does it reach the right hands?
- What information needs to be available?
- Where is the information?
- How frequently should it be evaluated?
- How is information coordinated?
- Who is responsible for the information?
- Possible alternatives for the coordination of these systems.

The coffee industry is facing a rust epidemic never before as well as highly-variable climatic conditions. This makes it essential to have monitoring and early-warning systems, not only for the producer but also for institutional decision makers.

This system should include not only aspects of rust, but of any other agronomic or meteorological concerns that affect plantations. Fortunately, we are not starting from scratch; there already are several experiences from which we can learn.

At producer level, “sentinel” plots are a reference tool for monitoring rust and weather conditions.

In Costa Rica, daily messages are broadcasted to producers through radio and cell phones.

One monitoring system consists of counting leaves with rust to determine the incidence of the disease. A more institutional method may be the dissemination of information through technicians. Regional information can help alert producers in other countries on a particular situation.

Another system is that an entity, such as the Ministry of Agriculture, calls certain producers every ten days to ask standardized questions and integrate them into a report.

Due to illiteracy, distances, and the dispersion of small producers, it is difficult to receive and transmit information to the rest of the country.

At decision-making level, there are a number of information tools that will help long-term preventions on food safety, fishing, catastrophes, agricultural problems, etc.

ANACAFÉ is working with a network of weather conditions by geographic areas. It designed an information system with favorable hours, number of times it rains, daily rainfall, and favorable weekly data. According to the number of leaves with rust submitted to the institution, it can make a projection that in “n” time a disease may appear. The map serves to prevent epidemics.

The group prioritized the following factors for a monitoring and early-warning system:

- I. Multi-plague monitoring at the beginning of the rainy season
 - Central American Weather Forum (climatologists’ network)
 - Methodology definition

- II. Compilation of information from producers
 - Georeferenced
 - Communication (telephone)
 - GIS → mapping
 - Frequency: monthly
 - IHCAFÉS
 - Incentives
 - Quality control
 - National / regional

GROUP 7.

Replacing varieties and development of new resistant varieties

G.7.1 Group leader

Mr. Vincent Petiard, Chairman of the Technical Committee RGC Coffee

G.7.2 General approach

Long-term prevention can only be achieved through new programs for developing resistant varieties. These programs should address not only the need for new rust-resistant genes, but also the combination of rust resistance with the CBD, CBB, CLS, and other diseases that occur or appear. Good-quality traits must be taken into consideration.

G.7.3 Objective

Ensure that producers have the best information for choosing varieties for plantation-renewal programs in the short and medium term to ensure that Central American producers have the highest-yielding and most resistant varieties with excellent quality in the future.

G.7.4 Deliverables

- Long-term cultivation strategy, highly resistant to rust and with high-quality attributes.
- List of current varieties with data on quality, productivity, and resistance
- Seed availability for renewal schemes
- Alternatives for seed-production expansion for renewal schemes
- Advantages, disadvantages, and risks of new varieties / replacement varieties

G.7.5 Specific questions, problems, and concerns to address

Why are we in this situation regarding coffee varieties? There are no seeds for coffee. There has been no genetic innovation. A seed industry for coffee does not exist. Just now, very recently, companies related to agronomy have tried to find new seeds.

At present, available varieties are Costa Rica 95, Lempira, Sarchimor Parainema, Oro Azteca, Iapar 59, Ihcafé 90, and T-5296.

The coffee industry is at the point where more resistant seeds need to be planted. Do we have the seeds?

Where do we find them? Lots of tissue culture is needed but cannot be produced. In addition, much of the problem is concentrated in the working capital and capital investment for plants and technology.

You cannot develop a strategy based on rust resistance alone. We must continue with Caturra and Catuaí. Breeding must continue. It is dangerous for a country to decide to go on its own. It must have variety to have long-term sustainability.

It is not recommend that all efforts be directed towards a single variety. New sources of resistance must be sought. We need diversity of varieties to divide the risks. This is even good for quality.

Enough seeds must be made available to the producer, but there are not enough hybrids. Coffee institutes must take decisions judiciously so that the best options are available to producers.

Unless genetics progress, we will not succeed. In coffee, you must seek productivity and quality. Rust is not the central problem. Resistance is not constant. Materials that are resistant today will be susceptible in 20 years. This is why it is important to work constantly in production.

There is no ideal solution, and perhaps there never will be. However, there are the following lines of action in the medium term:

1. The Timor hybrid plant is a good prospect - obtained from a cross between Arabica and Robusta.
2. New F1 hybrids.
3. Interspecific hybrids.
4. Pathogen genome sequencing.

There are many possibilities in the long term: a preproduction component to create varieties that can be used in all the countries, according to the particular conditions of each. Joint projects already exist, which have the support of international and national agencies in the field of preproduction. Another suggestion is to recreate Arabica, which comes from two plants: *C. canephora* and *C. eugenoides*, using two species of origin.

It is necessary to note that coffee is a permanent crop. This makes replacing a variety not so simple. Even if you have new varieties, it is complicated to take them where a farm is already planted. To this must be added the difficulty to distribute them and the financial sources available for the producer to obtain varieties.

GROUP 8.

Communications

G.8.1 Group leader

Mr. William Hempstead.

G.8.2 General approach

Technology and good agricultural practices are the main short-term response to control rust. Many farmers are not covered by the extension and training systems. Therefore, it is necessary to develop a communication program to reach them all.

Objective G.8.3

Propose strategies, planning, and communication tools to convey useful information to local farmers on rust control.

G.8.4 Deliverable

Communication strategies.

G.8.5 Specific questions, issues, and concerns to address:

- Which organizations are communicating in the countries?
- What are the key messages to be communicated?
- Who will pay for these communication interventions?
- How will its effectiveness be monitored?

The two target groups of communication are producers and members of the coffee chain. It is not advisable to send messages to consumers.

The different levels of communication that must be handled are local, national, regional (Central America), and international.

In each coffee-producing country, communication is handled by its professional organizations. Efforts are made by each country, but there is no coordination of information between countries. Regionally, PROMECAFE has a key role in coordinating and delivering messages representing all the national organizations. Coordination is vital for producing countries to exchange information materials and unify contents.

Feedback channels should be opened to have communication go from organizations to producers and vice-versa.

A communication master plan must be designed, which must be made known at all levels.

Key messages should be structured so that they are clear, simple, transparent, agile, and true.

The financing of communication must be the result of alliances that generate the lowest possible costs. The sponsorship of those involved in the coffee chain must be sought; such as retailers, suppliers of fungicides, shipping companies, NGOs, and related entities.

Monitoring should accompany communication through monitoring systems designed for news generated in a decentralized manner and in different geographical areas.

DEVELOPMENT OF THE INTERNATIONAL SUMMIT

MEETING No. 1:

Opening ceremony of the International Summit

The opening ceremony of the summit took place in the Salón Los Presidentes of ANACAFÉ - the National Coffee Association of Guatemala, chaired by professional staff related to the coffee farming activity from the private and public sectors.

As the host, Mr. Nils Leporowski, President ANACAFÉ, on behalf of the national coffee-growing industry and the institution he represents, addressed a welcoming to all attendees, emphasizing the following in his speech:

- “We have come together seeking joint solutions that allow us to better address the problem of coffee rust. It is a very important issue, and the presence of all the institutions represented here, including IICA, confirms our commitment.
- 1 month ago, this crisis was discussed in Costa Rica, and we are resuming this discussion with a regional focus, which is very important.
- It is essential that we organize as to coordinate actions in the short, medium, and long term.

Following, various national and international personalities linked to coffee growing addressed the attendees with keynote speeches that confirmed the international concern and their commitment to collaborate in helping coffee-producing countries to find ready and sustainable solutions.

They participated in the following order:

- Lloyd Day, Assistant General Director of IICA
- Elsa Murano, Executive Director of WCR, and Director of Borlaug Development Institute, University of Texas, USA
- Robert Nelson, President of the National Coffee Association, NCA
- Ric Rhinehart, SCAA
- Robério Oliveira Silva, Executive Director of OIC
- Tim Schilling, University of Texas

MEETING No. 2

Conference

NATIONAL STRATEGIES AND REGIONAL STRATEGY ON RUST

by **Mr. Armando García, PROMECAFÉ**

(Cooperative Program for the Technological Development and Modernization of Coffee)

The conference focused on the following points:

- The starting point is the Action Plan with immediate measures, 2013, which is under development.
- The approach is comprehensive.
- Four elements involved in the development of rust: crop mismanagement, neglect of plantations, aging plants, and susceptible varieties.
- Economic environmental and social sustainability of regional coffee growing must be sought.
- The Action Plan promotes a regional approach in order to achieve a better regional outcome, as opposed to individual effects achieved by each country.
- General objective: to contribute to an integrated fight against coffee rust and towards the recovery of the coffee plant productivity through immediate actions.
- Specific objectives: to perform actions systematically and effectively for an integrated management of rust, to promote the genetic upgrading of rust-resistant coffee, and to produce good quality cups.
- The components of the integrated rust management plan are: coffee improvement, attention to vulnerable populations, and institutional capacity development.
- There should be a regional communications program for producers in the region that generates specific, short, and uniform communication products.
- The coffee rust website, which is underway, needs to be developed to centralize all the rust information of the region.
- There are radio spots on 5 topics already, which can be downloaded from the PROMECAFÉ website.
- An early warning system should be in place.
- In genetic improvement, it is important to strengthen the program that PROMECAFÉ has had for long, including the study of alternatives of resistant varieties.
- Implemented actions must be taken into account at institutional level and also at field-producer level.
- Alliances with universities and other institutions.
- It is advisable to start a pre-investment process in the countries, including even coffee-parks renewal.
- The financial administration of the integrated program to combat coffee rust includes a 4-year budget, US\$8.1 million.
- There is another strategy by IICA-BCIE, to be taken into account to complement efforts.
- There is a pre-investment process in place in the countries (renewal and rehabilitation of coffee plantations). In each country, through IICA, the National Coffee Association, and the Ministries of Agriculture. Estimated cost: US\$800 million.
- Together we can control rust: PROMECAFÉ, CATIE, IICA, CIRAD, BCIE IDB, and other institutions.

A group to discuss the strategy for integral rust combat was created according to the concerns, comments, and / or questions from the 8 workshops. Group members: Miguel Medina, Vice-President with Anacafé,

and representatives from PROMECAFE, the Dominican Coffee Council, coffee institutes from Costa Rica and Honduras, and CIRAD. Members of the groups formed during the pre-summit, asked questions and made comments, to which the group answered.

Following are notes from each group on the questions and comments about what was discussed during the conference, as well as the answers given by group members.

Question by Group 1.

- *A clearer definition of ways to support the affected population, what will producers live on during the 1-4 year recovery period?*

Impact is greater than meets the eye. The incidence span is Mexico to Peru.

Support to vulnerable producers and collectors includes getting help. The example of Costa Rica: a program from an institute for social assistance called “Manos a la obra”, which in addition to the effort made, provides financial support for four months.

In regard to collectors, in the case of Costa Rica, it is also being coordinated with authorities. On the topic of breeding, PROMECAFE carried out a high-impact effort which resulted in F1 hybrids. They are resistant to rust.

Another issue is the in vitro multiplication of these plants, which need to get to producers fast. Support is needed to produce them by the millions.

The best time for renewal is now. Already there are pruned branches, and plants can be severely pruned, because there will be no production this year. This is the time but we do not have the seed, and when we do, pruned plants will already be producing.

The issue of renewal has never been solved.

We will need some kind of incentive for the next few years, so that when plants are given to producers, they are willing to give up part of their harvest for a while in order to allow for renewal.

Questions from Group 2

- *What are the funding instruments and how to avoid their being bureaucratized?*

In Costa Rica technicians visit farms and make a technical and financial analyses of each property and its history of about five years. Reports are sent to the central bank, which is providing the funding. Banks are concerned with guarantees. Terms are 12 to 13 years with 3 years grace. Banks help with the interest rates. We have to see how the producer enters this program because there is risk to it.

In Honduras, producers are willing. How to finance the restructuring is being discussed. The issue is funding.

In Guatemala, we have noted considerable increases in the prices of fungicides. We made three applications and negotiated a better price globally. Regarding funding, we have approached several entities, but they need the government to join. At present, we do not have a solution to prevent this from bureaucratizing. We have identified the size of plantations and the treatment each needs. We do not believe that everything will be solved simply by planting resistant varieties.

In Panama the cultivation of coffee is not as important as in the rest of the region, but 60% of the plantations are over 20 years old and producers are very small. The biggest concern is that coffee is a medium-term crop (2-3 years). What will people do while crops recover? An option is to get loans through official banks at an interest rate of 2% and seek alternatives parallel to the recovery of coffee plants, because people have to live on something and are looking for other self-managed opportunities also through funding, during recovery.

In the Dominican Republic, funding has a 41-point interest rate for renewal processes. The coffee park is very old, with low-yielding, very susceptible varieties. We are making funding efforts to renew or replant 30% of the coffee park within the national proposal that PROMECAFÉ is working on. Still, we have to create some incentives for the initial period. We must look at the social aspect.

One approach that has been successfully implemented is the solidarity card. Something similar could be done with a coffee solidarity card for producers to buy supplies.

- *How will the quantification system of the infection be implemented efficiently so that control recommendations are timely?*

This must be done through national associations, with support from international organizations.

Questions from Group 3

- *How will the plan be linked to the industry - liaison mechanisms to the private, exporting, industrial, and purchasing sector, and roasters, who are interested in finding solutions?*

April 11 was Coffee Day in the Dominican Republic. The President declared an emergency situation on rust. These actors are a part of the situation and committed to resolve it. The board of the Dominican Coffee Council is comprised of the official sector, the industry, and producers.

At ANACAFÉ we deem it important to send one message and make one plan. We have our technical team and could make a complementary plan. But just one message; otherwise, we will confuse the producers.

In Honduras, due to this problem with rust, the time came to check on cooperation. It must be redirected, but the diagnosis must be clear. I think it has been contributed to very responsibly. We have a strategy in each country, which shall decide what actions to take. We now need the support from donors and the general industry. There has been willingness to redirect resources, e.g. with Technoserve. There is an opportunity to renew the orientation of cooperation.

Questions from Group 4

- *What does the plan say in regard to how the small producers will survive the crisis in the coming 2-3 years?*

We have identified migration flows. The most important thing is to help renew production in order to promote this work. We know that the ability to respond to new plantings is limited. We have certified-seed producers in Guatemala, some resistant, some not. We are not talking about renovating the entire coffee park, but going by parts.

Coffee institutions have a problem communicating data when they lack sufficient human resource to reach all places, but the information is not so complicated. 30-40 years ago, when rust arrived in Central America, a very clear message was conveyed, and I do not see why today we could not have good results. But we have to renew the technical capacity of the technicians.

- *How can we ensure technical capability, assuming there were resources for purchasing seeds and fungicides?*

National associations must provide their technicians with constant updating courses and training.

