RESEARCH & INNOVATION FELLOWSHIP FOR AGRICULTURE

A collaboration of faculty & graduate scholars adding professional skills to International Community programs

Over 88 RIFA Fellows have worked in over 26 Countries

UCDAVIS

Global Food Initiative
UNIVERSITY OF CALIFORNIA

RIFA Presents an Innovation Solution

- Graduate Students not receiving practical experience in their field
- Need for STTA and project execution in resource poor nations
- Establishing a connection to University of California experts
- Fulfilling UN SDGs important priority for APLU
- Cost effective project management

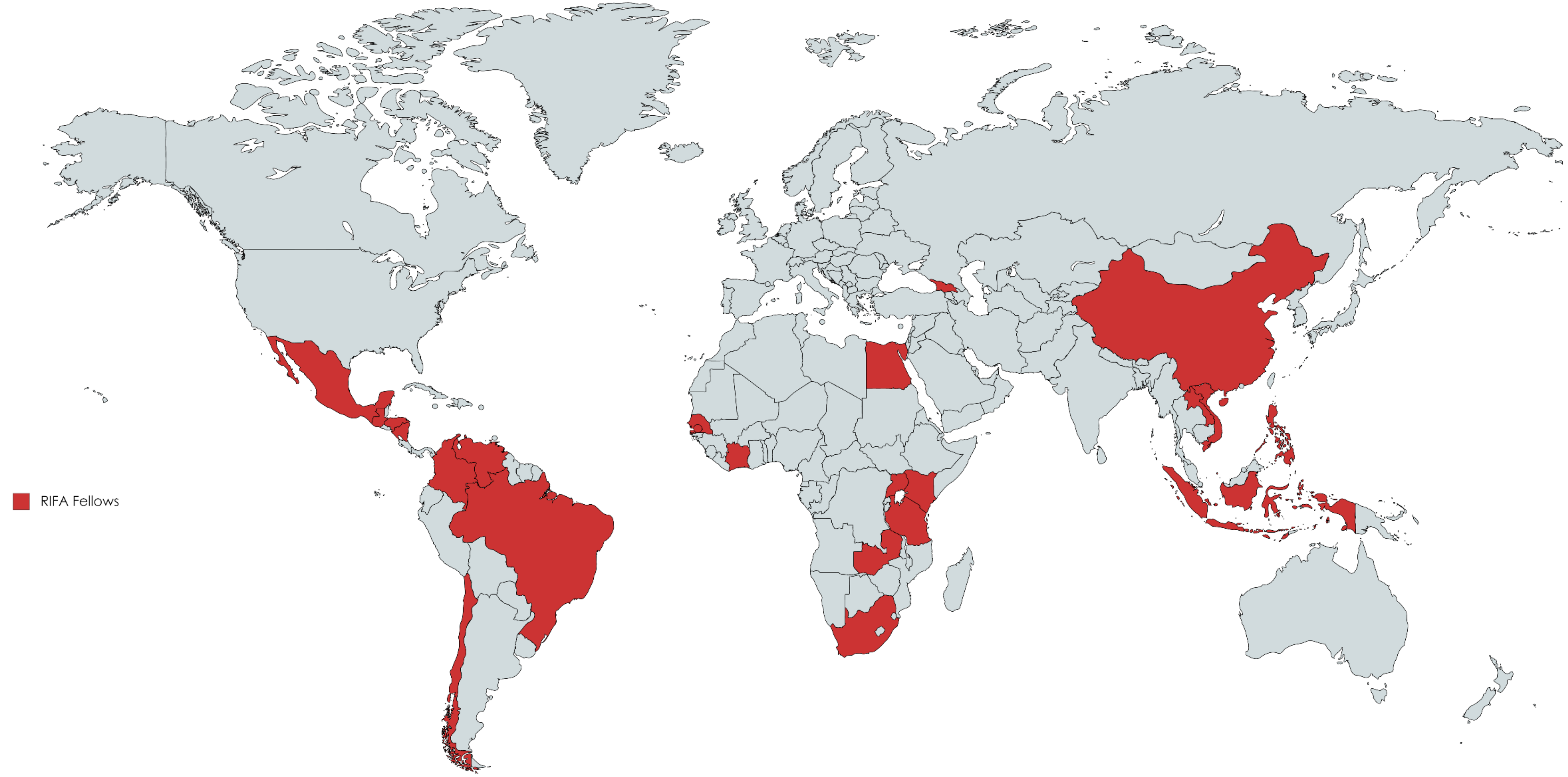
Program Successes

- **88** fellows in **5** years
- Work in **30** countries
- Over **$156,000** additional funding leveraged by fellows
- **22** scientific journal articles in progress
- **73** Additional Publications including fact sheets, guides, etc
- **1053** Professional Collaborations
- Grad students from:
  - UC Davis, Berkeley, Santa Cruz, Riverside, Santa Barbara, San Diego
  - Land-grant colleges: University of Florida, Idaho, Michigan, Arizona

UC DAVIS
UNIVERSITY OF CALIFORNIA

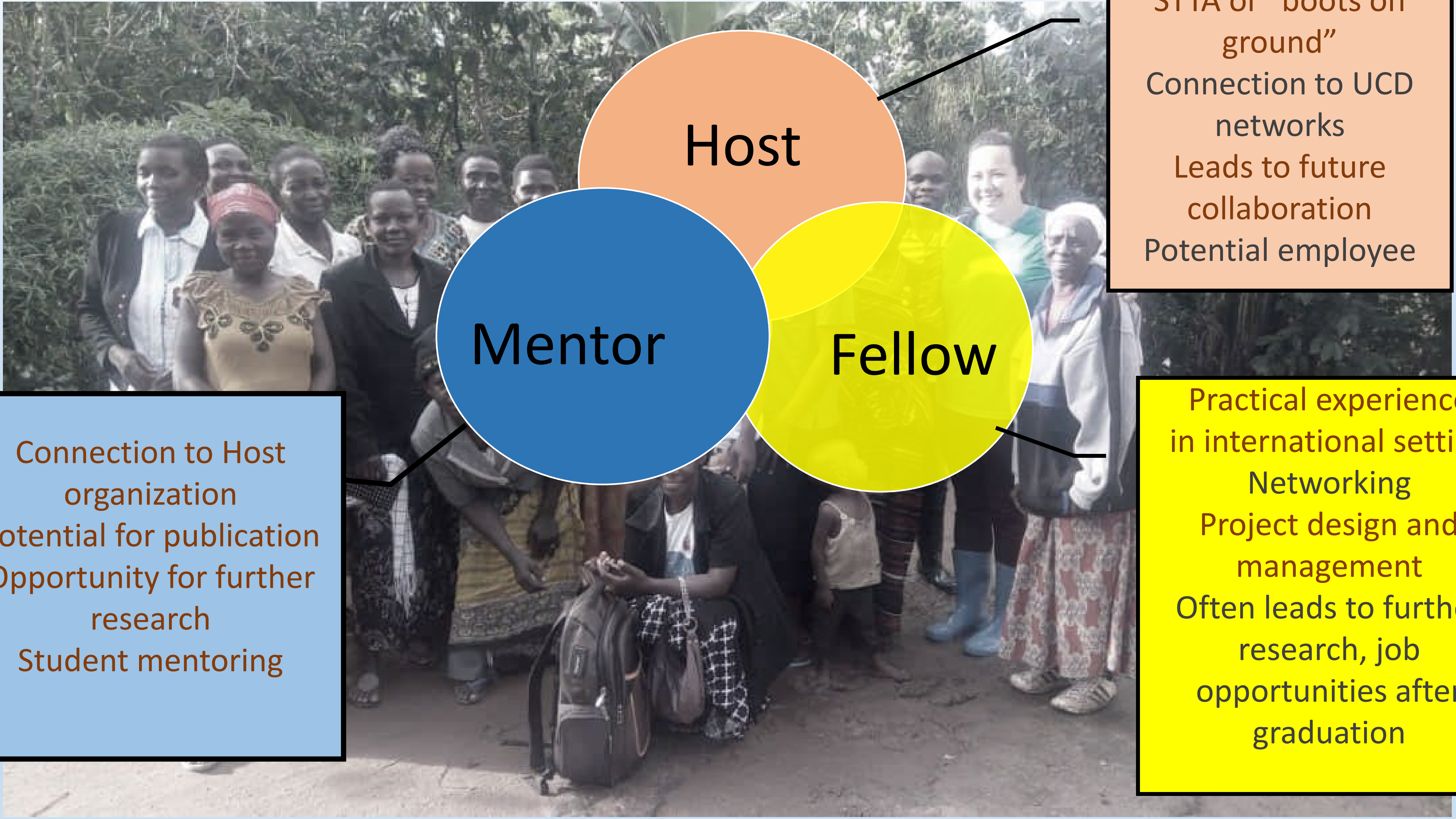
Global Food Initiative
UNIVERSITY OF CALIFORNIA