Questions from Group 5

- *Does the budget include the amount of funding (credit) needed for producers to invest, or does it cover only technical assistance and implementing the plan per se?*

Honduras: we have calculated for renewal time some 1,500 per acre of land. Approximately some 50,000 producers, in some 30,000 badly affected acres could be looked after. We approached the government, but it lacks resources. Hence, we have redirected resources. We undertook an effort to negotiate with two banks involved in this issue, favorable conditions: 7-year terms, 3 years grace, and 10% interest. The process can be replicated in other contexts. We will not wait for the government to help us, because each government has its priorities and limited budgets. We will succeed because we have the will and know-how, but every effort and all the necessary sacrifices must be made.

- *If resources were available, are there still time and enough supplies to start working, or is it too late for this harvest?*

There still is time to carry out specific actions to avoid a catastrophe. The plan is regional, but each country has its own problems, such as inaccessibility to many areas. You cannot go too fast nor is it easy, so each country must make the necessary adjustments to move forward in the best way.

Questions from Group 6

- *Who is going to increase plant material proportionally and which varieties will be increased?*

We hope to answer that question when we look in detail to the situation analysis and related topics.

- *What are the plans for in-farm validation practices as to the impact of rust incidence and severity?*

Progress has been made on this issue. PROMECAFE can lead and guide.

Questions from Group 7

- *When will seeds and other propagating material of new varieties and hybrids resistant to rust and other diseases be available to producers and what will be the cost of seeds?*

This question was somehow answered previously.

- *How can a good evaluation to mitigate the environmental effects of these initiatives against rust be incorporated into the strategy?*

The balance of effects is complicated and may be uncertain. I noticed that shaded plantations have less impact than those under full sunlight. Here lies the importance of the message - prevent contradictory messages.

Questions from Group 8

- *How do you link the plan to profitability, production, and prices? Links to types of coffee: special, organic, and generic. There is limited access to technical information in remote communities. The environmental core is fundamental: climate change and climate variability.*

Climate change is not really the problem; climate variability is. It may not last long, but it will last about 10 years. Maybe, during a few years we will have conditions for rust, others for berry borer, and others for rooster's eye disease. Then, the main difficulty is that the producer is not prepared for the problems that arise. It is vital that the effort is not dedicated solely to rust, but rather a holistic approach to the diseases of coffee.

Yes, the trigger is a weather phenomenon. Other weather changes may help rust disappear, but other diseases will appear. Therefore, we need to be prepared for everything with a holistic view.

Limited access to technical information can be overcome with a communication strategy that prioritizes radio programs with different topics. It can also help to train leaders.

In terms of profitability: the relation within technical charts has been discussed. Balance must be reached and strategies developed. The better coordinated all processes are, the higher the profits, but there is much to discuss and analyze. The important thing is to come up with an integrated plan.

The philosophy of not having only one variety is very interesting. Don't put all your eggs in one basket. We must have varieties that are highly valued in the market, but also resistant varieties, with which to cope against rust. Don't just have one variety in the farm. Have a palette of varieties to better deal with risks. Therefore, when hazards arise, only part of the plantation will be damaged not the whole.

Costs have increased due to the applications needed. Two years ago in a symposium of specialty coffees, the price was \$3 per pound, and it was said that a fair price would be \$2. Now nobody mentioned the right price issue, and price increase is not showing in productivity. Prices paid for organic coffee are relatively low. I do not see how it will survive.

Question from the audience:

- *You have mentioned everything regarding integrated management, but have forgotten about nutritional management. Does the comprehensive plan include coffee nutrition and inducing plant resistance through phosphites and pesticide reduction?*

In Anacafé we do contemplate nutritional issues. We cannot only recommend fungicide application if the other work will not be done.

A well-nourished plant is better equipped to renew after pruning. There will be no production losses the following year.

There may be nutritional factors that affect the capacity of the plant to respond to diseases.

Resistance as such cannot be induced in the plant.

MEETING No.3

Situation analysis

Mr. Peter Baker was in charge of this meeting. He is an expert on climate changes and rust trends, and member of CABI: British Research Organization.

The meeting developed as follows:

What happened actually?

- It began in Guatemala in 2010.
- All non-resistant varieties were affected. There are signs that even Catimores were attacked.
- 2012: The worst attack ever registered in Guatemala. In the other countries, too?
- But, do we have a historic record of previous epidemics in Central America?
- There was some basic prevention, but not enough.
- It was not taken very seriously; there was a problem of perception, failure to understand that, in a way, “the game has changed.”
- Nevertheless, well-managed fumigated plantations show little damage.

Learning from the Colombian experience:

- Is this situation similar to the epidemic in Colombia?

It began there in 2008. It was in 2010 when it really stroke hard. Good weather information helps explain what happened:

“After the long winter of 2008 and 2009, in the first half of 2010, summer was intense and skyrocketed levels of berry borer, affecting mainly the high- quality harvest in north Huila. Later, with the first rains, came the most abundant blooms of recent times, which portended a great harvest for the second half. Nevertheless, there were severe rust attacks, which found a favorable environment in non-resistant varieties – a true Achilles heel for Huilense coffee growing.”

Regarding similar evidence in Central America, there is relatively little information available. Suggestive information from Honduras:

- 2012 was not a very unusual climatic year, no strong El Niño or La Niña.
- 2010 was very humid. Was this a contributing factor, like in Colombia 2008-09?

What we know is that the weather in Central America has been changing:

- Temperatures have risen everywhere
- The wet season is heating up more than the dry season
- Greater precipitation events are increasing in the region

What we need to know:

- Potential early warning of future similar situations.
- How unusual recent climate parameters have been.

Probable causes:

- The weather has changed: warmer conditions. Lower temperatures with rain promote rust. The disease has reached higher altitudes than before.
- 2011-2012 provided ideal conditions, not so warm - not so cold - not so humid - not so dry, but more information is needed. Does it take more than a year for a strong rust epidemic to start?
- Good blooming, heavy bearing trees are more susceptible to rust.

Economic issues:

- Historically there have been insufficient economic resources to cope with rust.
- Fumigating costs about \$250/year. Why do it, if it has not been a problem?
- Inadequate agricultural practices (poor infrastructure - very bad roads after the 2010 storms).
- Have migrant workers taken rust spores with them?
- The problem was underestimated. Some warning signs were in place, but what happened surprised everyone, even scientists.

Consequently, these had an effect:

- Complacency and ineffective communication.
- Inefficient application techniques (size, frequency, and timing of applications).
- Getting used to fumigating “just in time” rather than “just in case”.

Insufficient communication:

- Warning conflict: most coffee producers have susceptible varieties - warning conflict between technicians (resistance) and roasters (susceptible varieties due to quality).

Are situations similar or different due to origin?

- No major differences found throughout Central America.

Was the impact similar in most countries?

- The main differences are related to the resistance of varieties in each country and different microclimates, or plantation density, and shade levels.

PROMECAFÉ has collected information on damage. Do we have a uniform sampling methodology for the future?

Are situations similar or different due to farm size?

- Farm size is not relevant. Damage has widely spread.
- Large and well-managed farms, surrounded by small farms lacking good management, may also be affected by rust.

But small farmers have fewer resources; therefore, they are more affected. Could they give up coffee faster as a result?

- There are economic difficulties for workers: in the past, when few plantations were affected, workers moved to other farms. Today this is not possible due to the wide geographical extent of affected areas.

Rust is not the only problem. There are others like the “rooster’s eye disease”, which has affected Panama, Costa Rica, and Colombia.

To summarize why rust has developed is complicated, but basically reasons are:

- No main cause
- Climate factor (rust now attacks at higher altitudes)
- Knowledge factor (lack of awareness, not taken seriously)
- Economic factor (general high fumigation costs)
- Technological factor (lack of varieties, long-term research neglected)
- Institutional problem (lack of support for routine monitoring of the disease and to raise awareness, growth, training)
- Lack of agencies (poor monitoring, implementation) due to chronic weakness and low institutional funds

Where is science in this?

In order to get closer, we need more systems, like Avelino’s rust machine.

Limited resources must be prioritized to address the current situation and to reduce impact in future years.

Also, information must be gathered: organized, analyzed, and distributed. Share statistics with producers preventively and take corrective actions. Get information and do research in:

- Climate: temperature, rainfall amounts and patterns, relative humidity, sunlight and shadow, the presence of El Niño and La Niña.
- Levels of infection, incidence, and severity
- Satellite maps
- New varieties
- Test / improve quality of Catimores
- Gather socioeconomic information
- Monitor other diseases (e.g. Rooster’s eye disease)
- Renew plantations
- Topography
- Altitude
- Soil types
- Soil conditions
- Physical and chemical analysis of soils

As a result, the following priorities were established:

- More diagnostics
- Field monitors for early prevention alarms to immediately activate corrective treatments
- Use of technology (cell phones)
- More ongoing research to improve technology, more diversity of varieties

- Monitoring farm systems: changes in tree density and modification of the shade to increase the endurance of coffee plantations
- Further studies on rust, its genetic diversity and virulence
- Improve financial resources
- Develop improved farming practices
- Create programs for crop insurance
- Improve networking and communication among producers
- A change in attitude by all stakeholders
- Better-equipped extension services to transfer knowledge and technology
- Better use and conservation of soil

All this leads to a new beginning, which must take into account that:

- We are playing with new rules: climatic conditions are more extreme now.
- We cannot continue as before. We must be more proactive, less reactive.
- This means that all farms must improve and access resistant varieties.
- It will take more research and extension, more innovation, and better overall farm systems.

The group comprised of members of Group 1 and Mr. Peter Baker responded to questions from groups and the public.

Questions by Group 1 itself:

- There is discouragement among producers; they know what to do but don't have the resources.

Financing alternatives and training need to be offered through extension. The best solution for everyone would be to increase the price of coffee. But even if quality is maintained or improved, that would not be up to producers. The market determines the price.

- *How could support from donors be defined and articulated?*
- *How could a Central American international pact be made to reduce impact, since it is greater?*

To both questions the answer is: through PROMECAFE.

- *How does the strategic plan mitigate the effect on variables likely to be affected?*

We have a number of threats; hence, the plan to be designed needs to be flexible, so that it addresses the different problems. Otherwise, we will waste time and stop being effective while we adapt.

Questions from Group 2

- *What would be the role of coffee buyers and exporters in this situation with rust?*

Basically, this is a price issue. If prices are low, producers lack financial capacity to take care of their plantations.

- *What if the weather conditions change and there is no rust?*

This is possible. This happens often. There is history: when funding is finally obtained, the problem is over. The important thing is that producers are better prepared because we do not know how long it will take to recover.

Questions from Group 3

- *What information / databases are there on soil quality and conditions of coffee plantations in the region? Based on this information, what recommendations / recipes are there to nourish / mend these soils?*

Seldom producers make soil analyses, but it would be ideal. The information would be very useful for everyone. This is essential.

- *What research is there on coffee ecosystems and how are they managed in regard to resistance development?*

Progress has been made, and national associations and PROMECAFE can provide the information.

Questions from Group 4

- *Coffee harvesters are among the vulnerable coffee populations. How can we define a plan to identify them in each country and give them the help they need to survive during times of crisis?*

The development of a plan of this nature can be through local coffee associations working jointly with governments in social plans and complementary productive projects.

- *How can capacity of response to new planting (seed, plants, and fungicides) be ensured?*

This is difficult, but you can start with more training on agricultural practices improvement and, hopefully, with a price increase, more resources will be available to invest on plantations.

- *What do weather indicators tell us about 2013? Will it be worse or better than 2012 in terms of rust?*

According to some forecasts, this year will be drier, and new outbreaks will be moderate.

In the past there have been severe epidemics in Central America, and they have been very punctual. Not to say that it will be so now, but it is unlikely that so many factors coincide again, like they did last year.

But we should not take risks, because two equal years would be dramatic. That is why we are here, to prevent greater damage.

- *From the funding perspective, what kinds of protocols are suggested in order to ensure that borrowers plant appropriate varieties and follow the best agricultural practices?*

Members of this group can define such protocols. Furthermore, institutions from each country should suggest ways in which they can be ensured, not only by loaning money but seeds, seedlings, etc., to guarantee that what will be planted is suitable.

Questions from Group 5

- *Comment: information systems must not only address technical and weather issues, but also laborers.*

Agreed. There should be a comprehensive study, a survey of the whole coffee world in Central America.

- *How can we get to share information available in other countries?*

This is a very important point. Funds must be raised. Some countries should be more willing to share data.

Questions from Group 6

- *How can monitoring and environmental warning systems spread out to the rest of Central America at the same time as data collection is standardized?*

More technical support is needed for this expansion.

- *Who will collect and disseminate the information obtained at the regional level?*

It is true that institutionalizing these activities is a problem, but it is very important. It hasn't been entirely done due to lack of funds.

Questions from Group 7

- *Are we clear on the effects that climatic microvariability has on the development of rust?*

The models based on climatic macro data are adequate to predict what would happen in the various microclimates typical of coffee areas.

- *Do we know how to explain to producers the complexity of the production system and the development of rust?*

What happened is that people did not expect rust, but something else; therefore, they were not concerned. It is not perfect, but we have progressed explaining the problem.

The following items relate to aspects that have somehow been explained:

Having so many microclimates is complicated, because there are many different effects.

The climate factor between micro and macro climate is not accountable for the differences among breakouts. I think it is more about specific factors.

When it comes to control issues, the first application counts a lot. Time must not be wasted before the first application. Applications must be made at regular intervals to keep plants protected until harvest begins.

Every producer must monitor, like he always does, but looking for any abnormalities too.

Preventive treatments are necessary before rust levels are very high. Otherwise, crops will be no good. These treatments are not 100% effective. An epidemic cannot be stopped.

The curative measures are double-edged swords, because producers can be too confident. Having a tool that can cure, the producer may think he can wait, and again it will be too late.

It must be well-explained that this must be systemic. Successful control is preventive control.

Questions from Group 8

- *What is the average age of plantations and how does this relate to the behavior of rust?*

Age is not the most important factor, but it counts. It is well known that old plants grow less and respond worse to fumigation; therefore, rust will more easily invade them. It's a race between plant and pathogen. It is my understanding that many of the coffee plantations in Central America are old, and this fact predisposes these plantations.

It is hard to foresee farmers surviving without a good production. Costs are ever-increasing, that's why plantations must be young.

In the future it will be very difficult to produce enough to justify the costs of production. Maybe lower areas are more prone to having coffee disappear, and they may switch to other crops, but no progress has been made. Soil reuse must be taken into consideration, according to altitudes and climatic conditions. High lands have fewer problems with diseases than lowlands do. I do believe that coffee farming has a tendency to disappear. Strategic planning is a must for the future.

- *Is rust a symptom of poor management?*

The disease resulted from the interaction of several factors. It is a symptom of that particular combination and, within that, of course, there is the factor of handling. Nutrition is decisive - one of the most important factors. Good nutrition does not mean resistance, but it allows the plant to react better against the attack.

In acid soils (seen in Honduras) impacts were stronger.

The productive potential of the plant is also most important. This factor alone can explain much of the problem.

Sampling is complicated. This must also be kept in mind. Each farm is a particular case, and there are many local factors that will affect the growth of rust.