RIFA Fellow Map



Fellows live and work for 2-6 months in country

RIFA Projects Benefit Stakeholders on many levels



STTA or "boots on ground"
Connection to UCD networks
Leads to future collaboration
Potential employee

Connection to Host organization
Potential for publication
Opportunity for further research
Student mentoring

Practical experience in international setting
Networking
Project design and management
Often leads to further research, job opportunities after graduation

Host Organizations

PCI
CELEBRATING 50 YEARS OF POSITIVE COMMUNITY IMPACT

Oxfam

CIAT
International Center for Tropical Agriculture
Since 1967 Science to cultivate change

ZAMORANO

MERCY CORPS

AYTHOS

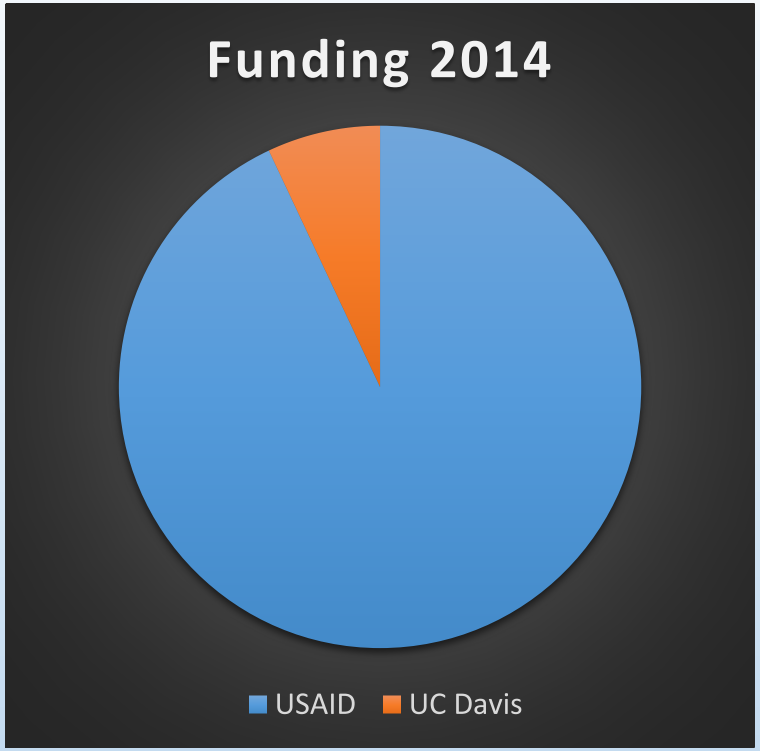
CIMMYT
International Maize and Wheat Improvement Center