Questions from the audience:

- *How can control and statistics be improved?*

Satellite photos are recommended in this field; they can be very helpful and should be periodic in order to evaluate differences. More research must be carried out and results need to be made available. There should be more technology transfer to all stakeholders.

- *Is it possible to have a monitoring network, not just for rust but for other diseases?*

Physical monitoring is necessary. There are positive experiences in Mexico in this regard. There are many types of coffee, and coffee plants are not uniform. Management systems influence results, but there are many variables and all should be viewed with a global vision to provide a comprehensive treatment.

There are global pest and coffee monitoring systems. CATIE and other institutions have worked on that aspect with models, perhaps, empirical. Also, there should be sentinels at the farms, attentive to every variable, which could send out an early warning. Information on these monitoring should be collected from producers.

MEETING No. 4

Short-term rust control

Spokesman: Marco Arévalo.

The starting point is: timely application of fungicides: crucial for handling rust + good agronomic practices = good rust control.

About fungicides:

- The life cycle of the disease must be known and not wait for an outbreak. Fungicides are applied when the rainy season starts. Also, small grains must be protected.
- Many companies produce fungicides, and they are effective.
- Pesticide residues in grains must not exceed the limits established by the country of destination or consumer.
- Fungicide residues were found in shipments from Brazil to Japan (each molecule has a specific limit). Japan has very strict limits, is very demanding. Companies are concerned and working on it.
- Regulatory agencies should regulate residues in the final coffee we consume as opposed to regulating green coffee.
- Green coffee (before roasting) is currently regarded as the final product. This is incorrect.
- Registered fungicides must meet regulations on safety, environment, etc.
- About food security: there is less risk in coffee than in other crops like vegetables / greens.
- Note that Triazoles are not organic. Copper can be used in organic coffee, but is less effective at high incidence.
- In the area of agronomy: shade is good but MUST be managed. It's complicated, but effective.
- For the health of the plantation: good combination of resistance, fertilization, and density.
- Proper application techniques must be followed: nozzles, right doses, amount of water, calibration, pH.
- Among systemic fungicides (foliar) are: Epoxiconazole (Opus), Cyproconazole (Alto), Caporal, Silvacur, Amistar (azoxystrobin). They can penetrate the grain; constant monitoring is needed.
- The application of several fungicides can be detected in the grain.
- All fungicide producers are concerned. The use of these products must be registered in Guatemala.
- Each coffee-importing country has its own set of rules regarding ceilings and which fungicides may be used.
- Systemic-action products imply residue risks.
- A protective fungicide: copper in general.
- Recommendation by ANACAFÉ: apply Epoxiconazole (Opus) when the grain is still small. Second application: 45 days later, Cyproconazol (Alto).
- Soil application: Verdadero (Verdadero = Cyproconazol + Thiamethoxam). Bayfidan Duo.
- In Costa Rica: after 10-15% incidence, a systemic fungicide is applied. If the disease surpasses protective fungicides, systemic ones are applied.
- Use backpack or engine sprayers for applying fungicides. The persons applying fungicides were using insufficient water, twice as much was needed. This produced phytotoxicity.
- Companies that adopt the use of agrochemicals should train applicators on their use.
- Regarding human security: fungicide BPA should not be a problem if applied correctly.

About agronomic practices:

- Shade should be regulated (40%), not too much shade.
- In general, this is difficult to determine, but there is evidence that: at more shade, more rust because plants receive less light and less radiation, which promotes rust.
- Regulated shade is the best choice.
- In Guatemala we have rust with or without shade, with or without sun.
- Rust severity depends on the weather and the amount of shade.
- Microclimates should be handled differently.
- Air circulation is important. Up to 3 prunings must be made during the life of the plantation. Colombia has done studies on shade and rust.
- Foliage increases humidity and, consequently, the occurrence of rust. Plant health basically depends on regulated use of fungicides.
- The disease must be controlled from a preventive viewpoint.
- Each country will have its local studies to recommend appropriate timing.
- The entire process should be part of an integrated management.
- Plant health must be seen as a system.
- Producers will have to be talked into making applications on time, supported by a good monitoring system to ensure good production and a return on investment.
- Techniques for adequate applications must be followed.

In short, agronomic practices cannot be recommended widespread because conditions and microclimates differ from country to country.

A Q&A period followed the presentation:

Questions from Group 8:

- *Who controls and regulates manufacturers that offer rust control fungicides? Is the product they offer really effective?*

There are regulations in each country, and every product must meet the requirements of competent authorities such as ministries of agriculture and official regulatory bodies.

Most brands have proven to be effective, and national associations can make recommendations in this regard.

Questions from Group 7:

- *Conditions of the pH of water used to apply herbicides have an enormous impact on control effectiveness. How do we ensure that producers know this?*

Consulting through extension services is recommended.

- *How can you measure the pH of water? Do they have the means to adjust acidity?*

This actually is very important, but producers have not paid due attention. We need to insist on this during trainings and increase efforts to ensure they have the means to carry out such assessments periodically.

Questions from Group 2:

- *What is the plan for disseminating proper fungicide application techniques?*

The diffusion should be through communication campaigns and extension services. Information can also be published on websites to be accessed by those with internet access.

Questions from Group 3:

- *What is your proposal on the management of the distribution of agrochemicals and ensuring appropriate training in their use?*

Distribution would be made according to the resources obtained, and training would be through extension services with on-location demonstrations.

Questions from Group 1:

- *What factors should be considered when designing an appropriate control program?*

The life cycle of the fungus and the correct application of products must be known, according to the conditions of each country. Soil, water, altitude, climate, and variety analysis are important.

Preventive applications must be made. This is to say, when rust has not appeared; else, it would not be preventive, but curative, and it would be late.

The problem is to convince producers about the importance of investing in these preventive applications. It's like insurance. Many producers think: "Why would I spend on fungicides for diseases that may not even affect my plantation?"

Comment from Group 5:

To be able to implement short-term solutions, producers need to have adequate funding. To make acquiring a loan attractive, incentives on the part of buyers are needed, such as contract/price warranties.

Questions by Group 6:

- *What are the options for rust control in organic systems, including biological control? How can the information available in other countries on pest and disease control in organic crops be accessed?*

Plagues, epidemics, and diseases are a recurring phenomenon in agriculture. Organic coffee producers are in serious trouble and have to resort to the best use of preventive agricultural practices. Some products are applied only to one leaf and then fall to the ground, not to the grain.

Information available in other countries may be collected and redistributed by PROMECAFÉ.

Questions from Group 4:

- *What (approximate) percentage of producers uses fungicides correctly? For those who do not, is it due to a lack of knowledge or lack of funds?*

Accurate data may not be available. More field research through monitoring and surveys is necessary. For those who do not, it may not be due to a lack of knowledge, but to lack of funds and the fact that they are confident that they will not be affected. This began to change recently due to the damage they have seen.

Questions from the audience:

- *Have you taken manufacturers into account for training and divulging rust control in general in the integrated management of coffee?*

Yes, proof is that here is a Syngenta representative (Brazil), where manufacturers and related sectors are closely related. In Guatemala we also see them as strong allies of this activity.

Last year manufacturers tried to promote in the ministries of agriculture products that are in registration processes. There is political will, but there are processes. For example, there are molecules such as one that is already available in Nicaragua but not in Costa Rica. Licenses are not up to the manufacturer or distributor. It is up to us to be well-informed regarding these new molecules so that we can give correct answers to producers.

But yes, manufacturers do help with training on the use of the products they sell.

MEETING No.5

Socio-economic impacts of the rust outbreak in the living conditions of producers

The spokesman of the meeting was Mr. Michael Sheridan.

“Rust is a symptom of the problem of coffee in our region.” This is based on the following:

- There is inadequate management and carelessness.
- In addition to our country’s farmer’s economic problems.
- Plants are of considerable age and low productivity.
- Today it’s rust; tomorrow something else. Costs go up, yields go down. Market volatility is high: 3 years ago \$3/pound of coffee, today \$1.20.
- We must ask ourselves “Where are we?”, “What is the current impact?”, “How will the 2012-13 harvest conclude?”

About income:

- The reduction in production is estimated between 5-40%, depending on the information source and country.
- Poverty is a risk factor: losses (10-20%) are higher among small farmers.
- Costa Rica has been the least affected country.
- In other countries, damage is between 20 and 40%.
- Impact is made more evident on income.
- Another problem is that production is not only less in quantity, but in quality.
- For the 2013-2014 harvest, reduction in production may be 15 to 56%.
- The institution “Creceer” estimates that small producers are 20% more likely to suffer damage.

What is happening in employment?

- There are direct and indirect impacts on employment.
- Less harvest, less employment.
- A temporary reduction is expected in permanent jobs and a drastic reduction in daily wages.
- It is estimated that 441,000 jobs are being lost at the regional level.

In terms of food security:

- There is food security. The risk is lower for coffee than vegetables.
- There is limited access to other sources of income.
- Impact is limited in food security due to an abundant prior harvest; hence, there still are reserves and affordable costs.
- An extended increase of lean (low) months is expected in Guatemala.
- Lean (low) months spread to regional level.

Food security must take these three aspects into consideration:

- Long-term risks to health (fetuses, cancer).
- Security for those who apply fungicides.
- Environment protection.

Some interesting facts:

- The risk (due to fungicides) of eating vegetables is higher than that of drinking coffee.
- According to CRS, only 25% of farmers have access to other sources of income, many rely almost exclusively on coffee.

Regarding fungicides:

- In regard to ground water: fungicides do meet the requirements of regulatory agencies. Product safety is honored. Upon falling to the ground, fungicides deactivate.
- Note that resistance against fungicides has developed: for 15 or 20 years the most frequently used product has been “Alto,” and efficacy tests prove it efficient.
- Organic records only permit the use of copper (bactericide and fungicide). It works for low levels of rust. It is applied every 30-35 days. Higher incidence, less effectiveness. There is no immunity, but there is resistance.

Food security monitoring allows:

- measuring resistance.
- working with coffee farmers as partners in a common cause.
- building a unified database.

It is important to know how much fungicides cost. To such end, the following cases are presented:

- Brazil: 1-2 sacks of green coffee (60kg) = cost of fungicide/hectare/year. 90% of farmers used this model in this country.
- Guatemala: cost of acre + labor, US\$150-200/hectare/year (rust control). Costa Rica: same.
- Rust control is less expensive than the resulting damage.
- Socio-economic difficulties: beginners may not have the money to spray their coffee.

In terms of nutrition:

- An undernourished plant exposed to the sun is more prone to have rust.

The above results in the following reflection:

- The crisis will be in 2014.
- The worst is yet to come: reduction of regional production: 15-56%.
- We no longer speak of main but critical points.

And what will the behavior of the market be?

- Differentials can be reduced compared to other markets.

Therefore, a market validation is needed.

- Producers need more security from buyers
- There is uncertainty about variants and susceptible harvests, but also regarding how interested the market will be.
- A difficult future is predicted for organic producers due to increasing production costs and because, by not using fungicides, they are more vulnerable.

In regard to public order:

- Analyze possible incidents and threats to public order motivated by poverty provoked by job loss.

Given this scenario, what ought to be done?

- A methodology and a unified database are necessary.
- Understand that each person has a different concept of impacts.
- A definite study and a unified message are necessary.
- Commitment to work as partners is necessary to preserve our coffee community.

Measures needing immediate attention:

- Food for work and direct subsidies to ease the pressure on family finances, especially for the small producer.
- Identify options to renew and diversify.
- Those who depend solely coffee are in most need to of diversify.
- The objective must be to keep farmers in the guild.
- Avoid intense food shortages.

After the presentation, a Q&A period took place as follows:

Questions from Group 1

- *Where would resources come from for the diversification of income?*

There are projects like food for work, funded by the Government of the United States, through USAID, to prevent migration and work in productive projects.

- *There is talk of the need for resources, but suppose they are obtained, how will they be given to farmers?*

Maybe through cooperatives or NGOs.

Questions from Group 2

- *Diversification is advised, what are the options?*

Choices may be banana or cocoa, although it is difficult to simultaneously handle two chains as sophisticated as that of coffee. The idea is to produce for alimentation and for the market.

Ten years ago, we all produced melons. The market had an excess in supply, and prices fell. Is recommended to monitor the products we are planning to diversify and to invest in market research, so that not everyone produces the same and we saturate the market again.

The vocation of producers, soil and climate analyses must also be considered.

Questions from Group 3

- *What kind of commitment do farmers need from the market in order to continue?*

A fair price. But, what is this price? Participants at this table estimated that the cost per pound produced is around \$1.20. Anything above would be the producer's profit.

Question from Group 4

- *How can a diversification strategy be designed?*

Diversification should be based on technical studies and market research.

Questions from Group 5

- *Is there a study comprised of the sectors that depend on the coffee economy, such as commerce, transport, and others?*

We are not sure. This should be investigated. If not, it would be important to make one.

Questions from Group 6

- *How could impacts include not only the primary chain but the entire value chain as well as the demographic effects?*

Producers and some laborers were asked if they thought that the highest impact will be next year. Many may consider migrating to the United States for example, but a survey would have to be made. We still have not thought of it.

- Opinion from the public: crop diversification is important, but even more important is an integrated crop management, as each crop can be struck by different diseases. At the level of small producers, there are different crops, and all should be managed properly.

Question from Group 7

- *Is diversification really a viable option for small and medium producers, when it is clear that to compete with Brazil, Vietnam, and even Colombia would be an ever-bigger challenge?*

Yes, if there is more competition, the option is to diversify.

Question from Group 8

- *What databases do countries have on production structures / producers for analysis and possible actions and strategies?*

What PROMECAFE has is information gathered from various associations. It is a starting point to begin to work.

MEETING No. 6

Extension services

Spokesman: Mr. Ric Rhinehart with SCAA.

The purpose of extension is to reach existing coffee producers with consistent information from national associations related to technical issues, best practices, emergency measures, market information, etc. through coordinated efforts to maximize implementation and impact.

The process consists of three steps:

- National coffee associations generate technical information.
- National extension technicians are trained.
- A strategy is developed to train producers according to size and territory.

The following is necessary for the coordination of extension efforts:

- Define population needs.
- Identify needed resources.
- Decide on the most appropriate extension method.

There are multiple models to reach producers:

- Train the trainer.
- Intensive training.
- Cooperative model.

Regarding extension strategies:

- Segmenting according to producer size (small, medium, large)
- Training
- In-class and field demonstrations
- Extension programs of NGOs and private industry
- Multiple methods:
 - Published information (manuals, flyers, documents)
 - Audiovisuals (video, radio, internet)
 - Seminars
 - Toolkits

Challenges and gaps:

- Materials and resources for extension; balance out cost and effectiveness

- Producers' access to technology (electric power, computers, and internet)
- Basic level of education of small producers
- Variations in the implementation of new practices
- Differentiate available information by origin and structure its dissemination
- Some projects end up requiring staff in order to continue training by national organizations

Q&A period:

Question from Group 8:

- *Through which mechanisms can producers' experience return and strengthen the knowledge of coffee institutes?*

In Technoserve we share information during trainings. We have helped ANACAFÉ by providing information on experiences, such as rust in San Martín Jilotepeque.