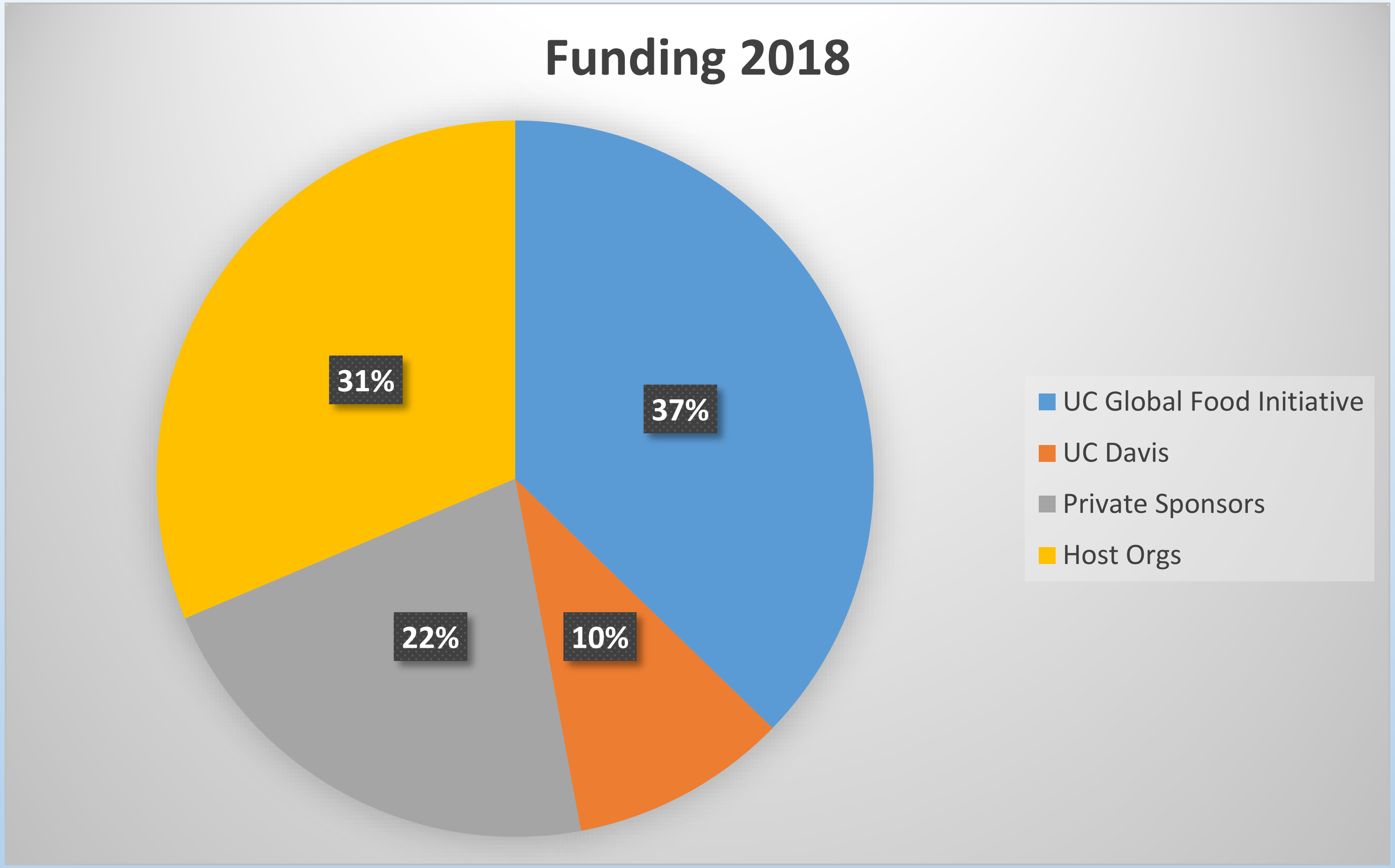
UNIVERSIDADE DE SÃO PAULO
SCIENTIA VINCES