Question from Group 2:

- *What is the key message on coffee rust that should be clear? How can farmers' adoption of control strategies be measured?*

The strategy must be reviewed in order to strengthen the types of actions of each association.

Question from Group 3:

- *Who will be responsible for coordinating the extension efforts?*

We must follow the usual guidelines with ANACAFÉ and PROMECAFE.

We have a monitoring system for the implementation of the practices we are teaching.

The World Bank has supported the other methodologies we are using, but it is dependent upon fundraising to maintain auditing and monitoring systems. The development programs of the last 10 years need updating. You have to give a lot of space to what has been happening in the private sector. The private sector plays an important role.

Question from Group 4:

- *Are there any plans to have regional meetings and coordination between governments, organizations, private exporters, producers groups, and collaborators, to establish a basic message about best practices?*

There have been several approaches and meetings with ANACAFÉ, not only with the staff but with community leaders to inform them and for them to identify field experts. So that when they need technicians, they can identify who can advise them and have a closer relationship with producers.

Question from Group 1:

- *Price does not help training at the farms. Could buyers give a differential to countries affected by rust?*

Support to producers is not given directly through a price to which we can commit. Support is given in training, technical programs, and monitoring.

Questions from Group 5:

- *What are the most urgent steps to be followed by PROMECAFE or the institutions in each country during these critical months of technology transfer in regard to monitoring and application? What does Fairtrade do as to technical support?*

PROMECAFE, in its role as institutional coordinator, is organizing various events with partner institutions. Within the strategic plan, it is aimed to have consensus and increase support to extensionists.

Without a viable, short-term, economic vision, support is needed for organic coffees to achieve that balance, but we know that it cannot be short term. A list of all products or methods (fungicides and organic pesticides) that are organic and are used to combat this plague will be put together.

Certifiers are approaching and are part of this process. There is experience in prevention for organic plants, but not so much on treatments.

Questions from Group 6:

- *Coffee institutes are not meeting the needs of the organic industry. How can this change? The current model of information from the coffee institute to producers needs to improve. How can institutes join together with universities and research institutions to improve the research that the industry needs? How can institutions deal with language barriers in extension services with indigenous people?*

PROMECAFE will elaborate the macro plan. There may be many micros, but the macro that will be carried out by most farmers will be that of PROMECAFE because that is where money is. All these plans cannot be executed without financial resources.

- *Has that decision been made or are talks still being held among PROMECAFE, OIRSA and technical parties, like TechnoServe?*

OIRSA is part of the regional program and, in this sense, the program under development is an integral part the PROMECAFE and CATIE program.

- **Comment by the MAGA representative:**

Currently the MAGA has the new directorate of rural extension with three extension workers in each municipality of the country. One such extensionist is the agricultural issue, and we are coordinating the messages with ANACAFE.

Together with ANACAFE, we put together a national plan, which was created from Ministry Agreement 11/2013.

WCR reacted to the crisis. They called all the parties involved. Several international companies are present here, what shows their interest and support to the problem. Everyone has to do his/her part. Some farms, where agriculture should be that of the twenty-first century, still have nineteenth century agriculture. Therefore, this should be a joint effort - by everyone.

Question by Group 7:

- *How and who evaluates the effectiveness/homogeneity of extension services provided by coffee institutes, government, and NGOs?*

It is assumed that each national coffee association in coordination with PROMECAFE.

Inquiries by the public:

- *What would be the necessary or adequate amount of technicians and at what cost?*

There is no answer, because it depends on the characteristics and resources of each country.

- *How will extension be coordinated among the ministries of agriculture, institutions that support coffee, NGOs, international cooperation, financial institutions, etc.?*

It depends on each country, but we should aim to make the best possible coordination efforts and that they are consistent and timely.

MEETING No.7

RUST MONITORING / EARLY WARNING SYSTEM

This topic was discussed by Mr. Jacques Avelino, researcher at CIRAD, the Center for Cooperation in Agricultural Research for Development.

- Special climatic conditions (very rainy) were favorable for fungus reproduction.
- Low coffee prices caused a decrease in the number of fungicide and fertilizer applications.
- The production start-up of 20,000 hectares of coffee (susceptible varieties) in relation to a renewal project of the coffee farming of the country.

Reference was made to the Mesoamerica 2012 challenge:

- Climatic factors that propitiated the epidemic of 2012 appear to be different
- This epidemic has been catastrophic
- Research is needed and cannot wait
- The results would help to improve a possible warning system
- Local factors may be more important than regional factors (rain is not present)
- This diversity must be considered in a warning system

Rust control:

- Few applications are made, 3 is normal.
- The moment of the first application is very important (at the beginning of the rainy season)
- Protection must be maintained until ripening start-up
- The interval between applications must be respected
- Based on monitoring the control program can be adapted

You need an early warning system with 2 purposes:

1. Inform producer of the right time to control rust.

- Specify when ideal conditions begin for the epidemic outbreak. Send a clear message by area (radio) informing that the rainy season has begun (Central American Climate Forum to define criteria), so that producers are prepared to make the first preventive fungicide application.
- Complement with a monitoring system at farm level (improve existing ones) to monitor not only rust but the whole complex of plagues and diseases and make better control decisions depending on the level of the attack.

2. Notify decision makers of the advance of the epidemic (s) and anticipate the crisis. To achieve this:

- Have a nationwide system to monitor the progress of rust, as well as other plagues and diseases, in order to anticipate crises and take action in the production area, in the country of the region.
- Collect information from producers' monitoring, complemented with information from sentinel plots and spatial tools to map the levels of damage.
- Have georeferenced plots, telephone communication, monitoring frequency (monthly), compilations by the Icafés, incentives, quality control, national/regional systems.
- Set up the monitoring/early warning system.
- Photograph of a beautiful parcel in Papua, New Guinea, which shows the difference in just one year, due to the attack of the coffee rust. Despite the spraying, it was almost a total loss because they didn't spray on time.
- We made an experiment in this plot. We were studying the spread of rust in a subplot. We did not apply fungicide there, and with proper management alone, we had good results. Next door they applied fungicides, but they had more rust problems because they had neglected nutrition.
- All of this explains the complicatedness of giving global recommendations when there may be big differences at small scales. In plots next to one another, there may be differences for several reasons.
- A newspaper article was shown from La Nación, Costa Rica, 1990, entitled "The coffee rust threats again". The analysis indicates that climatic conditions were unfavorable, with a very long rainy season and heavy rainfall. It is implied that there was low profitability (low prices), what implies careless weed control, lack of spraying, etc.
- What happened in 2012 is exceptional but not unique. It has happened before. It happened in 1995 in Nicaragua, it was greatly affected by rust, especially at high altitudes.
- This is no consolation, but if you see that what happened last year is not unique, it will allow us to reason things better.
- There was a renewal project of coffee growing in Nicaragua, but susceptible varieties resulted.
- Back then, the problem went away after a year. We do not know if this time it will too.
- Yes, there were climatic factors in 2012 that triggered the problem.
- While talking about a catastrophe, it is also an opportunity to better review the weather and management conditions affecting rust.
- Research is needed to better understand what happened. It's like doing autopsy work.
- If we understand properly what happened, we can learn the lesson better.
- The weather is a decisive factor, but there are others.
- In a study conducted by the Honduran Coffee Institute, more than 70 plots were studied thoroughly for 3 years. They were characterized by attacks, handling, environmental conditions, and characteristics of the coffee plant. We looked for the relationship between these features and the rust attack.
- It was possible to study the attack levels.
- The most important variable found within this work was the amount of knots with fruits of each coffee plant.
- When plants have less than 230 knots with fruits per plant, risk is low.
- Shade has a reducing effect on rust attacks due to a reduction of fruitful knots.
- When fertilized, the risk was not eliminated, but it was reduced.
- In plots that had a good load of fruits and were fertilized, altitude was the differentiating element. At higher altitudes there is less risk.
- Different factors are related to shade, like temperature and humidity, but also altitude. Sometimes, at equal amounts of shade, there are conflicting results because of other influencing factors.
- Fruit load has to do with the good growth of the plant. Somehow, the disease dilutes because there are many healthy leaves.
- The epidemic is like a race between fungus and plant. If it grows well, the fungus is less likely to thrive.
- Global factors have an effect, but other factors are very local.

- This was a strong epidemic never seen before. There may be a new stub.
- Actions taken by producers cannot be taken individually for individual lots.
- There are monitoring methods in farms, not only for rust. Three years ago it was the rooster's eye disease. We are in a period of climate variability. This year we may have rust or berry borer, and within two years, rooster's eye disease because conditions vary greatly. In 10 years, maybe we will have rust all the time due to changes in temperature. At this point, we may have them all.
- Farm monitoring allows monitoring other plagues and diseases and applying whatever is necessary to control whatever arises in the moment.
- Some parcels are affected and others aren't so affected by local situations.
- Monitoring ensures accuracy specific to your plot. You can make a decision based on what you see.
- Last year the infection was broad.
- There must be conditions that make the epidemic very strong; we should try to identify them.
- Colombia says that in El Niño years (dry) they do not have rust but have berry borer, and in years of La Niña, they have rust. This helps to prepare.
- It is more difficult to transmit the system to a number of persons in the field due to social aspects: illiteracy, small producers, and difficulties.
- Last year was El Niño year = more berry borer (as per Colombians).
- Farm-level monitoring is a very valid option (sampling).
- One of the best methods is to reach a specific recommendation for each plot, knowing that you have different results per plot.
- Control must begin at the start of the rainy season, supported with monitoring.
- It is necessary to establish sentinel plots that are representative: a reference not only environmental but of management. The disease is a climate problem and a management problem.
- Successful control depends on timing. If you wait too long, efficient control will be difficult.
- There is a very important criterion: the beginning of the rainy season. A criterion is needed to determine that the rainy season began and treatments must be in place.
- The key period to protect and control is after flowering and until the beginning of ripening -- about 4 - 6 months.
- After ripening, the plant is stressed and may cause unnecessary expenses.
- In Costa Rica, the biggest problem is reaching producers. Every day in the early morning, producers receive alerting messages through a radio program informing them that rain has begun, and that it's important to use a copper protector and then take samples to check for 10-15 rust, use a curative, and then another protector.
- They are also sending simple informative messages by cell phones about what needs to be done at the time.
- There are 50,000 coffee producers. General information is sent at the beginning of the rainfall.
- Leaf monitoring: by sampling 100 leaves.
- The producer is advised to make a basic sampling of 100 leaves and determine how many have at least one rust injury. This leaf will be counted as one leaf with rust. Incidence is determined through this reference.
- There are many good empirical methods that vary from country to country.
- Other alternative: a more structured methodology disseminated through technicians.
- Information must be collected for food safety decisions at regional, non-local, level. This is very necessary. Many do monitoring, others don't, but the information stays there, while it should be shared. Not in order to alert the producer but to take action at decision-maker level.
- The best sampling system should be at farm level.
- Many decisions are not made at farm level.
- Monitoring needs to be complemented in order to make institutional decisions, not farm level.
- Climatologists have a number of tools for long-term prevention for food safety, fishing, disasters, and agricultural problems.

- Climatic information is given quarterly.
- The relationship between coffee and meteorological information is used to combat rust.
- The group is well organized, and they have offered to establish a relationship between coffee and meteorological services as to give a warning three months in advance.
- They talk about rain, temperature, humidity.
- Regional monitoring should provide general alerts, and local monitoring should serve to make decisions.
- This should be systematized. This has already been done, there's no need to invent it.
- There is a wide variety of coffee cultivation systems. Information should be made available to decision makers and to those involved.
- A basic treatment with minimal variations should be established. We need to have a basic recommendation that works every time.
- Plant nutrition is very, very important. Applications can solve many problems.
- Many people believed that rust is not a problem, but it is.
- Treatments should be tailored to the specific conditions of each farm.
- In Guatemala many people cannot read and do not have internet access.
- How can you motivate a producer and tell him that the decision he made in his farm can affect the whole country?
- There is a monitoring system in Guatemala similar to that of the United States. El Salvador is also applying it. A person from the Ministry of Agriculture calls three farmers from each municipality Guatemala every ten days. He asks them standardized questions and questions with variables. This has been done for corn and beans. This monitors days with and without rain.
- There is no cost to farmers because the Ministry makes the call.
- A committee makes a map with this information. There are approximately 700 producers. INSIVUMEH has been included since 2005.
- Some producers are given fertilizers; others are motivated through receiving information.
- People see coffee monitoring as tedious. They do it at first and then stop.
- The US system collects information from the field without having to mobilize technicians. They can report from the field by cell phone. They do NOT need internet. They will control diseases by region. With the cucumber warning system, all they want to know is when is the first rain.
- In regard to early warnings, microclimates limit the generation of a sentinel-plot network, because the specific conditions of coffee must be known.
- The idea is to develop a system to make decisions at farm level.
- With coffee the limitation is that producers do not register data.
- All the factors that affect coffee cultivation must put together.
- In Colombia after so many days of flowering, the fungicide is applied. Another option: the rainy season began so the first application can be made.
- It is necessary to find ways to make producers share the data they have with coffee institutes.
- Diversity among farms will be reduced because we will have lots of data.
- Month to month, information will be available as to how the disease progresses.
- People will be warned about food prevention. Technicians could deliver courses while the problem is there.
- ANACAFÉ designed a system to communicate favorable hours, number of times it rains and daily rainfall, weekly favorable data. They also try to make a forecast. They request that a number of leaves with rust be brought to project that in "N" time there might be a disease. A map is made to help prevent an epidemic.
- A system based on Cenicafe has a big problem with valuable costly information. Little by little the system will be lost if there is not enough rust to justify its activity.
- The solution would be to try to collect information from producers and find a way to incentivize him.
- It is not our intention to propose something that requires an army of people touring the fields, like it can be done in Colombia or Mexico.

- CATIE carries out comprehensive monitoring: a chart with columns, complemented with photos, which allows for an integrated quantification of plagues on farms, not just rust.
- An early warning system has to have two purposes: notify the producer timely to control rust, and inform decision makers on the progress of epidemics to anticipate a crisis.
- Both systems can be combined.
- The Central American Climate Forum can help reviewing and updating climatic information.
- A multi-plague monitoring method must be established.
- Information should be gathered from producers through:
 - Georeferencing
 - Communication (telephone)
 - GIS → mapping
 - Frequency: Monthly
 - IHCAFÉS
 - Incentives
 - Quality control
 - National / regional
- Sentinel plots to complete monitoring.

Q&A period:

Questions from Group 2:

- *Are there forecasting models that can be used in Central America?*

Many forecasting models have been made in Central America, especially in Honduras in the 80s, also in Brazil. They have not been popular because they require a lot of information especially on weather conditions. There is always a margin of error in these models.

When a fungicide is applied in an adequate, timely way, work is well underway. Some growers make one application to save costs.

- *Do we need a study on the genetics of rust in Central America?*

It has been long since something was done in Central America on genetic studies. It would be very necessary. ANACAFÉ has historical data on rust, which was used to develop two basic models. The one on the climate variability window should be emphasized to see how these factors relate. It is not complete; it still has to be validated. But we are aware and there are perspectives.