CIP
INTERNATIONAL POTATO CENTER
A CGIAR RESEARCH CENTER

UNIVERSIDAD NACIONAL DE COLOMBIA

WorldFish


Funding 2014
USAID
UC Davis


Funding 2018
31%
37%
22%
10%
UC Global Food Initiative
UC Davis
Private Sponsors
Host Orgs

Fellow Costs VS Consultant Fees

COST COMPARISON

UC RIFA GRADUATE FELLOW WITH FACULTY MENTORSHIP (Approximate Budget)

TIME IN FIELD	TWO to SIX MONTHS (Average 4 Months)
INTERNATIONAL TRAVEL	$2000 (Maximum Allotted)
INSURANCE	$500
STIPEND @ $1,000/month	$4000 (Estimated for 4 Months)
UNIVERSITY SUPPORT SERVICE FEE	$3000
AVERAGE BUDGET (Per RIFA Fellow)	$9500

CONSULTANT FIRMS*	**(Approximate Budget)**
TIME IN FIELD	TWO to SIX MONTHS (Average 4 Months)
INTERNATIONAL TRAVEL	$2000 (Average Estimate)
INSURANCE	$500
PER DIEM @ 156/day (average rate)	$18,720 (Estimated for 4 Months)
DAILY RATE (4 MONTHS)	$36,000 ($300/day)
ESTIMATED COST (Per Consultant)	$55,420

***USAID APPROVED RATES**[1]**:**

Effects of Soil Health on the Incidence and Severity of Coffee Leaf Rust (*Hemileia vastatrix*)

Katherine Polakiewicz*[1], Jacques Avelino[2]

[1]University of California, Davis; [2]Tropical Agricultural Research and Higher Education Center (CATIE), Costa Rica

*kpolakiewicz@ucdavis.edu

Introduction

Hemileia vastatrix is a parasitic fungus causing coffee leaf rust (CLR), a disease having widespread detrimental effects on coffee producers globally. Since 2012, the disease has had sweeping impacts on production in Central America and México where producers' yields and incomes have been significantly reduced.

Drawing from research in Brazil and Colombia, CLR has evolved relatively quickly, and complex races of the pathogen have been shown to break down the resistance genes proceeding from *C. canephora* used in *C. arabica* breeding. A similar evolution is likely to occur in Central America where an increasing presence of resistant varieties is predicted to have high selection pressure on the pathogen (Avelino, 2016). Taking this into account, resistant varieties cannot be considered as a standalone solution to combat rust; they should be accompanied by management strategies that limit the presence of the disease through complementary mechanisms.

Fertilizer applications seem to be critical, but little research has been conducted on the effects of the relationships between soil fertility management, coffee plant nutrition, and physiological resistance to rust.

Objectives

The research objective is to understand the effects of soil health on coffee leaf rust as a basis for developing Best Management Practices and new training programs for technicians and producers.

Timeline	2016	2017			2018		2019
Characterization study in Honduras, Guatemala, and México	Field work **Phase I** (Preharvest)	Field work **Phase II** (Postharvest)	Analysis, preliminary report on the first year of the survey	Field work **Phase I** (Preharvest)	Field work **Phase II** (Postharvest)	Analysis, second preliminary report	Analysis and final report
Laboratory trial in Costa Rica	Nursery establishment	Trial, analysis, and final report					
Laboratory trial in Honduras		Nursery establishment			Trial, analysis, and final report		

Methods

In June 2016, CRS began working with CATIE and regional partners Promecafe, IHCAFE, and GAIA to conduct research that measures interactions between soil nutrient availability and coffee leaf rust disease presence at plots in Honduras, Guatemala, and México.

To study soil-rust interactions in a field setting, we use a subset of ~300 coffee plots among plots involved in CRS's Agricultura, Suelos, Agua (ASA) programming (~175 in Honduras, ~75 in Guatemala and ~50 in México). In each plot, CRS technicians and partner organizations collect data from both a subplot managed with fertilizer treatments and a control subplot managed by the producer as usual. As a result, the research study will have ~600 coffee plots under observation.