Questions from Group 1:

- *What is the criterion to determine the start of the rainy season?*

Constant communication with national meteorological institutions is recommended.

- *Or how many days or millimeters of rain?*

The first rain of the season must be confirmed by the national meteorological institution.

Questions from Group 8:

- *What are the criteria for selecting a sentinel plot?*
- *When monitoring many farms, is the agronomic management of individual farms taken into account?*

Actually, most producers want to know what they have to do and when. Indeed, there is no talk of rust management but of a system that tells the producer when to attack. Since rust is due to a combination of factors, a number of corrective steps must be taken, that's why we talk about integrated management, so that the plant is in good shape.

Comment from Group 5:

- *Intervention strategies need to integrate and facilitate proper fertilization. The current emphasis seems more on fungicides distribution. What is a simpler and more appropriate methodology for monitoring / sampling under current conditions, being aware of rust?*

Through observations by extensionists and reports provided by producers themselves.

Questions from Group 7:

- *Will the monthly monitoring by producers allow for enough time to respond to a crisis?*
- *What would be the prototype of tall varieties, among knots, long, shade and low productivity varieties that tolerate fungus better than short varieties or hybrids?*

Many studies about rust have been made through visual inspections, and it has worked quite well. Farm monitoring does not have to be so overwhelming. There must be a balance between the work done and the information to be obtained. We wouldn't be interested in working with complex models, because we would end up not using them.

Monitoring should help detect various diseases.

Coffee is Mexico's leading foreign exchange producer. They have given full importance to monitoring. A technical committee was formed to develop a system that checks on technological and agronomic management variables.

Questions from Group 6:

- *How should the nutrition system be integrated into the disease-monitoring system?*

Monitoring should be comprehensive, taking into account all the interrelated factors.

Questions from Group 3:

- *What are the meteorological data that must be collected for effective monitoring? How many sentinel farms would we be talking about in each country? What implications does this activity have in terms of human resources?*

The important data is: when the rain starts, how much rain, and what the relative humidity is. The number of sentinel farms depends on each country and the local association.

The extensionist profile must be defined so that this information can be easily given to farmers, and they can make their decision.

It may be appropriate to identify producers willing to provide feedback.

The number of sentinel plots in Mexico depends on the number of technicians. Right now 500 acres are worked on, with 25 technicians and 50 plots.

Questions from Group 4:

- *Does the decision tree have an economic dimension? For example, does the price of coffee affect fertilization decisions and the expected harvest amount?*

The different models are more or less comprehensive, but it is desirable to cover as much information as possible. It was found that as the price of coffee goes up, the amount of fertilizer applied goes up immediately. This is to say that there is a direct relationship between the price of coffee and farm management.

Questions from the audience:

- *Who is going to handle all the information and how will it reach producers?*

Not known. In Mexico, the information will be handled by the federal government to ensure that it is available to everyone at all times, but this is not due to rust. The system already existed because it has been used for citrus and berry borer.

- *Is rust a cyclic disease, that is, it is strong one year but not the next?*

There is a very specific pattern of rust through the years. Rust affects more plants with a higher production. Just like a biennial pattern of a high-production tall (high rust), and when production decreases, rust decreases too.

The low production cycle responds to the biennial pattern but may also be due to the spread of rust over the years.

- *What probability is there that the pathogen has undergone a mutation and has become more virulent?*

Is it likely that new, more resistant strains have appeared? It is possible as with any pathogen; mutation is natural. We can imagine that in Central America there are strains from different races.

MEETING No. 8

Communications

Presentation by Mr. William Hempstead

- Communication is a transversal topic in all axes, for all the issues addressed in this summit.
- It is a key issue that must be given full importance.
- We will continue with the existing channels and means of communication that each association has.

What we need to do:

- Manage accurate and transparent information.
- Timely communication.
- Elaborate clear and simple messages.
- Maintain feedback channels open.
- Encourage collaboration to be able to invest in recovery.
- Develop a plan (else wise, we will have nothing to communicate).
- Question: Do we need a regional spokesman? PROMECAFÉ?
- Suggest to Specialty Coffee, NCA, ICO, the talking points to its members through its communication channels (e.g., the results and conclusions of this summit on rust).

Aspects of communication:

- Each national association communicates in its country with:
 - Producers
 - The entire country
 - And, internationally, with related entities (PROMECAFÉ)
- Regional communication must be supported
- It is advisable to visit the website: www.mildwashedarabicacoffees.org
 - Founded in 2010
 - Excellent source of information for monthly export figures from various countries
 - \$250 – annual fee for the information service of this website
 - Contact in ANACAFÉ: Esther Eskenassy: esthere@anacafe.org
- **PROMECAFÉ website: www.promecafe.org**

The priority is to communicate with producers through:

- Extension services
- Complementary forms of communication
 - Audiovisuals
 - Radio
 - Printed materials

- Digital media (cell/texting)
- Seminars
- Workshops
- Make a note on considering native dialects
- Maintain low communication costs with effective results

It is also important to communicate with the international coffee industry (associations).

- Structured bulleted messages and talking points.
- Leverage what already exists: NCA, SCAA, ICO, (mailing lists, conventions, trade press, internet, social media, blogs).
- A contact person could be named in each country to unify strategies and messages.

In terms of financing:

- Get the best out of partnerships.

Communication monitoring:

- It is necessary to establish an effective communication efforts monitoring system.

After the presentation, members of the different groups asked questions, which were answered by the group, composed of media managers of each country.

Questions from Group 8:

- *How could the message (control rust) be communicated effectively to all producers in a timely manner? How is this coordinated in the region and in each country?*

The strategy of each country depends on its national coffee association.

Radio spots are efficient disseminators of messages to the entire nation.

We are working with CATIE on the design of materials.

Yesterday concluded a RIOPPAH event to unify messages in El Salvador.

Leading communication institutions in each country have handled figures responsibly.

The messages have focused on which agricultural practices to use and when it is appropriate.

Time is short and many of the actions needed to be executed yesterday.

For example, we know how much media space costs. There are no funds now, but when there are, we are not going to begin quoting. This has already been done.

In El Salvador there is talk with the commercial sector to support radio spots.

Focus: radio stations with a considerable audience comprised of our target producers group. We seek out a broader audience investing the least possible.

Questions from Group 1:

- *What are the “key messages” to pass on to producers? How do we make sure it is the right message?*

Key messages: pruning time, application time. Five 5 key messages at most to ensure they meet their objective, but doing everything within a strategy, within a regional framework and specific strategies in each country.

Questions from Group 5:

- *How can we make an effective communication not linked to the price/market issue?*
- *How can contradictory messages be avoided?*

Coordinate with PROMECAFE a key and clear message to all farmers, unique in each country, which will be echoed through the website of each association.

Questions from Group 7:

- *How do you get coffee institutes, governments, NGOs, and private sector providing technical assistance to have custom messages by producer type and agro-ecological region and put them in place in a coordinated manner at once?*

The PROMECAFE website has links to access the sites of coffee institutions and can be used to link the sites of other organizations.

The important thing is that all the entities participating in this summit are linked.

Questions from Group 2:

- *Communication is focused on rust causing a crisis. What positive message can be transmitted to growers? Does this have a solution?*

You have to send a positive message to growers. If there is a comprehensive management of the crop, rust can be attacked. If the recommended activities are carried out, we will have coffee cultivation for many years.

Questions from Group 4:

- *How could the communication strategy incorporate the use of social media like YouTube videos, and participatory extension like old field schools, to ensure a more effective transfer of best practices?*

PROMECAFE has Facebook and Twitter and also the websites of each association in the region.

Questions from Group 6:

- *How can we know the needs of each group of stakeholders to communicate the messages they want to hear? Can we work with various stakeholders to identify the best channels (methods) to communicate?*

These guidelines are important and should derive from the communication strategy.

Questions from Group 3:

- *Will there be a coordinated communication mechanism or dialogue from buyers / roasters to the producing countries regarding the crisis in addition to price or differential?*
- *What role do roasters play in communicating information associated with rust? Is it purely as funders of regional programs or is there any opportunity for a more direct role? Also, what are the recommendations to communicate the situation to consumers?*

This is why we are at this summit. We will open all the doors we have. We want to encourage consumers to buy for quality, not for a price. This will be reflected if good practices prevail.

Roasters are ready to spread this message.

Questions from the Audience:

- *How could the message from the commercial sector be regulated, where a universe of products has emerged and ultimately confuses the producer?*

There is no answer to this. Our countries are democratic. We cannot influence commerce. The market is open to any product. What we need is to be careful with fake products. Each association can give an opinion in this regard.

As to the supply of chemicals for rust control, PROMECAFE has been working for years on the official approval of the registration of all agrochemicals, fertilizers, etc.

Labels are uniform and must be used in every Central American country.

The influence of the agrochemical industry is strong, but the use of products is regulated.

METING No. 9

Replacement of varieties and development new resistant varieties

Presentation by Mr. Vincent Petiard.

- Why are we in this situation in regard to coffee varieties? We could talk about other products. There are no seeds for coffee. No innovation. Coffee farmers are rare. Coffee does not have a seed industry. It wasn't until now, very recently, that seed companies tried to find new seeds.
- Dupont made a deal with Malaysia. There had been no development of varieties, nothing permanent.
- This is why companies like Nestlé are investing in the development of varieties. Students need better training and to be very specific. It's good to train them, but train them about something that they can directly use.
- What varieties are available today?
- Costa Rica 95
- Lempira
- Sarchimor Parainema
- Oro Azteca
- Lapar 59
- Ihcafé 90
- T-5296
- The foremost recommendation: diversity of varieties, not just one.
- We need enough seeds, but there aren't enough hybrids.
- How can we propose that producers obtain funding to find new sources of resistance? At the medium term: something like a Timor hybrid, a cross between Arabica and Robusta. Try to use new sources of resistance of Arabica and Robusta in the medium term. This effort ceased for various reasons.
- Medium term: new F1 Hybrids.
- Long term: many possibilities. Recreate the Arábica, which comes from 2 plants: *C. C. canephora* and *C. eugenoides*. Create synthetics. Use the 2 species of origin.
- We need the variety to be adopted. We have demonstration plots. We need incentives to promote the adoption of varieties: consideration of costs, different varieties for small farmers.
- What happened was that there was no continuity. There was only one attempt.
- In Costa Rica they decided to plant below 900 m. I'm not so sure had they planted these varieties at another altitude, if they would have avoided these quality problems, although they would have had others.
- Some of these varieties are resistant to nematodes. They are susceptible to leaf spots.
- Some of them can confirm resistance.
- What we can say is that most of these give a good cup because they come from the original seed from Ethiopia.
- The Catimore was crossed with an Ethiopian variety that comes from the collections. A screening was expected. Combine the strengths of these categories with Ethiopian varieties. Today there is no access to Ethiopian varieties.
- There are 850 wild varieties.

- In Ethiopia, there is a collection of a few thousand varieties, but we do not have access to them. Accessing them is political issue nowadays. Ethiopian people are committed to protecting them.
- 90% their resource for coffee research is spent maintaining the collection.
- They have not produced anything new.
- Costa Rica, Lempira, Parainema, Oro Azteca, and Lapar 59 reproduce by seed.
- If some producers decide to plant again, they better plant something with more resistance. Why plant something unproductive?
- This is where we are. The next point is: do we have the seeds? Where do we find them?
- I do not have the answer to all these variables.
- Our limit today is the ability to produce a large number of tissue culture.
- The problem is working capital and capital investment for plants and technology.
- It takes millions of these plants. I would not recommend planting only one of these hybrids. We have enough seedlings to give to producers. This is a more expensive technology than simply producing seeds. The price should be calculated with the genetic benefit.
- I can ask the public, there are people from Costa Rica here, what is the real situation of the availability of seeds or seedlings of resistant varieties? We have 2 members. I know you are losing almost your entire farm to rust this year, can you get seeds? I have seen particularly Catimores.
- Seeds are obtained from producers, and ANACAFÉ bought a lot of seeds and made them available to producers.
- ANACAFÉ has seeds? Yes, as a matter of fact, it works directly with the producers who brought the seeds. One lot was bought. How many hectares can be replanted? 30 hectares.
- I'm sorry, but I'll make a terrible question, when speaking of resistance do they mean local-rust resistant? You don't know the genetics. You can have a Catimore with 2 genes and Catimore with 7 genes, and both are resistant.
- It is very difficult to know which is resistant, only by chance you can take the plant with high resistance and multiply it, and give it to producers. Yes, I know we do not know.
- The parents of these varieties are already susceptible in India, which means that all these plants are resistant here, but the source of the resistance shows resistance in India. One can observe the behavior of all these plants. When manipulating the material, one must be very careful.
- We need to know the genotype. New material is necessary.
- Good news: I kept some of these plants that show resistance, but not all are equal.
- Keep it in mind that they have different behaviors. This is very important: we must not settle with what we have today.
- We must differentiate these varieties by their resistance.
- Resistance can last longer if varieties are handled properly.
- These varieties have been tested in comparative batches.
- We must find other sources of resistance.
- These hybrids from Timor varieties come from a Robusta tree. Can we trust that completely? No.
- What was done with the germplasm must be extended.
- I know I have plants of this population in Portugal with different resistance expectations. We received a sample from India and some became resistant. Some are resistant, others are not. One or two became susceptible.
- We cannot develop our strategy based solely on rust resistant varieties. We must continue with Caturra and Catuaí. Breeding must continue.
- It is dangerous for a country to decide to go with just one. For long-term sustainability there must be variety.
- Weather conditions did not help us last year.
- We should not depend on one of these varieties alone. We must seek new sources of resistance.

- There is a gene that comes from resistance, which has apparently not been overtaken by rust V3. In Brazil, SH3 materials remain resilient.
- What I see is that SH3 is not a gene. It is more complex.
- Rust has greater difficulty with other genes.
- They have tried to create plants with SH3 because it is difficult for rust exceed it.
- Rust has the ability to create V3 in Brazil.
- Do we make a recommendation today knowing that we don't have something ideal, or do we wait for the ideal situation? If so, I'd recommend something.
- Do we have enough material to deliver? According to what we have, can someone recommend anything? Do we have the seedlings? Do we have the material?
- Recommendation: we cannot put all our efforts into a single variety.
- We need diversity of varieties in order to divide the risks.
- This is good for quality too.
- Variety is like a color: it needs different colors to be formed.
- Genetics is a prerequisite; quality, performance, etc. are important.
- If you do not have the genetic potential, you will not succeed.
- In coffee you need to look for productivity and quality, rust is not a problem.
- We know how to control rust in our nurseries.
- Do we recommend varieties? We should have varieties, not just one. Use different varieties.
- Who should make the decision on which to use in each country?
- In the case of Costa Rica: Catuai, Caturra, Venecia - they ripen in a month. They are resistant to rust. We recommend high-yielding, rust-resistant Sarchimor.
- We have everything except Obata. Resistance is inconstant.
- Resistant materials today will be susceptible in 20 years, so we must constantly work on production.
- We need enough seeds, but there are not enough hybrids. Lempira is a good choice, according to Hondurans.
- What do we do now with available resistant varieties in the region? We should make it easy on producers and give them what is available.
- If coffee institutes do not take these decisions judiciously, producers will take any seed, and this is more dangerous. It's not perfect; there are doubts.
- It is necessary to determine the existing seed supply and make it available to producers as orderly as possible.
- Resistant varieties must also meet good quality requirements.
- In Central American countries there are rust-resistant materials that are the same under different names. It is necessary to standardize this technical information.
- There are different names for varieties that are the same. You need to be pragmatic.
- The way to clarify this is through molecular biology, which is inexpensive today. A sequence of Ethiopian collections will be made.
- We don't have the ideal situation, and perhaps we never will.
- In the medium and long term, how can we propose that producers get funding in order to achieve new sources of resistance?
- Medium term: something like a hybrid plant from Timor, a cross between Arabica and Robusta. Try to make the most of the Arabica and Robusta new sources of resistance. This effort was stopped for various reasons. This approach is called inter-specific.
- Does it make sense to look at specific hybrids?

Medium-term expectations:

- Have new F1 hybrids
- Have inter-specific hybrids
- Establish a sequence of pathogen genomes

Long-term expectations:

- Production strategy. Today the seed industry has wild varieties. This is where material for preproduction is created, and then a variety is created.
- In preproduction: preproduction material that creates diversified material and is distributed in the market. Out of this a variety is chosen for each country.
- A material quite similar to the cultivated type is created. It is necessary to produce this basic material, which can be used in different countries looking for resistance against one plague today and another tomorrow.
- Creating this material for preproduction and sharing it with other countries is one of our goals. We started with CATIE (Costa Rica) or CENICAFÉ (Colombia).
- It is the responsibility of each country to use it. This is part of what I would call medium term; that is, to create varieties for preproduction.
- We propose a variety Eugenoide + Robusta = Arabica.
- I suggest that one Eugenoide and one Robusta plant are characterized.
- Facilitate the exchange between countries: the WCR project has been to use existing varieties only where we tested them in many countries. Twenty-two are committed to four plots.
- Some countries such as Colombia and Brazil, have agreed to share some existing varieties.
- How could we access the genetic process in Ethiopia? I do not know. Today we have nothing.

We must take note of the advantages and disadvantages:

- Coffee is a perennial crop. Replacing the variety is not simple.
- Even if we had new varieties, it would be complicated to take these varieties to a farm that is already planted.
- The time for a variety change is now.
- If we have varieties but do not want to use them, the issue with seeds is not so much about today but two or three years from today.
- If they cannot be distributed, they are useless. It's part of the seed industry. We need a system to facilitate their implementation.
- Not long ago Colombia did it successfully. It's very difficult here. We need experimental and demonstration plots. It's hard to replace a variety in small plots.
- We need to adopt the variety. We have demonstration plots.
- We need incentives to promote adopting varieties: consideration of costs, different varieties for small farmers.
- Robusta is competing with Arabica and other crops.

In this meeting, the scope and characteristics of the CENTRO DE INVESTIGACIÓN PARA LA ROYA DEL CAFÉ, CIFIC, (Research Center for Coffee Rust), were made shared. CIFIC was founded in Portugal with support from the United States of America.

Main activities carried out by the CIFIC:

- International cooperation to support coffee producers to develop resistance against leading diseases.
- Survey on races of rust.
- Characterize new sources of resistance.
- Help coffee research centers to select coffee materials with high resistance spectrums.
- Train researchers and technicians in the problems involved in the search for a more durable resistance.

What has been done in the field of research:

- In Portuguese laboratories we investigate rust characteristics.
- Rust is inoculated in plants under study.
- We have characterized about 50 rust races from 3,500 samples, but in India alone, five new races were recently identified.
- Genes that affect one leaf cannot affect the genes from another leaf that has been infected with another race.
- The meaning of coffee rust for world coffee production and fear of its introduction in America led the governments of the United States and Portugal to create CIFIC, because of what happened in Sri Lanka - first rust.
- Objectives: centralize the work on coffee rust in one place. Avoid the hazard of new races of this parasite.
- Portugal does not produce coffee. They import samples from around the world.
- Before CIFIC, the director made many tests on his plants with rust, especially coffee rust.
- Rust has existed in all producing countries. Australia and Hawaii no longer have rust. There were rust problems in 1989.
- Coffee institutions should be helped in the development resistant varieties.
- Catimore and Sarchimor were born here. All hybrid derivatives were tested here.
- Fundamental research on molecular variability of Hemileia and different varieties.
- We receive seeds, produce, and make tests.
- They have different strains and races in boxes. They are studying them to characterize them.
- It is possible for some of the flowering plants in the nursery.
- Inoculation process to characterize rust races. We characterized more than fifty races of rust.
- These races are a unique collection. No one else is working on this. They need rust from different plants from around the world to discover other resistances. We are looking to find sources of resistance. They also do molecular work.
- There are many races of rust. India is like a factory of races of rust. We distribute these plants for free to countries that request them.
- What happened in India? They have clones we delivered to them, and they are a resistance force of a variety.
- There are so many races of rust in India, while yet they don't exist in other places. Materials aren't well handled in production breeding programs; as a result, there is so much rust.
- People working with resistant varieties do not know how to prevent new rust races. This is very frequent.
- How can we contribute to breeding programs? With a survey on rust.
- Local units of characterization of rust in some countries.
- Train people to characterize rust races.
- Characterize new sources of resistance.
- Sometimes, people have good materials but don't know them (collections, banks). But they are not characterized.
- The usefulness of uncharacterized plants is unclear.

- We help coffee production centers to select materials and to discard materials resistant to local breeds.
- Producers are using plants that they do not know thoroughly against an enemy that they don't know either because they don't know which resistant races they have.
- Luckily they will choose a plant with many genes, which becomes susceptible very fast.
- We can help producers choose the best plants making resistance tests.
- Copper became completely susceptible in India in four years.
- We have a cooperation project with PROMECAFE. Between '82 and '87, we received 10,000 plants for testing.
- Practices to increase the durability of resistance: when crosses are made, genes dilute.
- Warning: cross with good monitoring or you will not know what you are doing in F2, and you will be helping rust to make new mutations that increase virulence.
- Germplasm banks, experimental fields.

An investigation on *Hemileia vastatrix* (rust) was shared during the meeting: "Knowing the Enemy, and Recruiting New Partners to Fight It" developed by Robert Barreto and Harly Charles Evans. The main points are:

- We have not seen the end of the research on the coffee rust fungi.
 - Miles Berkeley described and named the fungus as *Hemileia vastatrix*. The Latin word *Hemileia* was used - half smooth; *vastatrix* - destroyer. There are few scientific names as appropriate.
 - He invited him to Sri Lanka to study the Berkeley fungus. No fungicides. He suggested sulfur spray, but it did not work. He left a legacy of important suggestions in the early days of plant biology.
 - Marshall described and left the model of the life cycle of rust.
 - Studying the disease allows us to know its behavior and the best ways to attack it.
 - The devastating coffee leaf rust crisis in Central America is attributed to the weather.
- Known rust species have between 50 Mbp (*Phakopsora pachyrhizi*) and 402 Mbp for *Uromyces vignae*.
 - In *H. vastatrix* 733.5 Mbp!
 - A = 65.4% in GC = 34.6% suggests a high degree of repetitive DNA.
 - Deduction: the large genome can be connected to the limiting factor of the coffee rust to tolerate lower temperatures.
 - If this were true, this could explain the escape of mountain- coffee rust and make a connection between the current crisis with the global warming effect in Central and South America.

After 144 years of research on *H. Vastatrix*, we are still learning.

- *Why is a clonal fungus so innovative?*
 - Meiosis occurs in the spores. Now we have better color-marking technology. We have very good cytometry techniques.
 - The spore germinates with different nuclei, meiosis, what happens after this, we do not know.
 - We do not have the whole story. We don't know what happens inside the plant. We published this in Plus 1 several years ago. We won't stop.
 - Flow cytometry, used to diagnose cancer, is reliable to analyze rust. We obtained this result by comparing tomato nuclei to coffee nuclei. We got a value "c" a lot greater than any rust. The genome is enormous. The interesting thing is that the large size of the genome is a limiting factor for the organism. Large genomes allow its adaptation to extreme environments.
 - This is the foundation of the deduction that altitude coffee avoided rust because it has large genome.

- However, due to climatic changes rust can go up now. This doesn't solve anything, but it gives us an explanation of what is happening.
- *Question: Is Hemileia vastatrix really a clonable fungus?*
 - It should be. In reviewing official information, we see officially 42 races of *H. vastatrix*, with a predominant Breed II.
 - In Colombia, for example, there are 10 breeds that hunt among the known breeds and other 10 are unidentified and isolated.
 - Recently few and surprising studies were published on the genetic variability of *H. vastatrix*.
 - Spores are dominant.
 - When cold and humidity are combined between spores, some are sexual with thin walls. When they germinate, they produce a thin tube on the branches.
 - In theory, these spores do not affect coffee.
 - Asexual spores that clone the fungus. Each new spore germinates and produces a clone in the colony.
 - There are some studies published on rust. There are recent publications that use satellite markers which suggest great genetic diversity. The reduction of resistance has complicated the lives of producers.
 - The enemies of our enemies are our friends:

Potential use of “bodyguards” and natural enemies against coffee rust.

- Classic biocontrol has been used successfully for over a century for the management of invasive exotic plants, and it is working well.
- Classic biocontrol: if a species is affected, one seeks its enemies, runs tests and, if safe, introduces them into the organism. If this works well, it is controlled.
- The bindweed entered Australia early in the twentieth century. It was used to recover desert areas, but it began to invade other habitats. It's like a green cancer. It was the biggest threat to natural resources in Australia. It was an economic disaster. Animals were dying of thirst on the banks of the river.
- Australian and British scientists returned to the natural environment of this plant in Madagascar and found that it never had a similar density on the island. This plant is a relative of rust.
- This plant was put under quarantine with high technology. Tests were run to make sure it wouldn't attack something else. This was done with 120 plants and proved to be safe. The area where the plant was placed was sprayed because the emergency was enormous.
- This succeeded in three months. It doesn't germinate anymore. There are no seeds. This is how biocontrol works. But it does not always work so well.
- What is the parallel between this and rust? Rust is a success, from the perspective of the fungus, it is very successful. Why? Because it has no natural enemies.
- There are organisms, fungi, that grow within the plants and act as immune systems of plants, but plants must pay for having these bodyguards.

- When a plant has no natural enemies left, it begins to grow. This applies to rust. It left behind all its natural enemies. Now there is monoculture of plants without bodyguards, an incredible success. It's a good comparison to what is happening here: coffee without bodyguards and rust without natural enemies.
- We do not have the same examples for pathogens because we have not done it yet. It is a new field so far. Fungi have a list of enemies: insects, larvae, microparasites, fungi, virus, bacteria, etc. highly co-evolved to their microscopic hosts - bodyguard.
- Fungi give plants more resistance to abiotic and biotic stress. They protect them from microbe-riality environment.
- Natural enemies of monilia, a disastrous pathogen, Pacific side of Ecuador.
- Larvae, which feed on spores, were found on a mountain in the jungle. We also found an evolved food chain, a very diverse group of organisms.
- Studies on parasites and bodyguards have been made in Mexico and Latin America.
- In the future, integrated management through biologic control and plant crossing can be used. Funds are required to carry out research on coffee in its natural environment and get to the bottom of what is contained inside.
- It is an area of research that can be very useful and of great benefit in the future. There is nothing now, nor will there be in the next 2 or 3 years. It's a good idea to invest in this research.
- Exotic seeds, Hemileia and Maravalia, were very successful when introduced to natural enemies and endophytes. Endophytes act as microscopic bodyguards and also fight microparasites.
- The use of classic biological control seems to be at an early stage for the administration or management of exotic plant diseases, such as coffee rust, but preliminary studies show great potential.
- *What if we explore the coffee at its center of origin?*
 - There are examples of preliminary work on endophytes – bodyguards of coffee and of microparasites of coffee rust... but these were based on the study of agencies operating in Latin America where coffee is an exotic plant.
- Is there a formal link between Ethiopia, East Africa, and these natural enemies? We need more funding for research in the jungle and to take a mycologist to investigate.
- Is the virulence of this outbreak due to genetic changes in the fungus? Results in Colombia do not suggest such a thing. Was a study conducted in Central America on rust? Possibly, not.

• **Future:**

Integrated management using varieties in plantations and classical biological control strategies...The perfect blend?

What's next? The desire of the researcher:

- Research the life cycle of coffee rust in the center of origin of rust and in relation to other coffee types.

- A search of coffee bodyguard microbes and natural enemies of *H. vastatrix* in East Africa and Madagascar.

Questions from the audience:

Is there some sort of link between African and Latin American coffee associations to share knowledge, experiences, results, not only regarding coffee rust but all of the agricultural diseases?

Yes, there are some initiatives that need to be intensified.

What do you think of the potential of the *Lecanicillium* to attack coffee rust?

It is one of the most common parasites found in coffee rust. It can be fought with fungicides.

Mr. Tim Schilling discussed some aspects regarding mid and long-term prevention:

- The first issue to consider when we look at strategies in the medium and long term is the renewal of plantations.
- Renewal is an important aspect of strategy development.
- Genetic material is important in plantation renewal. What do we have available now and where? And how can we increase new materials to plant?
- Several producers gave us a list of current genetic material for use in a renewal program. Here is the resistance to Catimore rust.
- Resistance to nematodes.
- Seeds from these varieties are available through the normal channels: ANACAFÉ, IHCAFÉ. Many have discouraged people from their use. Using them should be reconsidered. Even if quality is lower than that of Caturra and Bourbon, these rust-resistant varieties have the cup of excellence.
- There may be problems, but they still have quality. A good product can be obtained from these varieties.
- Looking at scientific evidence, this is something that we can do very quickly.
- New varieties and hybrids F1 are emerging. They have not been tested.
- You do not invest in the renewal of a field with an untested variety that can have diseases.
- Varieties need data from a multisite testing within the country to support them.
- The variety Obata in Costa Rica is an example.
- Research is about to send to each Central American country a multisite test of 30 varieties that were obtained from all the regions of the world – they are the best in the world.
- Some are already being used.
- Seeds cost money, seedlings cost more.
- Basically, seeds from pure lines, not F1, can meet this need with available resources.
- F1 hybrids should be generated through cloning. What you get is not a seed but a seedling. You are familiar with laboratory tissue culture. They produce embryos developed in the laboratories. They plant them. We buy them. It is expensive. It's limiting. They are not as available.
- A private seed company is urgently needed to generate seedlings so that production is increased. Tissue culture - embryogenesis, cell cloning - for banana, pineapple, and horticulture.
- Can they get involved to produce greater quantities of F1 hybrid material?
- This could start the seedling production marketing. A real commercial process for the production of F1 hybrids is needed.
- There is a process in Nicaragua, but for them to produce more than 150 thousand seedlings would take very long.
- There is a need for industrial production for renewal programs – millions of seedlings.