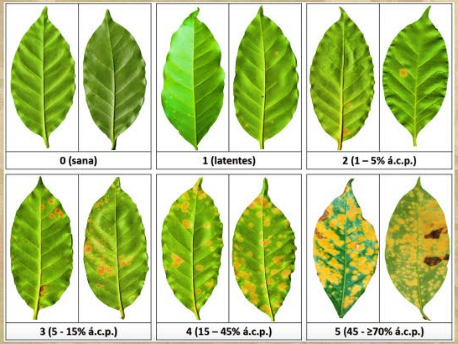
In addition to existing chemical soils baseline data manged by CRS, we trained technicians and smallholder producers in collecting data for the following variables: variety, density, plant age, cropping practices applied during the studied year, branch growth, defoliation, rust incidence, rust severity, fruit load, shade type, and shade cover. Most of these variables need to be considered because of their potential effects on CLR incidence.

Obtained from farmer interview:
- 1) Dominant variety in the subplot
- 2) Plant density within the subplot
- 3) Age of majority of coffee plants within the subplot
- 4) Management practices during the current year

Obtained by technician:
- 5) Branch growth
- 6) Defoliation
- 7) Rust incidence
- 8) Rust severity
- 9) Fruit load
- 10) Shade type
- 11) Shade cover

Desired Outputs

- A better understanding of the effects of soil health on CLR to the scientific and technical community;
- Value to producer livelihoods in being conducted by Catholic Relief Services, whose objective is that the results of the study are significant and useful to smallholders.



Upcoming Work

- Phase II (2017) of field work;
- Data bases on rust incidence and severity coming from field surveys and laboratory trials;
- At least two scientific open-access publications on the relationships between soil health and coffee rust;
- One technical publication on best practices for managing coffee rust in each country involved.

References

Avelino, J., et al. (2006). "The intensity of a coffee rust epidemic is dependent on production situations." Ecological Modelling 197(3-4): 431-447

Avelino, J., Rivas, G. (2013). La roya anaranjada del cafeto. 47. <hal-01071036>.

Dordas, C. (2008). Role of nutrients in controlling plant diseases in sustainable agriculture. A review. Agronomy for Sustainable Development. 28 (1): 33-46.

Ferrandino, F.J. (2008). Effect of crop growth and canopy filtration on the dynamics of plant disease epidemics spread by aerially dispersed spores. Phytopathology. 98 (5): 492-503.

Martinati, J.C., Harakava, R., Guzzo, S.D., y Tsai, S.M. (2008). The potential use of a silicon source as a component of an ecological management of coffee plants. Journal of Phytopathology. 156 (7-8):458-463.

Santos, F.d.S., de Souza, P.E., Pozza, E.A., Miranda, J.C., Carvalho, E.A., Fernandes, L.H.M., y Pozza, A.A.A. (2008). Organic fertilization, nutrition and the progress of brown eye spot and rust in coffee trees. Pesquisa Agropecuaria Brasileira. 43 (7): 783-791.

Gender Transformation and Post-Harvest Loss Reduction in Fisheries on the Upper Zambezi

2016 RIFA Fellow Larken Root in Cooperation with WorldFish CGIAR Center and the Zambia Department of Fisheries

WorldFish
Harnessing research that makes a difference

Location

Location of inset


The floodplain at high water


Camp with mix of permanent and temporary homes

The Project

Fishing camps in the Upper Zambezi Floodplain are a distance from markets, so fish are often processed using traditional methods which can incur high losses in quality and value. Due to culturally established gender roles, fish are caught mainly by men while processing is done by women. For this reason, the greatest impact of post-harvest losses is felt by women.