- There are signs on the horizon of artificial seed development, rather than embryos in test tubes and plant pots.
- Taking an embryo, giving it a code, and turning it to an artificial seed is in the process.
- You can purchase a “pill” and the embryo is inside. You plant it; it grows (in the near future).
- Transgenic plants: we have not worked on this option.
- We do not know what varieties should be replanted. Recommendation to producers in the short term: the material exists, some is rust resistant. We must broaden this material.
- There is enough supply in Central America.
- Quality, resistance to other things, production: the idea of having a production schedule is to have a substantial supply. The goal of long-term production is to combine more diversified varieties, production, breeding, more resistant genes.
- Current resistant varieties have the same genetic material that gives resistance to the plant. The plant becomes resistant.
- It is about introducing different sources of resistance incorporated into the new hybrids. Identify and incorporate these genes.
- Are there other sources of resistance? Yes, within Arabic, this is what was used before.
- There are other resistant genes. A lot big effort has been made on Robust and that family, but we are finding different sources within Robusta that have not been explored much.
- There are two other species with rust resistance. They are still growing.
- There are varieties that could incorporate more resistance to other strains.
- We must get more genetic diversity, and we will cross it with all the new sources we can find. We would use rust.
- We started with CATIE and CIRAD. We will use these rust-resistant varieties.
- Moving forward.
 - Start now by building on what has already been achieved.
 - Key alliances for success with other institutions such as CATIE, CIFC.

Questions / discussion

Questions from Group 5

- *If decided to renew, what would be planted in the region?*

Especially in Guatemala, the plan is to work with traditional varieties taking into consideration planting also resistant varieties.

- *What are the factors to consider within a strategy for making decisions on renewal?*

Institutions must be producer-oriented. It's part of their responsibility, and they have to share their experiences in the region with producers, and make pertinent recommendations on that basis.

The outbreak of rust has led to interest in more resistant varieties. Resistant varieties may be an option for aged and unproductive plantations at higher altitudes where varieties are related to quality. The criteria must be defined according to individual studies in each place. Institutions provide guidelines, but ultimately, it is the producer who makes the decision.

The decision to change varieties depends on various factors not only on a particular disease at a particular time.

Comment from Group 2

- *We see no decision or priority in this direction.*

Questions from Group 7

- *What are key recommendations to producers in the short term?*

There are materials but maybe not on a large scale. How to make them available to producers must be organized in an orderly fashion.

It's not that there's a great demand for seeds because of this rust problem, but it does bring up the issue of order.

In Guatemala the first Catimore plantations were established 30 years ago, and now they have a high degree of resistance to rust. Therefore, we don't know how long it will take to achieve an adequate resistance to rust, but this resistance also varies depending planting time.

Comment from Group 6

- We can learn a lot from Brazil and Colombia. There have been good exchanges with experts and several internships in these countries.

Questions from the Group 1

- *Main sources of funding? USAID?*

Whether it is seeds or plants from embryos that are produced, the plan should correspond to business development. The idea that an outsider funds a laboratory doesn't seem to be the way to go for me. The interest of the producer defines the demand, and then other organizations define their commercial interest.

Review of Group 3

- Diversification is better for controlling or preventing the risk of illnesses.

Yes, this initiative is very important. To not risk everything, we should have more than one variety. If you have plots with different varieties, risk is diversified. This is called variety of genetic material.

Questions from the audience:

- *What will be the response time to producers?*

This depends on several factors and, among others, the following variables may be considered:

- Larger F1 installations
- A CATIE laboratory, another one in Costa Rica
- Price per plant approximately \$1.20
- Costa Rica has the capacity to produce 5 million plants. There are other laboratories in Honduras and Nicaragua
- Seed and plant supply are low compared to the potential demand
- A production study on other hybrids at lower cost is underway

MEETING No. 10

Mitigation strategy: funding, credit, trade and delivery of solutions

Spokesman: Mr. Robert Nelson with NCA.

- No one has all the answers, but together we can gather what we have and determine a starting point. Let's listen to financial institutions:

Root Capital, Mr. Ryan

PPP ROOT Capital

- Root Capital is a financial institution that promotes investment for development. It focuses on small producer groups in Africa and Latin America.
- It works like a bank, granting loans and charging interest rates but with a social purpose.
- The focus is on people who have no assets as collateral, located far from the city. There are risks.
- We work with finances between value chains. Instead of taking mortgages as collateral, we take export contracts.
- For the most part they are short-term loans for working capital. We are increasingly having more demand from our customers.
- Since 1999 we have granted a little over \$500 million in loans to small producers, with a return rate of 97%.
- We have some experiences in financing renewal plantations.

Components for sustainable renewal:

- Institutional capacity to manage microcredits
- 5-7 year loans with two year grace
- When borrowing from the cooperative, not everyone renovates at the same time, so risks are shared
- There is capital available
- Longer terms for renewal are risky and almost not granted
- Technical assistance in the selection of varieties and implementation of best agricultural practices
- Commitment from buyers
- Impact assessment

IDB, Mr. Peter Stevenson

Financial instruments to deal with the crisis of rust

1. Financial component
2. Business and technological development component
3. Major additional elements

Major additional events:

- Support for restructuring: credit operations.
- Alternative regional investment structures are being explored, which could include both the public and the stakeholder sector (coffee exporters and buyers) and funded in part by multilateral banks, including concessional funds.
- Additionally, we would support a public-private network for the exchange of information on the crisis, its impact, and evolution of the results of applied policies. Additionally, we would explore the possibility of using regional reinsurance schemes, in order to lower the cost of premiums.
- Technical assistance
 - At country level
 - Financial sector interventions require technical assistance to ensure that private trusts have clear rules for the collection and use of funds for the required technological change.
 - At regional level
 - Agreement between the National Federation of Coffee Growers of Colombia and the IDB on an exchange program between Central America and Colombia to conduct technical visits and access information on agricultural and financial best practices.
- The bank is considering a comprehensive situation to support the rust crisis
- Value chain financing diagram
- There are two models: with and without a sovereign guarantee

IFC

- Part of the World Bank; institute that promotes economic development
- Funding is needed in short and long terms
- In the short term, for example, for better agricultural practices, and in the long-term, for example, for renewal
- 80% of the coffee is produced by 20% of the producers
- Two commercial funding sources
- Barriers for renewals and credits
- Roles of potential partnerships

USAID

- If \$1,000 million is the goal, to say a number, we need to know the structure of the current portfolio. In short, there are funds available, but we need to see a plan.
- Loans by destination (Guatemala).
- Loan portfolio guarantee of 50% by USAID.

Returning to the presentation by Mr. Robert Nelson:

Brainstorming activity:

This exercise, through which everyone will offer suggestions, will help us find solutions. Let's say that we need to raise \$2,000 million (only for purposes of this exercise). We need to determine the resources, programs, and tools through which to obtain this amount.

We can solve the problem using a force field diagram based on two principles: going from analytical to creative thinking, and going from convergent to divergent thinking.

Basic question:

How do we get \$2 billion?

Considerations for a starting point:

- This problem is about overall poverty, not just the coffee industry.
- We are fully aware that trying to obtain loans for renewal is not easy: trying to convince banks to grant short-term loans (3-6 months) and then need an extension (5 years).
- It is not easy for coffee producers to obtain loans because of the rust problem.
- This is necessary for renewal.
- Not all commercial banks grant loans for agriculture.
- Funds will very likely come jointly from the public and private sectors.
- The main problem is not money. With reliable plans, we can get that money.
- It is necessary to define risks.
- The concern is also about insecurity - the unknown.
- Research is needed. We need sources to fund research.
- We can obtain private loans with government guarantees.
- Banks may feel more comfortable with short-term loans.

Participants did the following brainstorming about aspects that favor and condition obtaining resources:

Funds

- Tobacco companies
- French Development Agency
- Hollywood
- Long-term loans
- Insurance
- Governments
- Universities
- Benefits to coffee farmers
- Fundraising programs
- Oil industry
- Environmental organizations
- Coffee producers and roasters
- Bank of China
- Taiwan
- Japan
- Agrochemical producers
- Pharmaceutical companies
- Bank of Qatar
- Pension funds
- Southern Wealth
- That consumers to pay more for coffee
- Bill Gates
- Rabo Bank
- Politicians
- Carlos Slim

- IFAD
- Bono (U2)
- Fees
- The Catholic Church

Obstacles

- Time
- Lack of coordination
- Lack of confidence
- Risk
- Lack of knowledge
- The cost of transactions
- Previous experience
- Current situation
- Banking institution
- Lack of organization
- Corruption
- Robusta coffee
- Natural disasters
- Rust
- Critical situation
- Lack of institutions
- Lack of farmer organizations
- Pessimism
- Evolution
- Coffee importers
- Prices
- Non certification
- Coffee prejudice
- Lack of reporting
- Lack of consumer engagement
- Currency
- FSMA
- Emergency cost
- Different objectives of organizations
- Lack of dissemination
- Investors' expectations
- Education level
- Lack of social interest
- Lack of unified messaging
- Lack of training and education
- Old plantations
- Sensitivity
- Lack of financial education
- Protectionism
- Lack of training
- Continuous plant nourishment

Driving forces:

- Develop capacity
- Competitive marketing
- Mobilize college students - identify volunteers to rebuild farms
- Mass campaigns
- Support small farmers' programs
- Open PROMECAFE to more countries in the region
- Technical assistance programs
- Research and alternate use of coffee
- Carbon bond
- Agro-ecotourism
- Increased technology
- Financial institutions diversity
- Farm workers
- Benchmarking
- Driving forces to employ more people
- Nominations of origin
- Identify and map farmers
- Advertising
- Engage investors
- Coffee-quality system
- Brand recognition (loyalty)
- Popularity of coffee
- Influence of the World Cocoa Foundation
- Migration issues
- Prevent drug trafficking
- Certifications
- Contribution to biodiversity
- Fear of political instability
- Programs to save or rescue nature
- Extension of loan periods
- Environmental services (coffee)
- Innovation
- Platform approach
- Increased coffee drinking
- Proper use of money
- Negative impact of GMPT

Restraining forces:

- Loans to farmers
- Savings groups for farmers
- Credit unions
- Restructuring loans
- Technical assistance
- Financial education
- Restructuring laws
- Mobilization of citizens

Strategies:

- Sending clear messages
- Expanding extension services
- Strengthening cooperation projects
- Target human stories
- Identify existing alliances
- Data collection
- Analysis reports
- Get the conclusions of this summit
- Reduce legal barriers for cooperatives
- Share success stories
- Promote the campaign “a day without coffee”
- Involve the media
- Increased stakeholder involvement
- Internet for consumer support
- Involve celebrities
- Use consumer engagement to support coffee quality

Collateral:

- Coffee leasing insurance
- CSA
- Green bonds
- Coffee exchange
- Long guarantees
- Purchase orders
- Internet campaign to consumers
- Collateral mobile register
- Pay with coffee
- Coffee CSA via sharing farms
- Customs warehouses
- Commitment from third parties

The round of scheduled meetings ended.

SUMMIT CLOSING CEREMONY

Remarks by Mr. Mark Visock, USAID

He expressed his appreciation to the sponsors of this conference and to the host organization, ANACAFÉ, and reiterated the support of USAID to the sector and looking forward to the implementation of the findings of this summit to prevent and control coffee rust, along with the consequent benefits this entails.

Closing Remarks: Mr. Nils Leporowski, President of Anacafé

- Mr. Robério Oliveira, Executive Director of International Coffee Organization, ICO;
- Mr. Lloyd Day, Deputy Director General with IICA;
- Mrs. Elsa Murano, Executive Director with WCR;
- Distinguished members of the public and private sectors of the coffee chain;
- Friends from the different media,

First I want to thank World Coffee Research and the Regional Cooperative Program for Technological Development and Modernization of Coffee for having gathered more than 160 representatives of the coffee chain to discuss and analyze the problem of rust from different perspectives within the Central American and regional contexts.

One of the objectives of this conference was to address the issue of rust from the agronomic, variety, and financing stand points. But we went beyond the problem that afflicts us today, as we comprehensively analyzed the plagues and diseases that can affect coffee production in the medium and long terms.

The proposals made during this summit must be translated into concrete actions to what all participants showed a personal and institutional commitment, both private and public sector, and to the creation of better conditions for the thousands of families dedicated to coffee.

It's time to act and bring about change. We are committed to growing coffee as a means to develop entire countries, and we believe that now more than ever, producers have to feel that we support them and that there is a light, not the end of the tunnel, but halfway.

Finally, I thank each of the sponsors for their unconditional support for the realization of this first summit. We appreciate the effort of all participants and invite everyone to continue this transformation process of the coffee industry. Thank you very much.

SUMMIT SUMMARY REPORT

Content by key topics

As a technical closure to the Coffee Rust Summit, it was agreed that the morning after the closing ceremony, a meeting would be held for lecturers, technicians, and other attendees to make comments, express their final opinions, and draw conclusions and recommendations regarding the topics addressed. This would be shared with all the participants.

On Saturday, April 20, in an informal atmosphere, hosts, sponsors, delegates from coffee-related entities, lecturers, and other attendees contributed their valuable opinions, which are summarized in this section.

Mr. Tim Schilling, Director with WCR

In this closing day, we must establish the priority actions that we will share.

Did we achieve our goals?

- The need remains for medium and long-term strategies not only in the scientific or organizational scopes.
- The financial issue is important.
- How we structure messages is important to get the funds.
- Main objective: to agree on activities to implement starting tomorrow, regarding the incidence of rust in the 2013-14 harvest. Major challenge: the rain of today. This is the most important issue. Many bad things happen when approached incorrectly.
- It is important to identify a control platform to guide actions. First, we must determine medium and long term actions. We cannot engage in the short term.
- It is necessary to create an entity to develop proposals, which will be responsible of finances and administration. In order to be accountable, these activities need to be monitored and evaluated. They must be incorporated and reported to donors. Funds should be obtained and expedited via grants or loans.
- Together with PROMECAFE we are here to help and support you. We are present and committed. PROMECAFE can create a unit specifically for this purpose.
- There was talk of decentralizing some decisions and actions and to have a support unit. This unit will determine:
 - Main actions to be developed as part of long and short-term plans
 - What can we do to decrease the incidence of rust in the 2013/14harvest?
 - Financial coordination and administration
 - Coordination of the development proposed
 - Loan coordination
- Strategy: Who and what are the entities that can participate or how can this be structured? All the links of the chain must participate.
- Socio-economic aspects should be taken into account. This point will be addressed during the next summit.

In order to follow up the plan, it is necessary to review emergency plans and the comments from the industry. Get the money and make it work.

PROMECAFÉ and some national associations have participated in plan development, but many private-sector representatives have never seen those plans. PROMECAFE could give more participation to the private sector.

PROMECAFÉ already exists. We must work within that mechanics. We have the people. Given such a short time, we can perfect a plan via email. In order to conclude something constructive today, an answer, we should migrate to the priority which is: immediate emergency interventions.