Three interventions were introduced into select fishing camps

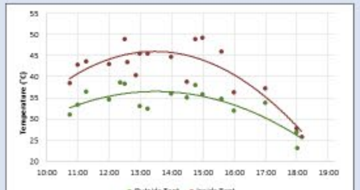
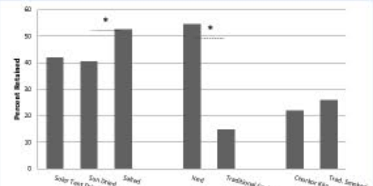
New Processing Technologies




Participatory Research Techniques


Gender Transformation Communication


Findings

Excitement!!





The Economic and Environmental Costs and Benefits of Cassava Cropping Systems in Van Yen, Vietnam.

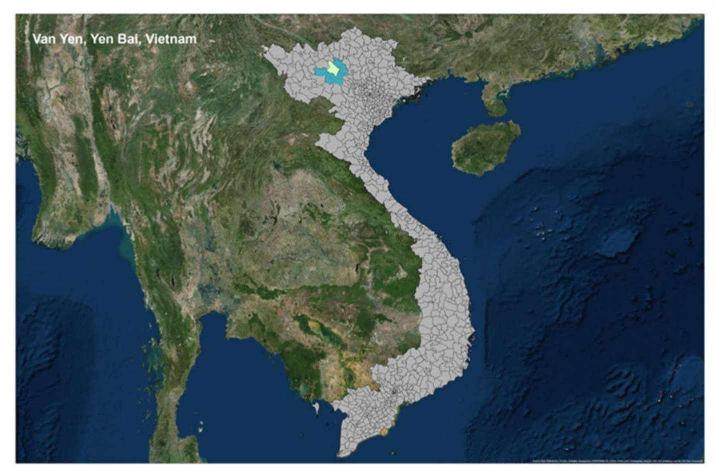
Leah Puro
CIAT
RIFA Fellow 2017

Background: In 1999 – 2002, CIAT conducted participatory research with farmers to improve cassava yields in select villages in Vietnam, China, and Thailand. In northern Vietnam, many farmers adopted growing grass strips on contour lines to minimize soil erosion.

Purpose: To evaluate the success of the grass and cassava intercrop system in Van Yen, Vietnam to limit soil erosion and increase yields.

Study Site: Van Yen, Yen Bai, Vietnam

- Van Yen is an agricultural district in Northern Vietnam
- Climate: Rainy Season April – September
  - Annual Rainfall: 1,500mm – 3,000 mm.
- Three communes: Mau Dong, Dong Cuong, An Binh.



Methodology:

- 45 households surveyed
- Treatments: 15 households with cassava monocrop, 15 households with grass-strip and cassava cultivation for 5 -7 years, 15 households with cassava and grass strip cultivation for 10-12 years.
- Criteria: plot must be on a slope of 20^{o} -45^{o}.

Part I: Socio-economic survey

- Collect data on household demographics, all plot inputs, costs of inputs, labor requirements, livestock, all plot outputs, challenges, and future plans.

Part II: Soil Sampling

- 2 samples analyzed from each plot, one from the top of the slope, one from the bottom of the slope at a depth 0-20 cm.
- Analyzed for texture, pH, total organic carbon, total nitrogen, available phosphorous, exchangeable cations, and bulk density.

Analysis: Use RUSLE (soil loss equation) to estimate soil erosion within the cultivation methods and combine with the soil and socioeconomic data to quantify the costs and benefits of the systems.

Kenya

Michael – MSc International Ag Development, UC Davis

Liberia

Austin – MSc International Ag Development, UC Davis

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Vietnam
Jen – PhD Political Science, UC Santa Cruz

Kenya
Noah – MSc International Ag Development, UC Davis

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Colombia

Emily – MSc International Ag Development, UC Davis

Venezuela

Eleinis – PhD Ecology, UC Riverside

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South Africa

Pedro – PhD Chemical & Environmental Engineering, UC Riverside

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Colombia

Sammi – MSc International Ag Development, UC Davis