Mr. Rick Rinhehart (SCAA). Immediate actions:

There is a saying: “How do you eat an elephant?” The answer is: “In small bites”. We see an elephant, and we have many approaches on how to eat it. The first bite is the most important. In one month time, we must create a plan that can be implemented. \$200 million to get fungicides, technical support, and field people is a lot to cover in 30 to 40 days. We are not certain of who will do this. It was made very clear that funding and implementation must be country by country. Only practices can be recommended regionally.

PROMECAFÉ is the coordinating body for each country and has the best access to remote producers within the country. We need to be supportive of the parameters established by PROMECAFE.

Funding sources: The Ministry of Agriculture must get involved in Guatemala. It is a public-private alliance (private sector - commerce, agrochemicals, and buyers).

It is important to restore producers’ optimism. They have been beaten many times with falling prices, natural disasters, and rust. Those better prepared have contemplated a crop change.

Roasting companies have offered hope to farmers in previous crises. Before farmers begin to apply treatments, they must hope to sell their coffee. They want to hear a commitment that it will be bought at the price at which it is placed in the market. The goal is to promote this message. For it to have impact, producers need to know it. WCR is willing to continue this struggle. We do not wish to impose. We want to be as supportive as possible. Conversations among donors, government, and commerce must take place.

It is important to aware stakeholders that this is not the end; there’s hope. This message is effective if there is commitment. Producers need to feel confident of moving forward and taking all necessary actions. Are there any willing companies? We need long-term commitments. The solution is not only offering a good price. Nobody is going to agree to sell in a 3-year term with a differential today to. This does not solve it.

We have no direct purchases, only through third parties. We are committed in the long term. We must support Central America. We want to support them, and we will buy the coffee at the right price in the long run – regardless of the differential.

It seems appropriate that PROMECAFE acts as the general coordinator of the coffee reactivation process because of its links with institutes, private sector, and government.

Ms. Rebecca Ott

There is a lot of discussion, but we have not seen the plans of PROMECAFE. We don't know who will follow through. This is not only about getting resources but using them properly. The analysis needs to include how badly the socioeconomic situation is affected. We need to know who is responsible for what, in order to make better follow-ups.

I agree with the comments, and I think this is a very complex issue. We must collect this information, and go back to the companies we represent to analyze it. We are innovative. See it through the lens, according to the objectives of each company. How can we optimize the solution? We are committed to this dialogue. The commercial sector is committed to Central America. We will not subsist without coffee in the region. We need fine coffees from this region and Africa. Consumers should contribute, as should all the chain as a whole.

We already have a model, we want to share it: alliances that have achieved long-term financing for producers. Let's take a look at successful models that can be replicated.

Let's address some scientific subjects. I think it's important that we leave this summit with specific knowledge to post in our press releases. We don't even have a basic plan. I don't think we will work things out in 20 minutes. We know the needs. You can see what was discussed between the Central American coffee industries regarding country to country financing.

When the private sector is included, make sure to include the Ministries of Agriculture and Economy, Labour and Social Development. This is not just about production. We have solutions and strategies. SQR supports volunteer research work with a global network of volunteers with different expertises to maximize the human resource.

Call to action: What can each of us do upon leaving this room? Have a conversation with a subcommittee. We need people ready to address these issues. Who will coordinate this? Michael mentioned Afghanistan. The crisis is serious. What can we determine today that will have a positive impact in 3 - 6 months? We need specific recommendations from our roasters' community - which is substantial. Who will be in charge? One full-time person will be needed to lead the committees and give them advice.

We need a starting platform. In an immediate emergency, the response of extension services has to be dramatic: provide planting and fungicide techniques. Extension services require a lot of money. ANACAFE already does this. To be immediate, it would be easy to approach ten more farmers per extension. Not just take more people to the field, but convince farmers of renewal and best practices.

We need a coordinating entity to organize efforts. Who? The most important actions are: to determine a coordinating body and appoint a person with skills and resources; to coordinate and carry out spoken actions (loans, donations, etc.). Will it be PROMECAFE? IICA? Who? I would like to hire someone to do it. PROMECAFE will provide office space for making contacts. Through CAA and IICA Guatemala, we will hire a person, a unit to coordinate actions.

We need to organize all the ideas, and then have another entity, maybe you, organize all the proposals and bring all consumers and their ideas together to develop an action plan.

This conference really was a meeting of the sectors (science included) to assess what actions we must

produce and the research issues to be addressed. Some people have had problems and others have not.

All the work done must be seen within the context of global warming.

When we look at strategies and actions, we talk about adaptation. The coffee industry must survive. We need to talk about future climatic changes and what we must do to implement appropriate policies.

We need an alliance of partners, but we must recognize the gist of what is happening (offensively and defensively). Climate change is an issue of this business.

1. Extension services: have coffee institutes integrate a strategy.
2. Keep track of the different varieties of rust. USAID has been present, looking for opportunities to provide funding. They want to see results to contribute.
3. There is US\$30,000 through PROMECAFÉ. We must call a meeting.
4. Farmers' needs of today and tomorrow, interventions, results; understand these topics in depth.
5. An organization that seeks solutions to rust. Launch a phytosanitary campaign.
6. In Central America this is worked through PROMECAFÉ. We must seek more opportunities to work and achieve this goal.

It might help to know how much we talking about for renewal and how much for fumigation. How much can be replanted in a year?

We invited the Portuguese to incorporate the institutional capacity that they have as part of a regional system of races, and do it with PROMECAFÉ.

Funding these ideas is a separate issue. The proposal is fabulous. We must explore other alternatives of donations for other initiatives. Perhaps local is better through donations and others, through other funding. We have to be nimble, move fast.

President Obama will travel to Costa Rica on May 5. The rust problem is already in his speech. Here there are representatives from 5 to 7 United States agencies. This is a very good opportunity. Having prioritized the components is essential. Opportunities to get funding need to be incorporated well before May 5.

As for the early warning system, weather satellite data can predict any impact. It is used in cases where plague criteria is already defined. It is necessary to inform producers with messages like: "If a farm has rust, and the wind blows in a certain direction, nearby farms can be alerted." The entire production chain must be included.

A research platform that involves facts is important; a tool for distribution to farmers through SMS. How should fungicides be managed? We have a feedback link. Information must flow in both directions. An early warning system to nearby farms.

PROMECAFÉ and research institutions in Central America will immediately work to generate a basic proposal, an outline, 2 or 3 pages, detailing major research components that can provide solutions in the long, medium, and short term.

Then we need to put together that research forum on another date, perhaps in June.

We are allies. There is a letter of understanding with PROMECAFÉ. We are ready to channel funds and take action.

WCR will take the lead in wording how entities here will contribute. We are using the same terminology.

It is urgent to move expeditiously, identify a donor, an emergency response - an entity that responds to the emergency. It takes someone with skills to respond to situations like this. Loans, grants, public-private partnerships. Does anyone disagree? No, okay. All agree.

Ideally, the product of the summit will be to identify the entity that will coordinate, manage money, etc. Not necessarily just one. The main concern is to name the entity that will say what to do.

Recommendation: this is the entity in which to invest. PROMECAFÉ already exists as an entity. The idea is a quick-response entity, not for channeling funds. Why create it? Let's use what's already there. We are trying to strengthen a unit, not to create a new one.

Mr. Keith Andrews, IICA executive in Guatemala

PROMECAFÉ is located within our facilities. I spoke with some donors. We will pass around a draft job profile for this emergency coordinator. We will coordinate funds.

PROMECAFÉ has specific attributions and some funds, but it cannot assume the responsibility of coordinating without a management-level person, who is bilingual and experienced in emergencies. S/he will be incorporated as an addition to an existing program. WCR will be a permanent observer to ensure effective coordination. This is not about creating new entities, but about quickly modifying existing ones in order to respond to these crises.

Mr. Armando García, PROMECAFÉ

About the official request to the IDB: a cooperation agreement between IDB and IICA already exists. IICA is the administrative umbrella of PROMECAFÉ. IHCAFE has carried out some projects with the IDB through this structure.

IDB Representative

That is correct, but it would only work for resources for technical support, and that does not solve the problem of sovereign-guaranteed loans through governments. There may be support interventions for non-refundable, short-term funds for specific issues, and could be longer-term loans, but applications from IDB member governments are required. Public and private sectors of the region must agree on priority actions and work together.

Mr. Armando García PROMECAFÉ

IICA also developed a document that lists the steps for what you mentioned. In the case of Guatemala, when amounts are significant, the loan application to the Bank is through the Ministry of Finance.

Mr. Tim Schilling WCR

How long does it take to get the money?

IDB Representative

If it's a short-term, non-refundable loan, very little time.

For greater sums with or without sovereign guarantees, even in emergency situations, preparation and approval included, it would take eight months. Therefore, funds could be available in early 2014. But there may also be valid loans with unexecuted funds. The reallocation of those resources could be authorized, which are already approved but not being used.

Mr. Tim Schilling WCR

Addition to the conclusions:

- Low management of the fruit in the medium and long term. It is important to consider:
 - Development a coffee monitoring system
 - TA and local packages for gradual growth of planting materials
 - Pre-varieties program
 - Coordinating a unit for information services
 - Genetics research on rust resistance, improve resistance
 - Research in the wild environments of coffee and *H. vastatrix* species
 - Other?

We leave with a commitment from the coffee industry and the different institutions to work together.

The final message is to keep moving forward and very fast, under the coordination of the regional body conformed by PROMECAFE and IICA, with the necessary and appropriate partnerships.

Suggestion from the public (rather applauded):

PROMECAFE should consider the Inter-American Institute for Cooperation on Agriculture (IICA) to be a permanent observer.

Funding for immediate rust control efforts requires:

- Country by country financing
- Better-practice recommendations, coordinated by PROMECAFE
- Extension services coordinated by national associations

Funding sources include:

- Donor agencies
- Governments
- Private sector
- How can commerce accomplish the highest impact?
 - Long-term purchasing commitments
 - Viable price structure

- Create buyer/consumer consciousness
- Assurance on behalf of donor agencies, confirmed commercial commitments

Comments:

Coffee roasters believe in and trust producers. They want to show their support and interest in working together.

We all want to see a concrete plan from PROMECAFÉ. That's why we participated here committed to provide knowledge and experience to cope jointly with the problem and solve it together.

We must work with governments, donors, loans, and the complete chain of stakeholders.

Ms. Rebecca Ott

Companies want to be part of the solution.

We are all clear that we cannot leave producers alone to solve their problems on their own. We're highly committed. We know and understand the problem, we have experience, and we can learn from other experiences, but we must react quickly in a strategic and comprehensive plan.

We should always keep fair trade in mind.

The problem is very complex, and I would like to introduce the research and the producer components. It appears that the loser in this process is the producer because he is the one in the field, facing the problem. The commitment of businesses related to this industry was not clear; it is now. It's great that the industry is committed with producers and willing to share the risk. The research component must not be forgotten. It must be continued and deepened. We need to share results.

WCR exists only for that, to do research on coffee, qualities, and production. We do not produce coffee. We buy from producers. We don't plan to stop doing what we are doing. On the contrary, we want to work harder in the coming years. That's why are here, to say that we want to be partners with you.

Science and Research Representative

One of the objectives is to review the scientific aspect. We think that in the short-term and in the particular case of rust, we need to understand what it is that we know scientifically and come up with two products, one for decision-makers and another for technicians. We have a small seed fund of \$ 30,000 to carry out an activity with PROMECAFÉ and combine it with a course, perhaps in August. We need to make this scientific event and define a baseline.

IDB Representative

I have no knowledge of a request to create a new operation for the crisis. There may be bilateral negotiations with some private banks, but it's better to negotiate together to obtain better terms.

IFC Representative / World Bank

We held meetings with Ministers of Agriculture and Economy. We are working on cooperation possibilities.

COI representative

We are supportive of producers. We are looking at ways to get volunteers to work with producers and support them.

Mr. Armando García PROMECAFE

The agreement of the council of Ministers is that this whole strategy is coordinated through PROMECAFE and the council itself. If someone were hired, it would be by IICA through PROMECAFE so that the implementation of the communication campaign decided on and for which the resources are obtained is monitored and coordinated.

Ms. Gabriela Cordón

Each country has already forwarded communication material through its association. It can be systematized by PROMECAFE.

During this meeting the need for a more systemic and integrated agenda on coffee research was made clear: genetics, management systems, the environmental topic, investment models, communication, and many aspects that need to be evaluated.

From the research viewpoint, a group of researchers needs to get together to define what to investigate. Parting from what we have, define existing needs, determine weaknesses, and then propose an international get-together to determine important aspects to research and allow for academic institutions to recommend projects, based on the budget, and see which ones provide the best proposals for the solutions needed.

At a regional level, there is an organization aiming to find solutions to the problem of rust. It is comprised of all the organizations such as IICA and CATIE. All coordinated through PROMECAFE. The phytosanitary campaign for rust control is coordinated nationally with each coffee association or institute and the ministers of agriculture. At the end of April, they will review the progress made. It would be good to coordinate to follow up on progress. The idea is to complement other actions that are underway, but we must be aware that a structure in the region is already working on this issue, and we need to coordinate with them.

USAID Representative

In two months we will be observing the results Costa Rica obtained through monitoring. We have established criteria for combating coffee rust, including the production chain as a whole. We do research via two systems: in the field and bibliographic. There is not just one research system. You have to use the most suitable and appropriate one, depending on the results it can provide.

Closing remarks, Mr. Armando García PROMECAFE

- I think this should have been said at the beginning and not the end, but as a reference: PROMECAFE comprises national coffee institutions or associations from Central America, Panama, Dominican Republic and Jamaica, in addition to CATIE, IICA, and CIRAD.
- I thank all the sectors that made their contributions these days because it really enriched the content of this summit. We have seen everyone's good will to jointly seek and find the best solutions to this crisis.

- We must seize this moment to make a comprehensive management in regional coffee growing.
- Everything indicates that we are turning this current problem to its positive side, so technological development of regional coffee production can be achieved for the benefit of coffee growers and families, and also for the benefit of our environment and society at large.

Closing remarks, Mr. Nils Leporowski, President of Anacafé

- We wish to express our special thanks again to Tim and to the coffee industry for their interest in rust and the crisis that producers of Central America are living.
- We drew conclusions, and we (industry, financial institutions, and business related to the industry) are aware of the effect this crisis will have.
- I want to emphasize our gratitude to those present from the importing, roasting, and commercial sectors.
- We hope that direct contracts between producers and roasters can be made so that quality is recognized by price, and it reaches producers.
- The best way to help the coffee industry is to improve prices. If the producer gets good prices, he will have the necessary resources to invest in planting.
- The problem is how to ask a producer to make a loan when prices are low.
- It's worth saying again that the best incentive for the rust crisis is the price of coffee.
- We need to keep working on fund-raising, studies for new varieties, and alternatives to reduce the risk of poverty.
- PROMECAFE can coordinate all these efforts.
- We know very well where we stand, what we have, and how it affects us.
- I hope this summit represents the beginning of a more prosperous and sustainable coffee growing for all.

Guatemala, April 2013